



**AGENDA
CITY OF CEDAR FALLS, IOWA
CITY COUNCIL MEETING
MONDAY, OCTOBER 18, 2021
7:00 PM AT CITY HALL**

The City is providing in-person and electronic options for this meeting in accordance with the Governor's Proclamation of Disaster Emergency regarding meetings and hearings. The City encourages in-person attendees to follow the latest CDC guidelines to reduce the risk of COVID-19 transmission.

The meeting will be accessible via video conference and the public may access/participate in the meeting in the following ways:

- a) By dialing the phone number +13126266799 or +19292056099 or +12532158782 or +13017158592 or +13462487799 or +16699006833 and when prompted, enter the meeting ID (access code) 962 7287 1738.
- b) iPhone one-tap: +13126266799,,96272871738# or +19292056099,,96272871738#
- c) Join via smartphone or computer using this link: <https://zoom.us/j/96272871738>.
- d) View the live stream on Channel 15 YouTube using this link: <https://www.youtube.com/channel/UCCzeig5nIS-dIEYisqah1uQ> (view only).
- e) Watch on Cedar Falls Cable Channel 15 (view only).

To request to speak when allowed on the agenda, participants must click "Raise Hand" if connected by smartphone or computer, or press *9 if connected by telephone. All participants will be muted by the presiding officer when not actually speaking.

Call to Order by the Mayor

Roll Call

Approval of Minutes

1. Regular Meeting of October 4, 2021.

Agenda Revisions

Special Presentations

2. Proclamation recognizing October 17-23, 2021 as Character Counts Week.
3. Proclamation recognizing October 17-23, 2021 as Friends of the Library Week.

Public Forum. (Speakers will have one opportunity to speak for up to 5 minutes on topics germane to City business.)

Special Order of Business

4. Public Hearing on the proposed plans, specifications, form of contract & estimate of cost for the City Hall Remodel Project.
 - a) Receive and file proof of publication of notice of hearing. (Notice published October 8, 2021)
 - b) Written communications on file with the City Clerk.
 - c) Staff comments.

d) Public comments.

e) Resolution approving and adopting the plans, specifications, form of contract & estimate of cost for the City Hall Remodel Project.

5. Public hearing on the proposed adoption by reference the 2021 International Building Code, 2021 International Residential Code, 2021 International Mechanical Code, 2021 Uniform Plumbing Code, 2021 National Fuel Gas Code and 2020 National Electrical Code, and associated revisions to Chapter 7, Buildings and Building Regulations of the Code of Ordinances.

a) Receive and file proof of publication of notice of hearing. (Notice published October 8, 2021)

b) Written communications on file with the City Clerk.

c) Staff comments.

d) Public comments.

e) Pass an ordinance adopting by reference the 2021 International Building Code, 2021 International Residential Code, 2021 International Mechanical Code, 2021 Uniform Plumbing Code, 2021 National Fuel Gas Code and 2020 National Electrical Code, and associated revisions to Chapter 7, Buildings and Building Regulations of the Code of Ordinances, upon its first consideration.

6. Public hearing on the proposed adoption by reference the 2021 International Fire Code, and associated revisions to Chapter 9, Fire Prevention and Protection of the Code of Ordinances.

a) Receive and file proof of publication of notice of hearing. (Notice published October 8, 2021)

b) Written communications on file with the City Clerk.

c) Staff comments.

d) Public comments.

e) Pass an ordinance adopting by reference the 2021 International Fire Code, and associated revisions to Chapter 9, Fire Prevention and Protection of the Code of Ordinances, upon its first consideration.

7. Public hearing on the proposed rezoning from R-1, Residence District and C-2, Commercial District to C-2, Commercial District of property located at 5424 University Avenue.

a) Receive and file proof of publication of notice of hearing. (Notice published October 8, 2021)

b) Written communications on file with the City Clerk.

c) Staff comments.

d) Public comments.

e) Pass an ordinance amending Section 26-118 of the Code of Ordinances by removing certain property located at 5424 University Avenue from the R-1, Residence District and C-2, Commercial District, and placing the same in the C-2, Commercial District, upon its first consideration.

Old Business

8. Pass Ordinance 2994, amending Chapter 26, Zoning, and other associated sections of the Code of Ordinances, relative to establishing the CD-DT, Downtown Character District, upon its second consideration.

- [9.](#) Pass Ordinance 2995, amending Section 26-118 of the Code of Ordinances, by removing all property within the defined boundaries of the Downtown Character District from current zoning districts and placing the same in the CD-DT, Downtown Character District Zoning District, upon its second consideration. (contingent upon approval of previous ordinance)
- [10.](#) Pass Ordinance #2996, amending Section 26-118 of the Code of Ordinances by removing certain property located in the vicinity of Cedar Heights Drive and Valley High Drive from the C-1, Commercial District, and placing the same in the R-P, Planned Residence District, upon its second consideration.

New Business

Consent Calendar: (The following items will be acted upon by voice vote on a single motion without separate discussion, unless someone from the Council or public requests that a specific item be considered separately.)

- [11.](#) Receive and file the Mayor's communication relative to creation of the Cedar Falls Sister Cities Committee as a sub-committee of the Cedar Falls Art & Culture Board.
- [12.](#) Receive and file the following resignations of members from Boards and Commissions:
 - a) Mario Basurto, Human Rights Commission.
 - b) Cynthia Snell, Library Board of Trustees.
- [13.](#) Receive and file the Committee of the Whole minutes of October 4, 2021 relative to the following items:
 - a) Downtown Zoning Code - Private Parking Requirements
- [14.](#) Receive and file a communication from the Civil Service Commission relative to a certified list for the position of Code Enforcement Officer.
- [15.](#) Receive, file and refer to the Planning & Zoning Commission a communication from Community Main Street, Inc. relative to reestablishment of the Downtown Cedar Falls Self-Supported Municipal Improvement District.
- [16.](#) Approve the application of J & M Displays (Holiday Hoopla) for a fireworks display permit for November 26, 2021.
- [17.](#) Approve the following applications for beer permits and liquor licenses:
 - a) Hampton Inn & Suites, 101 West 1st Street, Class C beer & Class B wine - renewal.
 - b) Peppers Grill & Sports Pub, 620 East 18th Street, Class C liquor - renewal.
 - c) SingleSpeed Brewing Co., 128 Main Street, Class C liquor & outdoor service - renewal.
 - d) Fareway Store, 4500 South Main Street, Class E liquor - renewal
 - e) G Corner, 2125 College Street, Class E liquor – new.

Resolution Calendar: (The following items will be acted upon by roll call vote on a single motion without separate discussion, unless someone from the Council or public requests that a specific item be considered separately.)

- [18.](#) Resolution supporting participation in the Home Base Iowa Initiative.
- [19.](#) Resolution approving and adopting the rate of \$3.89 per \$1,000 taxable value for the Downtown Cedar Falls Self-Supported Municipal Improvement District (SSMID) for FY23.
- [20.](#) Resolution approving and authorizing execution of a Professional Service Agreement with WHKS & Co. for testing and inspection services relative to the Park Drive Lift Station Inflow & Infiltration (I&I) Reduction Program.
- [21.](#) Resolution approving and authorizing execution of a Quit Claim Deed, conveying title for right-of-way purposes, in conjunction with the Highway 58 & Ridgeway Avenue Project.
- [22.](#) Resolution approving and authorizing execution of a Service/Product Agreement with Propel Nonprofits relative to strategic planning for the Art & Culture Board.

- [23.](#) Resolution approving and authorizing execution of Supplemental Agreement No. 3 to the Professional Service Agreement with Riverwise Engineering, LLC for construction services relative to the Cedar River Recreational Improvement Project.
- [24.](#) Resolution setting November 1, 2021 as the date of public hearing on the proposed condemnation of property located at 710 West 13th Street.
- [25.](#) Resolution setting November 1, 2021 as the date of public hearing on the proposed condemnation of property located at 1303 Walnut Street.

Allow Bills and Claims

- [26.](#) Allow Bills and Claims of October 18, 2021.

City Council Referrals

City Council Updates

Staff Updates

Executive Session

- 27. Executive Session to discuss Property Acquisition per Iowa Code Section 21.5(1)(j) to discuss the purchase or sale of particular real estate only where premature disclosure could be reasonably expected to increase the price the governmental body would have to pay for that property or reduce the price the governmental body would receive for that property.

Adjournment

**CITY HALL
CEDAR FALLS, IOWA, OCTOBER 4, 2021
REGULAR MEETING, CITY COUNCIL
MAYOR ROBERT M. GREEN PRESIDING**

- The City Council of the City of Cedar Falls, Iowa, met in Regular Session, pursuant to law, the rules of said Council and prior notice given each member thereof, at 7:20 P.M. on the above date. Members present: Miller, deBuhr, Kruse, Harding, Darrah, Sires, Dunn. Absent: None.
- 53486 - It was moved by Kruse and seconded by Darrah that the minutes of the Regular Meeting of September 20, 2021 be approved as presented and ordered of record. Motion carried unanimously.
- 53487 - Mayor Green read a Proclamation recognizing October 11, 2021 as Indigenous Peoples Day and presented a video with Cultural Programs Supervisor Skeens.
- Mayor Green read a Proclamation recognizing October 2021 as Breast Cancer Awareness Month. Police Chief Berte provided a brief summary of the Pink Patch Project fundraiser benefitting the Beyond Pink Team.
- 53488 - Roger White, 2303 Greenwood Avenue, provided positive feedback on the current Public Safety model. Mr. White also provided information on a Cedar Valley Cyclist fundraiser for the Beyond Pink Team which will be held on October 6, 2021.
- Eashaan Vajpeyi, 3831 Convair Lane, expressed concerns with proposed downtown parking and with setting October 18, 2021, as the date of the second consideration of the downtown zoning code.
- Dustin Ganfield, 726 Maucker Road, expressed concerns with moving up the second consideration of the downtown zoning code to the October 18, 2021 meeting.
- Jim Benda, 1816 Valley High Drive, expressed concerns with downtown parking.
- 53489 - Mayor announced that in accordance with the public notice of September 24, 2021, this was the time and place for a public hearing on a proposed amendment to the Future Land Use Map by changing the designation from Office & Business Park to Medium Density Residential, and on the proposed rezoning from C-1, Commercial District to R-P, Planned Residence District of property located in the vicinity of Cedar Heights Drive and Valley High Drive. It was then moved by Darrah and seconded by Miller that the proof of publication of notice of hearing be received and placed on file. Motion carried unanimously.
- 53490 - The Mayor then asked if there were any written communications filed to the proposed amendment and rezoning. Upon being advised that there were no written communications on file, the Mayor then called for oral comments. Planner I Sevy provided a brief summary of the proposed amendment and rezoning.

There being no one else present wishing to speak about the amendment and rezoning, the Mayor declared the hearing closed and passed to the next order of business.

- 53491 - It was moved by Darrah and seconded by Harding that Resolution #22,530, approving an amendment to the Future Land Use Map by changing the designation from Office & Business Park to Medium Density Residential of property located west of Cedar Heights Drive and north of Greenhill Road, be adopted. Following questions and comments by Councilmembers Kruse and deBuhr, and responses by Planner I Sevy, the Mayor put the question on the motion and upon call of the roll, the following named Councilmembers voted. Aye: Miller, deBuhr, Kruse, Harding, Darrah, Sires, Dunn. Nay: None. Motion carried. The Mayor then declared Resolution #22,530 duly passed and adopted.
- 53492 - It was moved by Miller and seconded by Harding that Ordinance #2996, amending Section 26-118 of the Code of Ordinances by removing certain property located in the vicinity of Cedar Heights Drive and Valley High Drive from the C-1, Commercial District, and placing the same in the R-P, Planned Residence District, be passed upon its first consideration. Following due consideration by the Council, the Mayor put the question on the motion and upon call of the roll, the following named Councilmembers voted. Aye: Miller, deBuhr, Kruse, Harding, Darrah, Sires, Dunn. Nay: None. Motion carried.
- 53493 - It was moved by Harding and seconded by Darrah that Resolution #22,531, approving and authorizing execution of an R-P, Planned Residential Zoning District Developmental Procedures Agreement with LG Companies, LLC and Heartland Development of Cedar Valley, Inc., and approving an R-P District site plan relative to a residential condominium development., be adopted. Following due consideration by the Council, the Mayor put the question on the motion and upon call of the roll, the following named Councilmembers voted. Aye: Miller, deBuhr, Kruse, Harding, Darrah, Sires, Dunn. Nay: None. Motion carried. The Mayor then declared Resolution #22,531 duly passed and adopted.
- 53494 - It was moved by Harding and seconded by Miller that Ordinance #2989, amending Section 26-118 of the Code of Ordinances by removing certain property located west of Cedar Heights Drive and north of Huntington Road from the A-1, Agricultural District and R-1, Residential Zoning District, and placing the same in the MU, Mixed Use Residential Zoning District, be passed upon its third and final consideration. Planning & Community Services Manager Howard provided a brief explanation regarding the delay of the final consideration. Following questions by Councilmember Harding and responses by Planning & Community Services Manager Howard, the Mayor put the question on the motion and upon call of the roll, the following named Councilmembers voted. Aye: Miller, deBuhr, Kruse, Harding, Darrah, Sires, Dunn. Nay: None. Motion carried. The Mayor then declared Ordinance #2989 duly passed and adopted.
- 53495 - It was moved by deBuhr and seconded by Miller that Resolution #22,532, approving and authorizing execution of a Second Amended and Restated Mixed Use Zoning District Developmental Procedures Agreement with Oster Partners,

L.P. and Greenhill Estates, Inc., and approving the updated Pinnacle Prairie Master Plan, be adopted. Following due consideration by the Council, the Mayor put the question on the motion and upon call of the roll, the following named Councilmembers voted. Aye: Miller, deBuhr, Kruse, Harding, Darrah, Sires, Dunn. Nay: None. Motion carried. The Mayor then declared Resolution #22,532 duly passed and adopted.

53496 - It was moved by Harding and seconded by deBuhr that the following items on the Consent Calendar be received, filed and approved:

Approve the following recommendation of the Mayor relative to the appointment of members to Boards and Commissions:

a) Cathy Showalter, Civil Service Commission, term ending 04/07/2025.

Receive and file the Committee of the Whole minutes of September 20, 2021 relative to the following items:

- a) Cedar Falls Economic Development Corp.
- b) Political Campaigning on City Property.
- c) Wastewater Facility Project and ARPA Funds.

Receive and file the Departmental Monthly Reports of August, 2021.

Approve the following Order Accepting Acknowledgment/Settlement Agreement:
a) Casey's General Store, 601 Main Street, First tobacco violation.

Approve the following applications for beer permits and liquor licenses:

- a) Metro Mart, 103 Franklin Street, Class C beer - renewal.
- b) Murphy USA, 518 Brandilynn Boulevard, Class C beer - renewal.
- c) The Landmark, 107 Main Street, Class C liquor & outdoor service - renewal.
- d) Casey's General Store, 601 Main Street, Class E liquor - renewal.
- e) Fareway Store, 214 North Magnolia Drive, Class E liquor - renewal.

Motion carried unanimously.

53497 - It was moved by Kruse and seconded by Harding that the following resolutions be introduced and adopted:

Resolution #22,533, levying a final assessment for costs incurred by the City to remove a hazardous tree on the property located at 1305 W 19th Street.

Resolution #22,534, levying a final assessment for costs incurred by the City to mow the property located at 2012 Vine Street.

Resolution #22,535, levying a final assessment for costs incurred by the City to remove a hazardous tree on the property located at 2404 Royal Drive.

Resolution #22,536, approving and authorizing execution of an Agreement with Berry, Dunn, McNeil & Parker, LLC for professional services relative to the selection process for replacement of the City's financial software.

Resolution #22,537, approving and authorizing execution of a contract for

renewal of the CLEAR for Law Enforcement Plus subscription with West Publishing Corporation relative to investigations and background checks conducted by the Public Safety Services Department.

Resolution #22,538, receiving and filing the bids, and approving and accepting the low bid of Boulder Contracting, LLC, in the amount of \$161,197.60, for the 2021 Street Patching Project.

Resolution #22,539, approving and authorizing execution of an Acknowledgement and Reimbursement Agreement with the Iowa Economic Development Authority (IEDA) for the Certified Site Program relative to expansion of the Cedar Falls Industrial Park.

Resolution #22,540, approving and authorizing a Change Order to the Rehabilitation Contract with Tojo Construction Inc. relative to a HOME Housing Rehabilitation Project at 2512 Cedar Heights Drive.

Resolution #22,541, approving and adopting the Housing Rehabilitation Program for Rental Rehabilitation Projects, in conjunction with the FY19-23 Community Development Block Grant (CDBG) and HOME Consortium 5-Year Plan.

Resolution #22,542, approving the Boe Minor Subdivision Plat.

Resolution #22,543, setting October 18, 2021 as the date of public hearing on the proposed rezoning from R-1, Residence District and C-2, Commercial District to C-2, Commercial District of property located at 5424 University Avenue.

Resolution #22,544, setting October 18, 2021 as the date of public hearing on the proposed adoption by reference the 2021 International Building Code, 2021 International Residential Code, 2021 International Mechanical Code, 2021 Uniform Plumbing Code, 2021 National Fuel Gas Code and 2020 National Electrical Code, and associated revisions to Chapter 7, Buildings and Building Regulations of the Code of Ordinances.

Resolution #22,545, setting October 18, 2021 as the date of public hearing on the proposed adoption by reference the 2021 International Fire Code, and associated revisions to Chapter 9, Fire Prevention and Protection of the Code of Ordinances.

Following due consideration by the Council, the Mayor put the question on the motion and upon call of the roll, the following named Councilmembers voted. Aye: Miller, deBuhr, Kruse, Harding, Darrah, Sires, Dunn. Nay: None. Motion carried. The Mayor then declared Resolutions #22,533 through #22,545 duly passed and adopted.

53498 - It was moved by Miller and seconded by deBuhr that Resolution #22,546, approving and authorizing execution of an Agreement to Enhance Economic Development in Cedar Falls with the Cedar Falls Economic Development Corporation be adopted. Following questions by Councilmembers Sires, Miller and Kruse, and responses by Economic Development Coordinator Graham, Mayor Green and Cedar Falls Economic Development Corporation

Representative Jim Brown, the Mayor put the question on the motion and upon call of the roll, the following named Councilmembers voted. Aye: Miller, deBuhr, Kruse, Harding, Darrah, Dunn. Nay: Sires. Motion carried. The Mayor then declared Resolution #22,546 duly passed and adopted.

- 53499 - It was moved by Darrah and seconded by Miller that Resolution #22,547, approving and authorizing submission of a grant agreement to the Iowa Homeland Security and Emergency Management Division (HSEMD) for the Voluntary Property Acquisition Program funded through the Hazard Mitigation Grant Program, and authorizing the local match relative to the Northern Cedar Falls Buyout Program, be adopted. Following a question by T.J. Frein, 1319 Austin Way, and response by Planning & Community Services Manager Howard, the Mayor put the question on the motion and upon call of the roll, the following named Councilmembers voted. Aye: deBuhr, Kruse, Harding, Darrah, Sires, Dunn. Nay: None. Abstain: Miller. Motion carried. The Mayor then declared Resolution #22,547 duly passed and adopted.
- 53500 - It was moved by Miller and seconded by Harding that Resolution #22,548, receiving and filing, and setting October 18, 2021 as the date of public hearing on the proposed plans, specifications, form of contract & estimate of cost for the City Hall Remodel Project, be adopted. Following comments and questions by Councilmembers Sires, Kruse, deBuhr and Harding, and responses by City Administrator Gaines, Mayor Green and City Attorney Rogers, the Mayor put the question on the motion and upon call of the roll, the following named Councilmembers voted. Aye: Miller, deBuhr, Kruse, Harding, Darrah, Dunn. Nay: Sires. Motion carried. The Mayor then declared Resolution #22,548 duly passed and adopted.
- 53501 - It was moved by Kruse and seconded by Harding that the bills and claims of October 4, 2021 be allowed as presented, and that the Controller/City Treasurer be authorized to issue City checks in the proper amounts and on the proper funds in payment of the same. Upon call of the roll, the following named Councilmembers voted. Aye: Miller, deBuhr, Kruse, Harding, Darrah, Sires, Dunn. Nay: None. Motion carried.
- 53502 - City Attorney Rogers responded to a question by Councilmember Miller regarding the use of Public Forum for political purposes.
- 53503 - Mayor Green announced October 30, 2021, as the tentative date for a watch party to view the launch of the SpaceX mission.
- 53504 - It was moved by Kruse and seconded by Miller that the meeting be adjourned at 8:22 P.M. Motion carried unanimously.

Kim Kerr, Administrative Supervisor



MAYOR ROBERT M. GREEN
CITY OF CEDAR FALLS, IOWA
220 CLAY STREET
CEDAR FALLS, IOWA 50613
319-273-8600



CHARACTER COUNTS WEEK

WEEK OF OCTOBER 17-23, 2021

WHEREAS, since 1993, the third week in October has been proclaimed as Character Counts Week by Presidents, the U.S. Senate, state governors and officials around the world; and

WHEREAS, Citizens of good character are a most valuable asset to our community, providing a safe and caring environment where all citizens value and model the principle that CHARACTER COUNTS; and

WHEREAS, the Six Pillars of Character are Trustworthiness, Respect, Responsibility, Fairness, Caring, and Citizenship; and

WHEREAS, the City of Cedar Falls supports the Cedar Valley Character Counts Committee and our metropolitan youth development programs in their effort to promote and encourage community-wide character education programs for our youth; and

WHEREAS, all Cedar Falls residents should strive to teach, enforce, advocate and model the six essential pillars of character to our young citizens; and

WHEREAS, this work will foster greater understanding and cooperation among individuals and organizations in our community to set good examples and address the civic issues that will shape the future of Cedar Falls and the Cedar Valley;

NOW, THEREFORE I, Mayor Robert M. Green, do hereby proclaim the week of October 17-23, 2021 as **Character Counts Week** in the City of Cedar Falls, and I encourage all residents to become aware of the importance of community-wide character education, and to actively support the positive character development of young citizens throughout our community.



Signed this 13th day of October 2021.

Mayor Robert M. Green



MAYOR ROBERT M. GREEN
CITY OF CEDAR FALLS, IOWA
220 CLAY STREET
CEDAR FALLS, IOWA 50613
319-273-8600



FRIENDS OF THE LIBRARY WEEK

WEEK OF OCTOBER 17-23, 2021

WHEREAS, the Friends of the Cedar Falls Library exist to “cultivate a love of learning and celebrate the joy of reading by supporting library services for the community”; and

WHEREAS, Friends of the Cedar Falls Public Library raise money which enables our library to move from good to great -- providing the resources for additional programming, much needed equipment, support for children’s summer reading, and special events throughout the year; and

WHEREAS, the work of the Friends highlights on an on-going basis the fact that our library is the cornerstone of the community providing opportunities for all to engage in the joy of life-long learning and connect with the thoughts and ideas of others from ages past to the present; and

WHEREAS, the Friends understand the critical importance of well-funded libraries and advocate to ensure that our library gets the resources it needs to provide a wide variety of services to all ages including access to print and electronic materials, along with expert assistance in research, readers’ advisory, and children’s services; and

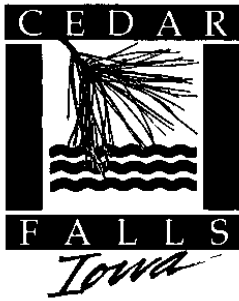
WHEREAS, the Friends’ gift of their time and commitment to the library sets an example for all in how volunteerism leads to positive civic engagement and community betterment;

NOW, THEREFORE I, Robert M. Green, Mayor of the City of Cedar Falls, do hereby proclaim the week of October 17-23, 2021 as **Friends of the Library Week** in the City of Cedar Falls, and I and urge all residents to consider joining the Friends of the Library, donate to and purchase from the Book Nook inside the Library, and to appreciate all that the Friends of the Library do to make our library and community so much better.



Signed this 13th day of October 2021.

Mayor Robert M. Green



DEPARTMENT OF COMMUNITY DEVELOPMENT

City of Cedar Falls
 220 Clay Street
 Cedar Falls, Iowa 50613
 Phone: 319-268-5161
 Fax: 319-268-5197
 www.cedarfalls.com

MEMORANDUM

Inspection Services Division

TO: Honorable Mayor Robert Green & City Council

FROM: Jamie Castle, AIA
 Building Official

DATE: October 11, 2021

SUBJECT: Public Hearing for City Hall Remodel Project

On October 18, 2021 a Public Hearing will be held for the potential City Hall Remodel Project.

The City's Capital Improvements Program started recognizing a goal to improve City Hall in the FY17-22 CIP. The project went through multiple iterations before we landed on what we believe is the best project and the best use of our resources. The project includes reorganizing the offices to utilize the vacant portion of the lower level, creating a single window to allow for a single stop for citizens to complete their business, enhancing and improving the accessibility of City Hall, creating a lobby outside council chambers for public meetings and council meeting overflow, exchanging light fixtures for efficient LED fixtures, replacing the outdated mechanical system, and replacing well-used carpet and furniture. Even though the scope is large, the designer and city staff have worked diligently to find ways to reuse and reduce to ensure a cost effective project.

Prior to voting to set the public hearing multiple questions and concerns were raised regarding this project. Below you will find our responses to these:

1. Replacement of the mechanical system – As part of this project, a life cycle study of the HVAC was completed by Michaels Energy with the assistance of Cedar Falls Utilities. This study showed that our current system has exceeded its expected useful life. This means we have two options. The first is reactionary response to repair and replace as needed. The other option is to proactively replace with a completely new system, during the remodel. We weighed both options and determined that a new system is the best long term solution. There were multiple reasons to make this choice. One is long term costs of the system. The Variable Refrigerant Flow System that we are proposing is current

technology with a lower lifetime cost. The other is that with the remodel project we were going to have to rework and re-duct a large portion of the building. If we are already making changes to the system, it seems to be the best time to change to a new system rather than piece the current one back together.

2. Energy efficiency – A big part of this project is to look for ways to upgrade our building to be more energy efficient. The first step is the mechanical system mentioned above. In addition to finding more efficiency in the heating and cooling, we will be changing out the lighting fixtures and controls to meet current code standards. By changing to LED fixtures and changing standard switching to occupancy sensors our electrical systems will be much more efficient. Many of the exterior windows have already been upgraded from single pane to double pane, but this project includes upgrading a couple of remaining windows to be double pane.
3. Costs – Our design team created a cost estimate which was updated frequently based on the changes to the project and the changes to industry cost estimates. At this time we believe the construction estimate is \$3,900,000.00. This is one portion of the \$4.5 million budget. The other costs are consultant fees, furnishings, and equipment. The question was raised as on whether we should wait a year to proceed, in hopes of lower costs. The industry has seen significant rises in costs and limited material availability in the last 18 months due to many factors. However, in researching the current costs and expectations for future costs, forecasters believe we are at the lowest costs we will see. Costs will never fall back to where they were in early 2020. Also industry standard is to assume at least an 8-10% increase in cost for every year a project is delayed.
4. Cost savings options – The initial project had a significantly larger scope, which we have narrowed to the most important items. Some of the changes that we made to lower the overall project cost are:
 - a. Furniture. Our current desks are 20+ years old, but they are in very good shape. We are reusing a majority of the desks. Rather than replacing the desks we are reusing and repairing as needed. We are also reusing several of the conference tables, all of the cabinetry, break room furniture, and file cabinets.
 - b. Council Chambers. The original design replaced the dais and created large openings with coiling doors, to create a connected overflow area. Through multiple design iterations and cost estimates, we determined the costs were too high for the minimal results. Rather than a whole new dais, we will be extending it for an additional seat, adding an accessible ramp, and refinishing the face and desktop. The idea to open the council to the overflow space was reworked because it is only needed a few times a year and we could not justify a cost of \$30,000 for the coiling doors. However, we still wanted to provide a connected overflow area. We created a large lobby to the Council Chambers that will also serve as a

multipurpose space. An additional set of double doors was added to the north end of the lobby/Chambers area. to the goal is to eliminate the bottle neck that sometimes occurs at the sole public entrance.

- c. Less square footage touched. Initially we looked to remodel every portion of the building. Rather than remodeling the entire building we chose not to upgrade several areas. These include the locker rooms, garages, and several storage areas. We also looked to reuse as many walls as possible. All of the perimeter offices will remain as they are, except for new finishes, LED lighting, occupancy sensors, and HVAC. Many of the other spaces were designed and sized to utilize the existing walls wherever possible.

We hope this answers the concerns that were previously raised. This project has been in the works for over 3 years and we are looking forward to moving forward to improve city hall for our citizens and staff.

CEDAR FALLS CITY HALL REMODEL

CITY OF CEDAR FALLS
220 CLAY ST
CEDAR FALLS, IA 50613

BID DOCUMENTS – VOLUME 1 OF 1



100 E 2nd St – Ste 103 | Cedar Falls, IA 50613

www.emergentarch.com | 319.529.3945

CEDAR FALLS CITY HALL REMODEL

PROJECT OWNER:

City of Cedar Falls
220 Clay Street
Cedar Falls, Iowa 50613

SCOPE OF WORK:

The project consists of a full building renovation to the City Hall. Base bid includes a multiple scope project with an alternate for a single scope option. The architectural scope includes removal of interior walls, ceilings and flooring and replacement of interior finishes. Wall, roof, and floor penetrations to be cut through concrete, coreslabs, and waffle slab structures. New frame walls, structural steel, casework, flooring, painting, ceiling work, doors and frames, and finish carpentry is included throughout the project. There is partial aluminum window and door replacement. There is minor exterior work including concrete patching, window replacement, exterior ladder and new mechanical roof top installation with roof patching.

Mechanical Scope: The entire mechanical system (geothermal) will get replaced with a new VRF system throughout the building. Rooftop condensing units and ERVs are installed and ducted throughout. Existing ductwork is reused in some locations. The building is separated into a northern half and a southern half with the rooftops serving the two zones. These zones are also split per the phasing plan. New restrooms are added, and existing restrooms are renovated. Minor lower level concrete work is required for sanitary connections.

Electrical Scope: Power distribution will be revised to accommodate HVAC renovation and code compliancy. Lighting will be renovated to new LED technology with occupancy sensor controls to align with current energy codes. Fire Alarm detection and notification will be upgraded throughout the facility; and technology systems currently in place (access control, security camera, Audio/Video) will be expanded.

ESTIMATE VALUE:

The project cost is anticipated to be approximately \$3,900,000.

COMPLETION DATE:

The work shall be completed in multiple phases as indicated on the Drawings with all work substantially complete on or before September 30, 2022. Please note Alternate 2 for single phase option.

PREBID MEETING:

A Pre-bid meeting will be held on Tuesday, October 19, 2021 at 9:00 am in the Council Chambers of Cedar Falls City Hall.

BID DATE:

Signed and sealed bids must be received by the city clerk at Cedar Falls City Hall located at 220 Clay Street, Cedar Falls, IA 50613 **by 2:00 pm on Thursday, November 4, 2021**. Bids will be opened publicly at 2:30 pm in the Council Chambers.

PLANS AND SPECIFICATIONS:

- Digital Plans and Specifications: Hosted by the City of Cedar Falls - Available through Quest CDN.
 - o Accessible by visiting www.cedarfalls.com and clicking on "Bid Opportunities" in the Popular Links.
- Rapids Reproductions is handling the printed plan distribution. Order by calling 1.800.383.1223.
 - o DEPOSIT: **\$100.00** per set + **30.00** per set non-refundable mailing fee, if shipped.
- Viewing Locations: Listed in the Supplementary Instructions to Bidders, Section 3.1.5.

CONTACT INFO:

Project Manager: Ted Friesner - 319.883.6309 - ted@emergentarch.com

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DOCUMENT 000107 - SEALS PAGE

1.1 DESIGN PROFESSIONALS OF RECORD

- A. Architect: Emergent Architecture
 - 1. John Jess Lizer
 - 2. 06948

- B. Mechanical Engineer: Bluestone Engineering
 - 1. Dennis Forinash
 - 2. P16723
 - 3. Mechanical, Plumbing and Fire Protection

- C. Electrical Engineer: Bluestone Engineering
 - 1. Thomas Foldes
 - 2. P12873
 - 3. Electrical and Technology

END OF DOCUMENT 000107

DOCUMENT 001113 – NOTICE TO BIDDERS

1.1 PROJECT INFORMATION

- A. Notice to Bidders: Qualified bidders may submit construction bids for project as described in this Document. Submit bids according to the Instructions to Bidders (002113) and Supplementary Instructions to Bidders (002213).
- B. Project Identification:
1. PROJECT NAME: **CEDAR FALLS CITY HALL REMODEL**
 2. PROJECT LOCATION: 220 Clay St., Cedar Falls, Iowa 50613
 3. PROJECT OWNER: City of Cedar Falls
 4. OWNER'S REPRESENTATIVE:
Jamie Castle, Building Official, 319.268.5189
 5. ARCHITECT: Emergent Architecture - 100 E 2nd St, Ste 204, Cedar Falls, Iowa, 50613
 6. ARCHITECT'S REPRESENTATIVE:
Ted Friesner, Project Manager, ted@emergentarch.com, 319.529.3945
 7. ENGINEER: Bluestone Engineering - 5518 NW 88th St, Johnston, Iowa 50131
 8. ENGINEER'S REPRESENTATIVE:
Dennis Forinash, Mechanical Engineer, forinashd@bluestonemep.com, 515.727.0700
 9. ENGINEER'S REPRESENTATIVE:
Tom Foldes, Electrical Engineer, foldest@bluestonemep.com, 515.259.5954
- C. Project Description:
1. The project consists of a full building renovation to the City Hall. Base bid includes a multiple phase project with an alternate for a single phase option. The architectural scope includes removal of interior walls, ceilings and flooring and replacement of interior finishes, walls, roof and floor penetrations to be cut through concrete, coreslabs, and waffle slab structures. New frame walls, structural steel, casework, flooring, painting, ceiling work, doors and frames, and finish carpentry is included throughout the project. There is partial aluminum window and door replacement. There is minor exterior work including concrete patching, window replacement, exterior ladder and new mechanical roof top installation with roof patching.
 2. Mechanical Scope: The entire mechanical system (geothermal) will get replaced with a new VRF system throughout the building. Rooftop condensing units and ERVs are installed and ducted throughout. Existing ductwork is reused in some locations. The building is separated into a northern half and a southern half with the rooftops serving the two zones. These zones are also split per the phasing plan. New restrooms are added, and existing restrooms are renovated. Minor lower level concrete work is required for sanitary connections.
 3. Electrical Scope: Power distribution will be revised to accommodate HVAC renovation and code compliancy. Lighting will be renovated to new LED technology with occupancy sensor controls to align with current energy codes. Fire alarm detection and notification will be upgraded throughout the facility; and technology systems currently in place (access control, security camera, audio/video) will be expanded.
- D. Project Cost: Project is anticipated to cost approximately Three Million, Nine Hundred Thousand Dollars.
- E. Construction Contract: A single, lump sum bid will be received for all work of the Prime General Contractor and shall include the work of all subcontractors.
- F. Time of Completion: Successful bidder shall begin the work upon receipt of Notice to Proceed and shall complete work in multiple phases as described on the Phasing Plan, with all work substantially complete by August 31, 2022. Please note Alternate 2 for single phase option.

1.2 BID SUBMITTAL AND OPENING

- A. Signed and sealed bids prepared in compliance with the Instructions to Bidders will be received at the office of the city clerk at Cedar Falls City Hall (200 Clay St, Cedar Falls, Iowa 50613) before **2:00 pm local standard time on Thursday, November 4, 2021.** Bids submitted after the listed time will be returned to the bidder unopened.
- B. Following bid receipt, bids will be opened publicly at 2:30 pm in the Cedar Falls Council Chambers. Successful bidders will be notified of award on November 16, 2021.

1.3 BID SECURITY

- A. Bids shall be accompanied, in a separate envelope, by a bid security deposit in an amount not less than five percent (5%) of the bid amount. Bid security shall be in the form of a bid bond, a certified check, or a cashier's check made payable to the City of Cedar Falls. If a bid bond is used for security, it must be signed by both the bidder and the surety (or surety's agent supported by accompanying Power of Attorney).
- B. Bid security shall be retained by the Owner as liquidated damages in the case the successful bidder shall fail or refuse to enter into a contract for the construction of the work, furnish the required bonds, and/or meet the requirements of this notice and the specifications regulating the Award. No bid may be withdrawn for a period of thirty (30) calendar days following the opening of bids.
 - 1. After a bid has been accepted, all securities will be returned to the non-winning bidders. The security deposit will be returned to the winning bidder after delivery to the Owner of the required Performance and Payment Bonds.

1.4 BID AWARD

- A. The contract shall be awarded to the lowest responsible bidder whose bid is in conformance to the Bidding Documents prepared by Emergent Architecture. bids may be held by the Owner for a period not to exceed thirty (30) days from the date of the opening to review the bids and investigate the qualifications of bidders, prior to awarding the contract. Once approved, a Notice to proceed will be issued to notify the bidder of the contract award.
- B. By statutory authority, a preference shall be given to products and provisions grown and coal produced within the State of Iowa. And preference shall be given to local domestic labor in the construction of the improvement.
- C. The Owner reserves the right to reject any and all bids, re-advertise for new bids, and to waive informalities or irregularities in the bids submitted.

1.5 PERFORMANCE & PAYMENT BONDS

- A. The successful bidder will be required to furnish a Performance Bond and a Payment Bond within ten (10) days after award in an amount equal to one hundred percent (100%) of the contract price.

1.6 INSURANCE REQUIREMENTS

- A. See 002213.01 - INSURANCE REQUIREMENTS for the specific insurance requirements of the City of Cedar Falls as they relate to this project.

1.7 BIDDER'S QUALIFICATIONS

- A. Bidders must be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the work.

1.8 SALES TAX EXEMPTION

- A. This project is exempt from state sales tax. Bidders shall not includes sales taxes in their bids. Upon receipt of successful bidder's listing of approved subcontractors and suppliers, Owner will issue Iowa Construction Sales Tax Exemption Certificates to each subcontractor applicable to purchases of building materials and/or supplies required in the performance of this project.

1.9 PREBID MEETING

- A. A Prebid meeting will be held at 9:00 am on Tuesday, October 19, 2021 in the Council Chambers of City Hall, located at 220 Clay St, Cedar Falls, Iowa. Prospective prime bidders are requested to attend. Architect will provide responses at Prebid meeting to bidders' questions received up to two (2) business days prior to meeting.

1.10 PUBLIC HEARING

- A. A Public Hearing will be conducted on the proposed plans, specifications, form of contract, and estimate of cost for the construction of the above-described project at 7:00 pm on Monday, October 18, 2021 in the Council Chamber of City Hall, located at 220 Clay St, Cedar Falls, Iowa.

1.11 PRE-CONSTRUCTION CONFERENCE

- A. Before the work is commenced, a conference shall be held to discuss the contract. The conference shall be attended by the Prime Contractor, Subcontractors, District Representatives and the Architect.

1.12 PROCUREMENT AND CONTRACTING DOCUMENTS

- A. Online Documents: Hosted by the City of Cedar Falls - available through Quest CDN. Obtain access by visiting www.cedarfalls.com and clicking on "Bid Opportunities" in the Popular Links.
 - 1. Online access will be provided to all registered bidders and suppliers. Once registered, bidders can view, download and print Bidding Documents.
- B. Printed Documents: Obtain by contacting Rapids Reproductions at 800.383.1223 .
 - 1. Deposit: \$100.00 per set with a check made payable to City of Cedar Falls. Deposits are fully refundable if the Plans and Specifications are returned in usable condition (i.e. generally free of markings, tears, soiling, etc.) to Rapids Reproductions within 14 days of project award.
 - 2. Shipping: Additional, non-refundable shipping charges of \$30.00 per set will apply to shipped documents. Provide a separate check made payable to City of Cedar Falls.
- C. Viewing Documents: Examine at any of the locations listed in the Supplementary Instructions to Bidders, Section 1.4.A.2.a (shown as Section 3.1.1.1).

1.13 NOTIFICATION

- A. This Advertisement for Bids document is posted pursuant to the provisions of Iowa Code Chapter 26 - Public Construction Bidding and is issued by Mayor Robert M. Green .

END OF DOCUMENT 001113

DOCUMENT 002113 - INSTRUCTIONS TO BIDDERS

1.1 INSTRUCTIONS TO BIDDERS

- A. AIA Document A701-2018 Instructions to Bidders is hereby incorporated into the Procurement and Contracting Requirements by reference.
 - 1. Section 002213 - Supplementary Instructions to Bidders modifies and adds to the requirements of the AIA Document A701-2018 Instructions to Bidders.

END OF DOCUMENT 002113

DOCUMENT 002213 - SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

1.1 INSTRUCTIONS TO BIDDERS

- A. Instructions to Bidders for Project consist of the following:
1. AIA Document A701-2018 Instructions to Bidders.
 2. The following Supplementary Instructions to Bidders that modify and add to the requirements of the Instructions to Bidders.

1.2 SUPPLEMENTARY INSTRUCTIONS TO BIDDERS, GENERAL

- A. The following supplements modify AIA Document A701-2018 Instructions to Bidders. Where a portion of the Instructions to Bidders is modified or deleted by these Supplementary Instructions to Bidders, unaltered portions of the Instructions to Bidders shall remain in effect.

1.3 ARTICLE 2 - BIDDER'S REPRESENTATIONS

- A. Add Section 2.1.4.1:
1. 2.1.4.1 - The bidder has investigated all required fees, permits, and regulatory requirements of authorities having jurisdiction over the Project and has properly included in the submitted bid the cost of such fees, permits, and requirements not otherwise indicated as provided by Owner.
- B. Add Section 2.1.5.1:
1. 2.1.5.1 - The bidder has incorporated into the Bid adequate sums for work performed by installers whose qualifications meet those indicated in the Procurement and Contracting Documents.
- C. Add Section 2.1.7:
1. 2.1.7 - The bidder is a properly licensed Contractor according to the laws and regulations of the State of Iowa and meets qualifications indicated in the Procurement and Contracting Documents.

1.4 ARTICLE 3 - BIDDING DOCUMENTS

- A. 3.1 - Distribution
1. Delete Section 3.1.1 and replace with the following:
 - a. 3.1.1 - Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement for Bid for the deposit sum stated therein. Bidding Documents are also available to be viewed at the plan rooms listed below. The plan deposit will be refunded to bidders who submit a bona fide bid and return the Bidding Documents in usable condition (free of marking, tears, soiling, etc.) within fourteen (14) days after contract award. The cost of replacement of missing or damaged documents will be deducted from the deposit. A bidder receiving a contract award may retain the Bidding Documents and the bidder's deposit will be refunded.
 - 1) Owner: City of Cedar Falls - City Hall - 220 Clay St, Cedar Falls, Iowa 50613 - 319.273.8600
 - 2) Architect: Emergent Architecture - 100 E 2nd St, Ste 204, Cedar Falls, IA 50613 - 319.529.3945
 - 3) Plan Rooms:
 - a) Master Builders of Iowa - 221 Park St, Des Moines, IA 50309 - 515.288.8904
 - b) Dodge Data & Analytics - 4300 Beltway Pl, Ste 180, Arlington, TX 76018 - 877.784.9556
 - c) iSqFt + BidClerk - 4500 Lake Forest Dr, Ste 502, Cincinnati, OH 45242 - 800.364.2059
 2. Delete Section 3.1.2 in its entirety.
- B. 3.2 - Modification or Interpretation of Bidding Documents:

1. Add Section 3.2.4:
 - a. 3.2.4 - An ambiguity, inconsistency, or error discovered too late to be clarified or interpreted by Addendum shall be handled in the following manner:
 - 1) The bidder shall promptly notify the Architect;
 - 2) The bidder shall determine, to the best of his ability, the proper methods or materials required to fulfill the design intent of the Architect and shall include the cost of providing such methods or materials in his bid;
 - 3) The bidder shall submit with the bid, as supplemental information, a description of the ambiguity, inconsistency, or error and the methods or materials which he has included in the bid;
 - 4) The Owner and Architect will review the supplemental information prior to awarding the contract.

C. 3.3 - Substitutions

1. Delete Section 3.3.2.2 and replace with the following:
 - a. 3.3.2.2 - All substitution requests shall be submitted on the supplied Substitution Request Form. All substitution requests submitted must be complete with all requested information. Incomplete forms and requests submitted on other forms shall be disregarded.
2. Delete Section 3.3.2.3 in its entirety.

D. 3.4 - Addenda:

1. Delete Section 3.4.3 and replace with the following:
 - a. 3.4.3 - Addenda may be issued at any time prior to the receipt of bids.
2. Add Section 3.4.4.1:
 - a. 3.4.4.1 - Owner may elect to waive the requirement for acknowledging receipt of 3.4.4 Addenda as follows:
 - 1) 3.4.4.1.1 - Information received as part of the bid indicates that the bid, as submitted, reflects modifications to the Procurement and Contracting Documents included in an unacknowledged Addendum.
 - 2) 3.4.4.1.2 - Modifications to the Procurement and Contracting Documents in an unacknowledged Addendum do not, in the opinion of Owner, affect the Contract Sum or Contract Time.

1.5 ARTICLE 4 - BIDDING PROCEDURES

A. 4.1 - Preparation of Bids:

1. Add Section 4.1.9:
 - a. 4.1.9 - Owner may elect to disqualify a bid due to failure to submit a bid on the form requested, failure to bid requested alternates or unit prices, failure to complete entries in all blanks in the Bid Form, or inclusion by the bidder of any alternates, conditions, limitations or provisions not called for.

B. 4.2 - Bid Security

1. Add the following to Section 4.2.1:
 - a. 4.2.1.1 - Bid Security in an amount not less than five percent (5%) of the bid shall be presented as:
 - 1) A surety bond from a surety company authorized to do business in the state of Iowa; or,
 - 2) A certified check on a solvent Iowa bank, made payable to the Owner; or,

- 3) A certified share draft on a solvent Iowa credit union, made payable to the Owner.

C. 4.3 - Submission of Bids:

1. Delete Section 4.3.1 and replace with the following:
 - a. All bids shall be submit by paper copy.
2. Delete Section 4.3.2 and replace with the following:
 - a. 4.3.2 - Bids, required submittals, and supplementary information shall be presented in two separate sealed opaque envelopes identified with the Project title, the bidder's name, and a list of the contents. Both envelopes shall be sealed in a mailing envelope addressed to the party receiving the bids and identified with the Project name, the bidder's name and address and, if applicable, the designated portion of the work for which the bid is submitted. The mailing envelope shall be noted "SEALED BID ENCLOSED". The contents of the envelopes shall be as follows:
 - 1) Envelope One shall contain the original copy of the bid.
 - 2) Envelope Two shall contain the Bid Security and any supplemental information offered by the bidder.
3. Add Section 4.3.6:
 - a. 4.3.6 - Bids shall remain in force and effect for sixty (60) days after the opening of bids.
4. Add Section 4.3.7:
 - a. 4.3.7 - Bidders are hereby given notice to review the accuracy and arithmetic of their bids prior to submission. Bids containing errors may result in rejection of the bid and loss of bid security.

D. 4.4 - Modification or Withdrawal of Bid:

1. Add the following sections to 4.4.2:
 - a. 4.4.2.1 - Such modifications to or withdrawal of a bid may only be made by persons authorized to act on behalf of the bidder. Authorized persons are those so identified in the bidder's corporate bylaws, specifically empowered by the bidder's charter or similar legally binding document acceptable to Owner, or by a power of attorney, signed and dated, describing the scope and limitations of the power of attorney. Make such documentation available to Owner at the time of seeking modifications or withdrawal of the bid.
 - b. 4.4.2.2 - Owner will consider modifications to a bid written on the sealed bid envelope by authorized persons when such modifications comply with the following: the modification is indicated by a percent or stated amount to be added to or deducted from the bid; the amount of the bid itself is not made known by the modification; a signature of the authorized person, along with the time and date of the modification, accompanies the modification. Completion of an unsealed bid form, awaiting final figures from the bidder, does not require power of attorney due to the evidenced authorization of the bidder implied by the circumstance of the completion and delivery of the bid.

E. 4.5 - Subcontractors, Suppliers, and Manufacturers List Bid Supplement:

1. Add Section 4.5 Subcontractors, Suppliers, and Manufacturers List Bid Supplement:
 - a. 4.5 - If requested, provide list of major subcontractors, suppliers, and manufacturers furnishing or installing products no later than two business days following Architect's request. Include those subcontractors, suppliers, and manufacturers providing work totaling (5%) five percent or more of the bid amount. Do not change subcontractors, suppliers, and manufacturers from those submitted without approval of Architect.

1.6 ARTICLE 5 - CONSIDERATION OF BIDS

A. 5.2 - Rejection of Bids:

1. Add Section 5.2.1:

- a. 5.2.1 - Owner reserves the right to reject a bid based on Owner's and Architect's evaluation of qualification information submitted following opening of bids. Owner's evaluation of the bidder's qualifications will include: status of licensure and record of compliance with licensing requirements, record of quality of completed work, record of Project completion and ability to complete, record of financial management including financial resources available to complete Project and record of timely payment of obligations, record of Project site management including compliance with requirements of authorities having jurisdiction, record of and number of current claims and disputes and the status of their resolution, and qualifications of the bidder's proposed Project staff and proposed subcontractors.

1.7 ARTICLE 6 - POST-BID INFORMATION

A. 6.1 - Contractor's Qualification Statement:

1. Add Section 6.1.1:
 - a. 6.1.1 - Submit Contractor's Qualification Statement no later than two business days following Architect's request.
2. Add Section 6.1.2:
 - a. 6.1.2 - Submission of a bid for this work shall constitute assurance that the Contractor is qualified and able to meet all requirements of this contract, including bonds, guarantees, insurance, performance, timeline, and related items as required and herein set out.

B. 6.3 - Submittals:

1. Add Section 6.3.1.4:
 - a. 6.3.1.4 - Submit information requested in Sections 6.3.1.1, 6.3.1.2, and 6.3.1.3 no later than ten days following Architect's request.

1.8 ARTICLE 7 - PERFORMANCE BOND AND PAYMENT BOND

A. 7.1 - Bond Requirements:

1. Add Section 7.1.1.1:
 - a. 7.1.1.1 - Both a Performance Bond and a Payment Bond will be required, each in an amount equal to one hundred percent (100%) of the contract amount.
2. Delete Section 7.1.4 in its entirety.

B. 7.2 - Time of Delivery and Form of Bonds:

1. Delete the first sentence of Section 7.2.1 and insert the following:
 - a. The bidder shall deliver the required bonds to the Owner no later than 10 days after the date of Notice of Award and no later than the date of execution of the contract, whichever occurs first. Owner may deem the failure of the bidder to deliver required bonds within the period of time allowed a default.
2. Delete Section 7.2.3 and insert the following:
 - a. 7.2.3 - Bonds shall be executed and in force on the date of the contract.

1.9 ARTICLE 8 - ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

A. Delete Section 8.1.2 and insert the following:

1. 8.1.2 - Insurance Requirements for Contractors for the City of Cedar Falls.

1.10 Add ARTICLE 9 - INSURANCE

- A. See 002213.01 - INSURANCE REQUIREMENTS for the specific insurance requirements of the City of Cedar Falls as they relate to this project.

1.11 Add ARTICLE 10 - FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

A. The following supplements modify, change, delete from or add to AIA Document A101-2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum. Where any Article of the A101-2017 is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these clarifications or modifications, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

1. Article 5 - Payments

a. Add the following paragraph to Section 5.1.7.3:

1) Upon achieving Substantial Completion, as defined by Iowa Code Chapter 26, the Contractor may formally request the release of all or part of the retainage funds being held on the Project. The Contractors' Request for Release of the Retainage Funds shall be accompanied by a sworn statement that ten (10) calendar days prior to filing the Request for Release of the Funds a notice was given to all know subcontractors, sub-subcontractors and suppliers that the Contractor is requesting the early release of retainage funds. If proper documentation is received from the Contractor, the Owner will release all retainage funds at the next monthly meeting council or within thirty (30) days, whichever is less, except it may retain the following:

- a) a) An amount equal to 200% of the value of labor or materials yet to be provided on the Project as determined by the Owner and its authorized contract representative. For the purposes of section, "authorized contract representative" means the Architect of record on the Project, unless otherwise specified.
- b) b) An amount equal to 200% of the value of any Chapter 573 claims currently on file at the time the Request for Release of Retainage is approved.

2) If the Owner withholds an amount from the retainage payment to the Contractor, the Owner will provide a reason the request is being denied to the Contractor within thirty (30) calendar days of the receipt of the request.

b. Modify Section 5.2.2 to add the following sentence to the end:

1) The Owner may withhold 200% of the value of the work not satisfactorily completed at the time of final acceptance as well as withhold 200% of the value of any Iowa Code Chapter 573 claims on file 30 days after final acceptance prior to the making of any final payment.

c. Modify Section 5.3 by adding the following sentence to the end:

1) At a rate equal to the rate specified by rule pursuant to Iowa Code Section 74A.2.

1.12 Add ARTICLE 10 - EXECUTION OF THE CONTRACT

- A. 10.1.1 - Within 10 days of receiving the Notice of Award, the Awardee shall execute and deliver the Agreement to Owner through Architect, in such number of counterparts as Owner may require.
- B. 10.1.2 - Owner may deem as a default the failure of the Awardee to execute the Contract and to supply the required bonds when the Agreement is presented for signature within the period of time allowed.
- C. 10.1.3 - Unless otherwise indicated in the Procurement and Contracting Documents or the executed Agreement, the date of commencement of the Work shall be the date of the executed Agreement.
- D. 10.1.4 - In the event of a default, Owner may declare the amount of the bid security forfeited and elect to either award the contract to the next responsible bidder or re-advertise for bids.

END OF DOCUMENT 002213

**CEDAR FALLS CITY HALL
REMODEL
Cedar Falls, Iowa
City Project Number _____**

03-27-2019

**INSURANCE REQUIREMENTS FOR
CONTRACTORS FOR THE CITY OF CEDAR FALLS**

*** This document outlines the insurance requirements for all Contractors who perform work for the City of Cedar Falls. The term “contractor” as used in this document shall be defined as the general contractor, artisan contractor, or design contractor that will be performing work for the City of Cedar Falls under contract.

1. All policies of insurance required hereunder shall be with an insurer authorized by law to do business in Iowa. All insurance policies shall be companies satisfactory to the City and have a rating of A-, VII or better in the current A.M. Best Rating Guide.
2. All Certificates of Insurance required hereunder shall include the Cancellation & Material Change Endorsement. A copy of this endorsement is attached in Exhibit 1.
3. Contractor shall furnish a signed Certificate of Insurance to the City of Cedar Falls, Iowa for the coverage required in Exhibit 1. Such Certificates shall include copies of the following endorsements:
 - a) Commercial General Liability policy is primary and non-contributing
 - b) Commercial General Liability additional insured endorsement – See Exhibit 1
 - c) Governmental Immunities Endorsement – See Exhibit 1

Copies of additional insured endorsements, executed by an authorized representative from an Insurer duly licensed to transact business at the location of the jobsite, must be provided prior to the first payment.

Contractor shall, upon request by the City, provide Certificates of Insurance for all subcontractors and sub-sub contractors who perform work or services pursuant to the provisions of this contract.

4. Each certificate shall be submitted to the City of Cedar Falls.

5. Failure to provide minimum coverage shall not be deemed a waiver of these requirements by the City of Cedar Falls. Failure to obtain or maintain the required insurance shall be considered a material breach of this agreement.
6. Failure of the Contractor to maintain the required insurance shall constitute a default under this Contract, and at City's option, shall allow City to terminate this Contract for cause and/or purchase said insurance at Contractor's expense.
7. Contractor shall be required to carry the following minimum coverage/limits or greater, if required by law or other legal agreement; as per Exhibit 1:
- This coverage shall be written on an occurrence, not claims made form. Form CG 25 03 03 97 "Designated Construction Project(s) General Aggregate Limit" shall be included. All deviations or exclusions from the standard ISO commercial general liability form CG 001 shall be clearly identified and shall be subject to the review and approval of the City.
 - Contractor shall maintain ongoing CGL coverage for at least 2 years following substantial completion of the Work to cover liability arising from the products-completed operations hazard and liability assumed under an insured contract.
 - Governmental Immunity endorsement identical or equivalent to form attached.
 - Additional Insured Requirement – See Exhibit 1.
The City of Cedar Falls, including all its elected and appointed officials, all its employees and volunteers, all its boards, commissions and/or authorities and their board members, employees and volunteers shall be named as an additional insured on General Liability Policies for all classes of contractors.

Contractors shall include coverage for the City of Cedar Falls as an additional insured including ongoing and completed operations coverage equivalent to: ISO CG 20 10 07 04* and ISO CG 20 37 07 04**

* ISO CG 20 10 07 04 "Additional Insured – Owners, Lessees or Contractors – Scheduled Person or Organization"

** ISO CG 20 37 07 04 "Additional Insured – Owners, Lessees or Contractors – Completed Operations"

9. Separation of Insured's Provision: If Contractor's liability policies do not contain the standard ISO separation of insured's provision, or a substantially similar clause, they shall be endorsed to provide cross-liability coverage.
10. Limits: By requiring the insurance as set out in this Contract, City does not represent that coverage and limits will necessarily be adequate to protect Contractor and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities provided to City in this Contract. The City will have the right at any time to require liability insurance greater than that otherwise specified in Exhibit 1. If required, the additional premium or premiums payable shall be added to the bid price.
11. Performance and Payment Bonds: The City shall have the right to require the Contractor to furnish performance and payment bonds for the full amount of the Contract price. The Contractor shall furnish, by a surety and in a form satisfactory to the City, such bonds to the City, prior to the start of Contractor's Work, covering the performance of the Contractor and the payment of all obligations arising hereunder. The Contractor, upon receipt of the bonds and invoice from the surety, shall pay for the cost of said bonds. Additional bond premium costs due to modifications to the Contract, shall be included in the modification amount submitted by Contractor, and paid by Contractor.
12. Indemnification (Hold Harmless) Provision: To the fullest extent permitted by law, the Contractor agrees to defend, pay on behalf of, indemnify, and hold harmless the City of Cedar Falls, Iowa, its elected and appointed officials, directors, employees, agents and volunteers working on behalf of the City of Cedar Falls, Iowa against any and all claims, demands, suits or loss, including any and all outlay and expense connected therewith, and for damages which may be asserted, claimed or recovered against or from the City of Cedar Falls, Iowa, its elected and appointed officials, directors, employees, agents and volunteers working on behalf of the City of Cedar Falls, Iowa, including, but not limited to, damages arising by reason of personal injury, including bodily injury or death, and property damages, which arises out of or is in any way connected or associated with the work and/or services provided by the Contractor to the City of Cedar Falls, Iowa pursuant to the provisions of this contract to the extent arising out of the errors, omissions or negligent acts of the Contractor, its agents, employees, subcontractors or others working on behalf of the Contractor. It is the intention of the parties that the City of Cedar Falls, Iowa, its elected and appointed officials, directors, employees, agents and volunteers working on behalf of the City of Cedar Falls, Iowa shall not be liable or in any way responsible for the injury, damage, liability, loss or expense incurred by the Contractor, its officers, employees, subcontractors, and others affiliated with the Contractor due to accidents, mishaps, misconduct, negligence or injuries either in person or property resulting from the work and/or services performed by the

Contractor pursuant to the provisions of this contract, except for and to the extent caused by the negligence of the City of Cedar Falls, Iowa.

The Contractor expressly assumes full responsibility for damages or injuries which may result to any person or property by reason of or in connection with the work and/or services provided by the Contractor to the City of Cedar Falls, Iowa pursuant to this contract to the extent arising out of the errors, omissions or negligent acts of the Contractor, its agents, employees, subcontractors or others working on behalf of the Contractor, and agrees to pay the City of Cedar Falls, Iowa for all damages caused to the City of Cedar Falls, Iowa premises resulting from the work and/or services of the Contractor, its officers, employees, subcontractors, and others affiliated with the Contractor to the extent arising out of such errors, omissions or negligent acts.

The Contractor represents that its activities pursuant to the provisions of this contract will be performed and supervised by adequately trained and qualified personnel, and the Contractor will observe, and cause its officers, employees, subcontractors and others affiliated with the Contractor to observe all applicable safety rules.

13. Waiver of Subrogation: To the extent permitted by law, Contractor hereby releases the City of Cedar Falls, Iowa, its elected and appointed officials, its directors, employees, agents and volunteers working on behalf of the City of Cedar Falls, Iowa, from and against any and all liability or responsibility to the Contractor or anyone claiming through or under the Contractor by way of subrogation or otherwise, for any loss or damage to property caused by fire or any other casualty and for any loss due to bodily injury to Contractor's employees. This provision shall be applicable and in full force and effect only with respect to loss or damage occurring during the time of this contract or arising out of the work performed under this contract. The Contractor's policies of insurance shall contain a clause or endorsement to the effect that such release shall not adversely affect or impair such policies or prejudice the right of the Contractor to recover thereunder.

Completion Checklist

- Certificate of Liability Insurance (2 pages)
- Designated Construction Project(s) General Aggregate Limit CG 25 03 03 97 (2 pages)
- Additional Insured CG 20 10 07 04
- Additional Insured CG 20 37 07 04
- Governmental Immunities Endorsement

EXHIBIT 1 – INSURANCE SCHEDULE**General Liability (Occurrence Form Only):**

Commercial General Liability	
General Aggregate	\$2,000,000
Products-Completed Operations Aggregate Limit	\$2,000,000
Personal and Advertising Injury Limit	\$1,000,000
Each Occurrence Limit	\$1,000,000
Fire Damage Limit (any one occurrence)	\$ 50,000
Medical Payments	\$ 5,000

Automobile: (Combined Single Limit) \$1,000,000

If the Contractor does not own any vehicles, coverage is required on non-owned and hired vehicles.

Standard Workers Compensation

Statutory for Coverage A	
Employers Liability:	
Each Accident	\$ 500,000
Each Employee – Disease	\$ 500,000
Policy Limit – Disease	\$ 500,000

Umbrella: \$3,000,000

The Umbrella/Excess Insurance shall be written on a per occurrence basis and if the Umbrella/Excess is not written on a follow form basis it shall have the same endorsements as required of the primary policy(ies).

Errors & Omissions: \$1,000,000

CITY OF CEDAR FALLS, IOWA ADDITIONAL INSURED ENDORSEMENT

The City of Cedar Falls, Iowa, including all its elected and appointed officials, all its employees and volunteers, all its boards, commissions and/or authorities and their board members, employees, and volunteers, are included as Additional Insureds, including ongoing operations CG 2010 07 04 or equivalent, and completed operations CG 2037 07 04 or equivalent. See Specimens.

This coverage shall be primary to the Additional Insureds, and not contributing with any other insurance or similar protection available to the Additional Insureds, whether other available coverage be primary, contributing or excess.

GOVERNMENTAL IMMUNITIES ENDORSEMENT (For use when including the City as an Additional Insured)

1. Nonwaiver of Government Immunity. The insurance carrier expressly agrees and states that the purchase of this policy and the including of the City of Cedar Falls, Iowa as an Additional Insured does not waive any of the defenses of governmental immunity available to the City of Cedar Falls, Iowa under Code of Iowa Section 670.4 as it now exists and as it may be amended from time to time.
2. Claims Coverage. The insurance carrier further agrees that this policy of insurance shall cover only those claims not subject to the defense of governmental immunity under the Code of Iowa Section 670.4 as it now exists and as it may be amended from time to time.
3. Assertion of Government Immunity. The City of Cedar Falls, Iowa shall be responsible for asserting any defense of governmental immunity, and may do so at any time and shall do so upon the timely written request of the insurance carrier. Nothing contained in this endorsement shall prevent the carrier from asserting the defense of governmental immunity on behalf of the City of Cedar Falls, Iowa.
4. Non-Denial of Coverage. The insurance carrier shall not deny coverage under this policy and the insurance carrier shall not deny any of the rights and benefits accruing to the City of Cedar Falls, Iowa under this policy for reasons of governmental immunity unless and until a court of competent jurisdiction has ruled in favor of the defense(s) of governmental immunity asserted by the City of Cedar Falls, Iowa.
5. No Other Change in Policy. The insurance carrier and the City of Cedar Falls, Iowa agree that the above preservation of governmental immunities shall not otherwise change or alter the coverage available under the policy.

CANCELLATION AND MATERIAL CHANGES ENDORSEMENT

Thirty (30) days Advance Written Notice of Cancellation, Non-Renewal, Reduction in coverage and/or limits and ten (10) days written notice of non-payment of premium shall be sent to: Risk Management Office, City of Cedar Falls, City Hall, 220 Clay Street, Cedar Falls, Iowa 50613. This endorsement supersedes the standard cancellation statement on the Certificate of Insurance to which this endorsement is attached. Contractor agrees to furnish the City with 30 days advance written notice of cancellation, non-renewal, reduction in coverage and/or limits, and 10 days advance written notice of non-payment of premium.

CG 25 03 03 97

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

DESIGNATED CONSTRUCTION PROJECT(S) GENERAL AGGREGATE LIMIT

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Designated Construction Projects:

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

A. For all sums which the insured becomes legally obligated to pay as damages caused by "occurrences" under **COVERAGE A (SECTION I)**, and for all medical expenses caused by accidents under **COVERAGE C (SECTION I)**, which can be attributed only to ongoing operations at a single designated construction project shown in the Schedule above:

1. A separate Designated Construction Project General Aggregate Limit applies to each designated construction project, and that limit is equal to the amount of the General Aggregate Limit shown in the Declarations.
2. The Designated Construction Project General Aggregate Limit is the most we will pay for the sum of all damages under **COVERAGE A**, except damages because of "bodily injury" or "property damage" included in the "products-completed operations hazard", and for medical expenses under **COVERAGE C** regardless of the number of:
 - a. Insureds;
 - b. Claims made or "suits" brought; or
 - c. Persons or organizations making claims or bringing "suits".
3. Any payments made under **COVERAGE A** for damages or under **COVERAGE C** for medical expenses shall reduce the Designated Construction Project General Aggregate Limit for that designated construction project. Such payments shall not reduce the General Aggregate Limit shown in the Declarations nor shall they reduce any other

Designated Construction Project General Aggregate Limit for any other designated construction project shown in the Schedule above.

4. The limits shown in the Declarations for Each Occurrence, Fire Damage and Medical Expense continue to apply. However, instead of being subject to the General Aggregate Limit shown in the Declarations, such limits will be subject to the applicable Designated Construction Project General Aggregate Limit.

B. For all sums which the insured becomes legally obligated to pay as damages caused by "occurrences" under **COVERAGE A (SECTION I)**, and for all medical expenses caused by accidents under **COVERAGE C (SECTION I)**, which cannot be attributed only to ongoing operations at a single designated construction project shown in the Schedule above:

1. Any payments made under **COVERAGE A** for damages or under **COVERAGE C** for medical expenses shall reduce the amount available under the General Aggregate Limit or the Products-Completed Operations Aggregate Limit, whichever is applicable; and
2. Such payments shall not reduce any Designated Construction Project General Aggregate Limit.

CG 25 03 03 97

- C.** When coverage for liability arising out of the "products-completed operations hazard" is provided, any payments for damages because of "bodily injury" or "property damage" included in the "products-completed operations hazard" will reduce the Products-Completed Operations Aggregate Limit, and not reduce the General Aggregate Limit nor the Designated Construction Project General Aggregate Limit.
- D.** If the applicable designated construction project has been abandoned, delayed, or abandoned and then restarted, or if the authorized contracting parties deviate from plans, blueprints, designs, specifications or timetables, the project will still be deemed to be the same construction project.
- E.** The provisions of Limits Of Insurance (SECTION III) not otherwise modified by this endorsement shall continue to apply as stipulated.

Copyright, Insurance Services Office, Inc., 1996

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY
CG 20 10 07 04

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

**ADDITIONAL INSURED – OWNERS, LESSEES OR
CONTRACTORS – SCHEDULED PERSON OR
ORGANIZATION**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s):
Location(s) Of Covered Operations
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.

A. Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to "bodily injury" or "property damage" occurring after:

1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

All terms and conditions of this policy apply unless modified by this endorsement.

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY
CG 20 37 07 04

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

**ADDITIONAL INSURED – OWNERS, LESSEES OR
CONTRACTORS – COMPLETED OPERATIONS**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s):
Location And Description Of Completed Operations
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.

Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at

the location designated and described in the schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

All terms and conditions of this policy apply unless modified by this endorsement.

DOCUMENT 002600 - PROCUREMENT SUBSTITUTION PROCEDURES

1.1 DEFINITIONS

- A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.
- B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 012500 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

1.2 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.3 PROCUREMENT SUBSTITUTIONS

- A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.
- B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action:
 - 1. Extensive revisions to the Contract Documents are not required.
 - 2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
 - 3. The request is fully documented and properly submitted.

1.4 SUBMITTALS

- A. Procurement Substitution Request: Submit to Architect . Procurement Substitution Request must be made in compliance with the following requirements:
 - 1. Requests for substitution of materials and equipment will be considered if received no later than 7 days prior to date of bid opening.
 - 2. Submittal Format: Submit 1 copy of each written Procurement Substitution Request, using the Substitution Request Form provided at Section 002600.01.
 - 3. Each Procurement Substitution Request shall be submitted on an individual form. Multiple products on one form will not be allowed.
- B. Architect's Action:
 - 1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.
- C. Architect's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

END OF DOCUMENT 002600

SUBSTITUTION REQUEST FORM

Project: _____

Substitution Request Number: _____

Project Number: _____

From: _____

To: _____

Date: _____

Specification Title: _____

Description: _____

Section: _____ Page: _____

Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade name: _____ Model No.: _____

Attached data includes product description, specifications, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Warranty furnished for proposed substitution will be the same as for specified product.
- The same maintenance service and source of replacements parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearance.
- Payment will be made for all changes to building design including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____

Firm: _____

Address: _____

Telephone: _____

Signed by: _____

A/E's REVIEW AND ACTION

- Substitution approved – Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- Substitution approved as noted – Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- Substitution rejected – Use specified materials.
- Substitution Request received too late – Use specified materials.

Signed by: _____ Date: _____

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

DOCUMENT 004113 - BID FORM - STIPULATED SUM (SINGLE-PRIME CONTRACT)

1.1 BID INFORMATION

- A. Bidder: _____
- B. Project Name: Cedar Falls City Hall Remodel
- C. Project Location: 220 Clay Street, Cedar Falls, Iowa, 50613
- D. Owner: City of Cedar Falls, Iowa
- E. Architect: Emergent Architecture
- F. Architect Project Number: 21004

1.2 ACKNOWLEDGEMENT OF ADDENDA

- A. The undersigned bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:
 - 1. Addendum No. 1, dated _____
 - 2. Addendum No. 2, dated _____
 - 3. Addendum No. 3, dated _____
 - 4. Addendum No. 4, dated _____
 - 5. Addendum No. 5, dated _____
 - 6. Addendum No. 6, dated _____

1.3 CERTIFICATIONS AND BASE BID

- A. Base Bid, Single-Prime (All Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by Emergent Architecture and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:

1. _____ Dollars
(\$ _____).

2. The above amount may be modified by amounts indicated by the Bidder as "Alternates."

1.4 ALLOWANCES

- A. Bidder's initials confirm that the amount listed above as Base Bid includes a General Contingency Allowance of \$200,000.00, as indicated in 012100 - Allowances:
_____ (initial to confirm).

1.5 BID SECURITY

- A. The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within ten (10) days after receipt of a written Notice of Award, if offered, and on failure to do so agrees to forfeit to Owner the attached Bid Security (provided in the form of a cashier's check, certified check, or bid bond) as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid amount above:

1. _____ Dollars
(\$ _____).

- B. In the event the Owner does not offer a Notice of Award within the time limits stated above, the Owner will return to the undersigned the Bid Security submitted.

1.6 TIME OF COMPLETION

- A. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents upon receipt of a Notice to Proceed, and shall complete the Work in multiple phases as indicated on the Drawings with all work substantially complete on or before September 30, 2022.

1.7 ALTERNATES

- A. Bidder proposes to furnish all labor and materials to construct the following alternates for the costs listed below indicating the increase or decrease by circling "ADD" or "DEDUCT". Further detail of each alternate is described under 012300 - Alternates.

1. ALTERNATE 1: Furnish and install all Tubular Daylighting devices as indicated on the drawings.
 - a. (ADD / DEDUCT) _____ Dollars
(\$ _____).
2. ALTERNATE 2: Change from a multi-phase project to a single phase project.
 - a. (ADD / DEDUCT) _____ Dollars
(\$ _____).
 - b. New Proposed Substantial Completion Date:

3. ALTERNATE 3: Furnish and install new fire alarm control panel and replace fire alarm devices throughout the facility as indicated on the drawings.
 - a. (ADD / DEDUCT) _____ Dollars
(\$ _____).

1.8 CONTRACTOR'S LICENSE

- A. The undersigned further states that it is a duly licensed contractor, for the type of work proposed, in the State of Iowa, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

1.9 SUBMISSION OF BID

- A. Respectfully submitted this ____ day of _____, 2021.
- B. Submitted By: _____ (Name of bidding firm or corporation)
- C. Authorized Signature: _____ (Handwritten signature)
- D. Signed By: _____ (Type or print name)
- E. Title: _____ (Owner/Partner/President/Vice President)
- F. Street Address: _____
- G. City, State, Zip: _____
- H. Phone: _____
- I. Email: _____

END OF DOCUMENT 004113

DOCUMENT 004313 - BID SECURITY FORMS

1.1 BID BOND FORM

- A. AIA Document A310-2010 "Bid Bond" is the recommended form for a bid bond. A bid bond acceptable to Owner, or other bid security as described in the Instructions to Bidders, is required to be attached to the Bid Form as a supplement.
- B. Copies of AIA standard forms may be obtained from The American Institute of Architects; <https://www.aiacontracts.org/>; email: docspurchases@aia.org; (800) 942-7732.

END OF DOCUMENT 004313

SECTION 007300 - SUPPLEMENTARY CONDITIONS

PART 1 - The following supplements modify, change, delete from or add to AIA Document A201-2017, General Conditions of the Contract for Construction. Where any article or portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered articles or portions of the General Conditions shall remain in effect.

1.1 ARTICLE 1 - GENERAL PROVISIONS

A. 1.1.2 - The Contract

1. Add Section 1.1.2.1:

- a. 1.1.2.1 - The Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents the Architect shall identify such unsigned Documents. No Contract shall be formed or enforced between the parties until all Contract Documents are executed by both parties.

B. 1.2 - Correlation and Intent of the Contract Documents

1. Add Section 1.2.1.1:

- a. 1.2.1.1 - Paragraph 1.2.1 shall be interpreted to mean that if an item is shown in the Specifications and not on the Drawings, or if an item is shown on the Drawings but is not in the Specifications, that item shall be included in the Contract. If different types and/or quantities of items are indicated between the Drawings and Specifications, or within either document, the greater quantity shall be included in the Contract.

2. Add Section 1.2.4:

- a. 1.2.4 - The terms and conditions of the Contract Documents, including but not limited to the General Conditions, the Supplementary Conditions, and Division 01 Specification Sections, apply to all Sections of the Specifications.

C. 1.7 - Digital Data Use and Transmission

1. Add Sections 1.7.1 and 1.7.2:

- a. 1.7.1 - Instruments of Service or any other information or documentation transmitted in digital form are not Contract Documents. Discrepancies may exist between digital data files and corresponding hard-copy Contract Documents including, but not limited to, subsequent modifications to the Contract Documents. In the event of a conflict between the Contract Documents and the digital data files, the Contract Documents shall govern. Users of digital data files shall be responsible for confirming the accuracy and completeness of the files relative to current Contract Documents.
- b. 1.7.2 - Data contained in Architect-provided digital data files, at the time of transfer to third parties, are part of the Architect's Instruments of Service and shall not be used by anyone receiving this data for any purpose other than as a convenience in the preparation of documents for the referenced project. Any other use or reuse by others is prohibited.

1.2 ARTICLE 2 - OWNER

A. 2.3 - Information and Services Required of the Owner

1. Add Section 2.3.4.1:

- a. 2.3.4.1 - The Contractor shall compare information furnished by the Owner (including but not limited to surveys and soil tests with observable physical conditions) and the Contract Documents and, on the basis of such review, shall report to the Owner and Architect any conflicts, errors or omissions. Contractor shall be responsible for any additional costs, delays and damages resulting from the Contractor's failure to immediately report any such errors, inconsistencies or omissions.

1.3 ARTICLE 3 - CONTRACTOR

- A. 3.2 - Review of Contract Documents and Field Conditions by Contractor
1. Modify Section 3.2.1 by adding the following sentence to the end:
 - a. The Contractor also represents that all Contract Documents for the Project have been examined; including those intended for work of trades not normally performed by the Contractor's own forces and has become thoroughly familiar with all conditions which may pertain to or affect the Work under the Contract.
- B. 3.4 - Labor and Materials
1. Modify Section 3.4.1 by adding the following sentence to the end:
 - a. Work required by the Contract Documents to be performed after working hours or work the Contractor elects to perform after hours shall be completed at no additional cost to the Owner.
 2. Add Section 3.4.2.1:
 - a. 3.4.2.1 - After the Contract has been executed, the Owner and Architect will consider requests for the substitution of products in place of those specified only under the conditions set forth in the General Requirements (Division 01 of the Specifications). By making requests for substitutions, the Contractor:
 - 1) .1 Represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
 - 2) .2 Represents that the Contractor will provide the same warranty for the substitution as it would be provided for the product specified;
 - 3) .3 Certifies that the cost data presented is complete and includes all related costs for the substituted product and for Work that must be changed as a result of the substitution, except for the Architect's redesign costs, and waives all claims for additional costs related to the substitution that subsequently become apparent; and
 - 4) .4 Shall coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
- C. 3.6 - Taxes
1. Delete paragraph 3.6 and replace with the following:
 - a. 3.6 - This Project is Iowa sales tax exempt. Contractor and their subcontractors shall purchase such items of tangible personal property without liability for the tax if such property will be used in the performance of the construction contract and a purchasing agent authorization letter and an exemption certificate, issued by the designated exempt entity, are presented to the retailer. Said taxes shall not be included in the bid value for this Project.
 - b. 3.6.1 - At or before the time the Performance Bond is filed, Contractor shall provide to the Owner a listing of Contractors, subcontractors, builders, and manufacturers which will be purchasing tangible personal property for the Project and request the Owner provide an authorization letter and an exemption certificate.
 - c. 3.6.2 - The Owner shall issue an authorization letter and an exemption certificate to the Contractor, subcontractor, builder, or manufacturer to be used as provided in Iowa Code section 422.42 (15) and (16), and 422.47 (5). The authorization letter and the exemption certificate shall specify the construction project to which they apply and shall be valid only for that project. The Owner shall notify the Iowa Department of Revenue that such authorization letter and exemption certificate have been issued. The notification shall, to the extent practicable, describe the project and identify the Contractors, subcontractors, builders, and manufacturers which will be using the letter and certificate.
 - d. 3.6.3 - It shall be the responsibility of the Contractors, subcontractors, builders, and manufacturers to maintain records identifying the property purchased exempt from tax and verifying that the property purchased was used in this contract with this Owner. It shall also be the responsibility of the Contractors, subcontractors, builders, and manufacturers to pay sales tax on items only that do not become part of the real property being constructed. In

addition, certain construction-related equipment is not subject to local option tax but remains subject to the state sales tax. See Rule 701-107.9 for details.

D. 3.7 - Permits, Fees, Notices and Compliance with Laws

1. Add Sections 3.7.2.1:

- a. 3.7.2.1 - All construction under this contract shall conform to the requirements of the local authority. Local Planning and Zoning regulations, ordinances and requirements shall be followed as adopted.

2. Delete Section 3.7.4 and replace with the following:

- a. 3.7.4 - If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. Failure to properly register a claim within the 14-day period shall be grounds for denial of the claim. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

3. Delete Section 3.7.5 and replace with the following:

- a. 3.7.5 - If, in the course of the Work, the Contractor knowingly encounters human remains or recognizes the existence of burial markers, archeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence or good faith belief of such existence of such remains or features may be made as provided in Article 15.

4. Add Section 3.7.6:

- a. 3.7.6 - The Contractor is responsible for scheduling inspections related to the performance of its work and ensuring work is complete for inspections. Any costs associated with reinspection caused by irregularities, deficiencies or non-conforming work will be borne by the responsible contractor including all Architectural and Engineering Services related to evaluation of the problem and development of an acceptable solution.

E. 3.10 - Contractor's Construction and Submittal Schedules

1. Modify Section 3.10.1 by adding the following to the end of the last sentence:

- a. "..., or as requested by the Owner or Architect."

2. Modify Section 3.10.2 by deleting the last sentence.

F. 3.12 - Shop Drawings, Product Data and Samples

1. Add Section 3.12.11:

- a. 3.12.11 - The Architect's review of Contractor's submittals will be limited to examination of an initial submittal and one (1) resubmittal. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional resubmittals.

G. 3.13 - Use of Site

1. Add Section 3.13.1:

- a. 3.13.1 - The Contractor shall not bring or permit any subcontractor, supplier or anyone else for whom the Contractor is responsible to bring onto the site any asbestos, PCB's petroleum, hazardous waste or radioactive materials (except for proper use in performing the Work).

H. 3.18 - Indemnification

1. Delete Section 3.18.1 and replace with the following:

- a. 3.18.1 - To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless the Owner, Architect, Architect's Consultants and their agents and employees from and against any and all claims, causes of actions, damages, losses and expenses, including but not limited to attorney's fees, arising out of or resulting from the performance or prosecution of the Work by the Contractor, it's subcontractors, agents or employees; or arising from any neglect, default, mismanagement or omission by the Contractor, it's subcontractors, agents or employees in the performance of any duties imposed by the contract or by law; provided that any such claim, damage, loss or expense:

- 1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting there from, and
- 2) is caused in whole or in part by any fault, negligence, act or omission of the Contractor, it's subcontractors, anyone directly or indirectly employed by them and/or anyone for whose acts they may be liable, and including an employee's injury or damages caused in whole or in part by the negligence of the same employee, regardless of whether or not it is cause in whole or in part or claimed to be caused in whole or in part by a party indemnified hereunder.

- b. Such obligation shall not be construed to negate, abridge or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in section 3.18.1.

I. Add Section 3.19 - Mechanic's Liens

1. Add Section 3.19.1:

- a. 3.19.1 - Contractor shall keep the Owner's property free of all mechanics' liens and to secure discharge by bond or otherwise of any mechanic's lien that arises from Contractor's dealings with subcontractors or suppliers, or from any subcontractor's dealings with sub-subcontractors or suppliers. Contractor shall indemnify the Owner for any costs the Owner may sustain due to the foreclosure or filing of mechanic's liens arising from Contractor's dealing with subcontractors or suppliers, including the price of any bond to discharge said liens and reasonable attorney's fees. The Owner reserves the right to pay mechanic's liens directly to the claimant Contractor under any progress payment or final payment. This provision shall not abrogate, reduce or limit the Owner's rights to make any claims or pursue any remedies it might have in contract or common law against the Contractor or surety.

1.4 ARTICLE 4 - ARCHITECT

A. 4.2 - Administration of the Contract

1. Add Section 4.2.15:

- a. 4.2.15 - If, due to the fault, negligence, act or omission caused in whole or in part by the Contractor, it's subcontractors, anyone directly or indirectly employed by them and/or anyone for whose acts they may be liable, damage is done to any existing building or grounds or work in place so that additional work is required by the Architect outside of original scope, or if the contract time exceeds the time specified by more than 25%, it shall be the Contractor's

responsibility to reimburse the Owner for these additional services of the Architect. This charge is based on two-and-one-half times the per hour rate for each of the Architect's staff types, plus mileage at the current IRS rate.

1.5 ARTICLE 5 - SUBCONTRACTORS

A. 5.2 - Award of Subcontracts and Other Contracts for Portions of the Work

1. Modify the first sentence of Section 5.2.1 by deleting the words: "as soon as practicable" and inserting the words: "within ten (10) days".

1.6 ARTICLE 7 - CHANGES IN THE WORK

A. 7.2 - Change Orders

1. Add Sections 7.2.2 and 7.2.3:

- a. 7.2.2 - The form used to process a Change Order will be AIA Document G701 – Change Order.
- b. 7.2.3 - Contractor shall comply with the following provisions in determining any change in contract cost:

- 1) .1 Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs. Contractor markup (overhead, profit, bond) is NOT allowed to be included in the change order. Any overhead and profit shall be included in the base bid.

- 2) .2 When approved changes or additions to the work involve an increase in the contract cost (non-contingency allowance funds), the combined overhead and profit included in the total cost to the Owner shall be based on the following schedule:

- a) .1 For the Contractor, for Work performed by Contractor's own forces, ten percent (10%) of the cost.
- b) .2 For the Contractor, for Work performed by Subcontractor(s), five percent (5%) of the amount due the Subcontractor(s).
- c) .3 For the Subcontractor, for Work performed by Subcontractor's own forces, ten percent (10%) of the cost.
- d) .4 For the Subcontractor, for Work performed by Sub-subcontractor(s), five percent (5%) of the amount due the Sub-subcontractor(s).
- e) .5 The maximum allowable mark-up shall be twenty percent (20%) passed through to the Owner by the Contractor under any circumstance.
- f) .6 Changes in the Work involving credits for contract work not performed shall be made on the basis of total cost. Contractor mark-up for profit and overhead SHALL BE INCLUDED and itemized in the construction cost change. All credits shall include itemization of costs.
- g) .7 All Change Proposal Requests shall include an itemized breakdown of quantities and prices for labor, materials and subcontracts (all subcontracts shall also be itemized). Degree and detail of breakdown shall be at the Architect's discretion.

B. 7.3 - Construction Change Directives

1. Modify Section 7.3.3.3 by deleting the words: "and a mutually acceptable fixed or percentage; or" and inserting the words: "plus the allocated percentage of combined overhead and profit; or".
2. Modify Sentence 1 of Section 7.3.4 by deleting the words: "set forth in the agreement, or if no such amount is set forth in the Agreement, a reasonable amount" and inserting the words: "indicated in paragraph 7.2.3".

1.7 ARTICLE 8 - TIME

A. 8.3 - Delays and Extensions of Time

1. Modify Section 8.3.1 by adding the following sentences to the end:

- a. A time extension shall be Contractor's sole remedy and compensation for all such delays other than those resulting from the acts or negligence of the Owner, the Architect, or the Owner's separate contractors (collectively "Owner Caused Delays"). For proven Owner Caused Delays, the Contractor may recoup the actual costs resulting from such delays, but not for any additional profit or fee.

1.8 ARTICLE 9 - PAYMENTS AND COMPLETION

A. 9.2 - Schedule of Values

1. Delete Section 9.2 and replace with the following:

- a. 9.2 - Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect within 10 business days of the Contract award, allocating the entire Contract Sum to the various portion of the Work. The Schedule of Values shall be listed according to the individual specification sections as provided within the project specification book, with each major line item identified by the spec section number including mechanical, electrical, technology, food service and any/all major subcontracts. List sub-values of major products or operations under the item. Labor cost and material cost (including shipping and taxes, if applicable) shall be further subdivided for each line item. Within 10 days after submitting the Schedule of Values, the prime Contractor shall submit a schedule of estimated payment sums, by month, for the duration of the project.

B. 9.3 - Applications for Payment

1. Modify Section 9.3.1 by adding the following sentences to the end:

- a. Once approved by the Architect, the Application for Payment must be submitted to the City by the 28th day of each month for approval at the regularly scheduled City Council meeting on the 3rd Monday of each month. The form of Application for Payment shall be a notarized AIA Document G702, Application and Certificate for Payment, supported by AIA Document G703, Continuation Sheet.

2. Delete Section 9.3.1.1 in its entirety.

3. Add Section 9.3.1.3:

- a. 9.3.1.3 - Payments will be made to the extent of the substantiated value of the work performed in the previous month less a retainage amount of five percent (5%) of the value of the work performed, in accordance with Section 573.12 of the Code of Iowa:

- 1) Retainage will be held for thirty (30) days after completion and final acceptance of the Work, unless otherwise requested by the Contractor in accordance with Section 26.13 of the Code of Iowa or as provided in Section 9.8.7.

C. 9.5 - Decisions to Withhold Certification

1. Delete Section 9.5.4 in its entirety.

D. 9.6 - Progress Payments

1. Delete the first two sentences of Section 9.6.4.

E. 9.8 - Substantial Completion

1. Modify Section 9.8.1 by adding the following to the end of the last sentence:

- a. "...subject only to completion of minor punch list items, the absence of completion of which does not interfere with the Owner's intended use of the Project."

2. Add Section 9.8.6:

- a. 9.8.6 - The Contractor shall reimburse the Owner for any Architect's additional services made necessary by the Contractor's failure to finally complete the Work within sixty (60) days after the date of Project Substantial Completion.

3. Add Section 9.8.7:

- a. 9.8.7 - Request for Early Release of Retainage Funds:

- 1) The Contractor may formally request the early release of all or part of the retainage funds being held on the Project upon completion of the following:
 - a) Substantial Completion of the Work Substantiated by an executed Certificate of Substantial Completion;
 - b) A sworn statement that ten (10) calendar days prior to filing the Request for Release of the Funds, notification was given to all known subcontractors, sub-subcontractors and suppliers of the Contractor's intent to request the early release of retained funds in compliance with Section 26.13.7 of the Code of Iowa;
 - c) Receipt of an itemized, tabulated list prepared by the Contractor of all incomplete or nonconforming work items, including valuation of each work item listed, separated by labor and material. Upon approval, this list shall be incorporated into the Schedule of Values for subsequent payment applications. All values shall be listed as 200% of the estimated value of the work item;
 - d) G706 – Contractor's Affidavit of Payment of Debts and Claims;
 - e) G706A – Contractor's Affidavit of Release of Liens;
 - f) G707 – Consent of Surety to Final Payment;
 - g) Evidence of continuation of liability coverage, including coverage for completed operations in accordance with Section 11.1 of AIA General Conditions.
- 2) If proper documentation is received from the Contractor, the Owner will release requested retainage funds within thirty (30) days, except it may retain the following:
 - a) An amount equal to 200% of the value of labor or materials yet to be provided on the Project as determined by the Owner or Architect.
 - b) An amount equal to 200% of the value of any Chapter 573 claims currently on file at the time of Request for Release of Retainage is approved.
- 3) If the Owner withholds an amount from the retainage payment to the Contractor, the Owner will provide a reason the request is being denied to the Contractor within thirty (30) calendar days of the receipt of the request.

F. 9.10 - Final Completion and Final Payment

1. Add Sections 9.10.6 and 9.10.7:

- a. 9.10.6 - Final payment will be made not earlier than 31 days following approval by the Owner at a regularly scheduled Council Meeting, receipt of all Lien Waivers, Chapter 573 Claim Releases, completed AIA Documents G706, G706A and G707, and all other required documentation, and subject to the conditions of and in accordance with the provisions of Iowa Code Chapter 573 and Iowa Code Chapter 26.
- b. 9.10.7 - The Contractor and the Contractor's surety, if any, shall be liable for and shall pay the Owner for any extra costs for engineering or architectural services, construction observation services and related expenses necessitated by the delayed prosecution of the work by the Contractor beyond the date of Final Completion required by the Agreement. Such costs are in no way a penalty, but represent additional expenses to the Owner caused by the Contractor's delay in completing the Work.

1.9 ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

A. 10.2 - Safety of Persons and Property

1. Delete Sentence 2 of Section 10.2.5 to replace with the following:

- a. "The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to negligent acts, errors, or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor."

1.10 ARTICLE 11 - INSURANCE AND BONDS

- A. 11.1 - Contractor's Insurance and Bonds
1. Add Section 11.1.1.1:
 - a. 11.1.1.1 - See "INSURANCE REQUIREMENTS FOR CONTRACTORS FOR THE CITY OF CEDAR FALLS" document, included at back of 002113-INSTRUCTIONS TO BIDDERS.
 2. Add Section 11.1.2.1:
 - a. 11.1.2.1 - The Contractor shall furnish a Performance Bond and a Payment Bond executed on AIA Form A312 or standard surety form covering faithful performance of the Contract and payment obligations arising thereunder. The penal sum for each shall be equal to one hundred percent (100%) of the contract sum. The surety on such bonds shall be a duly authorized surety company authorized to do business in the State of Iowa and countersigned by an Iowa agency satisfactory to the Owner. The bidder surety shall affix thereto a certified and current copy of his power of attorney indicating the monetary limit of such power.
- B. 11.2 - Owner's Insurance
1. Add Section 11.2.1.1:
 - a. 11.2.1.1 - The Owner shall purchase and maintain property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds.

1.11 ARTICLE 13 - MISCELLANEOUS PROVISIONS

- A. 13.1 - Governing Law
1. Delete the last sentence of Section 13.1.
 2. Add Section 13.1.1:
 - a. 13.1.1 - Compliance with Law Provision: The Contractor agrees that he will comply with all applicable Federal, State and local laws, statues, codes, rules and regulations having jurisdiction over the Project. Contractor shall take all necessary precautions to keep the site and work in compliance with the safety and health regulations for construction issued by the Bureau of Labor Standards of the U.S. Department of Labor as well as the Occupational Safety and Health Standards, parts 1910 and 1926 as amended and as enforced by the State of Iowa.
 3. Delete Section 13.5 and replace with the following:
 - a. 13.5 - Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate established by Section 74A.2, Code of Iowa.

1.12 ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT

- A. 14.2 - Termination by the Owner for Cause
1. Modify Section 14.2.2 by adding the following text at the end of line 4 after the word "surety" but before the colon (:):
 - a. "..., and unless otherwise prohibited by applicable statutory law"

1.13 ARTICLE 15 - CLAIMS AND DISPUTES

- A. 15.1.2 - Time Limits on Claims

1. Delete Section 15.1.2 in its entirety and replace with the following:
 - a. 15.1.2 - Commencement of Statutory Limitation Period
 - 1) As between Owner and Contractor:
 - a) Before Substantial Completion: As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;
 - b) Between Substantial Completion and Final Certificate for Payment: As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and
 - c) After Final Certificate for Payment: As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any Warranty provided under Section 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Section 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.
- B. 15.3 - Mediation
 1. Modify Section 15.3.2 to delete the last two sentences.
 2. Add Section 15.3.5:
 - a. 15.3.5 - Contractor agrees to include a similar mediation provision in all agreements with Sub-Contractors, Independent Contractors and Suppliers providing work under Contractor for this Project.
- C. 15.4 - Arbitration
 1. Delete Section 15.4 and all other references to arbitration. Claims and disputes not resolved by mediation shall be taken to litigation.

END OF DOCUMENT 007300

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work performed by Owner.
5. Contractor's use of site and premises.
6. Coordination with occupants.
7. Work restrictions.
8. Specification and Drawing conventions.

- B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. Section 017300 "Execution" for coordination of Owner-installed products.

1.3 PROJECT INFORMATION

- A. Project Identification: **21004 - Cedar Falls City Hall Remodel**

1. Project Location: 220 Clay Street, Cedar Falls, Iowa, 50613

- B. Owner: City of Cedar Falls, Iowa

- C. Architect: Emergent Architecture - 100 E 2nd St., Suite 204, Cedar Falls, Iowa, 50613 - 319.529.3945

- D. Architect's Consultants: Architect has retained the following design professionals, who have prepared designated portions of the Contract Documents:

1. Mechanical Engineer: Bluestone Engineering - 5518 NW 88th St, Johnston, Iowa 50131 - 515.727.0700
2. Electrical Engineer: Bluestone Engineering - 5518 NW 88th St, Johnson, Iowa, 50131 - 515.727.0700

- E. Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage.

1. See Section 013100 "Project Management and Coordination." for requirements for using web-based Project software.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. Description of Work:

- a. The project consists of a full building renovation to the City Hall. Base bid includes a multiple phase project with an alternate for a single phase option. The architectural scope includes removal of interior walls, ceilings and flooring and replacement of interior finishes. Wall, roof, and floor penetrations to be cut through concrete, coreslabs, and waffle slab structures. New frame walls, structural steel, casework, flooring, painting, ceiling work, doors and frames, and finish carpentry is included throughout the project. There is partial aluminum window and door replacement. There is minor exterior work including concrete patching, window replacement, exterior ladder and new mechanical roof top installation with roof patching.
- b. Mechanical Scope: The entire mechanical system (geothermal) will get replaced with a new VRF system throughout the building. Rooftop condensing units and ERVs are installed and ducted throughout. Existing ductwork is reused in some locations. The building is separated into a northern half and a southern half with the rooftops serving the two zones.

These zones are also split per the phasing plan. New restrooms are added, and existing restrooms are renovated. Minor lower level concrete work is required for sanitary connections.

- c. Electrical Scope: Power distribution will be revised to accommodate HVAC renovation and code compliancy. Lighting will be renovated to new LED technology with occupancy sensor controls to align with current energy codes. Fire alarm detection and notification will be upgraded throughout the facility; and technology systems currently in place (access control, security camera, audio/video) will be expanded.

B. Type of Contract:

- 1. All work will be constructed under a single prime contract.

1.5 PHASED CONSTRUCTION

A. Construct the Work in phases, with each phase substantially complete, as indicated on Drawings .

- 1. Alternate 2 provides an option to construct the project under a single phase with the Owner vacating the building.

B. Before commencing Work of each phase, submit an updated copy of Contractor's construction schedule, showing the sequence, commencement and completion dates , and move-out and -in dates of Owner's personnel for all phases of the Work.

1.6 WORK PERFORMED BY OWNER

A. Cooperate fully with Owner, so work may be carried out smoothly, without interfering with or delaying Work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before Work under this Contract begins.

- 1. Removal of existing furniture prior to the start of each phase .

C. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract.

- 1. Review technology plans for Owner provided and/or installed items .

1.7 CONTRACTOR'S USE OF SITE AND PREMISES

A. Restricted Use of Site: Each Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Limits on Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

- 1. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

- a. Schedule deliveries to minimize use of driveways and entrances by construction operations.

C. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.8 COORDINATION WITH OCCUPANTS

A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.

- 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.

- 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.9 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to between 7:00 a.m. to 9:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Owner's property is not permitted.
- F. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- G. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
 1. Maintain list of approved screened personnel with Owner's representative.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
 - 1. Contingency allowances.
- C. Related Requirements:
 - 1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Section 014000 "Quality Requirements" for procedures governing the use of allowances for field testing by an independent testing agency.

1.3 DEFINITIONS

- A. Allowance: A quantity of work or dollar amount included in the Contract, established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.5 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.6 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.7 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs. Contractor markup is NOT allowed to be included in the change order. Any overhead and profit shall be included under the base-bid.
- D. Contractor bonding is to be included on the total project sum and shall NOT be added to project changes.
- E. A detailed breakout of all requested changes shall be included with each change request. Breakouts include material costs and quantities, labor hours, rental fees, and other associated costs to equal the requested sum.
- F. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.9 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, required maintenance materials, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
 - 3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
 - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs due to a change in the scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Contingency Allowance: Include a contingency allowance of \$200,000.00 for use according to Owner's written instructions.

END OF SECTION 012100

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 1. Include, as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other Work of the Contract.
- C. Schedule: A Part 3 "Schedule of Alternates" Article is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1 : Tubular Daylighting Devices .
 1. Base Bid: No Tubular Daylighting Devices.
 2. Alternate: Under this alternate, provide a price to furnish and install all Tubular Daylighting devices as indicated on the drawings. The price shall include the full installation including roof and floor cutting and reinforcement, curbs, roof patching, etc. See section 086250 TUBULAR DAYLIGHTING DEVICES for product information.
- B. Alternate No. 2 : Single Phase Construction .
 1. Base Bid: Contractor shall price the project to comply with the phasing plans indicated on the drawings with the Owner occupied in parts of the building during construction.
 2. Alternate: Under this alternate, provide a price to change from a multi-phase project to a single phase project. The Owner shall vacate the building and allow the contractor to have full access and construct the project in any sequence that is most cost effective. The alternate shall include a potential deduct on cost and indicate a savings on the project construction time. .
- C. Alternate No. 3: Fire Alarm
 1. Alternate: Under this alternate, provide a price to furnish and install new fire alarm control panel and replace fire alarm devices throughout the facility as indicated on the drawings.

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Document 002600 "Procurement Substitution Procedures" for requirements for substitution requests prior to award of Contract.
 - 2. Section 012100 "Allowances" for products selected under an allowance.
 - 3. Section 012300 "Alternates" for products selected under an alternate.
 - 4. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.6 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
 - 2. Section 013100 "Project Management and Coordination" for requirements for forms for contract modifications provided as part of web-based Project management software.

1.3 MINOR CHANGES IN THE WORK (ASI)

- A. Architect will issue supplemental instructions (ASI) authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710 .

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 12 after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Architect .
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect .
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Proposal Request Form: Use form acceptable to Architect .

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 .

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714 . Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 1. Section 012100 "Allowances" for procedural requirements governing the handling and processing of allowances.
 2. Section 012200 "Unit Prices" for administrative requirements governing the use of unit prices.
 3. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 4. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Owner's name.
 - c. Owner's Project number.
 - d. Name of Architect.
 - e. Architect's Project number.
 - f. Contractor's name and address.
 - g. Date of submittal.
 2. Arrange schedule of values consistent with format of AIA Document G703 .
 3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
5. Mechanical and Electrical contracts shall be broken down by specification section, labor and material.
6. The plumbing contractor shall also separate costs of the work from 5 feet outside the building exterior into the building from the costs from 5 feet outside the building to the street or connection point of the civil portion of the work.
7. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Purchase Contracts: Provide a separate line item in the schedule of values for each Purchase contract. Show line-item value of Purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
10. Overhead Costs, Separate Line Items: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
11. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
12. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
13. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by Architect and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Owner/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:

- a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect Construction Manager by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Sustainable design action plans, including preliminary project materials cost data.
 6. Schedule of unit prices.
 7. Submittal schedule (preliminary if not final).
 8. List of Contractor's staff assignments.
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
 15. Data needed to acquire Owner's insurance.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 017700 "Closeout Procedures."
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Certification of completion of final punch list items.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706.
 5. AIA Document G706A.
 6. AIA Document G707.
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Waivers and releases.
 10. "As-Built" or "Record Drawings" of all contractors has been submitted to Architect.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 5. Web-based Project management software package.
 - 6. Project meetings.
- B. Related Requirements:
 - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. Coordination Drawings: A compilation of the pertinent layout and system drawings that show the sizes and locations, including elevations, of system components and required access areas to ensure that no two objects will occupy the same space.
- C. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of list in Project meeting room, in temporary field office, in web-based Project software directory, and in prominent location in each built facility. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS - **REQUIRED**

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Participation:
 - a. The contractors and subcontractors responsible for work defined in this section shall participate in the coordination drawing process.
 - b. Once contractor shall be designated as the Coordination Contractor for purposes of preparing a complete set of composite electronic CAD coordination drawings that include all applicable trades, and for coordinating the activities related to this process. The Coordinating Contractor for this project shall be the Mechanical Contractor.
 - 1) The Coordinating Contractor shall utilize personnel familiar with requirements of this project and skilled as draftspersons/CAD operators, competent to prepare the required coordination drawings.
 - c. Electronic 3D BIM drawings shall be submitted to the Coordinating Contractor for addition of work by other trades.
 2. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - 1) Contractors shall use the coordination process to identify the proper sequence of installation of all utilities above ceilings and in other congested areas, to ensure an orderly and coordinated end result, and to provide adequate access for service and maintenance.
 - g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide

alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

- h. Maintenance clearances and code-required dedicated space shall be included.
 - i. The coordination drawings shall include all underground, underfloor, in-floor, in chase, and vertical trade items.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms, showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 5. Mechanical and Plumbing Work: Include, but not limited to, the following:
 - a. Mechanical equipment, ductwork, fire protection systems, plumbing piping, hydronic piping, and any item that may impact coordination with other disciplines:
 - 1) Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - 2) Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - 3) Fire-rated enclosures around ductwork.
 6. Electrical Work: Include, but not limited to, the following:
 - a. Electrical equipment, conduit, conduit racks, cable trays, pull boxes, transformers, raceway, busway, lighting, ceiling-mounted devices, and any item that may impact coordination with other disciplines:
 - 1) Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - 2) Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - 3) Panel board, switchboard, switchgear, transformer, busway, generator, and motor-control center locations.
 - 4) Location of pull boxes and junction boxes, dimensioned from column center lines.
 7. Fire-Protection System: Include, but not limited to, the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
 8. Technology Work: Include, but not limited to, the following:
 - a. Technology equipment, racks, conduit 1-1/4 inches in diameter and larger, conduit racks, cable trays, ladder rack, pull boxes, raceway, ceiling-mounted devices, and any item that may impact coordination with other disciplines.
 9. Review: Architect will review coordination drawings to confirm that, in general, the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.
 10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. The file format and file naming convention shall be coordinated with and agreed to by all contractors participating in the coordination process and the Owner.
 - a. Scale of drawings:
 - 1) General plans: 1/4 Inch = 1'-0" (minimum).
 - 2) Mechanical, electrical, communication rooms, and including the surrounding areas within 10 feet: 1/2 Inch = 1'-0" (minimum).
 - 3) Shafts and risers: 1/2 Inch = 1'-0" (minimum).

- 4) Sections of shafts and mechanical and electrical equipment rooms: 1/4 Inch = 1'-0" (minimum).
- 5) Sections of congested areas: 1/2 Inch = 1'-0" (minimum).
- b. Ductwork layout drawings shall be the baseline system for other components. Ductwork layout drawings shall be modified to accommodate other components as the coordination process progresses.
- c. There may be more drawings required for risers, top and bottom levels of mechanical room, and shafts.
- d. The minimum quantity of drawings will be established at the first coordination meeting and sent to the A/E for review. Additional drawings may be required if other areas of congestion are discovered during the coordination process.
2. File Preparation Format:
 - a. Same digital data software program, version, and operating system as original Drawings.
 - b. DWG DXF DGN , Version , operating in Microsoft Windows operating system.
3. File Submittal Format: Submit or post coordination drawing files using PDF format.
4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 - b. Contractor shall execute a data licensing agreement in the form of AIA Document C106 .
- D. General:
 1. Coordination drawings files shall be made available to the A/E and Owner's Representative. The A/E will only review identified conflicts and give an opinion, but will not perform as a coordinator.
 2. A plotted set of coordination drawings shall be available at the project site.
 3. The contract drawings are schematic in nature and do not show ever fitting and appurtenance for each utility. Each contractor is expected to have included in his/her bid sufficient fittings, material, and labor to allow for adjustments in routing of utilities made necessary by the coordination process and to provide a complete and functional system.
 4. The contractors will not be allowed additional costs or time extensions due to participation in the coordination process.
 5. The contractors will not be allowed additional costs or time extensions for additional fittings, reroutings or changes of duct size, that are essentially equivalent sizes to those shown on the drawings and determined necessary through the coordination process.
 6. The A/E reserves the right to determine space priority of equipment in the event of spatial conflicts or interference between equipment, piping, conduit, ducts and equipment provided by the trades.
 7. Changes to the contract documents that are necessary for systems installation and coordination shall be brought to the attention of the A/E.
 8. Access panels shall preferably occur only in gypsum board walls or plaster ceiling where indicated on the drawings.
 - a. Access to mechanical, electrical, technology, and other items located above the ceiling shall be through accessible lay-in ceiling tiles areas.
 - b. Potential layout changes shall be made to avoid additional access panels.
 - c. Additional access panels shall not be allowed without written approval from the A/E at the coordination drawing stage.
 - d. Providing additional access panels shall be considered after other alternatives are reviewed and discarded by the A/E and the Owner's Representative.
 9. Complete the coordination drawing process and obtain sign off of the drawings by all contractors prior to installing any of the components.
 10. Conflicts that result after the coordination drawings are signed off shall be the responsibility of the contractor or subcontractor who did not properly identify their work requirements, or installed their work without proper coordination.
 11. Updated coordination drawings that reflect as-built conditions may be used as record documents.
- 1.7 REQUEST FOR INFORMATION (RFI)
 - A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Owner name.
 3. Owner's Project number.
 4. Name of Architect.
 5. Architect's Project number.
 6. Date.
 7. Name of Contractor.
 8. RFI number, numbered sequentially.
 9. RFI subject.
 10. Specification Section number and title and related paragraphs, as appropriate.
 11. Drawing number and detail references, as appropriate.
 12. Field dimensions and conditions, as appropriate.
 13. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 14. Contractor's signature.
 15. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 5 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log . Use software log that is part of web-based Project management software. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number, including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within three days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Use of Architect's Digital Data Files: Digital data files of Architect's CAD drawings will be provided by Architect for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project Record Drawings.
 2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
 3. Contractor shall execute a data licensing agreement in the form of AIA Document C106 Digital Data Licensing Agreement .
 - a. Subcontractors and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of AIA Document C106 .
 4. The following digital data files will be furnished for each appropriate discipline:
 - a. Floor plans.
 - b. Reflected ceiling plans.
- B. Web-Based Project Management Software Package: Provide, administer, and use web-based Project management software package for purposes of hosting and managing Project communication and documentation until Final Completion.
1. Web-based Project management software includes, at a minimum, the following features:
 - a. Compilation of Project data, including Contractor, subcontractors, Architect, Architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
 - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
 - c. Document workflow planning, allowing customization of workflow between project entities.
 - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
 - e. Track status of each Project communication in real time, and log time and date when responses are provided.
 - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
 - g. Creating and distributing meeting minutes.
 - h. Document management for Drawings, Specifications, and coordination drawings, including revision control.
 - i. Management of construction progress photographs.
 2. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect. Provide data in locked format to prevent further changes.

1.9 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of seven days prior to meeting.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the

- conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Preparation of Record Documents.
 - o. Use of the premises and existing building.
 - p. Work restrictions.
 - q. Working hours.
 - r. Owner's occupancy requirements.
 - s. Responsibility for temporary facilities and controls.
 - t. Procedures for moisture and mold control.
 - u. Procedures for disruptions and shutdowns.
 - v. Parking availability.
 - w. Office, work, and storage areas.
 - x. Equipment deliveries and priorities.
 - y. First aid.
 - z. Security.
 - aa. Progress cleaning.
 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other Sections and when required for coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility requirements.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written instructions.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.

- s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at monthly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site use.
 - 8) Temporary facilities and controls.
 - 9) Progress cleaning.
 - 10) Quality and work standards.
 - 11) Status of correction of deficient items.
 - 12) Field observations.
 - 13) Status of RFIs.
 - 14) Status of Proposal Requests.
 - 15) Pending changes.
 - 16) Status of Change Orders.
 - 17) Pending claims and disputes.
 - 18) Documentation of information for payment requests.
 4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- E. Coordination Meetings: Conduct Project coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site use.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of RFIs.
 - 14) Proposal Requests.
 - 15) Change Orders.
 - 16) Pending changes.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 013233 "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and Final Completion construction photographs.
5. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
6. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
7. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
8. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
9. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 2. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 3. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.

- a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.

1.5 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
 1. Project name.
 2. Date.
 3. Name of Architect.
 4. Name of Contractor.
 5. Name of firm or entity that prepared submittal.
 6. Names of subcontractor, manufacturer, and supplier.
 7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
 8. Category and type of submittal.
 9. Submittal purpose and description.
 10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 11. Drawing number and detail references, as appropriate.
 12. Indication of full or partial submittal.
 13. Location(s) where product is to be installed, as appropriate.
 14. Other necessary identification.
 15. Remarks.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.

1.6 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 1. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.
 - a. Basis of Design Web-Based Project Management Software: Submittal Exchange.
 - 1) Contractors existing Procore Construction Management System is an acceptable alternative.
 2. Paper: Prepare submittals in paper form and deliver to Architect.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.

- a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 - 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 - 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 - 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 - 5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.

- d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
- C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.
- 1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
 - 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 - 3. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
 - 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 - 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
- 1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 - 2. Manufacturer and product name, and model number if applicable.
 - 3. Number and name of room or space.
 - 4. Location within room or space.
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
 5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.
- H. Test and Research Reports:
1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
 2. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 3. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
 4. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- 1.8 DELEGATED-DESIGN SERVICES
- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
 - B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- 1.9 CONTRACTOR'S REVIEW
- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
 - B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp . Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.10 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required , and return.
 - 1. Submittals by Web-Based Project Management Software: Architect will indicate, on Project management software website, the appropriate action.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Mockups: Physical assemblies of portions of the Work constructed to establish the standard by which the Work will be judged. Mockups are not Samples.
 - 1. Mockups are used for one or more of the following:
 - a. Verify selections made under Sample submittals.
 - b. Demonstrate aesthetic effects.
 - c. Demonstrate the qualities of products and workmanship.
 - d. Demonstrate successful installation of interfaces between components and systems.
 - e. Perform preconstruction testing to determine system performance.
 - 2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
 - 3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

- G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
 - H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."
 - I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
 - J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.
- 1.4 DELEGATED DESIGN SERVICES
- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
 - B. Delegated Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
- 1.5 CONFLICTING REQUIREMENTS
- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.
 - B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.
- 1.6 INFORMATIONAL SUBMITTALS
- A. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.
- 1.7 CONTRACTOR'S QUALITY-CONTROL PLAN
- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice of Award , and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate Owner's quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.
 - B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project quality-control manager may also serve as Project superintendent .
 - C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
 - D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
- E. Monitoring and Documentation: Maintain testing and inspection reports, including log of approved and rejected results. Include Work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, telephone number, and email address of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.

1.9 QUALITY ASSURANCE

- A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.
- D. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups of size indicated.
 2. Build mockups in location indicated or, if not indicated, as directed by Architect.
 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 6. Obtain Architect's approval of mockups before starting corresponding Work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
 8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
10. Demolish and remove mockups when directed unless otherwise indicated.

1.10 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor will not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.11 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures, and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections, and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.

3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and authorities' having jurisdiction reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.
- C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- E. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.
- F. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste-handling procedures.
 - 5. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS**2.1 MATERIALS**

- A. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- B. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats minimum 36 by 60 inches.
- C. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION**3.1 TEMPORARY FACILITIES, GENERAL**

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
 - E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
 - F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
 - G. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
 - H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- 3.4 SUPPORT FACILITIES INSTALLATION
- A. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
 - 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 - 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 312000 "Earth Moving."
 - B. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
 - C. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 - 3. Maintain and touch up signs so they are legible at all times.
 - D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
 - E. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
 - 1. Do not load elevators beyond their rated weight capacity.
 - 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.

- F. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
- G. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- C. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- E. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- G. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 - 1. Insulate partitions to control noise transmission to occupied areas.
 - 2. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 - 3. Protect air-handling equipment.
 - 4. Provide walk-off mats at each entrance through temporary partition.
- H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.

2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 3. Indicate methods to be used to avoid trapping water in finished work.
 - B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
 - C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard and replace stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- 3.7 OPERATION, TERMINATION, AND REMOVAL
- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
 - B. Maintenance: Maintain facilities in good operating condition until removal.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
 - D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for Contractor requirements related to Owner-furnished products.
 - 2. Section 012100 "Allowances" for products selected under an allowance.
 - 3. Section 012300 "Alternates" for products selected under an alternate.
 - 4. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 5. Section 014200 "References" for applicable industry standards for products specified.
 - 6. Section 01770 "Closeout Procedures" for submitting warranties.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
 - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
 - 1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:

1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
- E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."
- F. Substitution: Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.
- 1.4 QUALITY ASSURANCE
- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- 1.5 COORDINATION
- A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.
- 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING
- A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.
- C. Storage:
1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
 2. Store products to allow for inspection and measurement of quantity or counting of units.
 3. Store materials in a manner that will not endanger Project structure.
 4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.
 5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 7. Protect stored products from damage and liquids from freezing.
- 1.7 PRODUCT WARRANTIES
- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.

3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
 - a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by the Architect, whose determination is final.
- B. Product Selection Procedures:
 1. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
 2. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.
 - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
 3. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
 4. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
 5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may

additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.

2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.

3. Evidence that proposed product provides specified warranty.

4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.

5. Samples, if requested.

B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 013300 "Submittal Procedures."

1. Form of Approval of Submittal: As specified in Section 013300 "Submittal Procedures."

2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

C. Submittal Requirements, Single-Step Process: When acceptable to Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by the Architect of Contractor's request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Installation of the Work.
 - 3. Cutting and patching.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Protection of installed construction.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for limits on use of Project site.
 - 2. Section 013300 "Submittal Procedures" for submitting surveys.
 - 3. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 - 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 1. Establish limits on use of Project site.
 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 3. Inform installers of lines and levels to which they must comply.
 4. Check the location, level and plumb, of every major element as the Work progresses.

5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
 - D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
 - E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.
 1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.5 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
 - B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
 - C. Temporary Support: Provide temporary support of work to be cut.
 - D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
 - E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."
 - F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
 - G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete : Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
 - H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
 - I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.
- 3.6 OWNER-INSTALLED PRODUCTS
- A. Site Access: Provide access to Project site for Owner's construction personnel.

- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.
- 3.7 PROGRESS CLEANING
- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
- 3.8 PROTECTION OF INSTALLED CONSTRUCTION
- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.
- END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Recycling nonhazardous demolition and construction waste.
 - 2. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
 - 1. Section 042000 "Unit Masonry" for disposal requirements for masonry waste.

1.3 DEFINITIONS

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 NOT USED.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."

- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 - C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.
- 3.2 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL
- A. General: Recycle paper and beverage containers used by on-site workers.
 - B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
 - C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 3. Store components off the ground and protect from the weather.
 - 4. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.
- 3.3 RECYCLING DEMOLITION WASTE
- A. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 - 1. Pulverize concrete to maximum 4-inch size.
 - B. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 - 1. Pulverize masonry to maximum 4-inch size.
 - 2. Clean and stack undamaged, whole masonry units on wood pallets.
 - C. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
 - D. Metals: Separate metals by type.
 - 1. Structural Steel: Stack members according to size, type of member, and length.
 - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
 - E. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
 - F. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
 - G. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
 - H. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.
 - I. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
 - J. Carpet Tile: Remove debris, trash, and adhesive.
 - 1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by carpet reclamation agency or carpet recycler.
 - K. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.
 - L. Conduit: Reduce conduit to straight lengths and store by material and size.
 - M. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.
- 3.4 RECYCLING CONSTRUCTION WASTE
- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.

- 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
 - B. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
 - 1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.
 - a. Comply with requirements in Section 329300 "Plants" for use of clean ground gypsum board as inorganic soil amendment.
 - C. Paint: Seal containers and store by type.
- 3.5 DISPOSAL OF WASTE
- A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - B. Burning: Do not burn waste materials.
- END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
- B. Related Requirements:
 - 1. Section 012900 "Payment Procedures" for requirements for Applications for Payment for Substantial Completion and Final Completion.
 - 2. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
 - 3. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 4. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.3 DEFINITIONS

- A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.5 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

1.7 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.

3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect . Label with manufacturer's name and model number.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain signature for receipt of submittals.
 5. Submit testing, adjusting, and balancing records.
 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 - C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 1. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 2. Complete startup and testing of systems and equipment.
 3. Perform preventive maintenance on equipment used prior to Substantial Completion.
 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
 5. Advise Owner of changeover in utility services.
 6. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 8. Complete final cleaning requirements.
 9. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
 - D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
 1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.
- 1.8 FINAL COMPLETION PROCEDURES
- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
 1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- 1.9 LIST OF INCOMPLETE ITEMS
- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.

2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the following format:
 - a. PDF Electronic File: Architect will return annotated file.
 - b. Web-Based Project Software Upload: Utilize software feature for creating and updating list of incomplete items (punch list).

1.10 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
 1. For final deliverable, provide one bound hard copy of all warranties and one PDF copy on USB 3.0 flash drive.
- D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 1. Submit by uploading to web-based project software site .
- E. Warranties in Paper Form:
 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- F. Provide additional copies of each warranty to include in operation and maintenance manuals.
- G. Unless specifically specified otherwise, supply all standard manufacturer warranties for all products used in project.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
 - i. Vacuum and mop concrete.
 - j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - l. Remove labels that are not permanent.
 - m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - q. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
 - r. Clean strainers.
 - s. Leave Project clean and ready for occupancy.

- C. Construction Waste Disposal: Comply with waste-disposal requirements in Section 017419 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations required by Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory manuals.
 - 2. Systems and equipment operation manuals.
 - 3. Systems and equipment maintenance manuals.
 - 4. Product maintenance manuals.
- B. Related Requirements:
 - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
 - 3. For final submission, provide 1 hard copy and 1 PDF version on USB 3.0 flash drive.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit by uploading to web-based project software site . Enable reviewer comments on draft submittals.
- C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
 - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within days of receipt of Architect's comments and prior to commencing demonstration and training.
- D. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

- B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
 4. Supplementary Prepared on 8-1/2-by-11-inch white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Include the following information:
1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name and contact information for Contractor.
 6. Name and contact information for Architect.
 7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

- 1.7 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL
- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
 2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
 3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- 1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS
- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- C. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- D. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

- 1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS
- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.
- J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of maintenance manuals.

1.10 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of all products, materials, and finishes incorporated into the Work, even if not specifically noted within each specification.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Product Information: Include the following, as applicable:
 1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 1. Include procedures to follow and required notifications for warranty claims.
 2. Unless specifically specified otherwise, supply all standard manufacturer warranties for all products used in project.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
- B. Related Requirements:
 - 1. Section 017300 "Execution" for final property survey.
 - 2. Section 017700 "Closeout Procedures" for general closeout procedures.
 - 3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of Record Drawings as follows:
 - a. Final Submittal:
 - 1) Submit PDF electronic files of scanned Record Prints and one set(s) of file prints for Owner.

1.4 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Depths of foundations.
 - c. Locations and depths of underground utilities.
 - d. Revisions to routing of piping and conduits.
 - e. Actual equipment locations.
 - f. Locations of concealed internal utilities.
 - g. Changes made by Change Order or Construction Change Directive.
 - h. Changes made following Architect's written orders.
 - i. Details not on the original Contract Drawings.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 - 4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Annotated PDF electronic file.
 2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 3. Refer instances of uncertainty to Architect for resolution.
 4. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
 - a. See Section 013100 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
- C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file.
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.
- 1.5 RECORD PRODUCT DATA
- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.
- B. Format: Submit Record Product Data as annotated PDF electronic file .
1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.
- 1.6 MAINTENANCE OF RECORD DOCUMENTS
- A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For facilitator. .
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.7 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.

- e. Equipment function.
- f. Operating characteristics.
- g. Limiting conditions.
- h. Performance curves.
- 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Systems and equipment operation manuals.
 - c. Systems and equipment maintenance manuals.
 - d. Product maintenance manuals.
 - e. Project Record Documents.
 - f. Identification systems.
- 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
- 4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning.
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

1.8 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

- B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner with at least seven days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Cleanup: Collect used and leftover educational materials and . Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017900

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 017300 "Execution" for cutting and patching procedures.
3. Section 013516 "Alteration Project Procedures" for general protection and work procedures for alteration projects.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse .
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 INFORMATIONAL SUBMITTALS

1.5 CLOSEOUT SUBMITTALS

1.6 QUALITY ASSURANCE

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 1. Before selective demolition, Owner will remove the following items:
 - a. furniture .
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 1. Hazardous materials will be removed by Owner before start of the Work.
 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.

- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
 - 1. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Arrange to shut off utilities with utility companies.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 5. Maintain adequate ventilation when using cutting torches.
 - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 9. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
 - 1. Transport items to Owner's storage area designated by Owner .
- D. Removed and Reinstalled Items:
 - 1. Clean and repair items to functional condition adequate for intended reuse.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal."
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.9 SELECTIVE DEMOLITION SCHEDULE

- A. Remove and Salvage: Remove items and turn over to the Owner .
 - 1. All unused hardware from the door access system (door/site controllers, electronic locks or strikes)
 - 2. Any water fountains that are being removed
 - 3. Sloan toilet valves
 - 4. Gun Lockers
 - 5. Lockers in engineering area
 - 6. TV mounts
- B. Remove and Reinstall: as indicated on the drawings .
- C. Existing to Remain: as indicated on the drawings .

END OF SECTION 024119

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

- A. Product Data: For each of the following.

- 1. Portland cement.
- 2. Fly ash.
- 3. Slag cement.
- 4. Blended hydraulic cement.
- 5. Aggregates.
- 6. Admixtures:
 - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
- 7. Vapor retarders.
- 8. Floor and slab treatments.
- 9. Liquid floor treatments.
- 10. Curing materials.
 - a. Include documentation from color pigment manufacturer, indicating that proposed methods of curing are recommended by color pigment manufacturer.
- 11. Joint fillers.
- 12. Repair materials.

- B. Design Mixtures: For each concrete mixture, include the following:

- 1. Mixture identification.
- 2. Minimum 28-day compressive strength.
- 3. Durability exposure class.
- 4. Maximum w/cm.
- 5. Calculated equilibrium unit weight, for lightweight concrete.
- 6. Slump limit.
- 7. Air content.
- 8. Nominal maximum aggregate size.
- 9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
- 10. Include manufacturer's certification that permeability-reducing admixture is compatible with mix design.
- 11. Include certification that dosage rate for permeability-reducing admixture matches dosage rate used in performance compliance test.
- 12. Intended placement method.
- 13. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

- C. Shop Drawings:
 - 1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - a. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For the following:
 - 1. Ready-mixed concrete manufacturer.
- B. Material Test Reports: For the following, from a qualified testing agency:
 - 1. Portland cement.
 - 2. Fly ash.
 - 3. Slag cement.
 - 4. Blended hydraulic cement.
 - 5. Aggregates.
 - 6. Admixtures:
 - a. Permeability-Reducing Admixture: Include independent test reports, indicating compliance with specified requirements, including dosage rate used in test.
- C. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer with a minimum of 5 years of experience with project of a similar size and scope.
- B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
 - 1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301.

1.8 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
 - 1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 3. Do not use frozen materials or materials containing ice or snow.
 - 4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
 - 5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
 - 1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

- A. Source Limitations:
 - 1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
 - 2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.

3. Obtain aggregate from single source.
 4. Obtain each type of admixture from single source from single manufacturer.
- B. Cementitious Materials:
1. Portland Cement: ASTM C150/C150M, Type I , gray .
 2. Fly Ash: ASTM C618, Class C or F.
 3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
 4. Blended Hydraulic Cement: ASTM C595/C595M, Type IS, portland blast-furnace slag cement.
- C. Normal-Weight Aggregates: ASTM C33/C33M, coarse aggregate or better, graded. Provide aggregates from a single source.
1. Maximum Coarse-Aggregate Size: 1 inch nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
 3. Aggregates shall be free of materials with deleterious reactivity to alkali in cement.
- D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride .
1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 2. Retarding Admixture: ASTM C494/C494M, Type B.
 3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
- E. Water and Water Used to Make Ice: ASTM C94/C94M, potable
- 2.3 VAPOR RETARDERS
- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A , except with maximum water-vapor permeance of ; not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Stego Industries, LLC; Stego Wrap Vapor Barrier (15-Mil) or comparable product by one of the following:
 - a. ISI Building Products; Viper VaporCheck II 15-mil
 - b. Raven Industries, Inc; VaporBlock VB10
 - c. W.R. Meadows, Inc; Perminator 15 mil
- 2.4 CURING MATERIALS
- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Corporation; MasterKure ER 50.
 - b. Euclid Chemical Company (The); an RPM company; Eucobar.
 - c. TK Products; TK-TRI-FILM
 - d. W.R. Meadows, Inc; EVAPRE.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
1. Color:
 - a. Ambient Temperature Below 50 deg F: Black.
 - b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
 - c. Ambient Temperature Above 85 deg F: White.
- D. Water: Potable or complying with ASTM C1602/C1602M.
- E. Clear, Waterborne, Membrane-Forming, Curing Compound: ASTM C309, Type 1, Class B, 18 to 25 percent solids, nondissipating , certified by curing compound manufacturer to not interfere with bonding of floor covering.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Corporation; MasterKure CC 1315WB
 - b. Euclid Chemical Company (The); an RPM company; EverClear VOX
 - c. W.R. Meadows, Inc; Vocomp-20.

- F. Clear, Solvent-Borne, Membrane-Forming, Curing and Sealing Compound: ASTM C1315, Type 1, Class A, (Exterior Surfaces).
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Corporation; MasterKure CC 300 XS
 - b. Euclid Chemical Company (The); an RPM company; Super Diamond Clear
 - c. TK Products; TK-Kure & Seal 1315
 - d. W.R. Meadows, Inc; CS-309-30.

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber .
- B. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

2.6 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
 4. Compressive Strength: Not less than 4100 psi at 28 days when tested in accordance with ASTM C109/C109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
 1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.7 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 1. Fly Ash or Other Pozzolans: 25 percent by mass.
 2. Slag Cement: 50 percent by mass.
 3. Silica Fume: 10 percent by mass.
 4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
 5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
 1. Use water-reducing admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and concrete with a w/cm below 0.50, 4" maximum slump. Maximum slump is 8" with use of Type F, High Range admixture.

2.8 CONCRETE MIXTURES

- A. Footings and foundations: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 3000 psi at 28 days.
 2. Maximum Water-Cementitious Materials Ratio: 0.56.
 3. Slump Limit: 4 inches, plus or minus 1 inch.
 4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of placement for 1-1/2-inch nominal maximum aggregate size.
- B. Foundation Walls: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
 2. Maximum Water-Cementitious Materials Ratio: 0.50.
 3. Slump Limit: 4 inches, plus or minus 1 inch.
 4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of placement for 1-1/2-inch nominal maximum aggregate size.
- C. Slabs-on-Grade (Interior): Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
 2. Maximum water-cementitious ratio: 0.50.
 3. Slump Limit: 4 inches, plus or minus 1 inch.
 4. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
- D. Slabs-on-Grade (Exterior): Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days
 2. Maximum water-cementitious ratio: 0.50.
 3. Slump Limit: 4 inches, plus or minus 1 inch.
 4. Air Content: 6-1/2 percent, plus or minus 1.5 percent at point of placement for 1-1/2-inch nominal maximum aggregate size.
- E. Concrete on Metal Deck / Topping Slabs: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
 2. Maximum water-cementitious ratio: 0.50.
 3. Slump Limit: 4 inches, plus or minus 1 inch.
 4. Air Content: Do not allow air content of troweled finished toppings to exceed 3 percent.

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with IDOT , and furnish batch ticket information.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.
1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
 2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Verification of Conditions:
1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
 2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
 2. Face laps away from exposed direction of concrete pour.

3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
4. Lap joints 6 inches and seal with manufacturer's recommended tape.
5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damaged area by 6 inches on all sides, and sealing to vapor retarder.

3.3 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
 1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 2. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 3. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
 1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

3.4 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
 1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.
 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
 1. If a section cannot be placed continuously, provide construction joints as indicated.
 2. Deposit concrete to avoid segregation.
 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 1. Do not place concrete floors and slabs in a checkerboard sequence.
 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 3. Maintain reinforcement in position on chairs during concrete placement.

4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 5. Level concrete, cut high areas, and fill low areas.
 6. Slope surfaces uniformly to drains where required.
 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
 8. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 95 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.5 FINISHING FORMED SURFACES

- A. As-Cast Surface Finishes:
1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
 - a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
 - b. Remove projections larger than 1 inch.
 - c. Tie holes do not require patching.
 - d. Surface Tolerance: ACI 117 Class D.
 - e. Apply to concrete surfaces not exposed to public view .
 2. ACI 301 Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
 - a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
 - b. Remove projections larger than 1/4 inch.
 - c. Patch tie holes.
 - d. Surface Tolerance: ACI 117 Class B.
 - e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete .
- B. Rubbed Finish: Apply the following to as cast surface finishes where indicated on Drawings:
1. Smooth-Rubbed Finish:
 - a. Perform no later than one day after form removal.
 - b. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture.
 - c. If sufficient cement paste cannot be drawn from the concrete by the rubbing process, use a grout made from the same cementitious materials used in the in-place concrete.
 - d. Maintain required patterns or variances as shown on Drawings or to match .
 2. Grout-Cleaned Rubbed Finish:
 - a. Clean concrete surfaces after contiguous surfaces are completed and accessible.
 - b. Do not clean concrete surfaces as Work progresses.
 - c. Mix 1 part portland cement to 1-1/2 parts fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
 - d. Wet concrete surfaces.
 - e. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap, and keep surface damp by fog spray for at least 36 hours.
 - f. Maintain required patterns or variances as shown on Drawings or to match .

3.6 FINISHING FLOORS AND SLABS

- A. Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish:
 - 1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
 - 2. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
 - 3. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo .
- C. Trowel Finish:
 - 1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
 - 2. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance.
 - 3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 4. Do not add water to concrete surface.
 - 5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
 - 6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system .
 - 7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
 - a. Slabs on Ground:
 - 1) Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 3/16 inch .
 - 2) Specified overall values of flatness, FF 35; and of levelness, FL 25; with minimum local values of flatness, FF 24; and of levelness, FL 17.
- D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces . While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
 - 1. Coordinate required final finish with Architect before application.
 - 2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

3.7 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

- A. Filling In:
 - 1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
 - 2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
 - 3. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations:
 - 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 - 2. Construct concrete bases 4 inches high unless otherwise indicated on Drawings, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
 - 3. Minimum Compressive Strength: 4000 psi at 28 days.
 - 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 - 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
 - 6. Prior to pouring concrete, place and secure anchorage devices.
 - a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

- b. Cast anchor-bolt insert into bases.
- c. Install anchor bolts to elevations required for proper attachment to supported equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items.
 - 1. Cast-in inserts and accessories, as shown on Drawings.
 - 2. Screed, tamp, and trowel finish concrete surfaces.

3.8 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 - 1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
 - 2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
 - 3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.
- B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:
 - 1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
 - 2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
 - 3. If forms remain during curing period, moist cure after loosening forms.
 - 4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
 - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.
- C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:
 - 1. Begin curing immediately after finishing concrete.

3.9 TOLERANCES

- A. Conform to ACI 117.

3.10 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
 - 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 - 2. Do not apply to concrete that is less than 14 days' old.
 - 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
 - 4. Rinse with water; remove excess material until surface is dry.
 - 5. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.11 JOINT FILLING

- A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month(s).
 - 2. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.
- D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.12 CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
 - 1. Repair and patch defective areas when approved by Architect.
 - 2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
 - a. Limit cut depth to 3/4 inch.
 - b. Make edges of cuts perpendicular to concrete surface.
 - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
 - d. Fill and compact with patching mortar before bonding agent has dried.
 - e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
 - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
 - b. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces:
 - 1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
 - a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 3. After concrete has cured at least 14 days, correct high areas by grinding.
 - 4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
 - 5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
 - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - b. Feather edges to match adjacent floor elevations.
 - 6. Correct other low areas scheduled to remain exposed with repair topping.
 - a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
 - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - 7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
 - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
 - d. Place, compact, and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
 - 8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
 - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
 - b. Dampen cleaned concrete surfaces and apply bonding agent.
 - c. Place patching mortar before bonding agent has dried.

- d. Compact patching mortar and finish to match adjacent concrete.
- e. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.13 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
- B. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 2. Slump: ASTM C143/C143M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete;
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 4. Concrete Temperature: ASTM C1064/C1064M:
 - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
 - 5. Compression Test Specimens: ASTM C31/C31M:
 - a. Cast and laboratory cure two sets of two 6-inch by 12-inch or 4-inch by 8-inch cylinder specimens for each composite sample.
 - 6. Compressive-Strength Tests: ASTM C39/C39M.
 - a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 - 7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
 - 8. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 - 9. Additional Tests:
 - a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
 - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
 - 1) Acceptance criteria for concrete strength shall be in accordance with ACI 301 section 1.6.6.3.
 - 10. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 - 11. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

- D. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 48 hours of completion of floor finishing and promptly report test results to Architect.

3.14 PROTECTION

- A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 033000

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Concrete masonry units.
 - 2. Mortar and grout.

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

- A. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

2.2 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

2.3 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide bullnose units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C90.
 - 1. Density Classification: Normal weight .
 - 2. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.
 - 3. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
 - 4. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

2.4 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Holcim (US) Inc.
 - b. Lafarge North America Inc.
- B. Water: Potable.

2.5 REINFORCEMENT

2.6 MISCELLANEOUS MASONRY ACCESSORIES

2.7 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Use masonry cement mortar unless otherwise indicated.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Grout for Unit Masonry: Comply with ASTM C476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 - 2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
 - 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 - 2. Verify that reinforcing dowels are properly placed.
 - 3. Verify that substrates are free of substances that would impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
 - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
 - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
 - 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
 - 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
 - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
 - 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
 - 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
 - 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
 - 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
 - 7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch.
- C. Joints:
 - 1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
 - 2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
 - 3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
 - 4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern indicated on Drawings; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs. Field verify existing bond and coursing. All patching to match adjacent bonding and coursing.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078443 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- F. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than 60 inches .

3.8 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 - 3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 4. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

END OF SECTION 042200

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 1. Structural steel.
 2. Grout.

1.3 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges."

1.4 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering analysis by a qualified professional engineer, to withstand loads indicated and comply with other information and restrictions indicated.
 1. Select and complete connections using schematic details indicated and AISC 360.
 2. Use ASD; data are given at service-load level.
- B. Moment Connections: Type FR, fully restrained.
- C. Construction: Combined system of moment frame, braced frame, and shear walls.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.
 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 2. Include embedment drawings.
 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
 5. For structural-steel connections indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified installer, fabricator, professional engineer and testing agency.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: AISC certified.
- B. Installer Qualifications: Five years of similar experience. All welders shall be certified. Provide welder certificates at beginning of project construction.
- C. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- D. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- E. Comply with applicable provisions of the following specifications and documents:
 1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
 - 2. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.

1.9 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS**2.1 STRUCTURAL-STEEL MATERIALS**

- A. W-Shapes: ASTM A 992.
- B. Channels, Angles, M and/or S-Shapes: ASTM A 36.
- C. Plate and Bar: ASTM A 36.
- D. Corrosion-Resisting Structural-Steel Shapes, Plates, and Bars: ASTM A 588, Grade 50.
- E. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- F. Corrosion-Resisting Cold-Formed Hollow Structural Sections: ASTM A 847, structural tubing.
- G. Steel Pipe: ASTM A 53, Type E or S, Grade B.
 - 1. Weight Class: Standard.
 - 2. Finish: Black, except where indicated to be galvanized.
- H. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563, Grade C, heavy hex carbon-steel nuts; and ASTM F 436, Type I, hardened carbon-steel washers; all with plain finish.
 - 1. Direct-Tension Indicators: ASTM F 959, Type 325 compressible-washer type.
- B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy hex or round head steel structural bolts with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
 - 1. Finish: Plain
- C. Unheaded Anchor Rods: ASTM F 1554, Grade 36.
 - 1. Configuration: Straight or hooked.
 - 2. Nuts: ASTM A 563 heavy hex carbon steel.
 - 3. Plate Washers: ASTM A 36 carbon steel.
 - 4. Washers: ASTM F 436 hardened carbon steel.
 - 5. Finish: Plain.
- D. Headed Anchor Rods: ASTM F 1554, Grade 36.
 - 1. Nuts: ASTM A 563 heavy hex carbon steel.
 - 2. Plate Washers: ASTM A 36 carbon steel.
 - 3. Washers: ASTM F 436 hardened carbon steel.
 - 4. Finish: Plain.
- E. Threaded Rods: ASTM A 36.
 - 1. Nuts: ASTM A 563 heavy hex carbon steel.
 - 2. Washers: ASTM F 436.
 - 3. Finish: Plain.

2.3 PRIMER

- A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

2.4 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 2. Surfaces to be field welded.
 3. Surfaces to be high-strength bolted with slip-critical connections.
 4. Surfaces to receive sprayed fire-resistive materials.
 5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
1. SSPC-SP 2, "Hand Tool Cleaning."
 2. SSPC-SP 3, "Power Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 2. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.
- D. Painting: Prepare steel and apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

2.8 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123.
1. Fill vent holes and grind smooth after galvanizing.
 2. Galvanize exterior lintels and shelf angles attached to structural-steel frame and located in exterior walls.

2.9 SOURCE QUALITY CONTROL

- A. Testing Agency - Owner may engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings-- Allowable Stress Design and Plastic Design."

3.3 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 - 1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges".

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner to engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

3.5 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.

END OF SECTION 051200

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 2. Metal ladders.
- B. Related Requirements:
 - 1. Section 051200 "Structural Steel Framing" for steel framing, supports, elevator machine beams, hoist beams, divider beams, door frames, and other steel items attached to the structural-steel framing.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
 - 1. Metal ladders.

1.5 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- D. Aluminum Plate and Sheet: ASTM B209, Alloy 6061-T6.
- E. Nickel Silver Extrusions: ASTM B151/B151M, Alloy UNS No. C74500.

2.2 FASTENERS

- A. General: Unless otherwise indicated, provide stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless steel fasteners for fastening aluminum stainless steel or nickel silver.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.

- C. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- D. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- E. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy stainless steel bolts, ASTM F593, and nuts, ASTM F594.

2.3 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.4 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.5 METAL LADDERS

- A. General:
 - 1. Comply with ANSI A14.3, except for elevator pit ladders.
 - 2. For elevator pit ladders, comply with ASME A17.1/CSA B44.
- B. Aluminum Ladders Exterior:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide O'Keeffe's Inc.; Model 502 Heavy Duty Tubular Rail or comparable product by one of the following:

- a. Fixfast USA.
- b. Halliday Products.
- c. Thompson Fabricating, LLC.
- d. Upnovr, Inc.
- e. O'Keeffe's Inc.
2. Include security door at the base of the ladder
 - a. Security Doors: Formed 1/8 inch (3 mm) thick aluminum sheet. Security panels shall extend on both sides, perpendicular to the door face, to within 2 inches (51 mm) of the wall. Security door shall be furnished with continuous aluminum piano hinge and heavy duty forged steel locking hasps.
3. Source Limitations: Obtain aluminum ladders from single source from single manufacturer.
4. Space siderails 18 inches apart unless otherwise indicated.
5. Siderails: Continuous extruded-aluminum channels or tubes, not less than 2-1/2 inches deep, 3/4 inch wide, and 1/8 inch thick.
6. Rungs: Extruded-aluminum tubes, not less than 3/4 inch deep and not less than 1/8 inch thick, with ribbed tread surfaces.
7. Fit rungs in centerline of siderails; fasten by welding or with stainless steel fasteners or brackets and aluminum rivets.
8. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted aluminum brackets.

2.6 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.7 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 1. Shop prime with universal shop primer unless indicated.
- C. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.8 ALUMINUM FINISHES

- A. As-Fabricated Finish: AA-M12.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
 - D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
 - E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
 - F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 1. Cast Aluminum: Heavy coat of bituminous paint.
 2. Extruded Aluminum: Two coats of clear lacquer.
- 3.2 REPAIRS
- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.
- END OF SECTION 055000

SECTION 055213 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel railings.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For .

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect mechanical finishes on exposed surfaces of railings from damage by applying a strippable, temporary protective covering before shipping.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.
 - 1. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

2.3 STEEL RAILINGS

- A. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- B. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
 - 1. Provide galvanized finish for exterior installations and where indicated.
- C. Plates, Shapes, and Bars: ASTM A36/A36M.

2.4 FASTENERS

- A. Fastener Materials:
 - 1. Ungalvanized-Steel Railing Components: Plated steel fasteners complying with ASTM F1941, Class Fe/Zn 5 for zinc coating.
 - 2. Hot-Dip Galvanized Railing Components: Type 304 stainless steel or hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329/F2329M for zinc coating.
 - 3. Finish exposed fasteners to match appearance, including color and texture, of railings.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
 - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
 - 2. Provide Phillips flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308.
 - 1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

2.5 MISCELLANEOUS MATERIALS

- A. Handrail Brackets: Cast iron center of handrail 2-1/2 inches from wall.
- B. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.
- C. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint, complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- F. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- G. Intermediate Coats and Topcoats: Provide products that comply with Section 099123 "Interior Painting."
- H. Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.
- I. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.
- J. Bituminous Paint: Cold-applied asphalt emulsion, complying with ASTM D1187/D1187M.
- K. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout, complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.6 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.
 - 1. Clearly mark units for reassembly and coordinated installation.
 - 2. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately.
 - 1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.
 - 2. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.

- E. Fabricate connections that are exposed to weather in a manner that excludes water.
 - 1. Provide weep holes where water may accumulate.
 - 2. Locate weep holes in inconspicuous locations.
 - F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
 - G. Connections: Fabricate railings with welded connections unless otherwise indicated.
 - H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #1 welds; ornamental quality with no evidence of a welded joint
 - I. Form changes in direction as follows:
 - 1. By bending or by inserting prefabricated elbow fittings.
 - 2. .
 - 3. By bending to smallest radius that will not result in distortion of railing member.
 - J. Bend members in jigs to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
 - K. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.
 - L. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
 - M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
 - N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work.
 - 1. Fabricate anchorage devices capable of withstanding loads imposed by railings.
 - 2. Coordinate anchorage devices with supporting structure.
 - O. For railing posts set in concrete, provide stainless steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.
- 2.7 STEEL AND IRON FINISHES
- A. For nongalvanized-steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves; however, hot-dip galvanize anchors to be embedded in exterior concrete or masonry.
 - B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3.
 - C. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1 for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
 - 1. Shop prime uncoated railings with universal shop primer unless indicated.
 - 2. Do not apply primer to galvanized surfaces.
 - D. Shop-Painted Finish: Comply with Section 099113 "Exterior Painting."
 - 1. Color: As indicated by manufacturer's designations .

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Perform cutting, drilling, and fitting required for installing railings.

1. Fit exposed connections together to form tight, hairline joints.
 2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
 3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
 4. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 5. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- C. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.
- 3.3 RAILING CONNECTIONS
- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article, whether welding is performed in the shop or in the field.
- 3.4 ANCHORING POSTS
- A. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout [or] , mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Leave anchorage joint exposed with anchoring material flush with adjacent surface.
- C. Anchor posts to metal surfaces with flanges, angle type, or floor type, as required by conditions, connected to posts and to metal supporting members as follows:
1. For steel railings, weld flanges to post and bolt to metal supporting surfaces.
- 3.5 ATTACHING RAILINGS
- A. Anchor railing ends to concrete and masonry with brackets on underside of rails connected to railing ends and anchored to wall construction with anchors and bolts.
- B. Attach handrails to walls with wall brackets. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface.
1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt .
 2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C. Secure wall brackets and railing end flanges to building construction as follows:
1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 2. For hollow masonry anchorage, use toggle bolts.
 3. For steel-framed partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with stud installation to locate backing members.
- 3.6 REPAIR
- A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099123 "Interior Painting."
- 3.7 CLEANING
- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A780/A780M.
- 3.8 PROTECTION
- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

- B. Restore finishes damaged during installation and construction period, so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 055213

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 1. Framing with dimension lumber.
 2. Wood blocking and nailers.
 3. Wood furring.
 4. Plywood backing panels.

1.3 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal or greater size but less than 5 inches nominal size in least dimension.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.
 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
- B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 - 2. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Treatment shall not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat items indicated on Drawings, and the following:
 - 1. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

- A. Other Framing: Construction or No. 2 grade of species:
 - 1. Hem-fir (north); NLGA.
 - 2. Southern pine; SPIB.
 - 3. Douglas fir-larch; WCLIB or WWPA.
 - 4. Southern pine or mixed southern pine; SPIB.
 - 5. Spruce-pine-fir; NLGA.
 - 6. Douglas fir-south; WWPA.
 - 7. Hem-fir; WCLIB or WWPA.
 - 8. Douglas fir-larch (north); NLGA.
 - 9. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.5 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Rooftop equipment bases and support curbs.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:
 - 1. Hem-fir (north); NLGA.
 - 2. Mixed southern pine or southern pine; SPIB.
 - 3. Spruce-pine-fir; NLGA.

4. Hem-fir; WCLIB or WWPA.
 5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
 6. Western woods; WCLIB or WWPA.
 7. Northern species; NLGA.
 8. Eastern softwoods; NeLMA.
- C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.
- 2.6 PLYWOOD BACKING PANELS
- A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C , fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.
- 2.7 FASTENERS
- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M .
- B. Screws for Fastening to Metal Framing: ASTM C954, length as recommended by screw manufacturer for material being fastened.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- 2.8 MISCELLANEOUS MATERIALS
- A. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.
- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

PART 3 - EXECUTION

- 3.1 INSTALLATION, GENERAL
- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 2. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
- H. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
1. Use copper naphthenate for items not continuously protected from liquid water.
- J. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- K. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 2. ICC-ES evaluation report for fastener.
- 3.2 INSTALLATION OF WOOD BLOCKING AND NAILER
- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.
- 3.3 PROTECTION
- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- END OF SECTION 061053

SECTION 062023 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior trim, including non-fire-rated interior door frames.
2. Interior plywood hardboard board paneling.

1.2 DEFINITIONS

- A. MDF: Medium-density fiberboard.
- B. MDO: Plywood with a medium-density overlay on the face.
- C. PVC: Polyvinyl chloride.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
- B. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.

2.2 INTERIOR TRIM

- A. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
 1. Species and Grade: Red oak ; NHLA A Finish .
 2. Maximum Moisture Content: 10 percent.
 3. Finger Jointing: Not allowed.
 4. Gluing for Width: Use for lumber trim wider than 6 inches.
 5. Face Surface: Surfaced (smooth) .
 6. Matching: Selected for compatible grain and color.
- B. Hardwood Moldings for Transparent Finish (Stain or Clear Finish):
 1. Species: NHLA Clear.
 2. Maximum Moisture Content: 9 percent.
 3. Finger Jointing: Not allowed.
 4. Matching: Selected for compatible grain and color.
 5. Base Pattern: Ferche #F238 - 7/16" x 3 1/4" or equal base.
 6. Casing Pattern: Ferche F158 - 11/16" x 2 1/4" or equal casing.

2.3 PANELING

- A. Hardwood Veneer Plywood Paneling: Manufacturer's stock hardwood plywood panels complying with HPVA HP-1.
 1. [<Click here to find, evaluate, and insert list of manufacturers and products.>](#)
 2. Face Veneer Species and Cut: Plain-sliced red oak .
 3. Veneer Matching: Selected for similar color and grain.
 4. Backing Veneer Species: Any hardwood compatible with face species.
 5. Construction: Veneer core.
 6. Thickness: 7/16 inch.
 7. Panel Size:

- a. 48 by 96 inches .
8. Glue Bond: Type II (interior).
9. Finish: As selected by Architect from manufacturer's full range.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.2 INSTALLATION, GENERAL

- A. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.
 1. Use concealed shims where necessary for alignment.
 2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
 4. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
 5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.3 INSTALLATION OF STANDING AND RUNNING TRIM

- A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.
 1. Do not use pieces less than 24 inches long, except where necessary.
 2. Stagger joints in adjacent and related standing and running trim.
 3. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.
 4. Use scarf joints for end-to-end joints.
 5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
 6. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
 7. Install trim after gypsum-board joint finishing operations are completed.
 8. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
 9. Fasten to prevent movement or warping.
 10. Countersink fastener heads on exposed carpentry work and fill holes.

3.4 INSTALLATION OF PANELING

- A. Plywood Paneling: Select and arrange panels on each wall to minimize noticeable variations in grain character and color between adjacent panels.
 1. Leave 1/4-inch gap to be covered with trim at top, bottom, and openings.
 2. Install with uniform tight joints between panels.
 3. Attach panels to supports with manufacturer's recommended panel adhesive and fasteners.
 4. Space fasteners and adhesive as recommended by panel manufacturer.
 5. Conceal fasteners to greatest practical extent.
 6. Arrange panels with grooves and joints over supports.
 - a. Fasten to supports with nails of type and at spacing recommended by panel manufacturer.
 - b. Use fasteners with prefinished heads matching groove color.

- B. Hardboard Paneling: Install according to manufacturer's written instructions.
1. Leave 1/4-inch gap to be covered with trim at top, bottom, and openings.
 2. Butt adjacent panels with moderate contact.
 3. Use fasteners with prefinished heads matching paneling color.
 4. Wood Stud or Furring Substrate: Install with 1-inch annular-ring shank hardboard nails.
 5. Plaster or Gypsum-Board Substrate: Install with 1-5/8-inch annular-ring shank hardboard nails.
 6. Nailing: Space nails 4 inches o.c. at panel perimeter and 8 inches o.c. at intermediate supports unless otherwise required by manufacturer.
- C. Board Paneling: Install according to manufacturer's written instructions.
1. Arrange in random-width pattern suggested by manufacturer unless boards or planks are of uniform width.
 2. Install in full lengths without end joints.
 3. Stagger end joints in random pattern to uniformly distribute joints on each wall.
 4. Install with uniform end joints with only end-matched (tongue-and-groove) joints within each field of paneling.
 5. Install with uniform end joints. Locate end joints only over furring or blocking.
 6. Select and arrange boards on each wall to minimize noticeable variations in grain character and color between adjacent boards.
 7. Install with uniform tight joints between boards.
 8. Fasten paneling by face nailing, setting nails, and filling over nail heads.
 9. Fasten paneling with trim screws, set below face and filled.
 10. Fasten paneling by blind nailing through tongues.
 11. Fasten paneling with paneling system manufacturer's concealed clips.
 12. Fasten paneling to gypsum wallboard with panel adhesive.

END OF SECTION 062023

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Extruded polystyrene foam-plastic board insulation.
 - 2. Glass-fiber blanket insulation.
- B. Related Requirements:
 - 1. Section 072119 "Foamed-in-Place Insulation" for spray-applied polyurethane foam insulation.
 - 2. Section 075423 "Thermoplastic-Polyolefin (TPO) Roofing" for insulation specified as part of roofing construction.
 - 3. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.
 - 4. Section 133419 - Metal Building Systems for "Simple Saver" insulation system at metal building walls and roof.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Extruded polystyrene foam-plastic board insulation.
 - 2. Glass-fiber blanket insulation.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
 - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
 - 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

- A. Extruded Polystyrene Board Insulation, Type X : ASTM C578, Type X, 15-psi minimum compressive strength; unfaced.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Chemical Company (The).
 - b. Owens Corning.
 - 2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 - 3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
 - 4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.
- B. Extruded Polystyrene Board Insulation, Type IV : ASTM C578, Type IV, 25-psi minimum compressive strength; unfaced.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Chemical Company (The).
 - b. Owens Corning.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.2 GLASS-FIBER BLANKET INSULATION

- A. Glass-Fiber Blanket Insulation, Unfaced : ASTM C665, Type I; passing ASTM E136 for combustion characteristics.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation; Saint-Gobain North America.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Owens Corning.
 2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
 4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.3 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF SLAB INSULATION

- A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

- A. Butt panels together for tight fit.
- B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions.
 2. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application.
 3. Apply insulation standoffs to each spindle to create cavity width indicated on Drawings between concrete substrate and insulation.

4. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.
 5. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
- C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.5 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..

3.6 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Penetration firestopping systems for the following applications:
 - a. Penetrations in fire-resistance-rated walls.
 - b. Penetrations in smoke barriers.

- B. Related Requirements:

- 1. Section 078443 "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Fire Protection Products.
 - b. Hilti, Inc.
 - c. RectorSeal Firestop; a CSW Industrials Company.
 - d. Specified Technologies, Inc.
 - e. Tremco, Inc.

- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

- 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

- C. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg.
 - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.
 - D. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
 - 1. Permanent forming/damming/backing materials.
 - 2. Substrate primers.
 - 3. Collars.
 - 4. Steel sleeves.
- 2.2 FILL MATERIALS
- A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
 - B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
 - C. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
 - D. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
 - E. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
 - F. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
 - G. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
 - H. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
 - I. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

PART 3 - EXECUTION

- 3.1 EXAMINATION
- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
 - B. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.2 PREPARATION
- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
 - B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
 - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.

3.5 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Urethane joint sealants.
 - 2. Mildew-resistant joint sealants.
 - 3. Latex joint sealants.
- B. Related Requirements:
 - 1. Section 079100 "Preformed Joint Seals" for preformed compressible foam and precured joint seals.
 - 2. Section 079219 "Acoustical Joint Sealants" for sealing joints in sound-rated construction.
 - 3. Section 321373 "Concrete Paving Joint Sealants" for sealing joints in paved roads, parking lots, walkways, and curbing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranties: For special warranties.

1.5 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

- A. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- B. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.
- B. Urethane, S, P, 35, T, NT: Single-component, pourable, plus 35 percent and minus 35 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 35, Uses T and NT.

2.3 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. STPE, Mildew Resistant, S, NS, 50, NT: Mildew-resistant, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, silyl-terminated polyether joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

2.4 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Everkem Diversified Products, Inc.; SilTex 40 Siliconized Acrylic Latex Caulk.
 - b. Pecora Corporation; AC-20
 - c. Sherwin-Williams Company (The); 850A Siliconized Acrylic Latex Caulk
 - d. Tremco Incorporated; Tremflex 834.

2.5 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Adfast; Adseal BR 2600.
 - b. Alcot Plastics Ltd.; ALCOT Soft Type Backer Rod
 - c. Master Builders Solutions; MasterSeal 920 & 921(Pre-2014: Sonolastic Backer Rod).
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

2.6 MISCELLANEOUS MATERIALS

- A. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- B. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
- 3.4 CLEANING
 - A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- 3.5 PROTECTION
 - A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.
- 3.6 JOINT-SEALANT SCHEDULE
 - A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 1. Joint Locations:
 - a. Joints between plant-precast architectural concrete units.
 - b. Control and expansion joints in unit masonry.
 - c. Joints between different materials listed above.
 - d. Perimeter joints between materials listed above and frames of doors windows and louvers.
 - e. Other joints as indicated on Drawings.
 2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT .
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors .
 - B. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
 1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Other joints as indicated on Drawings.
 2. Joint Sealant: Urethane, S, P, 25, T, NT .
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors .
 - C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Joints on underside of plant-precast structural concrete beams and planks.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Urethane, S, NS, 25, NT .
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors .
 - D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
 1. Joint Locations:
 - a. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
 - b. Other joints as indicated on Drawings.
 2. Joint Sealant: Acrylic latex .
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors .
 - E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
 1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.

- b. Other joints as indicated on Drawings.
- 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT .
- 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors .

END OF SECTION 079200

SECTION 079219 - ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Acoustical joint sealants.
- B. Related Requirements:
 - 1. Section 079200 "Joint Sealants" for elastomeric, latex, and butyl-rubber-based joint sealants for nonacoustical applications.

1.2 ACTION SUBMITTALS

- A. Product Data:
 - 1. Acoustical joint sealants.

1.3 INFORMATIONAL SUBMITTALS

1.4 CLOSEOUT SUBMITTALS

PART 2 - PRODUCTS

2.1 ACOUSTICAL JOINT SEALANTS

- A. Acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies in accordance with ASTM E90.
- B. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hilti, Inc.
 - b. Serious Energy Inc.
 - c. Tremco Incorporated.
 - d. USG Corporation.

2.2 MISCELLANEOUS MATERIALS

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C919, ASTM C1193, and manufacturer's written instructions for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079219

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Interior standard steel doors and frames.
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - 7. Details of anchorages, joints, field splices, and connections.
 - 8. Details of accessories.
 - 9. Details of moldings, removable stops, and glazing.
- C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.6 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 - 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ceco Door; ASSA ABLOY.
2. Curries Company; ASSA ABLOY.
3. Republic Doors and Frames.
4. Steelcraft; an Allegion brand.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
3. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

- B. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

- B. Standard-Duty Doors and Frames: ANSI/SDI A250.8, Level 1; ANSI/SDI A250.4, Level C. At locations indicated in the Door and Frame Schedule .

1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches .
 - c. Face: Uncoated steel sheet, minimum thickness of 0.032 inch.
 - d. Edge Construction: .
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Core: Polystyrene .
 - g. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated and temperature-rise-rated doors.
2. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of 0.042 inch.
 - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Knocked down .
3. Exposed Finish: Prime .

2.4 BORROWED LITES

- A. Fabricate of uncoated steel sheet, minimum thickness of 0.053 inch .
- B. Construction: Knocked down .

- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.5 HOLLOW-METAL PANELS

- A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.6 FRAME ANCHORS

- A. Jamb Anchors:
 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
 3. Postinstalled Expansion Anchor: Minimum 3/8-inch- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
 1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized according to ASTM A153/A153M, Class B.

2.7 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.
- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.
- G. Glazing: Comply with requirements in Section 088000 "Glazing."

2.8 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.
 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.
 1. Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.9 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11 .
 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 2. Fire-Rated Openings: Install frames according to NFPA 80.
 3. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 4. Solidly pack mineral-fiber insulation inside frames.
 5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
 - 1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8 .
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 3. Smoke-Control Doors: Install doors according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 1. Five-ply flush wood veneer-faced doors for transparent finish.
 2. Factory finishing flush wood doors.
- B. Related Requirements:
 1. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including the following:
 1. Door core materials and construction.
 2. Door edge construction
 3. Door face type and characteristics.
 4. Door trim for openings.
 5. Factory-machining criteria.
 6. Factory- finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:
 1. Door schedule indicating door and frame location, type, size, fire protection rating, and swing.
 2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
 3. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 4. Dimensions and locations of blocking for hardware attachment.
 5. Dimensions and locations of mortises and holes for hardware.
 6. Clearances and undercuts.
 7. Requirements for veneer matching.
 8. Doors to be factory finished and application requirements.
- C. Samples for Initial Selection: For factory-finished doors .

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons .
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Delamination of veneer.
 - b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.

- c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
2. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain flush wood doors indicated to be blueprint matched with paneling from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.
 1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

2.3 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.

2.4 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS AND TRANSOM PANELS FOR TRANSPARENT FINISH

- A. Interior Doors :
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eggers Industries.
 - b. Graham Wood Doors; an Assa Abloy Group company.
 - c. MARSHFIELD-ALGOMA.
 - d. VT Industries Inc.
 2. Performance Grade:
 - a. ANSI/WDMA I.S. 1A Heavy Duty unless otherwise indicated on Drawings.
 3. Architectural Woodwork Standards Grade: Premium .
 4. Faces: Single-ply wood veneer not less than 1/50 inch thick.
 - a. Species: &Red oak .
 - b. Cut: Plain sliced (flat sliced) .
 - c. Match between Veneer Leaves: Book match.
 - d. Assembly of Veneer Leaves on Door Faces: Center-balance match.
 - e. Pair and Set Match: Provide for doors hung in same opening.
 - f. Room Match: Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by 20 feet or more.
 5. Exposed Vertical Edges: Same species as faces - Architectural Woodwork Standards edge Type A .
 - a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
 - b. Fire-Rated Pairs of Doors: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
 - c. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - 1) Screw-Holding Capability: 475 lbf in accordance with WDMA T.M. 10.
 6. Core for Non-Fire-Rated Doors:
 - a. ANSI A208.1, Grade LD-1 particleboard.
 - 1) Blocking: Provide wood blocking in particleboard-core doors as follows:
 - a) 6.5-inch top-rail blocking, in doors indicated to have closers.

- b) 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
 - 2) Provide doors with WDMA I.S. 10 structural-composite-lumber cores instead of particleboard cores for doors scheduled to receive exit devices in Section 087100 "Door Hardware."
- b. WDMA I.S. 10 structural composite lumber.
 - 1) Screw Withdrawal, Door Face: 475 lbf .
 - 2) Screw Withdrawal, Vertical Door Edge: 475 lbf .
- 7. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
 - a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.
- 8. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.5 LIGHT FRAMES AND LOUVERS

- A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.
 - 1. Wood Species: Same species as door faces .
 - 2. Profile: Flush rectangular beads .
 - 3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.
- B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated on Drawings. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.
- C. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated on Drawings.

2.6 FABRICATION

- A. Factory machine doors for hardware that is not surface applied.
 - 1. Locate hardware to comply with DHI-WDHS-3.
 - 2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
 - 3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
 - 4. For doors scheduled to receive electrified locksets, provide factory-installed raceway with conduit and wiring to accommodate specified hardware.
- B. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.

2.7 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
 - 1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 2. Finish faces, all four edges, edges of cutouts, and mortises.
 - 3. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
 - 1. Architectural Woodwork Standards Grade: Premium .
 - 2. Finish: Architectural Woodwork Standards System-9, UV Curable, Acrylated Epoxy, Polyester or Urethane.
 - 3. Staining: As selected by Architect from manufacturer's full range .
 - a. Finish type A to match existing golden oak doors
 - b. Finish type B to be selected by Architect to match Architect's laminate sample
 - 4. Effect: Open-grain finish .
 - 5. Sheen: Satin .

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Install frames level, plumb, true, and straight.
 - 1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
 - 2. Anchor frames to anchors or blocking built in or directly attached to substrates.
 - a. Secure with countersunk, concealed fasteners and blind nailing.
 - b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
 - 1) For factory-finished items, use filler matching finish of items being installed.
 - 3. Install fire-rated doors and frames in accordance with NFPA 80.
 - 4. Install smoke- and draft-control doors in accordance with NFPA 105.
- D. Job-Fitted Doors:
 - 1. Align and fit doors in frames with uniform clearances and bevels as indicated below.
 - a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.
 - 2. Machine doors for hardware.
 - 3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 4. Clearances:
 - a. Provide 1/8 inch at heads, jambs, and between pairs of doors.
 - b. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
 - c. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
 - d. Comply with NFPA 80 for fire-rated doors.
 - 5. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
- E. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- F. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Aluminum-framed storefront systems.
 - 2. Aluminum-framed entrance door systems.
- B. Related Requirements:
 - 1. Section 084126 "All-Glass Entrances and Storefronts" for systems without aluminum support framing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- D. Delegated-Design Submittal: For aluminum-framed entrances and storefronts including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Water penetration through fixed glazing and framing areas.
 - d. Failure of operating components.
 - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, peeling, or chipping.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing venting windows and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrances and storefronts.
- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- C. Structural Loads:
 1. Wind Loads: As indicated on Drawings.
 2. Other Design Loads: As indicated on Drawings .
- D. Deflection of Framing Members Supporting Glass: At design wind load, as follows:
 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches .
 2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch .
 - a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
 3. Cantilever Deflection: Limited to 2l/175 at unsupported cantilevers.
- E. Structural: Test according to ASTM E330/E330M as follows:
 1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.
 2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- F. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:
 1. Thermal Transmittance (U-factor):
 - a. Fixed Glazing and Framing Areas: U-factor for the system of not more than 0.36 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 - b. Entrance Doors: U-factor of not more than 0.77 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 - c. Venting Windows: Whole window U-factor of not more than 0.43 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 2. Air Leakage:
 - a. Fixed Glazing and Framing Areas: Air leakage for the system of not more than 0.06 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft. when tested according to ASTM E283.
 - b. Entrance Doors: Air leakage of not more than 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
 - c. Venting Windows: Whole window air leakage of not more than 0.3 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft. when tested in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.

- G. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.3 STOREFRONT SYSTEMS - SF-1

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Tubelite Inc.;14000 I/O Series Storefront or comparable product by one of the following:
1. EFCO Corporation.
 2. Manko Window Systems, Inc.
 3. Oldcastle BuildingEnvelope (OBE); CRH Americas.
 4. YKK AP America Inc.
- B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Exterior Framing Construction: Thermally broken .
 2. Interior Vestibule Framing Construction: Nonthermal .
 3. Glazing System: Retained mechanically with gaskets on four sides .
 4. Glazing Plane: Front .
 5. Finish: Clear anodic finish .
 6. Fabrication Method: Field-fabricated stick system.
 7. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 8. Steel Reinforcement: As required by manufacturer.
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

2.4 ENTRANCE DOOR SYSTEMS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Tubelite Inc.; or comparable product by one of the following:
1. EFCO Corporation.
 2. Kawneer North America, an Arconic company.
 3. Manko Window Systems, Inc.
 4. Oldcastle BuildingEnvelope (OBE); CRH Americas.
 5. YKK AP America Inc.
 6. Tubelite Inc.
- B. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.
1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 2. Door Design: Wide stile; 5-inch nominal width .
 3. Glazing Stops and Gaskets: Square , snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.
 4. Finish: Match adjacent storefront framing finish.

2.5 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."

2.6 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Weatherseal Sealants: ASTM C920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and structural-sealant-glazed storefront manufacturers for this use.
1. Color: Match structural sealant.

2.7 MATERIALS

- A. Sheet and Plate: ASTM B209.
- B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.
- C. Structural Profiles: ASTM B308/B308M.
- D. Steel Reinforcement:
 - 1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
 - 2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
 - 3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.
- E. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

2.8 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123/A123M or ASTM A153/A153M requirements.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials .
- D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.
- E. Rigid PVC Filler.

2.9 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from exterior .
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Storefront Framing: Fabricate components for assembly using screw-spline system .
- F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
 - 1. At interior and exterior doors, provide compression weather stripping at fixed stops.
- G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
 - 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.10 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Comply with manufacturer's written instructions.
- B. Do not install damaged components.
- C. Fit joints to produce hairline joints free of burrs and distortion.
- D. Rigidly secure nonmovement joints.
- E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F. Seal perimeter and other joints watertight unless otherwise indicated.
- G. Metal Protection:
1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- H. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.
- I. Install joint filler behind sealant as recommended by sealant manufacturer.
- J. Install components plumb and true in alignment with established lines and grades.

3.3 INSTALLATION OF OPERABLE UNITS

- A. Install operable units level and plumb, securely anchored, and without distortion. Adjust weatherstripping contact and hardware movement to produce proper operation.

3.4 INSTALLATION OF GLAZING

- A. Install glazing as specified in Section 088000 "Glazing."

3.5 INSTALLATION OF WEATHERSEAL SEALANT

- A. After structural sealant has completely cured, remove temporary retainers and insert backer rod between lites of glass as recommended by sealant manufacturer.
- B. Install weatherseal sealant to completely fill cavity, according to sealant manufacturer's written instructions, to produce weatherproof joints.

3.6 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE DOORS

- A. Install entrance doors to produce smooth operation and tight fit at contact points.
1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.7 ERECTION TOLERANCES

- A. Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.

- b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
 - 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.
- END OF SECTION 084113

SECTION 084126.23 - INTERIOR ALL-GLASS ENTRANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior, manual-swinging, all-glass entrance systems.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for overhead-steel support for interior all-glass entrance systems.

1.3 PREINSTALLATION MEETINGS

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for all-glass system.
- B. Shop Drawings: For interior all-glass entrance systems.
 - 1. Include plans, elevations, and sections.
 - 2. Include details of fittings and glazing, including isometric drawings of fittings.
 - 3. Include door hardware locations, mounting heights, and installation requirements.
- C. Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate final door hardware schedule with door components, assemblies, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

1.7 QUALITY ASSURANCE

- A. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of interior all-glass entrance systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of metals, metal finishes, and other materials beyond normal use.
 - b. Failure of operating components.
 - 2. Warranty Period: Two years from date of Substantial Completion for assembly and components unless otherwise indicated.
 - a. Concealed Floor Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain all components of interior all-glass entrance systems, including accessories, from single manufacturer.

2.2 INTERIOR, MANUAL-SWINGING, ALL-GLASS ENTRANCE SYSTEMS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Avanti Systems, Inc.; Transverso Monoblock Modular Partition or comparable product by one of the following:

1. Oldcastle BuildingEnvelope (OBE); CRH Americas.
2. Steelcase.
3. Trulite Glass & Aluminum Solutions, LLC.
4. Avanti Systems, Inc.

- B. Fitting Configuration:

1. Door Fittings: Continuous rail fitting at top and bottom (P-Style) .
2. Sidelight and Transom Fittings: Continuous rail fitting at top and bottom .
3. Acoustic double glazed glass swing door at all locations
 - a. STC rating: 43 db
 - b. Door locations 232, 233, 235, 236 to have aluminum mini blind slats installed between the glass

- C. Fitting Material: Aluminum .

- D. Rail Fittings:

1. Height:
 - a. Top Rail: As indicated .
 - b. Bottom Rail: As indicated .
2. Profile: Square .
3. End Caps: Manufacturer's standard precision-fit end caps for rail fittings.

- E. Accessory Fittings:

1. Overhead doorstop.
2. Center-housing lock.

- F. Anchors and Fastenings: Concealed.

- G. Door Hardware: In sizes, quantities, and types recommended by manufacturer for interior all-glass entrance systems indicated. For exposed parts, match metal and finish of fittings.

1. Swing: hinged single acting.
 - a. Manufacturers standard locking handle set
 - b. Positive Dead Stop: Coordinated with hold-open angle if any, or at angle selected.
2. Opening-Force Requirements:
 - a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbf to set the door in motion and not more than 15 lbf to open the door to its minimum required width.
 - b. Accessible Interior (Swinging) Doors: Not more than 5 lbf to fully open door.
3. Concealed Overhead Holder: ANSI/BHMA A156.8, Grade 1, with dead-stop setting coordinated with concealed floor closer.
4. Single-Door and Active-Leaf Locksets: Center-housing combination deadbolt and latchbolt with lever handles .
5. Cylinders: As specified in Section 087100 "Door Hardware."

2.3 GLASS

- A. Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), Quality-Q3, tested for surface and edge compression in accordance with ASTM C1048 and for impact strength in accordance with 16 CFR 1201 for Category II materials.

1. Class 1: Clear monolithic.
 - a. Thickness: 12 mm.
 - b. Locations: As indicated .
2. Exposed Edges: Machine ground and flat polished.
3. Sound gasketing to be installed
4. Double glazed 1/4" clear tempered glass with aluminum min blind slats provided between the glass

- a. To be installed in all glass and frames at rooms 233, 232, 235, 236.

2.4 MATERIALS

- A. Aluminum: ASTM B221 with strength and durability characteristics of not less than Alloy 6063-T5 for extruded bars, rods, profiles, and tubes. ASTM B209 for sheet and plate.
1. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
- B. Structural Shapes, Plates, and Bars: ASTM A36/A36M.

2.5 FABRICATION

- A. Provide holes and cutouts in glass to receive hardware, fittings, and accessory fittings before tempering glass. Do not cut, drill, or make other alterations to glass after tempering.
1. Fully temper glass using horizontal (roller-hearth) process, and fabricate so that when glass is installed, roll-wave distortion is parallel with bottom edge of door or lite.
- B. Factory assemble components and factory install hardware and fittings to greatest extent possible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install all-glass entrance systems and associated components in accordance with manufacturer's written instructions.
- B. Systems to be compatible and the head to be installed to the ceiling grid system. Installer to supply additional blocking as required for the system if it can not be attached to the ceiling grid system.
- C. Set units level, plumb, and true to line, with uniform joints.
- D. Maintain uniform clearances between adjacent components.
- E. Lubricate hardware and other moving parts in accordance with manufacturer's written instructions.
- F. Set, seal, and grout floor closer cases as required to suit hardware and substrate indicated.

3.3 ADJUSTING AND CLEANING

- A. Adjust all-glass doors and hardware to produce smooth operation and tight fit at contact points.
1. For all-glass, swinging entrance doors accessible to people with disabilities, adjust closers to provide a three-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch measured to the leading door edge.
- B. Remove excess sealant and glazing compounds and dirt from surfaces.

END OF SECTION 084126.23

SECTION 085653 - SECURITY WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fixed, transaction security windows.
- B. Related Requirements:
 - 1. Section 099113 "Exterior Painting" for field painting exterior security windows.
 - 2. Section 099123 "Interior Painting" for field painting interior security windows.

1.2 COORDINATION

- A. Coordinate installation of anchorages for security windows. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in adjacent construction.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, weights and finishes for window units.
- B. Shop Drawings: For security windows.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Full-size section details of framing members, including internal armoring, reinforcement, and stiffeners.
 - 3. Location of weep holes.
 - 4. Hardware for sliding window units.
 - 5. Glazing details.
 - 6. Details of deal tray and speaking aperture.
- C. Delegated Design Submittal: For security windows indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For **[and]** .
- B. Sample Warranty: For special warranty.

1.5 QUALITY ASSURANCE

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Pack security windows in wood crates for shipment. Crate glazing separate from frames unless factory glazed.
- B. Label security window packaging with drawing designation.
- C. Store crated security windows on raised blocks to prevent moisture damage.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 SEQUENCING

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace security windows that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including deflections exceeding 1/4 inch.
 - b. Failure of welds.
 - c. Excessive air leakage.

- d. Faulty operation of sliding window hardware.
 - e. Faulty operation of transaction drawers.
 - f. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - g. .
2. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Attack Resistance: Provide units identical to those tested for compliance with requirements indicated, and as follows:
 - 1. Ballistics Resistance, UL 752: Level 4 in accordance with UL 752.
 - 2. Forced-Entry Resistance, ASTM F1233: Class 3.0 in accordance with ASTM F1233.
 - 3. Forced-Entry Resistance, SD-STD-01.01: 15 -minute protection level in accordance with SD-STD-01.01.
- B. Structural Loads: Security windows withstand the effects of wind loads, with no permanent deformation or breakage of components within window assembly when tested in accordance with ASTM E330/E330M.

2.2 FIXED, TRANSACTION SECURITY WINDOWS

- A. Provide fixed, transaction security windows with operable sash or ventilator capable of allowing transfer of currency and documents.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Armortex.
 - b. C.R. Laurence Co., Inc.
 - c. Creative Industries, Inc.
 - d. Krieger Specialty Products Company.
 - e. Norshield Products Group.
- B. Configuration: As indicated on Drawings.
- C. Framing: Fabricate perimeter framing, mullions, and glazing stops from **[aluminum]** as follows:
 - 1. Profile: Manufacturer's standard , with minimum face dimension indicated.
 - a. Minimum Face Dimension: 1-1/4 inches .
 - 2. Depth: Manufacturer's standard .
- D. Head and Jamb Framing: Designed for voice communication by speech at normal volume.
- E. Voice-Communication-Type Sill: Formed from stainless steel and designed to allow passage of speech at normal speaking volume without distortion.
- F. Glazing and Glazing Materials: Comply with requirements in in this section. Glazing to be prefabricated unit from the factory to meet safety requirements established for the frame assembly.
- G. Glazing Meeting Edges: Polished glazing.
- H. Materials:
 - 1. Mild Steel Plates, Shapes, and Bars: ASTM A36/A36M.
 - 2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, CS (Commercial Steel), Type B; suitable for exposed applications.
 - 3. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, CS (Commercial Steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.

2.3 FABRICATION

- A. General: Fabricate security windows to provide a complete system for assembly of components and anchorage of window units.
 - 1. Provide units that are reglazable from the secure side without dismantling the attack side of framing.
 - 2. Prepare security windows for field glazing unless preglazing at the factory is indicated.
- B. Provide weep holes and internal water passages for exterior security windows to conduct infiltrating water to the exterior.

- C. Thermally Improved or Thermally Broken Construction: Fabricate framing with an integral, concealed, low-conductance thermal barrier, located between exterior materials and members exposed on interior in a manner that eliminates direct metal-to-metal contact.
 - D. Framing: Miter or cope corners the full depth of framing; weld and dress smooth.
 - 1. Fabricate framing with manufacturer's standard, internal opaque armoring in thicknesses required for security windows to comply with ballistics-resistance performance indicated.
 - E. Glazing Stops: Finish glazing stops to match security window framing.
 - 1. Attack-Side (Exterior) Glazing Stops: Welded or integral to framing.
 - 2. Secure-Side (Interior) Glazing Stops: Removable, coordinated with glazing indicated.
 - F. Welding: Weld components to comply with referenced AWS standard. To greatest extent possible, weld before finishing and in concealed locations to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
 - G. Metal Protection: Separate dissimilar metals to protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
 - H. Factory-cut openings in glazing for speaking apertures.
 - I. Preglazed Fabrication: Preglaze window units at factory. Installation orientation of glazing to meet performance requirements of this specification.
 - J. Weather Stripping: Factory applied.
- 2.4 GENERAL FINISH REQUIREMENTS
- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
 - B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
 - C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- 2.5 ALUMINUM FINISHES
- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
- 2.6 STAINLESS STEEL FINISHES
- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- 2.7 ACCESSORIES
- A. Recessed, Nonricochet Deal Trays: Formed from stainless steel; fabricated with recessed bullet trap to ricochet bullets away from secure side, with exposed flanges for recessed installation into horizontal surface.
 - 1. Clear Opening Size: 12 inches wide by 11 inches deep by 1-1/2 inches high .
 - 2. Bullet Trap Location: Secure side .
 - 3. Ballistics Resistance: Same as security window .
 - 4. Listed and labeled as bullet resisting in accordance with UL 752.
 - B. Speaking Apertures: Fabricate from security glazing, designed to allow passage of speech at normal speaking volume without distortion.
 - 1. Shape: Circular .
 - 2. Ballistics Resistance: Same as security window .
 - 3. Listed and labeled as bullet resisting in accordance with UL 752.
 - C. Concealed Bolts: ASTM A307, Grade A unless otherwise indicated.
 - D. Cast-in-Place Anchors in Concrete: Fabricated from corrosion-resistant materials capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified testing agency; of type indicated below.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A27/A27M cast steel or ASTM A47/A47M malleable iron. Provide bolts, washers, and shims as required; hot-dip galvanized in accordance with ASTM A153/A153M or ASTM F2329/F2329M.
 - E. Embedded Plate Anchors: Fabricated from mild steel shapes and plates, minimum 3/16 inch thick; with minimum 1/2-inch- diameter, headed studs welded to back of plate.
 - F. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.
 - G. Glazing Strips and Weather Stripping: Manufacturer's standard replaceable components.

1. Compression Type: Molded EPDM or neoprene gaskets complying with ASTM D2000, Designations 2BC415 to 3BC620; molded PVC gaskets complying with ASTM D2287; or molded, expanded EPDM or neoprene gaskets complying with ASTM C509, Grade 4.
 2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric backing.
- H. Miscellaneous Glazing Materials: Provide material, size, and shape complying with requirements of glass manufacturers and with a proven record of compatibility with surfaces contacted in installation.
1. Cleaners, Primers, and Sealers: Type recommended by sealant or gasket manufacturer.
 2. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.
 3. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
 4. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- I. Anchors, Clips, and Window Accessories: Stainless steel; hot-dip, zinc-coated steel or iron, complying with ASTM B633; provide sufficient strength to withstand design pressures indicated.
- J. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- K. Sealants: For sealants required within fabricated security windows, provide type recommended by manufacturer for joint size and movement. Sealant remains permanently elastic, nonshrinking, and nonmigrating.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of security windows.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of security window connections before security window installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of security windows.
- D. Inspect built-in and cast-in anchor installations, before installing security windows, to verify that anchor installations comply with requirements. Prepare inspection reports.
 1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
 2. Perform additional inspections to determine compliance of replaced or additional work. Prepare anchor inspection reports.
- E. For factory-installed glazing materials whose orientation (secure or attack side) is critical for performance, verify installation orientation.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other security window anchors whose installation is specified in other Sections.
 1. Furnish cast-in-place anchors and similar devices to other trades for installation well in advance of time needed for coordinating other work.

3.3 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing security windows to in-place construction. Include threaded fasteners for inserts, security fasteners, and other connectors.
 1. Install an attached or integral flange to secure side of security windows extending over rough-in opening gap so that gap has same forced-entry-resistance and ballistics-resistance performance as security window.
- B. Voice-Communication-Type Framing: Attach removable glass spacers to jambs and head of glazing, located not more than 6 inches from each corner and spaced not more than 12 inches o.c.
- C. Glazed Framing: Provide gasket-glazed framing. Comply with installation requirements in Section 088853 "Security Glazing."
- D. Removable Glazing Stops and Trim: Fasten components with security fasteners.

- E. Fasteners: Install security windows using fasteners recommended by manufacturer with head style appropriate for installation requirements, strength, and finish of adjacent materials.
- F. Sealants: Comply with requirements in Section 079200 "Joint Sealants" for installing sealants, fillers, and gaskets.
 - 1. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction unless otherwise indicated.
 - 2. Seal frame perimeter with sealant to provide weathertight construction unless otherwise indicated.
- G. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended in writing by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

3.4 ADJUSTING

- A. Adjust horizontal-sliding, transaction security windows to provide a tight fit at contact points for smooth operation and a secure enclosure.
- B. Adjust transaction drawers to provide a tight fit at contact points and weather stripping for smooth operation and weathertight and secure enclosure.
- C. Remove and replace defective work, including security windows that are warped, bowed, or otherwise unacceptable.

END OF SECTION 085653

SECTION 086250 - TUBULAR DAYLIGHTING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Tubular daylighting devices and accessories.

1.2 RELATED SECTIONS

- A. Section 012300 - Alternates. Tubular Daylighting Devices to be provided under Alternate #1.
- B. Section 07540 - Thermoplastic Membrane Roofing: Flashing of skylight base.
- C. Section 07600 - Flashing and Sheet Metal: Metal curb flashings.

1.3 PERFORMANCE REQUIREMENTS

A. SOLAMASTER 750 DS-C (CLOSED CEILING)

- 1. AAMA/WDMA/CSA 101/IS2/A440, Class CW-PG70, size tested 21 inch (530 mm) diameter, Type TDDOC and Type TDDCC.
 - a. Air Infiltration Test:
 - 1) Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.
 - b. Water Resistance Test:
 - 1) Passes water resistance; no uncontrolled water leakage with a pressure differential of 10.7 psf (512 Pa) or 15 percent of the design load (whichever is greater) and a water spray rate of 5 gallons/hour/sf for 24 minutes when tested in accordance with ASTM E 547 and ASTM E 331.
 - c. Uniform Load Test: All units tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.
 - 1) No breakage, permanent damage to fasteners, hardware parts, or damage to make daylighting system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf (7.18 kPa) or Negative Load of 70 psf (3.35 kPa).

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Data sheets showing roof dome assembly, flashing base, reflective tubes, diffuser assembly, and accessories.
 - 4. Installation requirements.
- C. Shop Drawings. Submit shop drawings showing layout, profiles and product components, including rough opening and framing dimensions, anchorage, roof flashings and accessories.
- D. Verification Samples: As requested by Architect.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of twenty years experience in the top lighting industry. Secondary products shall be acceptable to the primary manufacturer.
- B. Installer Qualifications: All products shall be installed by a single installer with a minimum of five years demonstrated experience, with adequate equipment, skilled workers, and practical experience to meet the project schedule.
- C. Pre-Installation Meeting: Contractor shall convene a pre-installation meeting on the project site minimum one week before beginning work of this Section. The meeting shall include the Architect or Owner's Representative and representatives of all related trades to:
 - 1. Coordinate between the at least the following trades.
 - 2. Verify project requirements and site logistics.

3. Assess integrity of the roofing system and building structure.
4. Review manufacturer's installation instructions and warranty requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, seals and labels intact.
- B. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

- A. Coordinate delivery schedule with the Contractor and project schedule to minimize on site storage.
- B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- C. Store materials in a dry area, protected from freezing, staining, contamination or damage.

1.8 WARRANTY

- A. Daylighting Device: Manufacturer's standard warranty for 10 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Solatube International, Inc., which is located at: Solatube International 2210 Oak Ridge Way; Vista, CA 92081-8341; Toll Free Tel: 888-765-2882; Tel: (760) 477-1120; Fax: (760) 597-4488; Email: request info (commsales@solatube.com); Web: <http://www.solatube.com>
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 TUBULAR DAYLIGHTING DEVICES

- A. Tubular Daylighting Devices General: Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.
- B. SolaMaster Series: Solatube Model 750 DS, 21 inch (530 mm) Daylighting System:
 1. Model:
 - a. Solatube Model 750 DS-C Closed (Penetrating) Ceiling. AAMA Type TDDCC.
 2. Capture Zone:
 - a. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
 - 1) Outer Dome Glazing: Type DA, 0.125 inch (3.2 mm) minimum thickness injection molded acrylic classified as CC2 material; UV inhibiting (100 percent UV C, 100 percent UV B and 98.5 percent UV A), impact modified acrylic blend.
 - a) Raybender 3000: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.
 - b. Acrylic Dome plus Inner Dome Glazing: Inner Dome is 0.115 inch (3 mm) minimum thickness acrylic material.
 - c. Tube Ring: 0.090 inch (2.3 mm) nominal thickness injection molded high impact PVC. Prevents thermal bridging between base flashing and tubing and channel condensed moisture. Attached to base of dome ring with butyl glazing rope 0.24 inch (6 mm) diameter; to minimize air infiltration.
 - d. Dome Seal: Adhesive backed weatherstrip, 0.63 inch (16 mm) tall by 0.28 inch (7 mm) wide.
 3. Flashings:
 - a. Roof Flashing Base:
 - 1) One Piece: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube. Sheet steel, corrosion resistant conforming to ASTM A 653/A 653M or ASTM A 463/A 463M or ASTM A 792/A 792M, 0.028 inch (0.7 mm) plus or minus .006 inch (.015 mm) thick.
 - a) Base Style: Type FC, Curb cap, with inside dimensions of 27 inches by 27 inches (685 mm by 685 mm) to cover curb as specified below.

- b. Curbs: Metal Insulated Roof Curb: Corrosion resistant 18 Gauge hot-dipped galvanized steel conforming to ASTM A 653 G90 with continuous welded seams, integrated base plate for water tightness and extra strength, lined with 1-1/2 inch fiberglass fireproof sound attenuating thermal insulation, factory installed 2 by 2 treated wood nailer secured to top ledge of curb. Curb designed for single-ply roofing, lightweight fill or tapered insulation low slope roof types.
 - 1) C14 14 inch (356 mm) high Metal insulated curb
 - c. Flashing Options:
 - 1) Curb Cap Insulation: Type CCI, Nominal 1 inch thick thermal insulation pad to reduce thermal conduction between curb-cap and tubing and thermal convection between room air and curb-cap. Rated R-6 (OFxft2xhr/Btu) Insulation is Polyisocyanurate foam utilizing CFC, HCFC, & HFC free blowing agent. Type-1 Class-1 per ASTM C 1289; Passes UL 1715 (15-minute thermal barrier per IBC 2603.4); Attic ventilation may be required per IBC 1203.2(OFxft2xhr/Btu). For use with Flashing Type FC.
4. Transfer Zone:
- a. Extension Tubes: Aluminum sheet, thickness 0.018 inch (0.5 mm) conforming to ASTM B 209.
 - 1) Reflective Tubes:
 - a) Reflective extension tube, Type EXX and Type EL with total length of run as indicated on the Drawings.
 - b) Interior Finish: Spectralight Infinity with INFRAREduction Technology combining ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance.
 - 2) Tube Options
 - a) Extension Tube Angle Adapter: Provide manufacturer's standard adapters for applications requiring:
 - (1) Type A1 one 0 to 90 degree extension tube angle adapter.
 - b) Top Tube Angle Adapter and Bottom Tube Angle Adapter Kit: Type AK, Reflective 45 degree adjustable top and bottom angle adapters (one each), 16 inches (406 mm) long
 - c) Spectralight Infinity SoftLight Extension Tube: Type ES, 24 inch (610 mm) Super-reflective extension tube with structured surface providing precise light spread for enhanced visual comfort. Replaces one standard 24 inch (610 mm) extension tube in the tube assembly.
 - (1) Verify length and quantity of extension tubes required.
5. Delivery Zone:
- a. Diffuser Assemblies for Tubes Penetrating Ceilings: Solatube Model 750 DS-C. Ceiling mounted box transitioning from round tube to square ceiling assembly, supporting light transmitting surface at bottom termination of tube; 23.8 inches by 23.8 inches (605 mm by 605 mm) square frame to fit standard suspended ceiling grids or hard ceilings.
 - 1) Metal Transition Box: Type TM, Metal Round to Square transition box comprised of Spectralight Infinity SoftLight material with structured finish on exposed reflective surface, .015 in (0.4 mm) thick. Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
 - 2) Lens: Type L1, OptiView Fresnel lens design to maximize light output and diffusion with extruded aluminum frame and EPDM foam seal to minimize condensation and bug, dirt and air infiltration per ASTM E 283. Visible Light Transmission shall be greater than 90 percent at 0.022 inch (0.6 mm) thick. Classified as CC2.

2.3 ACCESSORIES

- A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.
- B. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.
- C. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Examine openings, substrates, structural support, anchorage, and conditions for compliance with requirements for installation tolerances and other conditions.
- C. If substrate and rough opening preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Coordinate requirements for power supply, conduit and wiring.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.
- B. Coordinate installation with substrates, air and vapor retarders, roof insulation, roofing membrane, and flashing to ensure that each element of the Work performs properly and that finished installation is weather tight.
 - 1. Install flashing to produce weatherproof seal with curb and overlap with roofing system termination at top of curb.
 - 2. Provide thermal isolation when components penetrate or disrupt building insulation. Pack fibrous insulation in rough opening to maintain continuity of thermal barriers.
 - 3. Coordinate attachment and seal of perimeter air and vapor barrier material.
- C. Where metal surfaces of tubular unit skylights will contact incompatible metal or corrosive substrates, including preservative-treated wood, provide permanent separation as recommended by manufacturer
- D. Align device free of warp or twist, maintain dimensional tolerances.
- E. Inspect installation to verify secure and proper mounting. Test each fixture to verify operation, control functions, and performance. Correct deficiencies.

3.4 CLEANING

- A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 086250

SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware for:
 - a. Swinging doors.
 - b. Sliding doors.
 - c. Gates.
2. Electronic access control system components
3. Field verification, preparation and modification of existing doors and frames to receive new door hardware.

B. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 08 Sections:
 - a. "Metal Doors and Frames"
 - b. "Flush Wood Doors"
 - c. "Stile and Rail Wood Doors"
 - d. "Interior Aluminum Doors and Frames"
 - e. "Aluminum-Framed Entrances and Storefronts"
 - f. "Stainless Steel Doors and Frames"
 - g. "Special Function Doors"
 - h. "Entrances"
5. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature

4. Installation Guide for Doors and Hardware

- C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

- D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

- A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
 - a. Comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, “EXAMINATION” article, herein.
 - b. Review drawings and Sections from related trades to verify compatibility with specified hardware.
 - c. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

- B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.
 - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule:

- a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
 - b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
 - c. Indicate complete designations of each item required for each opening, include:
 - 1) Door Index: door number, heading number, and Architect's hardware set number.
 - 2) Quantity, type, style, function, size, and finish of each hardware item.
 - 3) Name and manufacturer of each item.
 - 4) Fastenings and other pertinent information.
 - 5) Location of each hardware set cross-referenced to indications on Drawings.
 - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for hardware.
 - 8) Door and frame sizes and materials.
 - 9) Degree of door swing and handing.
 - 10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.
5. Key Schedule:
- a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
 - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
 - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
 - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.
- C. Informational Submittals:
1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
 2. Provide Product Data:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
 - b. Include warranties for specified door hardware.
- D. Closeout Submittals:
1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Factory order acknowledgement numbers (for warranty and service)
 - d. Name, address, and phone number of local representative for each manufacturer.

- e. Parts list for each product.
 - f. Final approved hardware schedule edited to reflect conditions as installed.
 - g. Final keying schedule
 - h. Copies of floor plans with keying nomenclature
 - i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
 - j. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
- E. Inspection and Testing:
- 1. Submit a written report of the results of functional testing and inspection for fire door assemblies, in compliance with NFPA 80.
 - a. Written report to be provided to the Owner and be made available to the Authority Having Jurisdiction (AHJ).
 - b. Report to include the door number for each fire door assembly, door location, door and frame material, fire rating, and summary of deficiencies.
 - 2. Submit a written report of the results of functional testing and inspection for required egress door assemblies, in compliance with NFPA 101.
 - a. Written report to be provided to the Owner and be made available to the Authority Having Jurisdiction (AHJ).
 - b. Report to include the door number for each required egress door assembly, door location, door and frame material, fire rating, and summary of deficiencies.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

- 1. Supplier: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
 - a. Warehousing Facilities: In Project's vicinity.
 - b. Scheduling Responsibility: Preparation of door hardware and keying schedules.
 - c. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies like those indicated for this Project.
 - d. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
 - 1) Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.
- 2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
- 3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - a. For door hardware: DHI certified AHC or DHC.
 - b. Can provide installation and technical data to Architect and other related subcontractors.

- c. Can inspect and verify components are in working order upon completion of installation.
 - d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.
 4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.
- B. Certifications:
 1. Fire-Rated Door Openings:
 - a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
 - b. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
 2. Smoke and Draft Control Door Assemblies:
 - a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
 - b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
 3. Electrified Door Hardware
 - a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
 4. Accessibility Requirements:
 - a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.
- C. Pre-Installation Meetings
 1. Keying Conference
 - a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2) Preliminary key system schematic diagram.
 - 3) Requirements for key control system.
 - 4) Requirements for access control.
 - 5) Address for delivery of keys.
 2. Pre-installation Conference
 - a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Inspect and discuss preparatory work performed by other trades.
 - c. Inspect and discuss electrical roughing-in for electrified door hardware.
 - d. Review sequence of operation for each type of electrified door hardware.
 - e. Review required testing, inspecting, and certifying procedures.
 - f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:

- a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.07 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
 - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
 - a. Mechanical Warranty
 - 1) Locks
 - a) Yale: 7 year
 - 2) Exit Devices
 - a) Von Duprin: 3 year
 - 3) Closers
 - a) LCN 4000 Series: 30 year
 - 4) Automatic Operators
 - a) LCN: 2 year
 - 5) Accessories
 - a) Ives Continuous Hinges: Lifetime
 - b. Electrical Warranty
 - 1) Locks
 - a) Yale: 1 year
 - 2) Exit Devices
 - a) Von Duprin: 1 year

1.08 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."
 1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.
- B. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
- C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru bolts are required.
4. Install hardware with fasteners provided by hardware manufacturer.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

C. Cable and Connectors: Hardwired Electronic Access Control Lockset and Exit Device Trim:

1. Data: 24AWG, 4 conductor shielded, Belden 9843, 9841 or comparable.
2. DC Power: 18 AWG, 2 conductor, Belden 8760 or comparable.
3. Provide type of data and DC power cabling required by access control device manufacturer for this installation.
4. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with enough and wire gauge with standardized Molex plug connectors to accommodate electric function of specified hardware. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Ives 5BB series
2. Acceptable Manufacturers and Products:
 - a. Stanley FBB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:

- a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 2 inches or thicker doors:
- a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
9. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
- a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
10. Provide hinges with electrified options as scheduled in the hardware sets. Provide with enough and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Stanley

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with enough and wire gage to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 ELECTRIC POWER TRANSFER

A. Manufacturers:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin EPT-10
2. Acceptable Manufacturers and Products:
 - a. ABH PT1000

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.06 CABLE AND CONNECTORS:

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Von Duprin – Connect

B. Requirements:

1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with enough and wire gauge with standardized Molex plug connectors to accommodate electric function of specified hardware. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.
2. Provide Connector Service Kit, one of each set:
 - a. Von Duprin – CON-KIT

2.07 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90

inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.08 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

- a. Schlage L9000 series

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide indicator window measuring a minimum 2-inch x 1/2 inch with 180-degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
 - a. Lever Design: As specified in hardware sets.

2.09 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

- a. Yale – 5400LN Series

2. Acceptable Manufacturers and Products:

- a. No Substitute

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.

- a. Lever Design: As specified in hardware sets.

2.10 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Von Duprin 98/35A series
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to “KEYING” article, herein.
3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer’s approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
13. Provide electrified options as scheduled.
14. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
15. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.11 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage/Von Duprin PS900 Series

B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with

consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.

3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:
 - a. 12/24 VDC Output, field selectable.
 - b. Class 2 Rated power limited output.
 - c. Universal 120-240 VAC input.
 - d. Low voltage DC, regulated and filtered.
 - e. Polarized connector for distribution boards.
 - f. Fused primary input.
 - g. AC input and DC output monitoring circuit w/LED indicators.
 - h. Cover mounted AC Input indication.
 - i. Tested and certified to meet UL294.
 - j. NEMA 1 enclosure.
 - k. Hinged cover w/lock down screws.
 - l. High voltage protective cover.

2.12 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Yale – GC keyway
2. Acceptable Manufacturers and Products:
 - a. No Substitute

B. Requirements:

1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
3. Nickel silver bottom pins.
4. Verify existing keyway with owner's locksmith.

2.13 KEYING

A. Provide cylinders/cores keyed into Owner's existing keying system managed by Owner's locksmith, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference. Contact:

1. Firm Name:
2. Contact Person:
3. Telephone:

B. Requirements:

1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - a. Master Keying system as directed by the Owner.

2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
3. Provide keys with the following features:
 - a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
4. Identification:
 - a. Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
 - b. Identification stamping provisions must be approved by the Architect and Owner.
 - c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
 - e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
5. Quantity: Furnish in the following quantities.
 - a. Change (Day) Keys: 3 per cylinder/core.
 - b. Master Keys: 6.

2.14 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 4040XP series
2. Acceptable Manufacturers and Products:
 - a. Sargent 281 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter with 5/8-inch (16 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.

9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.15 ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. LCN 4600 series

B. Requirements:

1. Provide low energy automatic operator units with hydraulic closer complying with ANSI/BHMA A156.19.
2. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
3. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check, and opening and closing speed adjustment valves to control door
4. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay.
5. Provide drop plates, brackets, and adapters for arms as required for details.
6. Provide hard-wired actuator switches and receivers for operation as specified.
7. Provide weather-resistant actuators at exterior applications.
8. Provide key switches with LED's, recommended and approved by manufacturer of automatic operator as required for function described in operation description of hardware group below. Cylinders: Refer to "KEYING" article, herein.
9. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.
10. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

2.16 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives.
2. Acceptable Manufacturers:
 - a. Burns

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.17 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Size plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.18 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:
 - a. Glynn-Johnson
2. Acceptable Manufacturers:
 - a. ABH

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
2. Provide friction type at doors without closer and positive type at doors with closer.

2.19 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. Burns

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button or thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.

4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.20 KEYSWITCHES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Schlage 650 series

B. Requirements:

1. Provide key switches capable of being configured to momentary or maintained action.
2. Provide key switches that accept a mortise cylinder. Cylinders: Refer to “KEYING” article, herein.

2.21 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Zero International
2. Acceptable Manufacturers:
 - a. Reese

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.22 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives
2. Acceptable Manufacturers:
 - a. No Substitute
 - b. Burns
 - c. Rockwood
 - d. Trimco

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.23 DOOR POSITION SWITCHES

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Schlage

B. Requirements:

1. Provide recessed or surface mounted type door position switches as specified.
2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used with magnetic locking device, provide minimum of 4 inches (102 mm) between switch and magnetic locking device.

2.24 FINISHES

A. Finish: BHMA 626/652 (US26D); except:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
3. Protection Plates: BHMA 630 (US32D)
4. Overhead Stops and Holders: BHMA 630 (US32D)
5. Door Closers: Powder Coat to Match
6. Wall Stops: BHMA 630 (US32D)
7. Latch Protectors: BHMA 630 (US32D)
8. Weatherstripping: Clear Anodized Aluminum
9. Thresholds: Mill Finish Aluminum

B. Finish: BHMA 630 (US32D); except:

1. Door Closers: Powder Coat to Match
2. Weatherstripping: Clear Anodized Aluminum
3. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.

- C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- D. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Where on-site modification of doors and frames is required:
 - 1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
 - 2. Field modify and prepare existing doors and frames for new hardware being installed.
 - 3. When modifications are exposed to view, use concealed fasteners, when possible.
 - 4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:
 - a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
 - b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
 - c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

3.03 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
 - 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- H. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:
 - 1. Conduit, junction boxes and wire pulls.

2. Connections to and from power supplies to electrified hardware.
 3. Connections to fire/smoke alarm system and smoke evacuation system.
 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
 5. Connections to panel interface modules, controllers, and gateways.
 6. Testing and labeling wires with Architect's opening number.
- I. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- J. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- K. Closer/holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- L. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
- M. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- N. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- O. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- P. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- Q. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.04 FIELD QUALITY CONTROL

- A. Inspection and Testing:
1. Provide functional testing and inspection of fire door assemblies by a qualified person in accordance with NFPA 80.
 - a. Schedule fire door assembly inspection within 90 days of Substantial Completion of the Project.
 - b. Submit a signed, written final report as specified in Paragraph 1.03.E.1.
 - c. Correct all deficiencies and schedule a reinspection of fire door assemblies noted as deficient on the inspection report.
 - d. Inspector to reinspect fire door assemblies after repairs are made.
 2. Provide inspection of required egress door assemblies by a qualified person in accordance with NFPA 101.
 - a. Schedule egress door assembly inspection within 90 days of Substantial Completion of the Project for the required openings.
 - b. Submit a signed, written final report as specified in Paragraph 1.03.E.2.
 - c. Correct all deficiencies and schedule a reinspection of egress door assemblies noted as deficient on the inspection report.
 - d. Inspector to reinspect required egress door assemblies after repairs are made.

3.05 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
 - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.06 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items per manufacturer's instructions to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.07 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D. Hardware Sets:

Abbreviation	Name
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
LCN	Lcn Commercial Division
SCE	Schlage Electronic Security
SCH	Schlage Lock Company
VON	Von Duprin
YAL	Yale Commercial Locks And Hardware
ZER	Zero International Inc

60754 OPT0230773 Version 2

Hardware Group No. 010.0

For use on Door #(s):
002

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5		626	IVE
1	EA	POWER TRANSFER	EPT10 CON		⚡ 689	VON
1	EA	ELECTRONIC CYLINDRICAL LOCK	MO5491LN REX 497		⚡ US26D	YAL
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		US32D	IVE
3	EA	SILENCER	SR64		GRY	IVE
1	EA	WIRE HARNESS FRAME - EPT TO POWER/CONTROLLER	CON-192P		⚡	SCH
1	EA	WIRE HARNESS DOOR - EPT TO ELEC LOCK/EXIT	CON-XX (LENGTH AS REQUIRED)		⚡	SCH
1	EA	DOOR POSITION SWITCH	67-05		⚡ BLK	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		⚡	VON
	EA	SET OF WIRING DIAGRAMS				
	EA	CARD READER	PROVIDED BY OWNER			

DOOR NORMALLY CLOSED, LATCHED AND SECURE. FREE EGRESS AT ALL TIMES.
ENTRY BY CARD READER UNLOCKS OUTSIDE LEVER.
LOCK PROVIDED WITH REQUEST TO EXIT SWITCH.

Hardware Group No. 011.0 - Not Used

Hardware Group No. 012.0

For use on Door #(s):

061B

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	POWER TRANSFER	EPT10 CON		⚡ 689	VON
1	EA	ELECTRONIC CYLINDRICAL LOCK	MO5491LN REX 497		⚡ US26D	YAL
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE
1	EA	WIRE HARNESS FRAME - EPT TO POWER/CONTROLLER	CON-192P		⚡	SCH
1	EA	WIRE HARNESS DOOR - EPT TO ELEC LOCK/EXIT	CON-XX (LENGTH AS REQUIRED)		⚡	SCH
1	EA	DOOR POSITION SWITCH	67-05		⚡ BLK	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		⚡	VON
	EA	SET OF WIRING DIAGRAMS				
	EA	CARD READER	PROVIDED BY OWNER			

DOOR NORMALLY CLOSED, LATCHED AND SECURE. FREE EGRESS AT ALL TIMES.
 ENTRY BY CARD READER UNLOCKS OUTSIDE LEVER.
 LOCK PROVIDED WITH REQUEST TO EXIT SWITCH.

Hardware Group No. 013.0

For use on Door #(s):

209B

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	POWER TRANSFER	EPT10 CON		✂ 689	VON
1	EA	ELECTRONIC CYLINDRICAL LOCK	MO5491LN REX 497		✂ US26D	YAL
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		US32D	IVE
3	EA	SILENCER	SR64		GRY	IVE
1	EA	WIRE HARNESS FRAME - EPT TO POWER/CONTROLLER	CON-192P		✂	SCH
1	EA	WIRE HARNESS DOOR - EPT TO ELEC LOCK/EXIT	CON-XX (LENGTH AS REQUIRED)		✂	SCH
1	EA	DOOR POSITION SWITCH	67-05		✂ BLK	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		✂	VON
	EA	SET OF WIRING DIAGRAMS				
	EA	CARD READER	PROVIDED BY OWNER			

DOOR NORMALLY CLOSED, LATCHED AND SECURE. FREE EGRESS AT ALL TIMES.
 ENTRY BY CARD READER UNLOCKS OUTSIDE LEVER.
 LOCK PROVIDED WITH REQUEST TO EXIT SWITCH.

Hardware Group No. 014.0

For use on Door #(s):
239B

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	POWER TRANSFER	EPT10 CON		⚡ 689	VON
1	EA	ELECTRONIC CYLINDRICAL LOCK	MO5491LN REX 497		⚡ US26D	YAL
1	EA	SURFACE CLOSER	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		US32D	IVE
3	EA	SILENCER	SR64		GRY	IVE
1	EA	WIRE HARNESS FRAME - EPT TO POWER/CONTROLLER	CON-192P		⚡	SCH
1	EA	WIRE HARNESS DOOR - EPT TO ELEC LOCK/EXIT	CON-XX (LENGTH AS REQUIRED)		⚡	SCH
1	EA	DOOR POSITION SWITCH	67-05		⚡ BLK	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		⚡	VON
	EA	SET OF WIRING DIAGRAMS				
	EA	CARD READER	PROVIDED BY OWNER			

DOOR NORMALLY CLOSED, LATCHED AND SECURE. FREE EGRESS AT ALL TIMES.
ENTRY BY CARD READER UNLOCKS OUTSIDE LEVER.
LOCK PROVIDED WITH REQUEST TO EXIT SWITCH.

Hardware Group No. 020.0

For use on Door #(s):
003






Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	CYLINDRICAL LOCK - STOREROOM	MO5408LN 497		US26D	YAL
1	EA	WALL STOP	WS406/407CVX		US32D	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 021.0

For use on Door #(s):
047




Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	CYLINDRICAL LOCK - STOREROOM	MO5408LN 497		US26D	YAL
1	EA	CLOSER WITH HOLD OPEN	4040XP HEDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		US32D	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 022.0

For use on Door #(s):
052






Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	CYLINDRICAL LOCK - STOREROOM	MO5408LN 497		US26D	YAL
1	EA	OH STOP	90S		630	GLY
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 023.0

For use on Door #(s):
239A




Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	CYLINDRICAL LOCK - STOREROOM	MO5408LN 497		US26D	YAL
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4040XP EDAW/62G		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 030.0

For use on Door #(s):
004 016 035 056A 206 218

Provide each SGL door(s) with the following:




QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	CYLINDRICAL LOCK - OFFICE	MO5407LN 497		US26D	YAL
1	EA	OH STOP	90S		630	GLY
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 031.0

For use on Door #(s):

019	020	021	043	056B	057
060	061A	063	067	207	216
217	240	241			

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	CYLINDRICAL LOCK - OFFICE	MO5407LN 497		US26D	YAL
1	EA	WALL STOP	WS406/407CVX		US32D	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 040.0

For use on Door #(s):

023	024	025	031	032	036
037	064	065	066	068	069
070	229	232	233	235	236

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	RIM/MORTISE CYLINDER AS REQ				YAL
	EA	BALANCE OF HARDWARE BY ALL GLASS DOOR SUPPLIER				

Hardware Group No. 050.0

For use on Door #(s):

028B

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CYLINDRICAL LOCK - PASSAGE	MO5401LN 497		US26D	YAL
	EA	BALANCE OF HARDWARE EXISTING TO REMAIN				

HARDWARE SUPPLIER TO VERIFY AND COORDINATE NEW LOCK WITH EXISTING DOOR PREP.

Hardware Group No. 060.0

For use on Door #(s):

040 202 203

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	PRIVACY LOCK W/INDICATOR	L9040 07N L583-363 L283-722		626	SCH
1	EA	SURFACE CLOSER	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		US32D	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 061.0

For use on Door #(s):

050

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	PRIVACY LOCK W/INDICATOR	L9040 07N L583-363 L283-722		626	SCH
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		US32D	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 062.0

For use on Door #(s):

051 054

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	PRIVACY LOCK W/INDICATOR	L9040 07N L583-363 L283-722		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4040XP EDAW/62G		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 070.0

For use on Door #(s):

044

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112XY EPT AS REQ BY DOOR MFG		US28	IVE
1	EA	POWER TRANSFER	EPT10 CON		⚡ 689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-33A-NL-OP-388-CON 24 VDC		⚡ US26D	VON
1	EA	RIM CYLINDER	TYPE AS REQUIRED		US26D	YAL
1	EA	DOOR PULL - OFFSET	9264F 18" O		630	IVE
1	EA	CONC OH STOP	100S		US32D	GLY
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA		689	LCN
1	EA	BLADE STOP SPACER	4040XP-61		689	LCN
1	EA	RAIN DRIP	142A DW + 4"		AA	ZER
1	EA	DOOR SWEEP	8198AA		AA	ZER
1	EA	THRESHOLD	655A-223		A	ZER
1	EA	WIRE HARNESS FRAME - EPT TO POWER/CONTROLLER	CON-192P		⚡	SCH
1	EA	WIRE HARNESS DOOR - EPT TO ELEC LOCK/EXIT	CON-XX (LENGTH AS REQUIRED)		⚡	SCH
1	EA	DOOR POSITION SWITCH	67-05		⚡ BLK	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		⚡	VON
	EA	SET OF WIRING DIAGRAMS				
	EA	CARD READER	PROVIDED BY OWNER			

WEATHER STRIPPING BY ALUMINUM DOOR SUPPLIER/MFG.

DOOR NORMALLY CLOSED, LATCHED AND SECURE. FREE EGRESS AT ALL TIMES. ENTRY BY CARD READER RETRACTS LATCH ALLOWING DOOR TO BE PULLED OPEN. ENTRY BY KEY OVERRIDE. EXIT DEVICE PROVIDED WITH REQUEST TO EXIT SWITCH.

Hardware Group No. 080.0

For use on Door #(s):

055 227

Provide each SGL door(s) with the following:




QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	CYLINDRICAL LOCK - PASSAGE	MO5401LN 497		US26D	YAL
1	EA	OH STOP	90S		630	GLY
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 081.0

For use on Door #(s):

228

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	CYLINDRICAL LOCK - PASSAGE	MO5401LN 497		US26D	YAL
1	EA	WALL STOP	WS406/407CVX		US32D	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 090.0

For use on Door #(s):

056C

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
	EA	ALL HARDWARE BY DOOR MFG.				

Hardware Group No. 100.0

For use on Door #(s):
058

Provide each PR door(s) with the following:

QTY	EA	DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5		626	IVE
2	EA	POWER TRANSFER	EPT10 CON		✂ 689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-9927-EO-LBR-CON 24 VDC		✂ 626	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-9927-NL-OP-LBR-110MD-CON 24 VDC		✂ 626	VON
1	EA	MORTISE CYLINDER	TYPE AS REQUIRED		626	SCH
1	EA	RIM CYLINDER	TYPE AS REQUIRED		US26D	YAL
2	EA	DOOR PULL - OFFSET	9264F 18" O		630	IVE
2	EA	SURF. AUTO OPERATOR	4642 WMS		✂ 689	LCN
2	EA	ACTUATOR, TOUCH	8310-853T		✂ 630	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
2	EA	WALL STOP	WS406/407CVX		US32D	IVE
2	EA	SILENCER	SR64		GRY	IVE
2	EA	WIRE HARNESS FRAME - EPT TO POWER/CONTROLLER	CON-192P		✂	SCH
2	EA	WIRE HARNESS DOOR - EPT TO ELEC LOCK/EXIT	CON-XX (LENGTH AS REQUIRED)		✂	SCH
1	EA	KEY SWITCH	653-04 NS L2 12/24 VDC		✂ 630	SCE
2	EA	DOOR POSITION SWITCH	67-05		✂ BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4RL 120/240 VAC		✂	VON
	EA	SET OF WIRING DIAGRAMS				
	EA	CARD READER	PROVIDED BY OWNER			

DOORS NORMALLY CLOSED, LATCHED AND SECURE. FREE EGRESS AT ALL TIMES.
 ENTRY BY CARD READER RETRACTS LATCH ALLOWING DOOR TO BE PULLED OPEN. ENTRY BY KEY OVERRIDE.
 ENTRY BY ADA OPERATOR AS PROGRAMMED BY ACCESS CONTROL SYSTEM.
 BOTH EXIT DEVICES PROVIDED WITH ELECTRONIC LATCH RETRACTION AND CAN BE PROGRAMMED FOR PUSH/PULL OPERATION BY ACCESS CONTROL SYSTEM.

Hardware Group No. 105.0 - Not Used

Hardware Group No. 110.0

For use on Door #(s):
077A

Provide each PR door(s) with the following:

QTY	EA	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY EPT AS REQ BY DOOR MFG	US28	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	RX-3347A-NL-OP-388-CON	626	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-3347A-EO-CON 24 VDC	626	VON
1	EA	RIM CYLINDER	TYPE AS REQUIRED	US26D	YAL
2	EA	DOOR PULL - OFFSET	9264F 18" O	630	IVE
2	EA	CONC OH STOP	100S	US32D	GLY
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN
1	EA	RAIN DRIP	142A DW + 4"	AA	ZER
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	655A-223	A	ZER
2	EA	WIRE HARNESS FRAME - EPT TO POWER/CONTROLLER	CON-192P		SCH
2	EA	WIRE HARNESS DOOR - EPT TO ELEC LOCK/EXIT	CON-XX (LENGTH AS REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	67-05	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		VON
	EA	SET OF WIRING DIAGRAMS			
	EA	CARD READER	PROVIDED BY OWNER		

DOORS NORMALLY CLOSED, LATCHED AND SECURE. FREE EGRESS AT ALL TIMES. ENTRY BY CARD READER RETRACTS LATCH ALLOWING DOOR TO BE PULLED OPEN. ENTRY BY KEY OVERRIDE. BOTH EXIT DEVICES PROVIDED WITH REQUEST TO EXIT SWITCH.

Hardware Group No. 120.0

For use on Door #(s):
077B

Provide each SGL door(s) with the following:

QTY	EA	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	626	IVE
1	EA	PANIC HARDWARE	99-L-07	626	VON
1	EA	RIM CYLINDER	TYPE AS REQUIRED	US26D	YAL
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	US32D	IVE
3	EA	SILENCER	SR64	GRY	IVE

EXIT DEVICE CAN BE MECHANICALLY DOGGED DOWN FOR PUSH PULL OPERATON. OUTSIDE LEVER TRIM - CLASSROOM FUNCTION.

Hardware Group No. 130.0

For use on Door #(s):
204

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5		626	IVE
1	EA	POWER TRANSFER	EPT10 CON		✂ 689	VON
2	EA	MANUAL FLUSH BOLT	FB358		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	ELECTRONIC CYLINDRICAL LOCK	MO5491LN REX 497		✂ US26D	YAL
2	EA	CLOSER W/ HOLD OPEN	4040XP HCUSH		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
2	EA	SILENCER	SR64		GRY	IVE
1	EA	WIRE HARNESS FRAME - EPT TO POWER/CONTROLLER	CON-192P		✂	SCH
1	EA	WIRE HARNESS DOOR - EPT TO ELEC LOCK/EXIT	CON-XX (LENGTH AS REQUIRED)		✂	SCH
2	EA	DOOR POSITION SWITCH	67-05		✂ BLK	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		✂	VON
	EA	SET OF WIRING DIAGRAMS				
	EA	CARD READER	PROVIDED BY OWNER			

CLOSER TO BE MOUNTED ON ACTIVE LEAF.

DOORS NORMALLY CLOSED, LATCHED AND SECURE. FREE EGRESS AT ALL TIMES. ENTRY BY CARD READER UNLOCKS OUTSIDE LEVER. ENTRY BY KEY OVERRIDE.

Hardware Group No. 140.0

For use on Door #(s):

208 226

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5		626	IVE
1	EA	POWER TRANSFER	EPT10 CON		⚡ 689	VON
1	EA	ELECTRONIC CYLINDRICAL LOCK	MO5491LN REX 497		⚡ US26D	YAL
1	EA	CLOSER W/ HOLD OPEN	4040XP HCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		US32D	IVE
3	EA	SILENCER	SR64		GRY	IVE
1	EA	WIRE HARNESS FRAME - EPT TO POWER/CONTROLLER	CON-192P		⚡	SCH
1	EA	WIRE HARNESS DOOR - EPT TO ELEC LOCK/EXIT	CON-XX (LENGTH AS REQUIRED)		⚡	SCH
1	EA	DOOR POSITION SWITCH	67-05		⚡ BLK	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		⚡	VON
	EA	SET OF WIRING DIAGRAMS				
	EA	CARD READER	PROVIDED BY OWNER			

DOOR NORMALLY CLOSED, LATCHED AND SECURE. FREE EGRESS AT ALL TIMES. ENTRY BY CARD READER UNLOCKS OUTSIDE LEVER. ENTRY BY KEY OVERRIDE.

Hardware Group No. 150.0

For use on Door #(s):

209A 209C










Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5		626	IVE
2	EA	PANIC HARDWARE SVR-CLASSROOM	9927-L-LBR-07		US26D	VON
2	EA	RIM CYLINDER	TYPE AS REQUIRED		US26D	YAL
2	EA	CLOSER W/ HOLD OPEN	4040XP HCUSH		689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	MEETING STILE	398V		V	ZER

Hardware Group No. 160.0

For use on Door #(s):
222

Provide each SGL door(s) with the following:




QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	PRIVACY LOCK W/INDICATOR	L9040 07N L583-363 L283-722		626	SCH
1	EA	SURFACE CLOSER	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		US32D	IVE
1	EA	GASKETING	119WB PSA		B	ZER
1	EA	GASKETING	770AA-S		AA	ZER
1	EA	DOOR BOTTOM	367AA		AA	ZER
1	EA	THRESHOLD	564A-223		A	ZER

SPECIFIED GASKETING AND THRESHOLD RATED AT 55 STC FOR METAL DOOR.
HARDWARE SUPPLIER TO COORDINATE SOUND GASKETING WITH MORTISE LOCK TRIM TO AVOID ANY HARDWARE CONFLICTS.

Hardware Group No. 170.0

For use on Door #(s):
045

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		626	IVE
1	EA	CYLINDRICAL LOCK - STOREROOM	MO5408LN 497		US26D	YAL
1	EA	OH STOP	90S		630	GLY
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 180.0

For use on Door #(s):
223A 223B

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
	EA	EXISTING DOOR, FRAME AND HARDWARE TO REMAIN				

Door#	HwSet#
002	010.0
003	020.0
004	030.0
016	030.0
019	031.0
020	031.0
021	031.0
023	040.0
024	040.0
025	040.0
028B	050.0
031	040.0
032	040.0
035	030.0
036	040.0
037	040.0
040	060.0
043	031.0
044	070.0
045	170.0
047	021.0
050	061.0
051	062.0
052	022.0
054	062.0
055	080.0
056A	030.0
056B	031.0
056C	090.0
057	031.0
058	100.0
060	031.0
061A	031.0
061B	012.0
063	031.0
064	040.0
065	040.0
066	040.0
067	031.0
068	040.0
069	040.0
070	040.0
077A	110.0
077B	120.0
202	060.0

Door#	HwSet#
203	060.0
204	130.0
206	030.0
207	031.0
208	140.0
209A	150.0
209B	013.0
209C	150.0
216	031.0
217	031.0
218	030.0
222	160.0
223A	180.0
223B	180.0
226	140.0
227	080.0
228	081.0
229	040.0
232	040.0
233	040.0
235	040.0
236	040.0
239A	023.0
239B	014.0
240	031.0
241	031.0

END OF SECTION

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Glass products.
 - 2. Insulating glass.
 - 3. Glazing sealants.
 - 4. Glazing tapes.
 - 5. Miscellaneous glazing materials.

1.2 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample warranties.

1.5 WARRANTY

- A. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- B. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 - 1. U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on LBL's WINDOW 7 computer program, expressed as Btu/sq. ft. x h x deg F.
 - 2. SHGC and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on LBL's WINDOW 7 computer program.
 - 3. Visible Reflectance: Center-of-glazing values, in accordance with NFRC 300.

2.2 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.3 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cardinal Glass Industries.
 - b. Guardian Glass; SunGuard.
 - c. Pilkington North America.
 - d. Saint-Gobain Glass Exprover NA.
 - e. Vitro Architectural Glass.
- B. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

2.4 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E2190.
 - 1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
 - 2. Perimeter Spacer: Manufacturer's standard spacer material and construction .
 - 3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.5 GLAZING SEALANTS

- A. General:
 - 1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 - 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range of industry colors.
- B. Neutral-Curing Silicone Glazing Sealant, Class 100/50: Complying with ASTM C920, Type S, Grade NS, Use NT.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. GE Construction Sealants; Momentive Performance Materials Inc.
 - b. Pecora Corporation.
 - c. Sika Corporation.
 - d. The Dow Chemical Company.
 - e. Tremco Incorporated.

2.6 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
 - 1. AAMA 804.3 tape, where indicated.
 - 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 - 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
 - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as primary sealant.

2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks:
 1. Neoprene with Shore A durometer hardness of 85, plus or minus 5.
 2. Type recommended in writing by sealant or glass manufacturer.
- C. Spacers:
 1. Neoprene blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
 2. Type recommended in writing by sealant or glass manufacturer.
- D. Edge Blocks:
 1. Neoprene with Shore A durometer hardness per manufacturer's written instructions.
 2. Type recommended in writing by sealant or glass manufacturer.
- E. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- F. Window Film: Window film to be equal to SOLYX-3160 Shimera. See glazing elevations for locations to be installed.

PART 3 - EXECUTION

3.1 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

3.2 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Apply heel bead of elastomeric sealant.
- F. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.3 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.4 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.5 CLEANING AND PROTECTION

- A. Immediately after installation, remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.

3.6 MONOLITHIC GLASS SCHEDULE

- A. Clear Glass Type : Annealed and Fully tempered float glass.
 - 1. Minimum Thickness: 6 mm (1/4") .
 - 2. Safety glazing required.
 - a. Provide tempered glass at all hazardous locations per IBC 2015, Chapter 2406.

3.7 INSULATING GLASS SCHEDULE

- A. Tinted Insulating Glass Type : Double Glazed Tinted Solar Control Insulating Glass Unit [Optigray® 6mm | Air (10%) / Argon (90%) Mix 1/2" (12.7mm) | Solarban® 60 on Starphire® 6mm (3)]
 - 1. Conformance: ASTM E 2190
 - 2. Outdoor Lite: Optigray® 6mm Tinted float glass as manufactured by Vitro Architectural Glass
 - a. Conformance: ASTM C 1036, Type 1, Class 2, Quality q3.
 - b. Heat-Treatment: None & Tempered; ASTM C 1048, Kind FT; Safety Glazing meets ANSI Z97.1 and CPSC 16CFR-1201.
 - 1) Provide tempered glass at all hazardous locations per IBC 2015, Chapter 2406.
 - c. Glass Thickness: 6mm (1/4")
 - 3. Interspace Content: Air (10%) / Argon (90%) Mix 1/2" (12.7mm)
 - 4. Indoor Lite: Starphire® Float Glass as manufactured by Vitro Architectural Glass
 - a. Conformance: ASTM C 1036, Type 1, Class 1, Quality q3.
 - b. Glass Thickness: 6mm (1/4")

- c. Magnetic Sputter Vacuum Deposition Coating (MSVD): ASTM C 1376.
 - d. Coating: Solarban® 60 on Surface # 3
 - e. Heat-Treatment: None & Tempered; ASTM C 1048, Kind FT; Safety Glazing meets ANSI Z97.1 and CPSC 16CFR-1201.
 - 1) Provide tempered glass at all hazardous locations per IBC 2015, Chapter 2406.
5. Performance Requirements:
- a. Visible Light Transmittance: 51 percent minimum.
 - b. Winter Nighttime U-Factor: 0.24 (Btu/hr*ft²*°F) maximum.
 - c. Summer daytime U-Factor: 0.22 (Btu/hr*ft²*°F) maximum.
 - d. Shading Coefficient: 0.40 maximum.
 - e. Solar Heat Gain Coefficient: 0.35 maximum.
 - f. Outdoor Visible Light Reflectance: 8 percent maximum.

END OF SECTION 088000

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior partitions.
 - 2. Grid suspension systems for gypsum board and plastic laminate ceilings.
- B. Related Requirements:
 - 1. Section 054000 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; and roof rafters and ceiling joists.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for steel unless otherwise indicated.
 - 2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C 645. Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.
 - 1. Steel Studs and Tracks:
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) ClarkDietrich.
 - 2) MarinoWARE.
 - 3) MBA Building Supplies.
 - 4) SCAFCO Steel Stud Company.
 - 5) Steel Construction Systems.
 - b. Minimum Base-Steel Thickness: 0.0296 inch .
 - c. Depth: As indicated on Drawings .
 - 2. Embossed, High Strength Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally comparable to conventional ASTM C 645 steel studs and tracks.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) ClarkDietrich.

- 2) MarinoWARE.
 - 3) MBA Building Supplies.
 - 4) SCAFCO Steel Stud Company.
 - 5) Steel Construction Systems.
 - b. Minimum Base-Steel Thickness: 0.0190 inch .
 - c. Depth: As indicated on Drawings .
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
1. Single Long-Leg Track System: ASTM C 645 top track with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
 2. Double-Track System: ASTM C 645 top outer tracks, inside track with 2-inch- deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
 3. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Steel Thickness: 0.0329 inch .
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch- wide flanges.
1. Depth: 1-1/2 inches .
 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches , 0.068-inch- thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base-Steel Thickness: 0.0296 inch .
 2. Depth: 7/8 inch .
- H. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.
1. Configuration: Asymmetrical .

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.
- B. Hanger Attachments to Concrete:
1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 AC193 AC58 or AC308 as appropriate for the substrate.
 - a. Uses: Securing hangers to structure.
 - b. Type: Torque-controlled, expansion anchor torque-controlled, adhesive anchor or adhesive anchor.
 - c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941 , Class Fe/Zn 5, unless otherwise indicated.
 2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- D. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Armstrong Ceiling & Wall Solutions.
 - b. USG Corporation.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide the following:
 1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
 2. Multilayer Application: 24 inches o.c. unless otherwise indicated.
 3. Tile Backing Panels: 16 inches o.c. unless otherwise indicated.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

- a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
 - 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
 - E. Direct Furring:
 - 1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
 - F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.
- 3.5 INSTALLING CEILING SUSPENSION SYSTEMS
- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Hangers: 48 inches o.c.
 - B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
 - C. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
 - D. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
 - E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.
- END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - 2. Tile backing panels.
- B. Related Requirements:
 - 1. Section 061600 "Sheathing" for gypsum sheathing for exterior walls.
 - 2. Section 079219 "Acoustical Joint Sealants" for acoustical joint sealants installed in gypsum board assemblies.
 - 3. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Gypsum board, Type X.
 - 2. Abuse-resistant gypsum board.
 - 3. Mold-resistant gypsum board.
 - 4. Water-resistant gypsum backing board.
 - 5. Interior trim.
 - 6. Joint treatment materials.
 - 7. Laminating adhesive.
 - 8. Sound-attenuation blankets.
 - 9. Acoustical sealant.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corporation; Saint-Gobain North America.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 - d. USG Corporation.
2. Thickness: 5/8 inch.
3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.

- B. Abuse-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation; Saint-Gobain North America.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 - d. USG Corporation.
2. Core: 5/8 inch , Type X.
3. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
4. Indentation: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
5. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
6. Long Edges: Tapered.
7. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

- C. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation; Saint-Gobain North America.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 - d. USG Corporation.
2. Core: 5/8 inch , Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.4 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation; Saint-Gobain North America.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 - d. USG Corporation.
2. Core: 5/8 inch , Type X.
3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

- B. Water-Resistant Gypsum Backing Board: ASTM C1396/C1396M, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation; Saint-Gobain North America.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 - d. USG Corporation.
2. Core: 5/8 inch , Type X .

2.5 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc .
 - 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.

2.6 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints , rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.
- D. Joint Compound for Tile Backing Panels:
 - 1. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.7 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
 - 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Type X: All gypsum board surfaces not indicated otherwise in the following locations listed below .
 - 2. Abuse-Resistant Type: The lower 8'-0" of walls in the following locations .
 - a. Hallways & corridors.
 - b. Vestibules.
 - c. Reception areas of offices.
 - 3. Mold-Resistant Type: On walls where plumbing fixtures occur and on and within 4' of adjacent walls except where tile is the finished surface .
 - 4. Tile Backing Panels: Any locations where ceramic tile is the finished surface.
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
 - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
 4. Fastening Methods: Fasten base layers and face layers separately to supports with screws .
 - D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- 3.4 INSTALLATION OF TILE BACKING PANELS
- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.
 - B. Water-Resistant Backing Board: Install where indicated with 1/4-inch gap where panels abut other construction or penetrations.
 - C. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.
- 3.5 INSTALLATION OF TRIM ACCESSORIES
- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
 - B. Control Joints: Install control joints at locations indicated on Drawings and according to ASTM C840 and in specific locations approved by Architect for visual effect.
 - C. Interior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners unless otherwise indicated.
 2. LC-Bead: Use at exposed panel edges .
 3. L-Bead: Use where indicated .
- 3.6 FINISHING GYPSUM BOARD
- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
 - B. Prefill open joints , rounded or beveled edges, and damaged surface areas.
 - C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
 - D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 2. Level 2: Panels that are substrate for tile Panels that are substrate for acoustical tile Panels that are substrate for tile .
 3. Level 3: Where indicated on Drawings .
 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated and walls with wall coverings At panel surfaces that will be exposed to view unless otherwise indicated .
- 3.7 PROTECTION
- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
 - B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
 - C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Porcelain tile.
 - 2. Glazed wall tile.
 - 3. Metal edge strips.
- B. Related Requirements:
 - 1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
 - 2. Section 092900 "Gypsum Board" for glass-mat, water-resistant backer board.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required.
 - 2. Full-size units of each type of trim and accessory for each color and finish required.
 - 3. Metal edge strips in 6-inch lengths.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
 - 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.5 QUALITY ASSURANCE

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store liquid materials in unopened containers and protected from freezing.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile of each color or finish from single source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
 1. Metal edge strips.

2.2 TILE PRODUCTS

- A. Ceramic Tile Type (T-1, T-2): Unglazed porcelain tile.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings .
 - a. See Finish Plans for product selection and colors.
 2. Certification: Tile certified by the Porcelain Tile Certification Agency.
 3. Face Size: As indicated on drawings.
 4. Dynamic Coefficient of Friction: Not less than 0.42.
 5. Tile Color, Glaze, and Pattern: As indicated by manufacturer's designations .
 6. Grout Color: As indicated on Finish Plans .
- B. Ceramic Tile Type (T-3): Glazed wall tile.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings .
 - a. See Finish Plans for product selection and colors.
 2. Tile Color and Pattern: As indicated by manufacturer's designations .
 3. Grout Color: As indicated on Finish Plans .
 4. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Wall Bullnose (used as base) for Thinset Mortar Installations: Surface bullnose, module size as indicated by manufacturers designations .
 - b. External Corners for Thinset Mortar Installations: Surface bullnose, same size as adjoining flat tile.

2.3 SETTING MATERIALS

- A. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.15.

2.4 GROUT MATERIALS

- A. Water-Cleanable Epoxy Grout: ANSI A118.3 , with a VOC content of 65 g/L or less.

2.5 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless steel, ASTM A276/A276M or ASTM A666, 300 Series exposed-edge material.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Schluter Systems L.P.; or comparable product by one of the following:
 - a. Blanke Corporation.
 - b. Ceramic Tool Company, Inc.
 - c. Schluter Systems L.P.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

2.6 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. See interior elevations for special shapes to be CNC water jet cut into ceramic wall tile.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION OF CERAMIC TILE

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile floors consisting of tiles 8 by 8 inches or larger.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - 2. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Glazed Wall Tile: 1/16 inch .
 - 2. Porcelain Tile: 1/8 inch.
- H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- I. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.
- J. Floor Sealer: Apply floor sealer to grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.5 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION 093013

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

1.2 PREINSTALLATION MEETINGS

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, and coordinated with each other, using input from installers of the items involved.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 ACOUSTICAL PANELS TYPE 1

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Ceiling & Wall Solutions; ULTIMA Lay-In and Tegular: 1911 or comparable product by one of the following:
 - 1. CertainTeed Corporation; Saint-Gobain North America.
 - 2. USG Corporation.
 - 3. Armstrong Ceiling & Wall Solutions.
- B. Classification: As follows, per ASTM E 1264:
 - 1. Type and Form: Type IV, Form 2 .
 - 2. Pattern: E (lightly textured) .
 - 3. LRC: Not less than 0.85 .
 - 4. NRC: Not less than 0.75 .
 - 5. CAC: Not less than 35 .
- C. Color: White .
- D. Edge Detail: Beveled Tegular.
- E. Thickness: 3/4 inch .
- F. Modular Size: 24 by 24 inches .
- G. Ceiling Suspension System:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Ceiling & Wall Solutions; PRELUDE XL 15/16" Exposed Tee or comparable product by one of the following:
 - 2. Ceiling Suspension System: Wide -face, direct-hung system; ASTM C 635, heavy-duty structural classification.
 - a. Face Design: Flat, flush .
 - b. Face Finish: Painted white .
 - 3. Attachment Devices: Sized for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
 - 4. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - a. Size: Provide yield strength at least 3 times the hanger design load (ASTM C 635, Table 1, Direct Hung), but not less than 0.135-inch- diameter wire.

2.3 ACOUSTICAL PANELS TYPE 2

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Ceiling & Wall Solutions; ULTIMA lay in and tegular: 1915 or comparable product by one of the following:
 - 1. CertainTeed Corporation; Saint-Gobain North America.
 - 2. USG Corporation.
 - 3. Armstrong Ceiling & Wall Solutions.
- B. Classification: As follows, per ASTM E 1264:
 - 1. Type and Form: Type IV, Form 2 .
 - 2. Pattern: E (lightly textured) .
 - 3. LRC: Not less than 0.75 .
 - 4. NRC: Not less than 0.75 .
 - 5. CAC: Not less than 35 .
- C. Color: White .
- D. Edge Detail: tegular .
- E. Thickness: 3/4 inch .
- F. Modular Size: 24 by 48 inches .
- G. Ceiling Suspension System:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Ceiling & Wall Solutions; SUPRAFINE XL 9/16" Exposed Tee or comparable product by one of the following:
 - a. CertainTeed Corporation; Saint-Gobain North America.
 - b. USG Corporation.
 - c. Armstrong Ceiling & Wall Solutions.
 - 2. Ceiling Suspension System: Wide -face, direct-hung system; ASTM C 635, heavy-duty structural classification.
 - a. Face Design: Flat, flush .
 - b. Face Finish: Painted white .
 - 3. Attachment Devices: Sized for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
 - 4. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - a. Size: Provide yield strength at least 3 times the hanger design load (ASTM C 635, Table 1, Direct Hung), but not less than 0.135-inch- diameter wire.

2.4 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Hold-Down Clips: Manufacturer's standard hold-down.

2.5 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - 1. Provide miscellaneous shapes and closure trims fabricated from 24 ga. prefinsihed metal as indicated on the drawings.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated.
- B. Layout openings for penetrations centered on the penetrating items.

3.2 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.

- B. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Do not use exposed fasteners, including pop rivets, on moldings and trim.
 - 2. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 - 3. Install hold-down clips in Vestibules and ceilings above exterior doors; space according to panel manufacturer's written instructions unless otherwise indicated.

END OF SECTION 095113

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 1. Vinyl base.
 2. Vinyl stair accessories.
 3. Vinyl molding accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.
- C. Product Schedule: For resilient base and accessory products.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.5 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F , in spaces to receive resilient products during the following periods:
 1. 48 hours before installation.
 2. During installation.
 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F .
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 VINYL BASE (VB-1)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Johnsonite; a Tarkett company; or comparable product by one of the following:
 1. Armstrong World Industries, Inc.
 2. Roppe Corporation; Roppe Holding Company.
 3. Johnsonite; a Tarkett company.
- B. Product Standard: ASTM F 1861, Type TV (vinyl, thermoplastic).
 1. Group: I (solid, homogeneous) .
 2. Style and Location:
 - a. Style B, Cove: .
- C. Minimum Thickness: 0.125 inch .
- D. Height: 4 inches .
- E. Lengths: Cut lengths 48 inches long or coils in manufacturer's standard length.
- F. Outside Corners: Job formed or preformed.
- G. Inside Corners: Job formed or preformed.
- H. Colors and Patterns: As indicated by manufacturer's designations .

2.2 VINYL MOLDING ACCESSORY

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Johnsonite; a Tarkett company; Wheeled Traffic Transitions or comparable product by one of the following:
1. Armstrong World Industries, Inc.
 2. Roppe Corporation; Roppe Holding Company.
- B. Description: Vinyl reducer strip for resilient floor covering joiner for tile and carpet transition strips .
- C. Profile and Dimensions: CTA-XX- .
- D. Colors and Patterns: As selected from manufacturer's standard offerings .

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.
1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 10 pH.
 4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. , and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until materials are the same temperature as space where they are to be installed.
1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.

- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.
 - a. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.
 - a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:
 - 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
 - 2. Tightly adhere to substrates throughout length of each piece.
 - 3. For treads installed as separate, equal-length units, install to produce a flush joint between units.
- C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum horizontal surfaces thoroughly.
 - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from marks, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Solid vinyl floor tile.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: Full-size units of each color, texture, and pattern of floor tile required.
- C. Samples for Verification: Full-size units of each color and pattern of floor tile required.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than or more than .
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

2.2 LUXURY VINYL TILE (LVT-1, LVT-2, LVT-3)

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. See finish plan.
- B. Tile Standard: ASTM F 1700.
 - 1. Class: As indicated by product designations Class III, Printed Film Vinyl Tile.
 - 2. Type: B, Embossed Surface.

- C. Thickness: .20 inch .
- D. Size: See Finish Plans .
- E. Colors and Patterns: As indicated by manufacturer's designations on Finish Plans .

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
 - 4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. , and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles in pattern indicated .
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles in pattern of colors and sizes indicated.

- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
 - 1. Apply two coat(s) at new VCT floors.
- E. Cover floor tile until Substantial Completion.

END OF SECTION 096519

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Modular carpet tile.
- B. Related Requirements:
 - 1. Section 024119 "Selective Demolition" for removing existing floor coverings.
 - 2. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include manufacturer's written installation recommendations for each type of substrate.
- B. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
 - 1. Carpet Tile: Full-size Sample.
 - 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- long Samples.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
 - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the Carpet and Rug Institute's CRI 104.

1.8 FIELD CONDITIONS

- A. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

1.9 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, the following:
 - a. More than 10 percent edge raveling, snags, and runs.
 - b. Dimensional instability.
 - c. Excess static discharge.
 - d. Loss of tuft-bind strength.
 - e. Loss of face fiber.
 - f. Delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE (CPT-1, CPT-2, CPT-3, CPT-4, WO-1)

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 1. Milliken & Company.
- B. Color: As indicated by manufacturer's designation on Finish Plans .
- C. Pattern: Match Architect's samples .
- D. Backing System: Manufacturer's standard for product indicated .
- E. Size: As indicated on Finish Plans .

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
 1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. , and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive .
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns indicated on Drawings .
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.
- I. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with the Carpet and Rug Institute's CRI 104, Section 13.7.
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 097200 - WALL COVERINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Heavy-duty, synthetic, textile wall covering.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data on physical characteristics, durability, fade resistance, and fire-test-response characteristics.
- B. Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern placement, seams and termination points.
- C. Samples: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36-inch- long in size.
 - 1. Wall-Covering Sample: From same production run to be used for the Work, with specified treatments applied.
- D. Samples for Initial Selection: For each type of wall covering.

1.4 INFORMATIONAL SUBMITTALS

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For wall coverings to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

1.7 QUALITY ASSURANCE

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.
- B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 50 or less.
 - 2. Fire-Growth Contribution: No flashover and heat and smoke release according to NFPA 265 .

2.2 HEAVY-DUTY, SYNTHETIC, TEXTILE WALL COVERING (MC-1)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide MDC; Davenport Cloud Cover or comparable product by one of the following:
1. Carnegie.
 2. DesignTex Inc.
 3. Gilford Inc.
 4. Wolf-Gordon.
 5. MDC.
- B. Description: Provide mildew-resistant wall coverings in rolls from same production run and that comply with ASTM F 793.
1. Category: IV, Type I, Commercial Serviceability .
- C. Test Responses:
1. Colorfastness to Wet and Dry Crocking: Passes AATCC 8, Class 3, minimum.
 2. Colorfastness to Light: Passes AATCC 16 Test Option 1 or 3, Class 4, minimum, at 40 hours.
- D. Total Weight: 24 oz/lyd .
- E. Width: 54 inches .
- F. Colors, Textures, and Patterns: Match Architect's samples .

2.3 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining , strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.
- B. Seam Tape: As recommended in writing by wall-covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 WALL-COVERING INSTALLATION

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Match pattern 72 inches above the finish floor.
- F. Install seams vertical and plumb at least 6 inches from outside corners and 6 inches from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.

- G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- H. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.4 CLEANING

- A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wall-covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 097200

SECTION 098433 - SOUND-ABSORBING WALL UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes shop-fabricated, acoustical panel units tested for acoustical performance, including the following:
 - 1. Sound-absorbing wall panels.
- B. Related Requirements:
 - 1. Section 097200 "Wall Coverings" for adhesively applied textile wall coverings and for coordinated requirements for fabric.
 - 2. Section 097723 "Fabric-Wrapped Panels" for decorative, fabric-wrapped wall panels that are not required to be tested for acoustical performance and for coordinated requirements for fabric.

1.3 DEFINITIONS

- A. NRC: Noise Reduction Coefficient.
- B. SAA: Sound Absorption Average.

1.4 PREINSTALLATION MEETINGS

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include fabric facing, panel edge, core material, and mounting indicated.
- B. Shop Drawings: For unit assembly and installation.
 - 1. Include plans, elevations, sections, and mounting devices and details.
 - 2. Include details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge profile and core materials.
 - 3. Include details at cutouts and penetrations for other work.
 - 4. Include direction of fabric weave and pattern matching.
- C. Samples for Initial Selection: For each type of fabric facing.
 - 1. Include Samples of hardware and accessories involving color or finish selection.

1.6 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranty.

1.7 CLOSEOUT SUBMITTALS

1.8 QUALITY ASSURANCE

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Lighting: Do not install units until a permanent level of lighting is provided on surfaces to receive the units.

- C. Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.
- D. Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to the following:
 - a. Acoustical performance.
 - b. Fabric sagging, distorting, or releasing from panel edge.
 - c. Warping of core.
 - 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall units specified in this Section from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.3 SOUND-ABSORBING WALL UNITS

- A. Sound-Absorbing Wall Panel : Manufacturer's standard panel construction consisting of facing material stretched over front face of edge-framed core and bonded or attached to edges and back of frame .
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Tectum Inc; Fabric Walls or comparable product by one of the following:
 - 1. Acoustical Solutions.
 - 2. Acoustical Surfaces, Inc.
 - 3. Armstrong World Industries, Inc.
 - 4. MBI Products Company, Inc.
 - 5. Panel Solutions, Inc.
 - 6. Tectum Inc.

2.4 MATERIALS

- A. Core Materials:
 - 1. Mineral-Fiber Board: Maximum flame-spread and smoke-developed indexes of 25 and 10, respectively; minimum density of 13 lb/cu. ft. , and with perforated surface.
- B. Mounting Devices: Concealed on back of unit, recommended by manufacturer to support weight of unit, and as follows:
 - 1. Splines: Manufacturer's standard concealed metal or plastic splines that engage the kerfed edges of the unit, with other moldings and trim for interior corners, exterior corners, and exposed edges, with factory-applied finish on exposed items.

2.5 FABRICATION

- A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.

- B. Edge Hardening: For mineral-fiber board cores, chemically harden core edges and areas of core where mounting devices are attached.
- C. Core-Face Layer: Evenly stretched over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, or sags.
- D. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.
 - 1. Square Corners: Tailor corners. Heat-seal vinyl fabric seams at corners.
 - 2. Radius and Other Nonsquare Corners: Attach facing material so there are no seams or gathering of material.
 - 3. Fabrics with Directional or Repeating Patterns or Directional Weave: Mark fabric top and attach fabric in same direction so pattern or weave matches in adjacent units.
- E. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch for the following:
 - 1. Thickness.
 - 2. Edge straightness.
 - 3. Overall length and width.
 - 4. Squareness from corner to corner.
 - 5. Chords, radii, and diameters.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fabric, fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.
- C. Align fabric pattern and grain with adjacent units .

3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches, noncumulative.
- B. Variation of Joint Width: Not more than 1/16-inch variation from hairline in 48 inches, noncumulative.

3.4 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION 098433

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Primers.
2. Water-based finish coatings.
3. Solvent-based finish coatings.
4. Floor sealers and paints.

- B. Related Requirements:

1. Section 051200 "Structural Steel Framing" for shop priming structural steel.
2. Section 055000 "Metal Fabrications" for shop priming metal fabrications.
3. Section 055213 "Pipe and Tube Railings" for shop priming pipe and tube railings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 1. Include preparation requirements and application instructions.
 2. Indicate VOC content.
- B. Samples: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 1. Submit Samples on rigid backing, 8 inches square.
 2. Apply coats on Samples in steps to show each coat required for system.
 3. Label each coat of each Sample.
 4. Label each Sample for location and application area.
- D. Product Schedule: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Paint Products: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); or comparable product by one of the following:
 1. Benjamin Moore & Co.

2. Diamond Vogel Paints.
3. PPG Paints.

B. Source Limitations: Obtain each paint product from single source from single manufacturer.

2.2 PAINT PRODUCTS, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. Colors: As indicated in a color schedule .

2.3 PRIMERS

A. Interior/Exterior Latex Block Filler: Water-based, high-solids, emulsion coating formulated to bridge and fill porous surfaces of exterior concrete masonry units in preparation for specified subsequent coatings.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. Diamond Vogel Paints.
 - c. PPG Paints.

B. Alkali-Resistant, Water-Based Primer: Water-based primer formulated for use on alkaline surfaces, such as plaster, vertical concrete, and masonry.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints.

C. Interior Latex Primer Sealer: Water-based latex sealer used on new interior plaster, concrete, and gypsum wallboard surfaces.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. Diamond Vogel Paints.
 - c. PPG Paints.

D. Interior Latex Primer for Wood: Waterborne-emulsion primer formulated for resistance to extractive bleeding, mold, and microbes; for hiding stains; and for use on interior wood subject to extractive bleeding.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. Diamond Vogel Paints.
 - c. PPG Paints.

E. Alkyd Quick-Dry Primer for Metal: Corrosion-resistant, solvent-based, modified-alkyd primer; lead and chromate free; formulated for quick-drying capabilities and for use on cleaned, interior steel surfaces.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. Diamond Vogel Paints.
 - c. PPG Paints.

F. Anti-Corrosive Epoxy Primer: Corrosion-resistant, solvent-based, two-component epoxy primer formulated for use on prepared, interior ferrous- and galvanized-metal surfaces.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); or comparable product by one of the following:
 - a. PPG Paints.

G. Surface-Tolerant Metal Primer: Corrosion-resistant, solvent-based metal primer formulated for use on structural steel and metal fabrications that have been minimally prepared.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); or comparable product by one of the following:

- a. Benjamin Moore & Co.
- b. Diamond Vogel Paints.
- c. PPG Paints.

2.4 WATER-BASED FINISH COATS

- A. Interior, Latex, Eggshell: Pigmented, water-based paint for use on primed/sealed interior plaster and gypsum board, and on primed wood and metals.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. Diamond Vogel Paints.
 - c. PPG Paints.
 2. Gloss and Sheen Level: Manufacturer's standard eggshell finish .
- B. Interior, Water-Based Light-Industrial Coating, Semigloss: Pigmented, water-based emulsion coating for interior primed wood and metal surfaces (e.g., walls, doors, frames, trim, and sash), providing resistance to moderate abrasion and mild chemical exposure and corrosive conditions.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints.
 2. Gloss Level: Manufacturer's standard semigloss finish .
- C. Interior, Latex, High-Performance Architectural Coating, Eggshell: High-performance architectural latex coating providing a significantly higher level of performance than conventional latex paints in the areas of scrub resistance, burnish resistance, and ease of stain removal.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); or comparable product by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Paints.
 2. Gloss and Sheen Level: Manufacturer's standard eggshell finish .

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Fiber-Cement Board: 12 percent.
 3. Masonry (Clay and CMUs): 12 percent.
 4. Wood: 15 percent.
 5. Gypsum Board: 12 percent.
 6. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Plaster Substrates: Verify that plaster is fully cured.
- E. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.
- F. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- G. Proceed with coating application only after unsatisfactory conditions have been corrected.
 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
 1. SSPC-SP 3.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Existing Stained and Finished Wood Substrates:
 1. Sand surfaces that will be exposed to view, and dust off.
 2. Prime edges, ends, faces, undersides, and backsides of wood.
 3. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 INSTALLATION

- A. Apply paints according to manufacturer's written instructions.
 1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 1. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Pipe hangers and supports.
 - d. Metal conduit.
 - e. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - f. Other items as directed by Architect.
 - g. .
 2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 - 1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
 - 2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
 - 3. Allow empty paint cans to dry before disposal.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
 - 1. Latex System :
 - a. Prime Coat: Matching topcoat.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior latex paint, eggshell .
- B. Clay Masonry Substrates:
 - 1. Latex System :
 - a. Prime Coat: Alkali-resistant, water-based primer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, eggshell .
- C. CMU Substrates:
 - 1. Latex System :
 - a. Block Filler: Interior/exterior latex block filler.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, eggshell .
- D. Steel Substrates:
 - 1. Latex System, Alkyd Primer :
 - a. Prime Coat: Alkyd quick-dry primer for metal .
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, semigloss .
 - 2. Latex over Shop-Applied Quick-Drying Shop Primer System :
 - a. Prime Coat: Quick-dry primer for shop application.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, semigloss .
 - 3. High-Performance Architectural Latex System :
 - a. Prime Coat: .
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Topcoat: Interior, latex, high-performance architectural coating, eggshell semigloss.
- E. Galvanized-Metal Substrates:
 - 1. Latex System :
 - a. Prime Coat: Water-based galvanized primer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, eggshell .
- F. Finish Carpentry: Wood trim Doors Windows and Wood board paneling.
 - 1. Latex over Latex Primer System :
 - a. Prime Coat: Interior latex primer for wood.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, eggshell .
- G. Gypsum Board and Plaster Substrates:
 - 1. Latex over Latex Sealer System :
 - a. Prime Coat: Interior latex primer sealer.
 - b. Intermediate Coat: Matching topcoat.

- c. Topcoat: Interior, latex, eggshell .
 - 2. Latex over Alkyd Primer System (for Plaster Only) :
 - a. Prime Coat: Interior alkyd primer sealer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, eggshell .
 - H. Insulation-Covering Substrates: Including .
- END OF SECTION 099123

SECTION 099300 - STAINING AND TRANSPARENT FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and application of wood stains and transparent finishes . on the following substrates:
 - 1. Interior Substrates:
 - a. Dressed lumber (finish carpentry or woodwork).
- B. Related Requirements:
 - 1. Section 099123 "Interior Painting" for stains and transparent finishes on concrete floors.

1.3 DEFINITIONS

- A. MPI Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- D. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- E. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials , from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Stains and Transparent Finishes: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each finish system indicated and each color selected to verify preliminary selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each type of finish system and substrate.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of stain color selections will be based on mockups.
 - a. If preliminary stain color selections are not approved, apply additional mockups of additional stain colors selected by Architect at no added cost to Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply finishes when relative humidity exceeds 85 percent, at temperatures less than 5 deg F above the dew point, or to damp or wet surfaces.
- C. Do not apply exterior finishes in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. Diamond Vogel Paints.
 - 3. PPG Paints.
 - 4. Rust-Oleum Corporation; a subsidiary of RPM International, Inc.
 - 5. Zinsser; Rust-Oleum Corporation.
- B. Products: Subject to compliance with requirements, provide one of the products listed in wood finish systems schedules for the product category indicated.

2.2 MATERIALS, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. Stain Colors: As selected by Architect from manufacturer's full range .

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Interior Wood Substrates: 10 percent, when measured with an electronic moisture meter.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with finish application only after unsatisfactory conditions have been corrected.
 - 1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
 - 1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each substrate condition and as specified.
 - 1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.

2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

D. Interior Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
3. Sand surfaces exposed to view and dust off.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dry.

3.3 APPLICATION

- A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 1. Use applicators and techniques suited for finish and substrate indicated.
 2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.
 3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.5 INTERIOR WOOD -FINISH-SYSTEM SCHEDULE

- A. Wood Substrates: Wood trim architectural woodwork windows .
 1. Water-Based Varnish System MPI INT 6.3Q:
 - a. Prime Coat: Water-based varnish matching topcoat.
 - b. Intermediate Coat: Water-based varnish matching topcoat.
 - c. Topcoat: Varnish, water based, clear, semi-gloss (MPI Gloss Level 5) , MPI #129.
- B. Wood Substrates: Traffic surfaces including floors and stairs.

END OF SECTION 099300

SECTION 101100 - VISUAL DISPLAY UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Visual display board assemblies.
 - 2. Wall mount display racks
- B. Related Requirements:
 - 1. Section 097200 "Wall Coverings"

1.3 ACTION SUBMITTALS

- A. Shop Drawings: For visual display units.
 - 1. Include plans, elevations, sections, details, and attachment to other work.
 - 2. Show locations and layout of special-purpose graphics.
 - 3. Include sections of typical trim members.
 - 4. Include wiring diagrams for power and control wiring.
- B. Samples for Initial Selection: For each type of visual display unit indicated, for units with factory-applied color finishes, and as follows:
 - 1. Fabric swatches of fabric facings for tackboards.

1.4 INFORMATIONAL SUBMITTALS

1.5 CLOSEOUT SUBMITTALS

1.6 QUALITY ASSURANCE

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver factory-fabricated visual display units completely assembled in one piece. If dimensions exceed maximum manufactured unit size, or if unit size is impracticable to ship in one piece, provide two or more pieces with joints in locations indicated on approved Shop Drawings.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install visual display units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 TACK BOARD ASSEMBLY (TB)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Aarco Products, Inc.
 - 2. ASI Visual Display Products.
 - 3. Claridge Products and Equipment, Inc.
- B. Tack Board Assembly: or factory fabricated.
 - 1. Assembly: and tackboard.

2. Corners: Square Rounded.
 3. Width: 48" .
 4. Height: 48" .
 5. Mounting Method: Direct to wall .
- C. Tackboard Panel: Vinyl-fabric-faced tackboard panel on core indicated.
1. Fabric Wrapped Edge: Wrap edge of tackboard panel with fabric facing.
 2. Color and Pattern: As selected by Architect from full range of industry colors.
- 2.3 WALL MOUNT DISPLAY RACKS
- A. Basis-of-Design Product: Subject to compliance with requirements, provide Displays2go.com 4 Tiered Metal Literature Wall Rack or comparable product by one of the following:
1. Displays2go.com .
 - a. Model BRWM4X4BLKP 38.5" wide unit with 16 clear acrylic hanging display inserts. Provide (5) indicated on drawings as "LT-1"
 - b. Model BRWM4XPBK 32" wide unit with 8 clear acrylic hanging display inserts. Provide (2) indicated on drawings as "LT-2"
- B. COLOR: Extruded aluminum in black finish.
- 2.4 MATERIALS
- A. Natural-Cork Sheet: Seamless, single-layer, compressed fine-grain cork sheet; bulletin board quality; face sanded for natural finish.
 - B. Vinyl Fabric: Mildew resistant, washable, complying with ASTM F 793/F 793M, Type II, ; weighing not less than 13 oz./sq. yd. ; with surface-burning characteristics indicated.
 - C. Particleboard: ANSI A208.1, Grade M-1.
 - D. MDF: ANSI A208.2, Grade 130.
 - E. Fiberboard: ASTM C 208 cellulosic fiber insulating board.
 - F. Extruded Aluminum: ASTM B 221 , Alloy 6063.
 - G. Adhesives for Field Application: Mildew-resistant, nonstaining adhesive for use with specific type of panels, sheets, or assemblies; and for substrate application; as recommended in writing by visual display unit manufacturer.

PART 3 - EXECUTION

- 3.1 EXAMINATION
- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.
 - B. Examine roughing-in for electrical power systems to verify actual locations of connections before installation of motorized, sliding visual display units.
 - C. Examine walls and partitions for proper preparation and backing for visual display units.
 - D. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.
 - E. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.2 PREPARATION
- A. Comply with manufacturer's written instructions for surface preparation.
- 3.3 INSTALLATION
- A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
- 3.4 CLEANING AND PROTECTION
- A. Clean visual display units in accordance with manufacturer's written instructions. Attach one removable cleaning instructions label to visual display unit in each room.
 - B. Touch up factory-applied finishes to restore damaged or soiled areas.

C. Cover and protect visual display units after installation and cleaning.
END OF SECTION 101100

SECTION 101200 - DISPLAY CASES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Swing glass display case doors and shelves
- B. Related Requirements:
 - 1. Section 097723 "Fabric-Wrapped Panels" for tackable, fabric-covered wall panels.
 - 2. Section 101100 "Visual Display Units" for tackboards.
 - 3. Section 101300 "Directories" for boards with changeable messages or changeable letters and for bulletin boards within built-in directories.

1.3 DEFINITIONS

- A. Bulletin Board: Glazed cabinet with tackboard panel, without shelves, typically of shallow depth for display of paper documents.
- B. Display Case: Glazed cabinet with adjustable shelves.
- C. Tackboard Panel: A material for holding push-pins or tacks, typically consisting of a facing such as fabric, vinyl, or cork; adhered to a substrate such as fiberboard, hardboard, or particleboard.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: For display cases .
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show location of seams and joints in tackboard panels.
 - 3. Include sections of typical trim members.
 - 4. Include diagrams for wiring of illuminated display cases .
- B. Samples: For each exposed product and for each color and texture specified; not less than 8-1/2 by 11 inches for tackboard panels and 6 inches long for trim with factory finish.

1.5 INFORMATIONAL SUBMITTALS

1.6 CLOSEOUT SUBMITTALS

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install display cases and for indoor installations until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 DISPLAY CASES

- A. Swing glass display case doors and hardware
 - 1. CRL-Blumcraft® Brushed Stainless 1301-CM Display Case Double Door and Sidelite with Mounting Bars - 1/2" Laminated Glass

- a. see elevation for size and location
- b. provide tempered glass to withstand size requirements of opening heights
- B. Glass display case support brackets and shelving
 - 1. KV black finished heavy duty support brackets, 12" in length
 - a. provide black full height standards as indicated on the drawings. Spaced no greater than 30" o.c.
 - b. Provide laminated sheet glass shelving (12" wide) and acrylic shelf support clips
 - 1) Size and Quantity: see drawings

2.4 MATERIALS

- A. Hardboard: ANSI A135.4, tempered.
- B. Fiberboard: ASTM C 208.
- C. Particleboard: ANSI A208.1, Grade M-1.
- D. Hardwood Plywood: HPVA HP-1.
- E. Natural-Cork Sheet: Seamless, single-layer, compressed fine-grain cork sheet; bulletin board quality; face sanded for natural finish.
- F. Plastic-Impregnated-Cork Sheet: Seamless, homogeneous, self-sealing sheet consisting of granulated cork, linseed oil, resin binders, and dry pigments that are mixed and calendared onto burlap backing; with washable vinyl finish and integral color throughout.
- G. Polyester Fabric: Nondirectional weave, 100 percent polyester; weighing not less than 15 oz./sq. yd. ; with flame-spread index of 25 or less when tested in accordance with ASTM E 84.
- H. Vinyl Fabric: ASTM F 793/F 793M, Type II, burlap weave ; weighing not less than 13 oz./sq. yd. ; with flame-spread index of 25 or less when tested in accordance with ASTM E 84.
- I. Extruded-Aluminum Bars and Shapes: ASTM B 221 , Alloy 6063.
- J. Aluminum Tubing: ASTM B 429/B 429M, Alloy 6063.
- K. Clear Tempered Glass: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality Q3, with exposed edges seamed before tempering.
- L. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), with Finish 1 (smooth or polished), colorless sheet with visible light transmittance of 92 percent measured in accordance with ASTM D 1003.
- M. Opaque Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet).
- N. Translucent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), with Finish 1 (smooth or polished). Provide white-colored sheet unless otherwise indicated, of density required to produce uniform brightness and minimum halation effects.
- O. High-Pressure Plastic Laminate: NEMA LD 3.
- P. Fasteners: Provide screws, bolts, and other fastening devices made from same material as items being fastened, except provide hot-dip galvanized, stainless steel, or aluminum fasteners for exterior applications. Provide types, sizes, and lengths to suit installation conditions. Use security fasteners where exposed to view.

2.5 FABRICATION

- A. Fabricate display cases to requirements indicated for dimensions, design, and thickness and finish of materials.
- B. Use metals and shapes of thickness and reinforcing required to produce flat surfaces, and to impart strength for size, design, and application indicated.
- C. Fabricate cabinets and door frames with reinforced corners, mitered to a hairline fit, with no exposed fasteners.
- D. Fabricate shelf standards plumb and at heights to align shelf brackets for level shelves.

2.6 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
- B. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.
- C. Baked-Enamel or Powder-Coat Finish: AAMA 2603, except with a minimum dry film thickness of 1.5 mils . Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine walls, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical power systems to verify actual locations of connections before installation of illuminated units.
- C. Examine walls and partitions for proper backing for display cases.
- D. Examine walls and partitions for suitable framing depth if recessed units will be installed.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for display cases as required by type and size of unit.

3.3 INSTALLATION

- A. General: Install units in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
 - 1. Mounting Height: 1'- 4" inches above finished floor to top of cabinet.
- B. Recessed Display Cases: Attach units to wall framing with fasteners at not more than 16 inches o.c. Attach aluminum trim over edges of recessed display cases and conceal grounds and clips. Attach trim with fasteners at not more than 24 inches o.c.
- C. Comply with requirements specified elsewhere for connecting illuminated and display cases.
- D. Install display case shelving level and straight.

3.4 ADJUSTING AND CLEANING

- A. Adjust doors to operate smoothly without warp or bind and so contact points meet accurately. Lubricate operating hardware as recommended in writing by manufacturer.
- B. Touch up factory-applied finishes to restore damaged areas.

END OF SECTION 101200

SECTION 101419 - DIMENSIONAL LETTER SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 1. Dimensional characters.
 - a. Cast dimensional characters.

1.2 COORDINATION

- A. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

1.3 ACTION SUBMITTALS

- A. Shop Drawings: For signs.
 1. Include fabrication and installation details and attachments to other work.
 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
 3. Show message list, typestyles, graphic elements, and layout for each sign at least half size .
 4. Show locations of electrical service connections.
 5. Include diagrams for power, signal, and control wiring.
- B. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
 1. Include representative Samples of available typestyles and graphic symbols.
- C. Product Schedule: For dimensional letter signs. Use same designations indicated on Drawings or specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For and .

1.5 CLOSEOUT SUBMITTALS

1.6 QUALITY ASSURANCE

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify locations of electrical service embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Deterioration of finishes beyond normal weathering.
 - b. Separation or delamination of sheet materials and components.
 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 DIMENSIONAL CHARACTERS

- A. Cast Characters : Characters with uniform faces, sharp corners, and precisely formed lines and profiles, and as follows:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A.R.K. Ramos.
 - b. ACE Sign Systems, Inc.
 - c. ASI Sign Systems, Inc.
 - d. Cosco.
 - e. Gemini Incorporated.
 - f. Metal Arts.
2. Character Material: Cast aluminum .
3. Character Height: 5" tall .
4. Thickness: Manufacturer's standard for size of character .
5. Finishes:
 - a. Integral Aluminum Finish: Clear anodized .
 - b. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in color matching Architect's sample .
6. Mounting: Concealed studs .
7. Typeface: To match City of Cedar Falls font type .
8. Signage Schedule: Provide characters for the following signs
 - a. DUKE YOUNG CONFERENCE SPACE
 - b. PLANNING AND ZONING
 - c. SECTION 8
 - d. HELP DESK
 - e. ADMINISTRATION WINDOW
 - f. COUNCIL CHAMBERS

2.3 DIMENSIONAL CHARACTER MATERIALS

- A. Aluminum Castings: ASTM B26/B26M, alloy and temper recommended by sign manufacturer for casting process used and for type of use and finish indicated.
- B. Aluminum Sheet and Plate: ASTM B209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- C. Aluminum Extrusions: ASTM B221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- D. Zinc Sheet: ASTM B69 , alloy and temper recommended by sign manufacturer for type of use and finish indicated.
- E. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- F. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:
 1. Use concealed fasteners and anchors unless indicated to be exposed.
 2. For exterior exposure, furnish stainless steel devices unless otherwise indicated.
 3. Exposed Metal-Fastener Components, General:
 - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
 4. Sign Mounting Fasteners:
 - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.
 - b. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.
 - c. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, installed in predrilled holes.

2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
5. Internally brace dimensional characters for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
6. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
7. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.
- D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.
- B. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Verify that electrical service is correctly sized and located to accommodate signs.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF DIMENSIONAL CHARACTERS

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
 3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Mounting Methods:
 1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.

- a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
- b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.
2. Projecting Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place spacers on studs, place sign in position, and push until spacers are pinched between sign and substrate, embedding the stud ends in holes. Temporarily support sign in position until adhesive fully sets.
 - b. Thin or Hollow Surfaces: Place spacers on studs, place sign in position with spacers pinched between sign and substrate, and install washers and nuts on stud ends projecting through opposite side of surface, and tighten.
3. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.
4. Back Bar and Brackets: Remove loose debris from substrate surface and install backbar or bracket supports in position, so that signage is correctly located and aligned.
5. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
6. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

END OF SECTION 101419

SECTION 101423 - PANEL SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 1. Panel signs.
 2. Field-applied, vinyl-graphic signs.

1.3 DEFINITIONS

- A. Accessible: In accordance with the accessibility standard.

1.4 COORDINATION

1.5 ACTION SUBMITTALS

- A. Shop Drawings: For panel signs.
 1. Include fabrication and installation details and attachments to other work.
 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
 3. Show message list, typestyles, graphic elements , including raised characters and Braille, and layout for each sign at least half size .
- B. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
 1. Include representative Samples of available typestyles and graphic symbols.
- C. Product Schedule: For panel signs. Use same designations indicated on Drawings or specified.

1.6 CLOSEOUT SUBMITTALS

1.7 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 PANEL SIGNS

- A. Panel Sign : Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allen Industries Architectural Signage.
 - b. ASI Sign Systems, Inc.
 - c. Best Sign Systems, Inc.
 - d. Inpro Corporation.
 2. Solid-Sheet Sign and Returns , Returns, and Back : Acrylic sheet with finish specified in "Surface Finish and Applied Graphics" Subparagraph and as follows:
 - a. Thickness: Manufacturer's standard for size of sign .
 - b. Surface-Applied, Raised Graphics: Applied polymer characters and Braille .
 3. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition at Vertical Edges at Horizontal Edges : Bullnosed .
 - b. Corner Condition in Elevation: Rounded to radius indicated .
 4. Mounting: Surface mounted to wall with two-face tape .
 5. Surface Finish and Applied Graphics:
 - a. Integral Acrylic Sheet Color: As selected by Architect from full range of industry colors .

6. Text and Typeface: Accessible raised characters and Braille typeface as selected by Architect from manufacturer's full range and variable content as scheduled . Finish raised characters to contrast with background color, and finish Braille to match background color.
7. Flatness Tolerance: Sign shall remain flat or uniformly curved under installed conditions as indicated on Drawings and within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner.

2.2 FIELD-APPLIED, VINYL-CHARACTER SIGNS

- A. Field-Applied, Vinyl-Character Sign : Prespaced characters die cut from 3- to 3.5-mil thick, weather-resistant vinyl film with release liner on the back and carrier film on the front for on-site alignment and application.
 1. Size: As indicated on Drawings .
 2. Substrate: As indicated on Drawings Walls .
 3. Design: review drawings for areas of vinyl applied graphics .
 - a. Contractor shall work with the Owner and the Architect to design and produce graphics for the different areas

2.3 PANEL-SIGN MATERIALS

- A. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

2.4 ACCESSORIES

- A. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

2.6 GENERAL FINISH REQUIREMENTS

- A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Accessible Signage: Install in locations on walls according to the accessibility standard .
- C. Mounting Methods:
 1. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.
- D. Field-Applied, Vinyl-Character Signs: Clean and dry substrate. Align sign characters in final position before removing release liner. Remove release liner in stages, and apply and firmly press characters

into final position. Press from the middle outward to obtain good bond without blisters or fishmouths. Remove carrier film without disturbing applied vinyl film.

- E. Signs Mounted on Glass: Provide opaque sheet matching sign material and finish onto opposite side of glass to conceal back of sign.

3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423

SECTION 102239 - FOLDING PANEL PARTITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Manually operated, acoustical panel partitions.

1.3 DEFINITIONS

- A. NIC: Noise Isolation Class.
- B. NRC: Noise Reduction Coefficient.
- C. STC: Sound Transmission Class.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For operable panel partitions.
 - 1. Include plans, elevations, sections, attachment details.
 - 2. Indicate stacking and operating clearances. Indicate location and installation requirements for hardware and track, blocking, and direction of travel.
 - 3. Include diagrams for power, signal, and control wiring.
- C. Samples for Initial Selection: For each type of exposed material, finish, covering, or facing.
 - 1. Include Samples of accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer .
- B. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For operable panel partitions to include in maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Panel finish facings and finishes for exposed trim and accessories. Include precautions for cleaning materials and methods that could be detrimental to finishes and performance.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protectively package and sequence panels in order for installation. Clearly mark packages and panels with numbering system used on Shop Drawings. Do not use permanent markings on panels.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of operable panel partitions that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of operable panel partitions.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal use.
 - 2. Warranty Period: 3 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 OPERABLE ACOUSTICAL PANELS

- A. Operable Acoustical Panels: Partition system, including panels, seals, finish facing, suspension system, operators, and accessories.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Modernfold, Inc; Modernfold, Inc. Acousti-Seal Legacy or comparable product by one of the following:
 - a. Hufcor, Inc.
 - b. Panelfold Inc.
- B. Panel Operation: Manually operated, individual panels.
- C. Panel Construction: As required to support panel from suspension components and with reinforcement for hardware attachment. Fabricate panels with tight hairline joints and concealed fasteners. Fabricate panels so finished in-place partition is rigid; level; plumb; aligned, with tight joints and uniform appearance; and free of bow, warp, twist, deformation, and surface and finish irregularities.
- D. Dimensions: Fabricate operable acoustical panel partitions to form an assembled system of dimensions indicated and verified by field measurements.
 - 1. Panel Width: Standard widths .
- E. STC: Not less than 50 .
- F. Panel Weight: 8 lb/sq. ft. maximum.
- G. Panel Thickness: Nominal dimension of 3 inches .
- H. Panel Materials:
 - 1. Steel Frame: Steel sheet, manufacturer's standard nominal minimum thickness for uncoated steel.
 - 2. Steel Face/Liner Sheets: Tension-leveled steel sheet, manufacturer's standard nominal thickness for uncoated steel.
- I. Panel Closure: Manufacturer's standard unless otherwise indicated.
 - 1. Initial Closure: Fixed jamb .
 - 2. Final Closure: Constant-force, lever-operated mechanical closure expanding from panel edge to create a constant-pressure acoustical seal .
- J. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.
 - 1. Hinges: Manufacturer's standard .
 - 2. .
- K. Finish Facing: Carpet wall covering .

2.2 SEALS

- A. Description: Seals that produce operable panel partitions complying with performance requirements and the following:
 - 1. Manufacturer's standard seals unless otherwise indicated.
 - 2. Seals made from materials and in profiles that minimize sound leakage.
 - 3. Seals fitting tight at contact surfaces and sealing continuously between adjacent panels and between operable panel partition perimeter and adjacent surfaces, when operable panel partition is extended and closed.
- B. Vertical Seals: Deep-nesting, interlocking astragals mounted on each edge of panel, with continuous, resilient acoustical seal.
- C. Horizontal Top Seals: Continuous-contact, resilient seal exerting uniform constant pressure on track .
- D. Horizontal Bottom Seals: Resilient, mechanical, retractable, constant-force-contact seal exerting uniform constant pressure on floor when extended, ensuring horizontal and vertical sealing and resisting panel movement.
 - 1. Automatically Operated for Acoustical Panels: Extension and retraction of bottom seal automatically operated by movement of partition, with operating range not less than 1-1/2 inches between retracted seal and floor finish.

2.3 PANEL FINISH FACINGS

- A. Description: Finish facings for panels that comply with indicated fire-test-response characteristics and that are factory applied to operable panel partitions with appropriate backing, using mildew-resistant nonstaining adhesive as recommended by facing manufacturer's written instructions.

1. Apply facings free of air bubbles, wrinkles, blisters, and other defects, with no gaps or overlaps. Horizontal butted edges seams are not permitted. Tightly secure and conceal raw and selvage edges of facing for finished appearance.
 - B. Carpet Wall Covering: Manufacturer's standard nonwoven, needle-punched carpet with fibers fused to backing, from same dye lot, treated to resist stains.
 1. Color/Pattern: to select from standard color options .
 - C. Paint: Manufacturer's standard painted finish.
 1. Color: As selected by Architect from manufacturer's full range .
 - D. Cap-Trimmed Edges: Protective perimeter-edge trim with tight hairline joints concealing edges of panel and finish facing, finished as follows:
 1. Steel, Painted: Finished with manufacturer's color as selected by Architect from manufacturer's full range.
- 2.4 SUSPENSION SYSTEMS
- A. Tracks: Steel or aluminum with adjustable steel hanger rods for overhead support, designed for operation, size, and weight of operable panel partition indicated. Size track to support partition operation and storage without damage to suspension system, operable panel partitions, or adjacent construction. Limit track deflection to no more than 0.10 inch between bracket supports. Provide a continuous system of track sections and accessories to accommodate configuration and layout indicated for partition operation and storage.
 1. Modernfold Truss System: Prefabricated, self-supporting header system for the support of operable partitions.
 - B. Carriers: Trolley system as required for configuration type, size, and weight of partition and for easy operation; with ball-bearing wheels.
 1. Shall have horizontal counter-rotating wheels with oversized heavy duty thrust steel bearings. Carriers permit panels to traverse L, T, or X intersections without mechanical switching.
 - C. Track Intersections, Switches, and Accessories: As required for operation, storage, track configuration, and layout indicated for operable panel partitions, and compatible with partition assembly specified. Fabricate track intersections and switches from steel or aluminum.
 1. L Intersections: Allow panels to change 90 degrees in direction of travel.
 - D. Steel Finish: Manufacturer's standard, factory-applied, corrosion-resistant, protective coating unless otherwise indicated.

2.5 ACCESSORIES

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine flooring, floor levelness, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable panel partitions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed in area of partition installation.
- B. Install panels in numbered sequence indicated on Shop Drawings.
- C. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.
- D. Broken, cracked, deformed, or unmatched gasketing or gasketing with gaps at butted ends is not acceptable.

3.3 ADJUSTING

- A. Adjust operable panel partitions, hardware, and other moving parts to function smoothly, and lubricate as recommended by manufacturer.
- B. Verify that safety devices are properly functioning.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain operable panel partitions.

END OF SECTION 102239

SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Corner guards.
 - 2. End-wall guards.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
 - 2. Include fire ratings of units recessed in fire-rated walls and listings for door-protection items attached to fire-rated doors.
- B. Shop Drawings: For each type of wall and door protection showing locations and extent.
 - 1. Include plans, elevations, sections, and attachment details.
- C. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:
 - 1. Corner and End-Wall Guards: 12 inches long. Include example top caps.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 - 1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
 - 2. Keep plastic materials out of direct sunlight.
 - 3. Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.
 - a. Store corner-guard covers in a vertical position.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall- and door-protection products of each type from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 .

2.3 CORNER GUARDS

- A. Surface-Mounted, Metal Corner Guards CG-1 : Fabricated as one piece from formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Construction Specialties, Inc.
- b. Inpro Corporation.
- c. Korogard Wall Protection Systems; a division of RJF International Corporation.
- d. Pawling Corporation.
- e. WallGuard.com.
2. Material: Stainless-steel sheet, Type 430.
 - a. Thickness: Minimum 0.0625 inch .
 - b. Finish: Directional satin, No. 4 .
3. Wing Size: Nominal 1-1/2 by 1-1/2 inches .
4. Corner Radius: 1/8 inch .
5. Mounting: Adhesive.

2.4 END-WALL GUARDS

- A. Surface-Mounted, Metal, End-Wall Guards CG-2 : Fabricated from one-piece, formed or extruded metal that covers entire end of wall; with formed edges.
 1. Material: Stainless-steel sheet, Type 430.
 - a. Thickness: Minimum 0.0625 inch .
 - b. Finish: Directional satin, No. 4 .
 2. Wing Size: Nominal 1-1/2 by 1-1/2 inches .
 3. Corner Radius: 1/8 inch .
 4. Mounting: Adhesive.

2.5 MATERIALS

- A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.
- B. Polycarbonate Plastic Sheet: ASTM D 6098, S-PC01, Class 1 or Class 2, abrasion resistant; with a minimum impact-resistance rating of 15 ft.-lbf/in. of notch when tested according to ASTM D 256, Test Method A.
- C. Solid Wood: Clear hardwood lumber of species indicated, free of appearance defects, and selected for compatible grain and color.
- D. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- E. Adhesive: As recommended by protection product manufacturer.

2.6 FABRICATION

- A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.
- B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
- C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.
- D. Wood Handrails: Miter corners and ends of wood handrails for returns.

2.7 FINISHES

- A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- B. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
 - 1. For wall and door protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing wall and door protection.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

- A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

3.4 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600

SECTION 102641 - BULLET RESISTANT PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Bullet resistant fiberglass panels of the following ballistic rating level:

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 2. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 3. ASTM F 1233 - Standard Test Method for Security Glazing Materials and Systems.
- B. International Organization for Standardization (ISO):
 - 1. ISO 9001-2008 - Quality Management System.
- C. National Institute of Justice Ballistic Standards (NIJ):
 - 1. NIJ Standard 0108.01.
- D. Small Business Administration (SBA):
 - 1. SBA Small Business Size Standard.
- E. Underwriters Laboratories (UL):
- F. The United States Department of State:
 - 1. The International Traffic in Arms Regulations (ITAR).

1.3 SUBMITTALS

- A. Submit under provisions of Section 013000 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Details of installation of bullet resistant fiberglass panels.
- D. Certificates: Submit printed data to indicate compliance with following requirements.
 - 1. UL Listing Verification and UL752 Current Test Results as provided by Underwriters Laboratories.
 - 2. ASTM E 119.
 - 3. ASTM F 1233.
 - 4. ASTM E 90.
 - 5. ASTM E 413.
 - 6. ASTM E 1332.
 - 7. Manufacturer's third party certificate of registration with ISO 9001:2008.
 - 8. Manufacturer's U.S. Dept. of State ITAR Statement of Registration.
 - 9. Manufacturer's SBA Profile verifying small business status by the SBA.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

1.4 QUALITY ASSURANCE

- A. Sourcing: Panels manufactured in the United States of America with raw materials sourced from the U.S.A. for quality assurance purposes and to comply with any applicable "Buy American" provisions.
- B. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.
- C. Installer Qualifications: Minimum 2 year experience installing similar products.
- D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship is approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.5 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to starting work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- B. Deliver materials to project with manufacturer's UL Listed labels intact and legible.
- C. Handle material with care to prevent damage. Store materials inside under cover, stack flat and off the floor.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 WARRANTY

- A. Provide manufacturer's standard limited warranty for materials and workmanship against defects for a period of ten years from the date of Substantial Completion.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Basis of Design: ArmorCore by Waco Composites
- B. Substitutions: pre-approved equal
- C. Requests for substitutions will be considered in accordance with provisions of Section 016000 - Product Requirements.

2.2 BULLET RESISTANT PANELS

- A. General:
 - 1. Bullet Resistant Fiberglass Panels shall be "non-ricochet type" to permit the encapture and retention of an attacking projectile lessening the potential of a random injury or lateral penetration.
 - 2. Bullet resistance of joints: Equal to that of the panel.
- B. Product: Panels shall be fabricated of multiple layers of woven roving ballistic grade fiberglass cloth impregnated with a thermoset polyester resin and compressed into flat rigid sheets as manufactured by Waco Composites.
- C. Panel Product: ArmorCore Level 7.
 - 1. Panel Rating: UL752 Level 7.
 - 2. Physical Characteristics: 1-1/8 inches (28.6 mm) thick, 11.9 lbs. per sq.ft. (58.1 kg per sq. m).
 - 3. Panel Size: Maximum size to limit number of seams.
 - 4. Panel Size: 3 feet x 8 feet (914 mm x 2438 mm).

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. Prior to starting installation, verify work of related trades required in contract documents and architectural drawings is complete to the point where work of this Section may properly commence.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.
- B. Reinforce joints with a back-up layer of bullet resistive material. Minimum width of reinforcing layer at joint shall be 4 inches (102 mm), centered on panel joints.
- C. Install panels in accordance with manufacturer's printed recommendations and as required by contract documents.
- D. Secure armor panels using screws, bolts, or an industrial adhesive.
- E. Method of application shall install panels minimizing vulnerabilities by fitting tightly to adjacent surfaces including concrete floor slab, concrete roof slab, bullet resistive door frames, bullet resistive window frames, and other assemblies.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 102641

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Public-use washroom accessories.
 - 2. Childcare accessories.
 - 3. Custodial accessories.
- B. Related Requirements:
 - 1. Section 088300 "Mirrors" for frameless mirrors.

1.3 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, visible silver spoilage defects.
 - 2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

- A. Source Limitations: Obtain each type of public-use washroom accessory from single source from single manufacturer.
- B. Toilet Tissue (Roll) Dispenser TPH :
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc; 20030 or comparable product by one of the following:

- a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
 - e. American Specialties, Inc.
 2. Description: Roll-in-reserve dispenser with hinged front secured with tumbler lockset .
 3. Mounting: Surface mounted.
 4. Operation: Noncontrol delivery with standard spindle .
 5. Capacity: Designed for 5-inch- diameter tissue rolls.
 6. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .
- C. Automatic Paper Towel (Roll) Dispenser (PTD) :
1. Basis-of-Design Product: Subject to compliance with requirements, provide ASI Group; 204523A-9 or comparable product by one of the following:
 - a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
 - e. ASI Group.
 2. Description: Automatic motion sensing mechanism with user-adjustable delay and paper towel length; battery powered .
 3. Mounting: Surface mounted.
 4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .
 5. Lockset: Tumbler type.
- D. Soap Dispenser SD :
1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc; 0359 or comparable product by one of the following:
 - a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
 - e. American Specialties, Inc.
 2. Description: Designed for manual operation and dispensing soap in lather form.
 3. Mounting: Vertically oriented, surface mounted .
 4. Capacity: 40 oz. .
 5. Lockset: Tumbler type.
 6. Refill Indicator: Window type.
- E. Grab Bars GBS :
1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc; 3800 SERIES or comparable product by one of the following:
 - a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
 - e. American Specialties, Inc.
 2. Mounting: Flanges with concealed fasteners.
 3. Material: Stainless steel, 0.05 inch thick.
 - a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin) on ends and slip-resistant texture in grip area.
 4. Outside Diameter: 1-1/2 inches.
 5. Configuration and Length: .
 - a. Straight, 18 inches long.
 - b. Straight, 24 inches long.
 - c. Straight, 36 inches long.
 - d. Straight, 42 inches long.
- F. Sanitary-Napkin Disposal Unit SND :
1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc; 0852 or comparable product by one of the following:
 - a. AJW Architectural Products.

- b. Bobrick Washroom Equipment, Inc.
- c. Bradley Corporation.
- d. GAMCO Specialty Accessories; a division of Bobrick.
- e. American Specialties, Inc.
- 2. Mounting: Surface mounted.
- 3. Door or Cover: Self-closing, disposal-opening cover.
- 4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin) .
- G. Mirror Unit (MOL, CMOL, FLM) :
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide American Specialties, Inc; 0600 SERIES or comparable product by one of the following:
 - a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. GAMCO Specialty Accessories; a division of Bobrick.
 - e. American Specialties, Inc.
 - 2. Frame: Stainless steel angle, 0.05 inch thick .
 - a. Corners: Welded and ground smooth.
 - 3. Size: .
 - a. Mirror Over Lavatory (MOL) - 24" W. x 36" H.
 - b. Continuous Mirror Over Lavatory (CMOL) - Width equal to length of adjacent countertop x 36" H.
 - c. Full Length Mirror (FLM) - 24" W. x 48" H.
 - 4. Hangers: Manufacturer's standard rigid, tamper and theft resistant .

2.3 CHILDCARE ACCESSORIES

- A. Source Limitations: Obtain each type of childcare accessory from single source from single manufacturer.
- B. Baby-Changing Station BCS :
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Koala Kare Products; a Division of Bobrick; KB200 or comparable product by one of the following:
 - a. Foundations Worldwide, Inc.
 - b. GAMCO Specialty Accessories; a division of Bobrick.
 - c. Tubular Specialties Manufacturing, Inc.
 - d. Koala Kare Products; a Division of Bobrick.
 - 2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
 - a. Engineered to support minimum of 250-lb static load when opened.
 - 3. Mounting: Surface mounted, with unit projecting not more than 4 inches from wall when closed .
 - 4. Operation: By pneumatic shock-absorbing mechanism.
 - 5. Material and Finish: HDPE in manufacturer's standard color .
 - 6. Liner Dispenser: Provide built-in dispenser for disposable sanitary liners.

2.4 MATERIALS

- A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch- minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B19, flat products; ASTM B16/B16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B30, castings.
- C. Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), 0.036-inch-minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A653/A653M, with G60 hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.
- G. Chrome Plating: ASTM B456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.5 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
 - 1. Remove temporary labels and protective coatings.
- B. Grab Bars: Install to comply with specified structural-performance requirements.
- C. Shower Seats: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Fire-protection cabinets for the following:
 - a. Portable fire extinguisher.
- B. Related Requirements:
 - 1. Section 104416 "Fire Extinguishers" for portable, hand-carried fire extinguishers accommodated by fire-protection cabinets

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.
- B. Shop Drawings: For fire-protection cabinets.
 - 1. Include plans, elevations, sections, details, and attachments to other work.

1.4 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.2 FIRE-PROTECTION CABINET F.E.C.

- A. Cabinet Type: Suitable for fire extinguisher .
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Activar Construction Products Group, Inc. - JL Industries.
 - b. Babcock-Davis.
 - c. Guardian Fire Equipment, Inc.
 - d. Larsens Manufacturing Company.
 - e. Nystrom.
 - f. Potter Roemer LLC; a Division of Morris Group International.
- B. Cabinet Construction: One-hour fire rated .
 - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch-thick cold-rolled steel sheet lined with minimum 5/8-inch- thick fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Cold-rolled steel sheet .
 - 1. Shelf: Same metal and finish as cabinet.
- D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
 - 1. Rolled-Edge Trim: 2-1/2-inch backbend depth.
- E. Cabinet Trim Material: Steel sheet .

- F. Door Material: Steel sheet .
- G. Door Style: Vertical duo panel with frame .
- H. Door Glazing: Acrylic sheet .
 - 1. Acrylic Sheet Color: Clear transparent acrylic sheet.
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
 - 1. Provide projecting door pull and friction latch .
 - 2. Provide concealed hinge , permitting door to open 180 degrees.
- J. Accessories:
 - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 - 2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated .
 - a. Identify fire extinguisher in fire-protection cabinet with the words " FIRE EXTINGUISHER ."
 - 1) Location: Applied to cabinet door .
 - 2) Application Process: Decals .
 - 3) Lettering Color: Red, Black or White as selected by Architect.
 - 4) Orientation: Vertical .
- K. Materials:
 - 1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.
 - a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
 - b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - c. Color: As selected by Architect from manufacturer's full range .
 - 2. Transparent Acrylic Sheet: ASTM D4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or polished) .

2.3 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 - 1. Weld joints and grind smooth.
 - 2. Miter corners and grind smooth.
 - 3. Provide factory-drilled mounting holes.
 - 4. Prepare doors and frames to receive locks.
 - 5. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
 - 1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
 - 2. Fabricate door frames of one-piece construction with edges flanged.
 - 3. Miter and weld perimeter door frames and grind smooth.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
 - 1. Fire-Protection Cabinets: 42 inches above finished floor to top of fire extinguisher.
- B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
 - 1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
 - 2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.
- C. Identification:
 - 1. Apply decals at locations indicated.

3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Requirements:
 1. Section 104413 "Fire Protection Cabinets."
 2. Section 233813 "Commercial-Kitchen Hoods" for fire-extinguishing systems provided as part of commercial-kitchen exhaust hoods.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

1.4 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
 1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each and mounting bracket indicated.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Activar Construction Products Group, Inc. - JL Industries.
 - b. Amerex Corporation.
 - c. Ansul by Johnson Controls Company.
 - d. Babcock-Davis.
 - e. Badger Fire Protection.
 - f. Guardian Fire Equipment, Inc.
 - g. Larsens Manufacturing Company.
 - h. Nystrom.
 2. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
 3. Valves: Manufacturer's standard .
 4. Handles and Levers: Manufacturer's standard .
 5. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.
- B. Wet-Chemical Type (Kitchen Location) : UL-rated 2-A:1-B:C:K, nominal capacity, with potassium acetate -based chemical in stainless-steel container; with pressure-indicating gage.
- C. Regular Dry-Chemical Type in Steel Container (Mechanical Room Locations) : UL-rated 120-B:C, 20-lb nominal capacity, with sodium bicarbonate-based dry chemical in enameled-steel container.
- D. Multipurpose Dry-Chemical Type in Steel Container (Corridor Locations) : UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 - 1. Mounting Brackets: Top of fire extinguisher to be at 42 inches above finished floor.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 105113 - METAL LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Welded athletic lockers.
 - 2. Locker benches.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker and bench.
- B. Shop Drawings: For metal lockers.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show locker trim and accessories.
 - 3. Include locker identification system and numbering sequence.
- C. Samples for Verification: For the following products, in manufacturer's standard size:
 - 1. Lockers and equipment.
 - 2. Locker benches.
- D. Product Schedule: For lockers. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. The following metal locker hardware items equal to 10 percent of amount installed for each type and finish installed, but no fewer than five units:
 - a. Locks.
 - b. Blank identification plates.
 - c. Hooks.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.
- B. Deliver combination control charts to Owner by registered mail or overnight package service .

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.9 COORDINATION

- A. Coordinate sizes and locations of concrete bases for metal lockers.
- B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Faulty operation of latches and other door hardware.
 2. Damage from deliberate destruction and vandalism is excluded.
 3. Warranty Period for Welded Metal Lockers: Lifetime from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain metal lockers , locker benches, and accessories from single source from single locker manufacturer.
1. Obtain locks from single lock manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: For lockers and locker benches indicated to be accessible, comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" ICC A117.1 .

2.3 WELDED ATHLETIC LOCKERS TYPE - A

- A. Basis-of-Design Product: Subject to compliance with requirements, provide List Industries Inc.; Superior - Athletic Team, Varsity single Tier or comparable product by one of the following:
1. Lyon Workspace Products, LLC.
 2. Penco Products, Inc.
 3. Republic Storage Systems, LLC.
 4. Comparable product approved by the Architect, prior to bid.
- B. Configuration: Single Tier, 15-inches wide by 16-inches deep by height of 72-inches.
- C. Louvered Doors: One piece; fabricated from 0.075-inch nominal-thickness steel sheet with manufacturer's standard louvers; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges .
1. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches wide; welded to inner face of doors.
- D. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
1. Tops and Bottoms: 0.060-inch nominal thickness, with single bend at edges.
 2. Backs: 0.048-inch nominal thickness.
- E. Unperforated Sides: Fabricated from 0.048-inch nominal-thickness steel sheet.
- F. Frames: Channel formed; fabricated from 0.090-inch nominal-thickness steel sheet or 0.097-inch nominal-thickness steel angles; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.
- G. Reinforced Bottoms: Structural channels, formed from 0.060-inch nominal-thickness steel sheet; welded to front and rear of side-panel frames.
- H. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
1. Knuckle Hinges: Steel, full loop, five or seven knuckles, tight pin; minimum 3 1/2 inches high. Provide no fewer than three hinges for each door more than 47 inches high.
- I. Recessed Door Handle and Latch: Stainless -steel cup with integral door pull, recessed so locking device does not protrude beyond door face; pry and vandal resistant.
1. Multipoint Latching: Finger-lift latch control designed for use with built-in combination locks, built-in cylinder locks, or padlocks; positive automatic latching and prelocking.
 - a. Latch Hooks: Equip doors 48 inches and higher with three latch hooks and doors less than 48 inches high with two latch hooks; fabricated from 0.120-inch nominal-thickness steel sheet; welded to full-height door strikes; with resilient silencer on each latch hook.

- b. Latching Mechanism: Manufacturer's standard, rattle-free latching mechanism and moving components isolated to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.
 - J. Locks: Built-in combination locks .
 - K. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch high.
 - L. Hooks: Manufacturer's standard ball-pointed, aluminum or steel; zinc plated.
 - M. Filler Panels: Fabricated from 0.048-inch nominal-thickness steel sheet.
 - N. Finished End Panels: Fabricated from 0.024-inch nominal-thickness steel sheet to cover unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.
 - O. Materials:
 - 1. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B, suitable for exposed applications.
 - 2. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with A60 zinc-iron, alloy (galvannealed) coating designation.
 - P. Finish: Baked enamel or powder coat.
 - 1. Color: As indicated by manufacturer's designations .
 - a. #708 - BLACK, see plan for locations.
 - b. #717 - GRAND SLAM BLUE, see plan for locations.
- 2.4 LOCKS
- A. Built-in Combination Lock: Key-controlled, three-number dialing combination locks; capable of at least five combination changes made automatically with a control key.
- 2.5 LOCKER BENCHES
- A. Basis-of-Design Product: Subject to compliance with requirements, provide List Industries Inc.; White Northern Hard Wood Bench or comparable product by one of the following:
 - 1. Lyon Workspace Products, LLC.
 - 2. Penco Products, Inc.
 - 3. List Industries Inc.
 - B. Provide bench units with overall assembly height of 17-1/2 inches .
 - C. Bench Tops: Manufacturer's standard one-piece units, with rounded corners and edges.
 - 1. Size: Minimum 9-1/2 inches wide by 1-1/4 inches thick except provide 20- to 24-inch- wide tops where accessible benches are indicated.
 - 2. Laminated clear hardwood with one coat of clear sealer on all surfaces and one coat of clear lacquer on top and sides.
 - D. Fixed-Bench Pedestals: Manufacturer's standard supports, with predrilled fastener holes for attaching bench top and anchoring to floor, complete with fasteners and anchors, and as follows:
 - 1. Tubular Steel:
 - a. 1-1/4-inch- diameter steel tubing, with 0.1265-inch- thick steel flanges welded at top and base; with baked-enamel finish; anchored with exposed fasteners.
 - 1) Color: As selected by Architect from manufacturer's full range.
 - E. Materials:
 - 1. Stainless Steel Plate, Sheet, and Strip: ASTM A240/A240M or ASTM A666, Type 304.
 - 2. Plastic Laminate: NEMA LD 3, Grade HGP.
 - 3. Extruded Aluminum: ASTM B221, alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated.
 - 4. Steel Tube: ASTM A500/A500M, cold rolled.
 - 5. Particleboard: ANSI A208.1, Grade M-2.
- 2.6 FABRICATION
- A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
 - 1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
 - 2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.

- B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.
 - C. Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds smooth and flush.
 - D. Accessible Lockers: Fabricate as follows:
 - 1. Locate bottom shelf no lower than 15 inches above the floor.
 - 2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches above the floor.
 - E. Recess Trim: Fabricated with minimum 2-1/2-inch face width and in lengths as long as practical; finished to match lockers.
 - F. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.
 - G. Boxed End Panels: Fabricated with 1-inch- wide edge dimension, and designed for concealing fasteners and holes at exposed ends of nonrecessed metal lockers; finished to match lockers.
 - 1. Provide one-piece panels for double-row (back-to-back) locker ends.
 - H. Finished End Panels: Fabricated to conceal unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.
 - 1. Provide one-piece panels for double-row (back-to-back) locker ends.
 - I. Center Dividers: Full-depth, vertical partitions between bottom and shelf; finished to match lockers.
- 2.7 ACCESSORIES
- A. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
 - B. Anchors: Material, type, and size required for secure anchorage to each substrate.
 - 1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls , and elsewhere as indicated, for corrosion resistance.
 - 2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and floors or support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install lockers level, plumb, and true; shim as required, using concealed shims.
 - 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
 - 2. Anchor single rows of metal lockers to walls near top of lockers and to floor.
 - 3. Anchor back-to-back metal lockers to floor.
- B. Welded Lockers: Connect groups together with manufacturer's standard fasteners, with no exposed fasteners on face frames.
- C. Equipment:
 - 1. Attach hooks with at least two fasteners.
 - 2. Attach door locks on doors using security-type fasteners.
 - 3. Identification Plates: Identify metal lockers with identification indicated on Drawings.
 - a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
 - b. Attach plates to upper shelf of each open-front metal locker, centered, with a least two aluminum rivets.
- D. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
 - 1. Attach recess trim to recessed metal lockers with concealed clips.
 - 2. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.

3. Attach sloping-top units to metal lockers, with closures at exposed ends.
 4. Attach boxed end panels using concealed fasteners to conceal exposed ends of nonrecessed metal lockers.
 5. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.
- E. Fixed Benches: Provide no fewer than two pedestals for each bench, uniformly spaced not more than 72 inches apart. Securely fasten tops of pedestals to undersides of bench tops, and anchor bases to floor.

3.3 ADJUSTING

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.

3.4 PROTECTION

- A. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.
- B. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 105113

SECTION 123216 - MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad casework.
2. Solid surface material and sinks
3. Casework hardware and accessories.
4. Resin Panels

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood blocking for anchoring casework.
2. Section 092216 "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring casework.
3. Section 096513 "Resilient Base and Accessories" for resilient base applied to plastic-laminate-clad casework.

1.2 DEFINITIONS

- A. Definitions in the AWI/AWMAC/WI's "Architectural Woodwork Standards" apply to the Work of this Section.

1.3 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that casework can be supported and installed as indicated.

1.4 ACTION SUBMITTALS

A. Shop Drawings: For plastic-laminate-clad casework.

1. Include plans, elevations, sections, and attachments to other work including blocking and reinforcements required for installation.
2. Indicate types and sizes of casework.
3. Indicate manufacturer's catalog numbers for casework.
4. Show fabrication details, including types and locations of hardware.
5. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and equipment.
6. Apply AWI's Quality Certification Program label to Shop Drawings.

B. Keying Schedule: Include schematic keying diagram, and index each key set to unique designations that are coordinated with the Contract Documents.

C. Samples for Verification: For the following:

1. Plastic Laminates: 8 by 10 inches , for each type, color, pattern, and surface finish required.
 - a. Provide one Sample applied to core material with specified edge material applied to one edge.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For casework manufacturer .

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during remainder of construction period. Maintain temperature and relative humidity during remainder of construction period in range recommended for Project location by the AWI/AWMAC/WI's "Architectural Woodwork Standards."

- B. Field Measurements: Where casework is indicated to fit to existing construction, verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Provide fillers and scribes to allow for trimming and fitting.
- C. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before enclosing them, and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Advanced Cabinet Systems (ACS).
 2. Case Systems Inc.
 3. Stevens Industries, Inc.
 4. Calmar Manufacturing Company.
 5. Precision Millwork.
 6. Architectural Arts, Inc.
 7. RCS Millwork.
 8. Other manufacturers approved by the Architect, prior to bid.
- B. Source Limitations: Obtain from single source from single manufacturer.

2.2 GENERAL REQUIREMENTS FOR CASEWORK

- A. Quality Standard: Unless otherwise indicated, comply with the AWI/AWMAC/WI's "Architectural Woodwork Standards" for grades of casework indicated for construction, finishes, installation, and other requirements.
 1. Grade: Premium .
- B. Product Designations:
 1. Drawings indicate sizes, configurations, and finish materials of manufactured plastic-laminate-clad casework by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes and door and drawer configurations, of same finish materials, and complying with the Specifications may be considered. See Section 016000 "Product Requirements."
 2. Drawings indicate configurations of manufactured plastic-laminate-clad casework by referencing designations of Casework Design Series numbering system in the Appendix of the AWI/AWMAC/WI's "Architectural Woodwork Standards."

2.3 PLASTIC-LAMINATE-CLAD CASEWORK

- A. Design: Frameless cabinet construction with the following door and drawer-front style:
 1. Flush overlay.
- B. Exposed Materials:
 1. Plastic-Laminate Grade: HGS .
 - a. Colors and Patterns: As indicated by manufacturer's designations .
 - b. See finish plans for color selections.
 2. Edgebanding: PVC.
 - a. PVC Edgebanding Color: By Charter Industries, LLC or equal, color to match adjacent plastic laminate color .
- C. Semiexposed Materials:
 1. Plastic Laminate: Grade VGS unless otherwise indicated. Provide plastic laminate for semiexposed surfaces unless otherwise indicated.
 - a. Colors and Patterns: .
 - 1) See finish plans for casework material and colors.
 - b. Provide plastic laminate of same grade as exposed surfaces for interior faces of doors and drawer fronts and other locations where opposite side of component is exposed.
 2. Unless otherwise indicated, provide specified edgebanding on all semiexposed edges.
- D. Concealed Materials:
 1. Plastic Laminate: Grade BKL.
 2. MDF.

2.4 CASEWORK HARDWARE AND ACCESSORIES

- A. Hardware, General: Unless otherwise indicated, provide manufacturer's standard satin-finish , commercial-quality, heavy-duty hardware.
 - 1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.
- B. Butt Hinges: Stainless steel , semiconcealed, five-knuckle hinges complying with ANSI/BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide two hinges for doors less than 48 inches high, and provide three hinges for doors more than 48 inches high.
- C. Wire Pulls: Solid stainless steel or chrome-plated brass wire pulls, fastened from back with two screws.
 - 1. Provide two pulls for drawers more than 24 inches wide.
- D. Door and Drawer Bumpers: Self-adhering, clear silicone rubber.
 - 1. Doors: Provide one bumper at top and bottom of closing edge of each swinging door.
 - 2. Drawers: Provide one bumper on back side of drawer front at each corner.
- E. Drawer Slides: ANSI/BHMA A156.9.
 - 1. Heavy Duty (Grade 1HD-100): Side mount .
 - a. Type: Full extension.
 - b. Material: Zinc-plated steel slides.
 - 2. General-purpose drawers; provide 100 lb (45 kg) load capacity.
 - 3. File drawers; provide 150 lb (45 kg) load capacity.
- F. Label Holders: Stainless steel or chrome plated, sized to receive standard label cards approximately 1 by 2 inches, and attached with screws or brads.
 - 1. Provide label holders where indicated .
- G. Drawer and Hinged-Door Locks: Cylindrical (cam) type, five-pin tumbler, brass with chrome-plated finish, and complying with ANSI/BHMA A156.11, Grade 1.
 - 1. Provide a minimum of two keys per lock and six master keys.
 - 2. Provide locks where indicated .
 - a. Master key for up to 500 key changes.
- H. Adjustable Shelf Supports
 - 1. Adjustable Shelf Supports: Pin-type, two-pin-locking plastic shelf rests complying with ANSI/BHMA A156.9, Type B04013 .
- I. Countertop Support Brackets: 1/8" painted steel brackets size as required to provide full support of countertop. At frame walls, coordinate wall blocking as required for anchoring to wall assembly indicated.
 - 1. Manufacturer: A&M Hardware Inc.1165 Strickler Road, Mount Joy, PA 17552; www.AandMhardware.com.
- J. Coat Hooks: Hook shall be of solid aluminum 5" high, 2 3/16" wide and projecting 3 3/8" from the wall. The colors to chosen from manufacturer's standard chrome, black,red, yellow or dark brown. MANUFACTURER: M10 hook by EMCO Specialty Products, Inc., Kansas City, KS.
- K. Closet Rod and Shelf Brackets: For 11" to 14" depth shelves, 12-gauge steel construction with 2-1/2" hook depth. Provide 1 inch thick continous laminate shelf over bracket.
 - 1. Bracket: Knappe & Vogt 1195 Heavy-Duty Series bracket.
 - a. Spacing: 30 inches on center, maximum.
 - 2. Closet Rod: Knappe & Vogt 660 Series Heavy-Duty Round Closet Rod.

2.5 Resin Panels

- A. 3-Form Varia Ecoresin Naturals
 - 1. Color: Trail Grove
 - 2. Thickness: 1/4" or manufacturers standard for finish type

2.6 MATERIALS

- A. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
- B. Hardwood Plywood: HPVA HP-1, particleboard core except where veneer core is indicated.
- C. Softwood Plywood: DOC PS 1.
- D. Particleboard: ANSI A208.1, Grade M-2.
- E. MDF: Medium-density fiberboard, ANSI A208.2, Grade 130 .
- F. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.

- G. PVC Edgebanding for Plastic Laminate: Rigid PVC extrusions, through color with satin finish, 3.0 mm thick at doors and drawer fronts, 1.0 mm thick elsewhere.

2.7 COUNTERTOP AND SINK MATERIALS

- A. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.
1. Colors, Patterns, and Finishes: As indicated by manufacturer's designations.
 - a. See finish plans for plastic laminate color selections.
 2. Edge Treatment: Same as laminate cladding on horizontal surfaces or 3.0-mm PVC edging as indicated on Drawings.
 3. Core Material: Particleboard or MDF.
 4. Core Material at Sinks: MDF made with exterior glue or exterior-grade plywood.
 5. Core Thickness: 1-1/8 inch.
 - a. Build up countertop thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.
- B. Solid Surface Countertop Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings.
 2. Integral Sink Bowls: Comply with CSA B45.5/IAPMO Z124.
 - a. Restroom Sinks: Corian - Model #8252 - "Glacier White"
 - b. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 - c. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
 3. Particleboard: ANSI A208.1 Grade M-2-Exterior Glue.
 4. Countertops: 1/2-inch- thick, solid surface material with front edge built up with same material.
 5. Backsplashes: 1/2-inch- thick, solid surface material.
 6. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

2.8 FABRICATION

- A. Plastic-Laminate-Clad Cabinet Construction: As required by referenced quality standard, but not less than the following:
1. Bottoms and Ends of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch particleboard.
 2. Shelves: 3/4-inch- thick plywood or 1-inch- thick particleboard.
 - a. Provide 1-inch thick shelves where cabinet is over 36-inches in width.
 3. Backs of Casework: 1/2-inch- thick particleboard or MDF where exposed, dadoed into sides, bottoms, and tops where not exposed.
 4. Drawer Fronts: 3/4-inch particleboard.
 5. Drawer Sides and Backs: 1/2-inch- thick particleboard or MDF, with glued dovetail or multiple-dowel joints.
 6. Drawer Bottoms: 1/4-inch- thick particleboard or MDF glued and dadoed into front, back, and sides of drawers. Use 1/2-inch material for drawers more than 24 inches wide.
 7. Doors: 3/4 inch thick, with particleboard or MDF cores.
- B. Filler Strips: Provide as needed to close spaces between casework and walls, ceilings, and equipment. Fabricate from same material and with same finish as casework.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Grade: Install casework to comply with same quality standard grade as item to be installed.
- B. Install casework level, plumb, and true in line; shim as required using concealed shims. Where casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- C. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16 inch of a single plane. Align similar adjoining doors and drawers to a tolerance of 1/16 inch. Bolt adjacent cabinets together with joints flush, tight, and uniform.
- D. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within 1/16 inch of a single plane. Fasten cabinets to hanging strips, masonry, framing, wood blocking, or reinforcements in walls and partitions. Align similar adjoining doors to a tolerance of 1/16 inch.
- E. Fasten casework to adjacent units and to masonry, framing, wood blocking, or reinforcements in walls and partitions to comply with the AWI/AWMAC/WI's "Architectural Woodwork Standards."
- F. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- G. Adjust operating hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

END OF SECTION 123216

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SECTION 210500 – FIRE PROTECTION COMMON WORK RESULTS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the equipment and systems indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. Fire protection work shall comply with specification section 230500.
- B. In addition to Division 21, Fire Protection work shall comply with the following sections:
 - 1. Section 230500 HVAC Common Work Results
 - 2. Section 230529 Pipe Hangers and Supports
 - 3. Section 230553 Mechanical Identification
 - 4. Section 230593 Cleaning and Testing

1.3 SUBMITTALS

- A. Submittals must be reviewed and approved by the Contractor before submitting to the Engineer.

1.4 REGULATORY AND UTILITY REQUIREMENTS

- A. Contractor is responsible for coordinating all required site inspections by authorities having jurisdiction. Contractor shall notify General Contractor of all scheduled inspections seven (7) working days prior to site visit.
- B. Contractor is responsible for paying for all fees, permits, and inspections required to complete their work.
- C. Contractor shall include all work required to install new and relocate utilities and meters as shown on drawings.
- D. Utility work 5'-0" from outside of building is by others, unless shown otherwise.
- E. Contractor shall notify Owner of any utility service shutdown 48 hours in advance.

1.5 COORDINATION DRAWINGS

- A. The mechanical contractor shall be responsible for producing coordination drawings. The drawings will need to incorporate piping, ductwork, equipment, lighting, conduits, building structure and all other building and system components that will need to be coordinated for proper systems installation and operation.

- B. The fire protection contractor shall provide all necessary information to the mechanical contractor to produce coordination drawings. The contractor shall also attend and participate in all coordination meetings.
- C. The drawings will be 1/4" scale.
- D. Coordination meetings will be conducted on site with all concerned contractors present. Representatives from the Owner, Architect and Engineer will also be present to review conflicts and approve contractor variations to the contract documents.

PART 2 - PRODUCTS

2.1 PAINT

- A. For indoor applications, use paints and primers that have a VOC content of 250 g/L or less when calculated according to the adopted version of the Green Seal Standard GC-03, Anti-Corrosive Paints.

PART 3 - EXECUTION

3.1 CONCRETE BASES

- A. Refer to specification section 230500 and individual equipment specifications for additional requirements.

3.2 PAINTING

- A. Contractor shall paint the following items:
 - 1. All exposed fire protection piping. Color to be coordinated with the Architect.
- B. Paint with two (2) coats of exterior enamel over one (1) coat primer. Select paint to be compliant with material being used, i.e. metal, plastic, etc.
- C. Prep piping as needed to accept painting.

END OF SECTION 210500

SECTION 211300 - SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the equipment and systems indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment Included in This Section
 - 1. Pipes, fittings, and specialties
 - 2. Fire-protection valves
 - 3. Fire-department connections
 - 4. Sprinklers
 - 5. Alarm devices
 - 6. Control panels
 - 7. Pressure gauges
- C. System Pressure
 - 1. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175 psig maximum.
 - 2. High-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure higher than standard 175 psig, but not higher than 250 psig.
- D. System Descriptions
 - 1. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water that is connected to a water supply through an alarm valve. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts a fusible link.
 - 2. Dry-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing compressed air supplied by a UL 1450 rated air compressor. Water is supplied through a dry-pipe valve. When sprinklers are opened, the compressed air is purged from the system with the flow of water into the system. Sprinklers open when heat melts a fusible link.
 - 3. Deluge Sprinkler System: Open sprinklers are attached to piping connected to water supply through a deluge valve. Fire-detection system, in same area as sprinklers, will open the deluge valve. Water flows into piping system and discharges from attached sprinklers when valve opens.
 - 4. Automatic sprinklers are attached to piping containing compressed air supplied by a UL rated compressor. Water is supplied through a dry-pipe valve. When sprinklers are

opened, the compressed air is purged from the system with the flow of water into the system. Sprinklers open when heat melts a fusible link. The system requires the activation of a sprinkler in addition to a heat or smoke detector for water to be released into the system.

5. Combined Sprinkler / Standpipe System: A standpipe system having piping that supplies both hose connections and automatic sprinklers.
6. Class I Standpipe: Consists of 2-1/2 hose valves to be used by the fire department
7. Class II Standpipe: Consists of 1-1/2" hose valves and typically 100' of hose to be used by facility staff.
8. Class III Standpipe: Consists of a combination of 1-1/2" and 2-1/2" hose valves typically installed in a common cabinet.
9. Standpipe Types
 - a. Automatic Standpipe - Systems are designed to provide the needed pressure and water supply when the valve is opened.
 - b. Automatic Dry Standpipe - System is only designed to have water in the system piping when the system is in use.
 - c. Manual Dry Standpipe - System is exclusively for fire department use and requires a fire department pumper to supply the needed pressure and water supply through a fire department connection.
 - d. Semi-Automatic Standpipe - System are capable of providing the needed pressure and water supply, after the activation of a control device or fire pump.
 - e. Wet Standpipe - Systems are wet at all times.

1.2 REFERENCES

- A. All materials, installation and Workmanship shall comply with the applicable requirements and standards addressed within the following references:
 1. Factory Mutual System (FM) - Approval Guide and Loss Prevention Data Sheets
 2. UL – Underwriters Laboratory
 3. NFPA 13 – Standard for the Installation of Sprinkler Systems
 4. NFPA 14 - Standard for the Installation of Standpipe and Hose Systems
 5. NFPA 25 – Standard for the Inspection, Testing and Maintenance of Water – Based Fire Protection Systems
 6. NFPA 13R – Standard for the Installation of Sprinkler Systems in Low Rise Residential Occupancies

1.3 SUBMITTALS

- A. Review Procedure
 1. Contractor shall submit the shop drawings, working plans including product data and hydraulic calculations where applicable, to the Owner's Insurance Agency, Factory

Mutual (FM) Global and Engineer for review. Review shall be based on applicable NFPA Standards, current version or as specified in the construction document.

2. The Owner's Insurance Agency and FM Global shall provide review comments back to the Engineer.
 3. Engineer shall consult with the Owner prior to applying comments from the Owner's Insurance Agency and FM Global and return the shop drawings with review comments back to the Contractor. Repeat the process until the Engineer approves the submittals.
 4. Contractor shall submit the Engineer/Owner approved shop drawings to the Authority Having Jurisdiction (AHJ) for final approval prior to installation.
- B. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
 - C. Shop Drawings: For all sprinkler systems. Include plans, elevations, sections, details, and attachments to other work.
 - D. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.
 - E. Fire-hydrant flow test report.
 - F. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."
 - G. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing design services needed to assume responsibility. Base calculations on results of fire-hydrant flow test.
- B. Sprinkler drawings shall be designed and stamped by a NICET III or NICET IV certified designer.
- C. Design sprinkler system(s) per NFPA 13, using performance requirements and design criteria indicated.
- D. Sprinkler system shall be hydraulically designed and have a density of at least that required by the hazard rating of the area protected.
- E. Pipe sizes shall be no less than 1". The velocity of water in pipe shall not exceed 20 ft/sec
- F. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.
- G. Center sprinkler heads in ceiling tiles in both directions.
- H. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.5 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six (6) spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

1.6 PROJECT CONDITIONS

- A. Interruption of Existing Sprinkler Service: Do not interrupt sprinkler service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary sprinkler service according to requirements indicated:
1. Notify Owner no fewer than two (2) days in advance of proposed interruption of sprinkler service.
 2. Do not proceed with interruption of sprinkler service without Owner's written permission.
 3. Provide a fire watch as required by NFPA for systems taken out of operation.

PART 2 - PRODUCTS

2.1 BACKFLOW PREVENTER

- A. Acceptable Manufacturers
1. Ames
 2. Apollo
 3. Febco
 4. Watts
 5. Wilkins
 6. Zurn

2.2 GAUGES

- A. Acceptable Manufacturers
1. AMETEK
 2. Ashcroft

2.3 SPRINKLERS

- A. Acceptable Manufacturers

1. Reliable
2. Tyco
3. Victaulic
4. Viking

2.4 VALVES – ANGLE/BALL/BUTTERFLY/CHECK/GATE

A. Acceptable Manufacturers

1. Anvil
2. FPPI
3. Kennedy Valve
4. Milwaukee Valve
5. Nibco
6. Tyco Fire
7. Victaulic

2.5 WATER MOTOR OPERATED GONG

A. Acceptable Manufacturers

1. Tyco Fire
2. Victaulic
3. Viking

2.6 ELECTRICALLY OPERATED ALARM BELL

A. Acceptable Manufacturers

1. Notifier
2. Potter

2.7 WATER FLOW INDICATORS

A. Acceptable Manufacturers

1. McDonnell & Miller (ITT Industries)
2. Potter
3. System Sensor (Honeywell)

4. Viking

2.8 PRESSURE SWITCHES

A. Acceptable Manufacturers

1. Potter
2. System Sensor (Honeywell)
3. Tyco
4. Viking

2.9 VALVE SUPERVISORY SWITCHES

A. Acceptable Manufacturers

1. Kennedy
2. Potter
3. System Sensor (Honeywell)

B. Post Indicator Supervisory Switches

1. Potter
2. System Sensor (Honeywell)

2.10 PIPING USAGE SCHEDULE

- A. Refer to piping usage schedule on drawings for specific system requirements.

2.11 STEEL PIPE AND FITTINGS (GENERAL REQUIREMENTS)

- A. Standard Weight, Black-Steel Pipe: ASTM A 53/A 53M, Type E, Grade B. Hot dipped galvanized where indicated. Pipe ends may be factory or field formed to match joining method.
- B. Black-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends, hot dipped galvanized where indicated.
- C. Steel Couplings: ASTM A 865, threaded, hot dipped galvanized where indicated.
- D. Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern, hot dipped galvanized where indicated.
- E. Malleable- or Ductile-Iron Unions: UL 860.
- F. Cast-Iron Flanges: ASME 16.1, Class 125.
- G. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.

- H. Steel Welding Fittings: ASTM A 234/A 234M and ASME B16.9.
- I. Grooved-Joint, Steel-Pipe Appurtenances
 - 1. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Shurjoint Piping Products
 - b. Tyco Fire & Building Products LP
 - c. Victaulic Company.
 - 2. Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe, hot dipped galvanized where indicated.
 - 3. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

2.12 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick or ASME B16.21, nonmetallic and asbestos free.
 - 1. Class 125, Cast-Iron Flanges and Class 150, Bronze Flat-Face Flanges: Full-face gaskets.
 - 2. Class 250, Cast-Iron Flanges and Class 300, Steel Raised-Face Flanges: Ring-type gaskets.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.13 LISTED FIRE-PROTECTION VALVES

- A. General Requirements
 - 1. Minimum Pressure Rating for Standard-Pressure Piping: 175 psig.
 - 2. Minimum Pressure Rating for High-Pressure Piping: 250 psig.
 - 3. Body Material: Cast or ductile iron.
 - 4. Size: Same as connected piping.
 - 5. End Connections: Flanged, threaded or grooved.

2.14 SPRINKLER SPECIALTY PIPE FITTINGS

- A. Branch Outlet Fittings
 - 1. Standard: UL 213.

2. Pressure Rating: 175 psig minimum.
3. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
4. Type: Mechanical-T and -cross fittings.
5. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
6. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
7. Branch Outlets: Grooved, plain-end pipe, or threaded.

2.15 SPRINKLERS

A. General Requirements

1. Pressure Rating for Automatic Sprinklers: 175 psig minimum.
2. Pressure Rating for High-Pressure Automatic Sprinklers: 250 psig minimum.
3. Temperature Rating: 165° F minimum. Contractor to verify required sprinkler temperatures based on space usage and location.

B. Open Sprinklers with Heat-Responsive Element Removed: UL 199.

1. Characteristics

- a. Nominal 1/2" Orifice: With Discharge Coefficient K between 5.3 and 5.8.
- b. Nominal 17/32" Orifice: With Discharge Coefficient K between 7.4 and 8.2.

C. Automatic Sprinklers with Heat-Responsive Element

1. Early-Suppression, Fast-Response Applications: UL 1767.
2. Nonresidential Applications: UL 199.
3. Characteristics: Nominal 1/2" orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.
4. Element Type: Glass bulb.

D. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

E. Sprinkler Guards

1. Cage provided by same manufacturer as sprinkler.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following: Reliable, Tyco, Victaulic, and Viking.
3. Standard: UL 199.

2.16 PRESSURE GAUGES

- A. Standard: UL 393.
- B. Dial Size: 3-1/2" to 4-1/2" diameter.
- C. Pressure Gauge Range: 0 to 250 psig minimum.
- D. Water System Piping Gauge: Include "WATER" or "AIR/WATER" label on dial face.
- E. Air System Piping Gauge: Include "AIR" or "AIR/WATER" label on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.
- B. Report test results promptly and in writing to Owner and Engineer.

3.2 WATER-SUPPLY CONNECTIONS

- A. Connect sprinkler piping to building's interior water-distribution piping.
- B. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-distribution piping. Comply with requirements for backflow preventers in Division 22 Section "Domestic Water Piping Specialties."

3.3 PIPING INSTALLATION

- A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.
 - 1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
- B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.
- C. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- D. Install unions adjacent to each valve in pipes 2" and smaller.
- E. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having 2-1/2" and larger end connections.
- F. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13. Unless indicated otherwise, inspector's test connections shall be located at the end of the most remote branch line in the upper story. Test

valve shall be located not over 7' above the floor and in lockable rooms. Discharge shall be to floor drain equipped with a funnel.

- G. Install sprinkler piping with drains for complete system drainage. Terminate drain lines to the nearest floor drain with funnel or to a service sink.
- H. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.
- I. For combined sprinkler / standpipe systems, install 2-1/2" hose valve and sprinkler control assembly including OS&Y valves with tamper, flow switch, and inspector's test and drain valves in each floor. Connect drain lines to drain risers.
- J. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill over floor drain or to outside building.
- K. Install alarm devices in piping systems. A flow alarm switch shall be provided in the sprinkler riser and shall be wired into the fire alarm system. Where a main line branches out, a separate alarm shall be installed on each branch to a different building or section of building. A separate flow alarm switch for the standpipe risers is not required for the combined system.
- L. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.
- M. Install pressure gauges on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than 1/4" and with soft metal seated globe valve, arranged for draining pipe between gauge and valve. Install gauges to permit removal and install where they will not be subject to freezing.
- N. Fill sprinkler system piping with water.

3.4 JOINT CONSTRUCTION

- A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- D. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.
- E. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

- F. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.
 - 1. Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.
- G. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.
- H. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- I. Solvent Joints: Follow manufacturer's instructions for set and cure times for solvent cement joints. Avoid significant stresses during set and cure times. Do not apply any stress that will disturb an un-dried joint. Sprinkler fittings shall be allowed to cure in accordance with the manufacturer's guidelines and the contractor shall assure the outlets are clear of any excess cement prior to installing sprinklers.

3.5 VALVE AND SPECIALTIES INSTALLATION

- A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. System water supply valves, isolation control valves, and other valves in feed mains shall be supervised by locking valves open. Provide owner approved padlocks.
- D. Install backflow preventers in potable-water-supply sources.
- E. Specialty Valves:
 - 1. General Requirements: Install in vertical position for proper direction of flow, in main supply to system.
 - 2. Alarm Valves: Include bypass check valve and retarding chamber drain-line connection.
- F. Deluge Valves: Install in vertical position, in proper direction of flow, and in main supply to deluge system. Install trim sets for drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.

3.6 SPRINKLER INSTALLATION

- A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels. Center sprinkler in tile in both directions.
- B. Install sprinklers in a reasonably symmetrical pattern in areas with finished drywall ceilings.
- C. Install dry-type sprinklers with water supply from heated space. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing.

- D. Provide automatic sprinklers of ordinary or intermediate temperature rating in the elevator machine room. Each system shall have a readily accessible shut-off valve, that is electronically supervised, located outside the protected area.

3.7 IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.
- B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- C. All exposed sprinkler piping in unfinished areas shall be painted red. All exposed piping in finished areas shall be painted to match the adjoining walls and ceilings or a color selected by the Architect.
- A. At intervals not to exceed 50 feet, provide printed identification and flow direction labels entitled "SPRINKLER FIRE." Refer to Specification Section 230553 – Mechanical Identification for required pipe label requirements. Labels shall be snap on or adhesive style equal to Seton "Setmark."

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections
 1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
 4. Energize circuits to electrical equipment and devices.
 5. Coordinate with fire-alarm tests. Operate as required.
 6. Verify that equipment hose threads are same as local fire-department equipment.
- C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.9 CLEANING

- A. Clean dirt and debris from sprinklers.
- B. Remove and replace sprinklers with paint other than factory finish.

3.10 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves.

END OF SECTION 211300

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SECTION 220500 – PLUMBING COMMON WORK RESULTS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the equipment and systems indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. Plumbing work shall comply with specification section 230500.
- B. In addition to Division 22, Plumbing work shall comply with the following sections:
 - 1. Section 230500 HVAC Common Work Results
 - 2. Section 230529 Pipe Hangers and Supports
 - 3. Section 230553 Mechanical Identification
 - 4. Section 230593 Cleaning and Testing
 - 5. Section 230594 Balancing of Systems
 - 6. Section 230719 Piping Insulation

1.3 SUBMITTALS

- A. Submittals must be reviewed and approved by the Contractor before submitting to the Engineer.

1.4 REGULATORY AND UTILITY REQUIREMENTS

- A. Contractor is responsible for coordinating all required site inspections by authorities having jurisdiction. Contractor shall notify General Contractor of all scheduled inspections seven (7) working days prior to site visit.
- B. Contractor is responsible for paying for all fees, permits, and inspections required to complete their work.
- C. Contractor shall include all work required to install new and relocate utilities and meters as shown on drawings.
- D. Utility work 5'-0" from outside of building is by others, unless shown otherwise.
- E. Contractor shall notify Owner of any utility service shutdown 48 hours in advance. This includes gas, water, sanitary, and storm systems.

1.5 SUBSTITUTIONS

- A. All manufacturers listed as Acceptable Manufacturers in each specification section are considered equal to the basis of design. The basis of design is preferred and will take precedence. Any products from an alternate approved manufacturer need to meet the requirements and performance specified and shall be equal to the basis of design.
- B. The Contractor may request permission for a substitution of any item (equipment or material), subject to the following conditions:
 - 1. Submit substitution requests in writing to the Engineer, on a form supplied by the Engineer. A sample copy of this form is included at the end of this section. An electronic copy can also be provided to the Contractor by the Engineer.
 - 2. Where equipment or accessories are used which differ in arrangement, configuration, dimensions, ratings, or engineering parameters from those indicated on the contractor documents, the Contractor is responsible for all costs involved in integrating the equipment or accessories into the system and the assigned space and for obtaining the performance from the system into which these items are placed as well as any re-design costs incurred by the Architect or Engineer. The Contractor is also responsible for coordinating changes required by other trades.
 - 3. Any requests for alternate manufacturers must be submitted to the Architect/Engineer at least ten (10) days prior to bid day. Incomplete substitution requests will not be considered.
- C. Approval
 - 1. No work involving requests for substitution shall commence without written approval on the provided form by the Engineer.
 - 2. Any work started or material ordered/installed by the Contractor without written approval shall be removed/repared at the sole expense of the Contractor. The Contractor will also be responsible for any costs incurred by the Owner for such rework.

1.6 COORDINATION DRAWINGS

- A. The mechanical contractor shall be responsible for producing coordination drawings. The drawings will need to incorporate piping, ductwork, equipment, lighting, conduits, building structure and all other building and system components that will need to be coordinated for proper systems installation and operation.
- B. The plumbing contractor shall provide all necessary information to the mechanical contractor to produce coordination drawings. The contractor shall also attend and participate in all coordination meetings.
- C. The drawings will be 1/4" scale.
- D. Coordination meetings will be conducted on site with all concerned contractors present. Representatives from the Owner, Architect and Engineer will also be present to review conflicts and approve contractor variations to the contract documents.

PART 2 - PRODUCTS

2.1 PAINT

- A. For indoor applications, use paints and primers that have a VOC content of 250 g/L or less when calculated according established in Green Seal Standard GC-03, Anti-Corrosive Paints.

PART 3 - EXECUTION

3.1 CONCRETE BASES

- A. Refer to specification section 230500 HVAC Common Work Results and individual equipment specifications for additional requirements.

3.2 PAINTING

- A. Contractor shall paint the following items:
 - 1.
- B. Paint with two (2) coats of exterior enamel over one (1) coat primer. Select paint to be compliant with material being used, i.e. metal, plastic, etc.
- C. Prep piping as needed to accept painting.

END OF SECTION 220500

SECTION 220523 – PLUMBING VALVES

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following Plumbing Valves indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment Included in This Section
 - 1. All valves shown on the plumbing drawings.
 - 2. Valves to isolate all plumbing fixture groups.
 - 3. Valves to isolate water heaters and other plumbing equipment.
 - 4. Valves to isolate owner provided equipment.
 - 5. Valves for makeup water connections serving hydronic systems.

1.2 REFERENCES

- A. Abbreviations
 - 1. IBBM: Iron body, bronze mounted.
 - 2. OS&Y: Outside screw and yoke.
 - 3. WOG: Water, oil, gas.
 - 4. WSP: Working steam pressure.

1.3 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions for each valve type.
- B. Operation and Maintenance Data: For valves, safety valves, pressure-reducing valves, air vents, vacuum breakers, and meters to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements
 - 1. Comply with the most recent version following standards:
 - a. Safe Drinking Water Act (SDWA) and the associated lead content requirements.

PART 2 - PRODUCTS

2.1 VALVES - GENERAL

- A. Acceptable Manufacturers (unless specified otherwise)
 - 1. Apollo
 - 2. Conbraco
 - 3. Crane
 - 4. Hammond
 - 5. Milwaukee
 - 6. Nibco
 - 7. Stockham
 - 8. Victaulic
 - 9. Watts
 - 10. HCI Terminator
- B. Valve Standardization: Valves from one or more manufacturers may be used, however valves supplied for each specific valve type shall be the product of one manufacturer.
- C. Valves shall be first quality, free from all imperfections and defects, with body markings indicating manufacturer and rating.
- D. Valve parts of same manufacturer, size and type shall be interchangeable.
- E. Valves which use packing shall be capable of being packed when wide open and under full working pressure.
- F. Size valves the same size as the piping in which they are installed, unless specified otherwise.
- G. Provide extended shafts for all valves installed on insulated piping.
- H. Coordinate the end connection type with the piping and other specialties in the systems. Refer to the piping usage schedule for additional requirement. The following are acceptable styles:
 - 1. Solder
 - 2. Mechanical press
 - 3. Threaded
 - 4. Flanged
 - 5. Grooved

- I. Provide unions in the system as needed for installation or removal of valves and specialties.
- J. Manually operated gate, globe and angle valves shall be of rising stem type, unless otherwise specified.

2.2 GATE VALVES

- A. GT-1: 200 psig WSP, IBBM with non-toxic, corrosion resistant coating inside and out, FDA-approved, OS&Y, non-rising stem. Valve rated for 175 psi and designed to connect to the indicator post. Bolted bonnet, resilient solid wedge disc, completely and permanently encapsulated in rubber. Delrin Anti-friction thrust bearing. UL listed. AWWA C509 Acceptable Valve.
- B. Indicator post provided by Fire Protection Contractor. Coordinate requirements and installation with Fire Protection Contractor.
- C. Coordinate end connection type with site utility contractor.

2.3 CHECK VALVES

- A. CK-1: 125 psig WSP, 200 psig WOG, bronze body, brass or bronze trim, horizontal swing, renewable and regrindable. Face discs for cold water service with Teflon.
- B. CK-2: 125 psig WSP, 200 psig WOG, bronze body, brass or bronze trim, horizontal swing, renewable and regrindable disc. Face discs for cold water service with Teflon.
- C. CK-3: 125 psig WSP, 200 psig WOG, IBBM, horizontal swing, bolted bonnet, regrindable and renewable seat ring and disc. Discs on valves 4 inch size and larger may be cast iron with bronze face.

2.4 BALL VALVES

- A. BV-1: 150 psig WSP, 600 psig WOG, two (2) piece bronze body, full-port, solid blow-out proof 316 stainless steel stem, Teflon seats, 316 stainless steel ball, Teflon seals, corrosion resistant steel lever handles with vinyl grips, and balancing stop.

2.5 BUTTERFLY VALVES

- A. BF-1: Ductile iron body, flangeless wafer, grooved, or lugged type, (lug for each bolt hole, drilled and tapped for cap screws), with resilient Teflon or EPDM seats, ductile iron discs, stainless steel stems, and raised necks able to accommodate 2 inches of insulation.
 - 1. Pressure Ratings:
 - a. 12 inch size and Less: 200 psig WOG at 275° F.
 - b. 14 inch size and Up: 150 psig WOG at 275° F.
- B. Operators
 - 1. 6 inch size and Less: Manual actuator handles with external indication of disc position, memory stop, and suitable means of locking actuator in any fixed position.
 - 2. 8 inch size and Up: Worm gear operator.

2.6 BALANCING VALVES

A. Manual Type

1. Acceptable Manufacturers:
 - a. Bell & Gossett
 - b. Conbraco
 - c. Griswold
 - d. Nexus
 - e. Nibco
 - f. Taco
2. All valves to be of bronze body/stainless steel construction with glass and carbon filled TFE seat rings. Valves to have differential pressure read-out ports across valve seat area. Read-out ports to be fitted with internal EPT insert and check valve. Valve bodies to have 1/4 inch drain/purge port. Valves to have memory stop and calibrated nameplate.
3. Valves shall be leak-tight at full rated working pressure.
 - a. 1/2 to 3 inch: 300 psig at 250° F.
 - b. 1/2 to 2 inch: 200 psig at 250° F.

2.7 SAFETY AND RELIEF VALVES

- ### A. General Requirements: Valves shall be as specified by ASME Code governing manufacture of such valves within scope of their particular usage, i.e., Heating Boilers, Unfired Pressure Valves, etc., shall be tested, rated and listed, unless otherwise specified. Valves for applications specified shall conform to the ASME Code, Section IV, Heating Boilers and the following:
1. Valves for combination domestic hot water heater and storage tanks shall conform to the requirements of ASME Code, Section IV and USA Standard Z21.22 and shall be NBB listed. Valves shall be of the temperature - pressure type. Thermostatic element shall, on rising temperature, cause the valve to open at 200° F and valve shall deliver its rated capacity at 210° F and close drip tight at 195° F. Valves shall be sized in accordance with Unfired Vessel Code.
 2. End Connections: Unless otherwise specified, safety valves, relief valves and safety relief valves, in sizes 3/4 inch to 3 inches IPS inclusive, may be furnished with male or female pipe thread inlet and female pipe thread outlet; valves over 3 inches IPS must be furnished with 125 lb. or 250 lb. inlet and may be equipped with 125 lb. outlet.

2.8 GAUGE COCKS

A. Acceptable Manufacturers:

1. Marsh Instrument Company
2. Mueller Instruments Co.
3. H.O. Trerice Co.
4. Weksler Instruments Corp.

- ### B. Gauge Cocks: All brass construction, "T" or lever handles, built for 300 psig hydraulic pressure.

2.9 STRAINERS

A. Acceptable manufacturers:

1. Zurn
2. Watts

B. All strainers to be of constructed of lead free brass, bronze, or copper and shall be rated for use in potable water systems and shall meet the requirements of NSF/ANSI 372. Strainers shall include 20 mesh stainless steel strainer screen and tapped access cover and pipe plug.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install valves at locations noted on the drawings or specified.

1. Install shutoffs for branch lines to each group of fixtures.
2. Install shutoff valves above ceiling for each fixture if fixture is not provided with integral stops.

3.2 VALVE APPLICATION SCHEDULE

A. Schedule of valve applications for the different services is as follows:

1. Cold Water, Domestic Hot Water and Circulating (CW, HW, HWC) located inside building, 125 psig and Less:
 - a. 3 inch and Less: BV-1, CK-1, CK-2.
 - b. 4 inch and Up: BF-1, CK-3.
2. Building Water Service
 - a. GT-1

END OF SECTION 220523

SECTION 221100 - PLUMBING PIPING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following Plumbing Piping Systems indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment Included in this section:
 - 1. Cold Water
 - 2. Hot Water
 - 3. Hot Water Recirculation
 - 4. Sanitary
 - 5. Vent

1.2 REFERENCES

- A. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
 - 1. The adopted version of the Uniform Plumbing Code shall be applicable to this Project unless identified by a specific edition date.

1.3 SUBMITTALS

- A. Product Data
 - 1. Catalog sheets and specifications indicating manufacturer name, pipe/fitting type, applicable reference standard, schedule, or class for specified pipe and fittings.
 - 2. Material Schedule: Itemized pipe and fitting material list for each specified piping application in Pipe and Fittings Schedule as defined in Part 3 of this specification section. Where optional materials are specified indicate option selected.
- B. Submit piping layout drawings as per specification section 230500 HVAC Common Work Results.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements
 - 1. Comply with the most recent version following standards:
 - a. Safe Drinking Water Act (SDWA) and the associated lead content requirements.

2. Use only materials and methods allowed by applicable codes and authority having jurisdiction (AHJ). It is the contractor's responsibility to confirm if plastic piping is acceptable with the AHJ prior to installation.

B. Qualification of Brazers

1. Comply with the following: The persons performing the brazing and their supervisors shall be personally experienced in brazing procedures.

1.5 EXTRA MATERIALS

- A. Provide new manual pipe cutting and crimp ring tools for PEX piping. Crimping tool shall be capable of crimping joints for all sizes of piping installed on job. Tools shall be same as pipe manufacturer. Tools shall include instructions.

PART 2 - PRODUCTS

2.1 COPPER AND BRASS PIPE, TUBING AND FITTINGS

- A. Copper Tube, Types K and L: ASTM B 88.
- B. Wrought Copper Tube Fittings, Solder Joint: ASME B16.22.
- C. Cast Copper Alloy Tube Fittings, Solder Joint: ASME B16.18.
- D. Drainage Tube, Type DWV: ASTM B 306.
- E. Wrought Copper Drainage Tube Fittings, Solder Joint: ASME B16.29.
- F. Cast Copper Alloy Drainage Fittings, Solder Joint: ASME B16.23.
- G. Chrome Plated Grade A Red Brass Threaded Pipe, Standard Weight: ASTM B 43.
 1. Plating: 0.02 mil chromium over 0.2 mil nickel plating, high polish finish.
- H. Unions: Cast bronze, 150 lb Class, bronze to bronze seats, threaded or solder joint.
- I. Flared Tube Fittings
 1. Water Tube Type: ASME B16.26.
- J. Flanges: Conform to the Standards for fittings used in systems.
 1. Brazing Flanges: ASME B16.24, hubs modified for brazing ends.
- K. Mechanical Press Fittings
 1. Copper with EPDM seals; ANSI B-16.22, NSF-61.

2.2 CAST IRON PIPE AND FITTINGS

- A. Bell and Spigot Soil Pipe: Service Weight, Bitumin coated; ASTM A 74, CISPI/NSF. All pipes shall be marked with CISPI and NSF listing.
- B. Bell and Spigot Soil Pipe Fittings: Service Weight, Bitumin coated; ASTM A 74, CISPI/NSF.
- C. Bell and Spigot Soil Pipe Gaskets: ASTM C564
- D. Hubless Pipe: Bitumin coated; CISPI Standard No. 301. All pipes shall be marked with CISPI and NSF listing.
- E. Hubless Pipe Fittings: Drainage Pattern, Bitumin coated; CISPI No. 301.
- F. Hubless Joint Couplings: Stainless steel shield and clamp assembly, and elastomer sealing sleeve; CISPI-310.

2.3 PEX PIPING AND FITTINGS

- A. Acceptable Manufacturers:
 - 1. Uponor
 - 2. Rehau
- B. Pipe: Pex-a (Engel Method Crosslinked Polyethylene Piping) for potable water use. Meets ASTM Standards F-876, F-877 and E84, NSF Standards 14, 61 & 372, PEX 5306.
 - 1. Color: Piping may be white, red, or blue in color. If red/blue colored piping is used, red must be used for all hot water pipe and blue for cold water. Maintain color scheme throughout building.
 - 2. Note: If using color coded tubing as described above, then labeling of these pipes may be omitted.
- C. Fittings: All fittings used with crosslinked polyethylene (PEXa) water distribution pipe shall be cold-expansion fittings with PEXa reinforcing ring. Meets ASTM Standard F1960. Fittings same as pipe manufacturer. All fittings shall be completely brass or polymer. Use copper stub-outs for fixture rough-ins, PEX shall not be exposed out of the wall at fixture rough-ins.
 - 1. Brass fittings to be lead-free ECO Brass UNS C69300
 - 2. Polymer fittings in accordance to ASTM D 6394
- D. Valves: Lead-free brass ball valve.
 - 1. Manufacturer: valve from same manufacturer as piping system.
 - 2. Ball valve: full-port, two-piece, positive stop shoulder, ASTM F1960 cold-expansion ends with PEXa reinforcing ring.
- E. Accessories: Stub-out plates shall be used to support rough-in piping for fixture connections.

2.4 PVC PIPING AND FITTINGS

- A. Pipe: Schedule 40 PVC , Type I, rated for 140° F, ASTM D2665
- B. Fittings: Same as pipe manufacturer; ASTM D2466. Solvent welded using solvent approved by manufacturer.

2.5 JOINING AND SEALANT MATERIALS

A. Thread Sealant

- 1. LA-CO Industries', Slic-Tite Paste with Teflon.
- 2. Loctite Corp.'s No. 565 Thread Sealant.
- 3. Thread sealants for potable water shall be NSF approved.

B. Solder: Solid wire type conforming to the following:

- 1. Lead-free tin-silver solder (ASTM B 32 Alloy Grade E, AC, or HB)

C. Brazing Alloys

- 1. Type 1: AWS A5.8, Class BCuP-5, for brazing copper to brass, bronze, or copper.
- 2. Type 2: AWS A5.8, Class BAg-7, for brazing copper to steel or stainless steel.

D. Brazing Flux: FS O-F-499, Type B.

E. Gaskets For Use With Ductile Iron Water Pipe and Cast Iron Drainage Pipe: Synthetic rubber rings (molded or tubular): Clow Corp.'s Belltite, Tyler Pipe Industries Inc.'s Ty-Seal, or U.S. Pipe and Foundry Co.'s Tyton.

F. Flange Gasket Material

- 1. For Use With Cold Water: 1/16" thick rubber.
- 2. For Use With Hot Water, Air or Steam: Waterproofed non-asbestos ceramic or mineral fiber, or a combination of metal and water-proofed non-asbestos ceramic or mineral fiber, designed for the temperatures and pressures of the piping systems in which installed.

G. Gaskets For Use With Grooved End Pipe and Fittings: Type and materials as recommended and furnished by the fitting manufacturer, for the service of piping system in which installed.

H. Anti-Seize Lubricant: Bostik Inc.'s Never Seez or Dow Corning Corp.'s Molykote 1000.

2.6 PACKING MATERIALS FOR BUILDING CONSTRUCTION PENETRATIONS

A. Oiled Oakum: Manufactured by Nupak of New Orleans, Inc.

B. Mechanical Modular Seals: Thunderline Corp.'s Link Seal wall and floor seals designed for the service of piping system in which installed.

2.7 DIELECTRIC CONNECTORS

- A. Use for all connections between piping connections of dissimilar materials.
- B. Unions
 - 1. Rated 250 psig at 180° F; ASME B16.39; Wilkins Model DU.
 - 2. Rated 100 psig at 210° F; ASME B16.39; Wilkins Model DU with high temperature gasket.
 - 3. Rated Above 100 psig and 210° F: Use Flange Electrical Insulation Kit specified below.
- C. Flange Electrical Insulation Kit: Consisting of dielectric sleeves and washers, and dielectric gasket.
 - 1. Rated 150 psi at 250° F: ANSI Class 150, full faced neoprene gasket with bolt holes, double phenolic washers, and Mylar sleeves; Model 150 by APS, Lafayette, LA.

2.8 PIPE SLEEVES

- A. Type A: Schedule 40 steel pipe.
- B. Type B: No. 16 gauge galvanized sheet steel.
- C. Type C: Schedule 40 steel pipe with 1/4" steel collar continuously welded to pipe sleeve. Size steel collars as required to span a minimum of one (1) cell or corrugation, on all sides of the rough opening thru the metal deck.
- D. Type D: No. 16 gauge galvanized sheet steel with 16 gauge sheet steel metal collar rigidly secured to sleeve. Size metal collars as required to span a minimum of one (1) cell or corrugation, on all sides of the rough opening thru the metal deck.

2.9 PIPING ESCUTCHEONS

- A. Cast Brass: Polished chrome plated finish, with set screw.
- B. Cast Iron: Solid type, unplated, with set screw; Model 395 by Grinnell Corp.

2.10 THERMOMETERS

- A. Acceptable Manufacturers
 - 1. Weiss Instruments
 - 2. Prior Approval
- B. Bi-Metal Thermometers
 - 1. Body: Type 304 Stainless Steel, heavy glass face, and hermetically sealed.
 - 2. Bimetallic Element: Bimetallic element calibrated to meet temperature standards of manufacturer and helix assembly with silicon dampening.

3. Stem: Stainless steel to match body and of a length to suit installation. Bare stem shall be used for hydronic systems in non-corrosive applications.
4. Connector: $\frac{3}{4}$ inch, with ASME B1.1 screw threads.
5. Accuracy: Plus or minus 1 percent of scale range or one scale division, to maximum of 1.5 percent of scale range.
6. See piping application schedule for thermometer range requirements based on system type.

C. Liquid in Glass Thermometers

1. Body: Molded plastic with variable angle mounting compliant with ASME B40.200.
2. Tube: Glass with magnifying lens, blue organic liquid, nonreflective aluminum with permanently etched scale markings graduated in deg F and deg C.
3. Stem: Aluminum or brass and of a length to suit installation. Bare stem shall be used for hydronic systems in non-corrosive applications.
4. Connector: $\frac{3}{4}$ inch, with ASME B1.1 screw threads.
5. Accuracy: Plus or minus 1 percent of scale range or one scale division, to maximum of 1.5 percent of scale range.
6. See piping application schedule for thermometer range requirements based on system type.

D. Digital Thermometer

1. Body: Molded plastic with variable angle mounting.
2. Stem: Aluminum or brass and of a length to suit installation. Bare stem shall be used for hydronic systems in non-corrosive applications.
3. Connector: $\frac{3}{4}$ inch, with ASME B1.1 screw threads.
4. Display: Digital
5. Accuracy: Plus or minus 2 deg F.
6. Provide thermowell compatible with thermometer based on pipe diameter and system of installation.
7. See piping application schedule for thermometer range requirements based on system type.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Piping shall be stored to prevent debris from entering the piping. This shall consist of piping caps or temporary covers.
- B. Above or below grade piping that is roughed in shall have a temporary cap installed to prevent debris from entering the piping system. The cap shall be removed to allow for the final connection or continuation of piping to be installed.
- C. Install piping at approximate locations indicated, and at maximum height.
- D. Install piping clear of door swings, and above sash heads.
- E. Make allowances for expansion and contraction.
- F. Install expansion loops in PEX piping as recommended by manufacturer.
- G. Allow for a minimum of 1" free air space around pipe or pipe covering, unless otherwise specified.
- H. Install all underground piping outside the footprint of the building to meet the minimum cover and distance below the frost depth requirements listed below:
 - 1. Sanitary and Storm – 48" minimum cover (below frost depth)
 - 2. Domestic water service – 12" below frost depth of the local jurisdiction or 72" deep, whichever is greater.
 - 3. Fire service - 12" below frost depth of the local jurisdiction or 72" deep, whichever is greater.
- I. Fire service piping shall be installed to meet the cover requirements as noted in NFPA 13. Coordinate exact requirements for the project location with NFPA 13.
- J. Install horizontal piping with a constant pitch, and without sags or humps.
 - 1. Water Piping: Pitch 1/4" per 10 feet upward in direction of flow, unless otherwise noted. If it is not possible to maintain constant pitch, establish a new low point and continue. At the low point, provide a 1/2" drip leg and gate valve with a hose bibb end. Provide an air vent at the high point.
 - 2. Sanitary Piping: Pitch piping 3" and Under 1/4" per foot downward, in direction of flow, unless otherwise noted. Pitch piping 4" and Over 1/8" per foot downward, in direction of flow, unless otherwise noted.
 - 3. Vent Piping: Pitch 1/8" per foot upward, unless otherwise noted.
- K. Install vertical piping plumb.
- L. Use fittings for offsets and direction changes, except for Type K soft annealed copper temper water tube, and mechanically extracted joints in Type L copper tubing.

- M. Cut pipe and tubing ends square; ream before joining.
- N. Threading: Use American Standard Taper Pipe Thread Dies.
 - 1. Thread brass pipe with special brass threading dies.
- O. PEX shall only be allowed individual branch or fixture piping, not mains connecting more than one (1) room.
 - 1. PEX piping shall not be installed in rated walls or ceiling spaces being used as a return air plenum.
 - 2. PEX piping shall not be installed where exposed, this includes mechanical rooms.

3.2 DRAINAGE SYSTEMS

A. Fittings

- 1. Long Sweep Fittings
 - a. Long sweep fittings shall be those in the category where 4" diameter piping has a minimum R/D = 10.5"/4".
 - b. Use long sweep drainage pattern fittings for all fittings unless noted otherwise.
 - c. Use of other fittings must be approved by Engineer in writing prior to use.
- 2. Short Sweep Fittings
 - a. Short sweep fittings shall be those in the category where 4" diameter piping has a minimum R/D = 7.5"/4".
 - b. Short sweep drainage pattern fittings may be used for the following.
 - 1) Vent piping.
 - 2) Fixture connections.
 - 3) Other locations as approved by the Engineer in writing.
- 3. Vertical Offsets: Make vertical offsets with 45° elbows, or 1/8 bends.

B. Cleanouts

- 1. Install cleanouts with sufficient side and end clearance to allow for the removal of the cleanout plug, and the use of cleaning tools.
- 2. Lubricate cleanout plugs with anti-seize lubricant.

3.3 DOMESTIC WATER PIPING SYSTEM

- A. Connect branch lines to the upper quadrant of the main, and run upward at not less than 45° before extending laterally.
- B. Make final connections to plumbing fixtures and equipment with unions, or flanges.
 - 1. Do not use unions in ferrous piping larger than 3".
 - 2. Do not use unions in brass or copper piping larger than 2-1/2".

3.4 PIPE JOINT MAKE-UP

- A. Threaded Joint: Make up joint with a pipe thread compound applied in accordance with manufacturer's printed application instructions for the intended service.
 - 1. Chrome Plated Brass Pipe: Tighten joint with a strap or Parmalee wrench; do not mar pipe finish. Install piping so that no threads are visible.
- B. Soldered Joint: Thoroughly clean tube end and inside of fitting with emery cloth, sand cloth, or wire brush. Apply flux to the pre-cleaned surfaces. Install fitting, heat to soldering temperature, and join the metals with type of solder specified. Remove residue.
- C. Flanged Pipe Joint
 - 1. Install threaded companion flanges on steel pipe; flanges on galvanized pipe are not required to be galvanized.
 - 2. Provide a gasket for each joint.
 - a. Hot Water Pipe Gasket: Coat with a thin film of oil before making up joint.
 - 3. Coat bolt threads and nuts with anti-seize lubricant before making up joint.
- D. Caulked Joint: Pack hub with joint packing specified, and caulk. Run 12 ounces molten lead for each inch of pipe diameter. Caulk cooled lead ring and face off smoothly.
- E. Rubber Ring Push-on Joint: Clean hub, bevel spigot, and make up joint with lubricated gasket in conformance with the manufacturer's printed installation instructions.
- F. Grooved Pipe Joint: Roll groove pipe ends, make up joint with grooved end fittings and couplings, in conformance with the manufacturer's printed installation instructions.
 - 1. Cut grooved end piping is not acceptable.
- G. Hubless CI Pipe Joint: Make up joint with hubless fitting and couplings, in conformance with the manufacturer's printed installation instructions.
- H. Mechanical Joint: Make up joint in conformance with the manufacturer's printed installation instructions, with particular reference to tightening of bolts.
- I. Mechanical Press Joint: Install joint with tool approved by joint manufacturer. Installer shall be fully trained and have experience in installing this type of joint.
- J. PEX Joint: Cut pipe and install joints with tool approved by joint manufacturer. Installer shall be fully trained and have experience in installing this type of joint.
- K. Dissimilar Pipe Joint
 - 1. Joining Bell and Spigot and Threaded Pipe: Install a half coupling on the pipe or tube end to form a spigot, and caulk into the cast iron bell.
 - 2. Joining Dissimilar Threaded Piping: Make up connection with a threaded coupling or with companion flanges.

3. Joining Dissimilar Non-Threaded Piping: Make up connection with adapters recommended by the manufacturers of the piping to be joined.

3.5 PIPING PENETRATIONS

- A. Install pre-manufactured flexible boots for vent terminations through roof. Use materials compatible with roof system.
- B. Sleeve Schedule: Unless otherwise shown, comply with the following schedule for the type of sleeve to be used where piping penetrates wall or floor construction:

CONSTRUCTION	SLEEVE TYPE
1. Frame construction.	None Required
2. Foundation walls.	A*
3. Non-waterproof interior walls.	B*
4. Non-waterproof interior floors on metal decks.	D*
5. Non-waterproof interior floors not on metal decks.	B*
6. Floors not on grade having a floor drain.	A
7. Floors over mechanical equipment, steam service, machine, and boiler rooms.	A
8. Floors finished or to be finished with latex composition or terrazzo, and on metal decks.	D*
9. Floors finished or to be finished with latex composition or terrazzo, and not on metal decks.	A
10. Earth supported concrete floors.	None Required
11. Exterior concrete slabs on grade.	A
12. Fixtures with floor outlet waste piping.	None Required
13. Metal roof decks.	C
14. Non-metal roof decks.	A
15. Waterproof floors on metal decks.	D
16. Waterproof floors not on metal decks.	A
17. Waterproof walls.	A

*Core drilling is permissible in lieu of sleeves where marked with asterisks.

C. Diameter of Sleeves and Core Drilled Holes

1. Unless otherwise specified, size holes thru floors and walls in accordance with the through penetration fire stopping system being used.
2. Size holes thru exterior walls or waterproofed walls above inside earth or finished floors, and exterior concrete slabs in accordance with the following:

- a. Uninsulated (Bare) Pipe: Inside diameter of sleeve or core drilled hole 1/2" greater than outside diameter of pipe, unless otherwise specified.
- b. Insulated Pipe: Inside diameter of sleeve or core drilled hole 1/2" greater than outside diameter of insulation, unless otherwise specified.
- c. Mechanical Modular Seals: Size holes in accordance with the manufacturer's recommendations.

D. Length of Sleeves (except as shown otherwise on Drawings)

1. Walls and Partitions: Equal in length to total finished thickness of wall or partition.
2. Floors, Finished: Equal in length to total finished thickness of floor and extending 1/2" above the finished floor level, except as follows:
 - a. In furred spaces at exterior walls, extend sleeve 1" above the finished floor level.
3. Exterior Concrete Slabs: Equal in length to total thickness of slab and extending 1/2" above the concrete slab.
4. Roofs: Equal in length to the total thickness of roof construction, including insulation and roofing materials, and extending one inch above the finished roof level.

E. Packing of Sleeves and Core Drilled Holes

1. Unless otherwise specified, pack sleeves or cored drilled holes in accordance with Section 07 84 00 - FIRESTOPPING.
2. Pack sleeves in exterior walls below grade and concrete floor slabs at or below with mechanical modular seals.

3.6 ESCUTCHEONS

- A. Install plates for exposed uninsulated piping passing thru floors, walls, ceilings, and exterior concrete slabs as follows:
1. In Finished Spaces: chrome plated cast brass.
 2. Unfinished Spaces (Including Exterior Concrete Slabs): unplated cast iron.
 3. Fasten plates with set screws.
 4. Plates are not required in pipe shafts or furred spaces.

3.7 PIPE AND FITTING SCHEDULE

- A. Refer to Drawings for Piping Application Schedule.
- B. Where options are given, choose only one (1) option for each piping service. No deviations from the selected option will be allowed.

END OF SECTION 221100

SECTION 223300 - DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following Domestic Water Heaters indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. Water heater shall be UL listed and labeled.
- B. Water heater shall bear the seal of the American Gas Association.
- C. Comply with the Iowa State Energy Code.
- D. Water heater performance shall meet the adopted version of ASHRAE 90.1.
- E. Water heaters serving emergency fixtures shall meet all requirements of ANSI Z358.1 for tepid water.

1.3 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions for each water heater, gas vent pipe, fittings, and accessories required for the vent system.

1.4 WARRANTY

- A. Manufacturer's Warranty: Three (3) year warranty for the glass lined water heater tank. Provide a copy of the warranty as part of the closeout documents.

PART 2 - PRODUCTS

2.1 TANK TYPE WATER HEATERS

- A. Acceptable Manufacturers
 - 1. A.O. Smith
 - 2. Bradford White
 - 3. Bock Water Heaters
 - 4. Laars
 - 5. PVI

6. RBI
 7. Rheem / Ruud
 8. State
- B. Tank: Welded steel, factory tested at 300 psi and rated for 160 psi working pressure.
1. Glass lining permanently bonded to tank interior surface.
 2. Tank nipples factory installed.
 3. Maintenance-free powered, renewable magnesium anode.
 4. Corrosion resistant dip tube.
 5. Drain and relief valve tapping.
 6. Renewable bronze boiler drain.
- C. Capacity of water heaters shall be as scheduled on the drawings.
- D. Water heaters shall be supplied with factory Pressure-Temperature Relief Valves sized for the specific application. Valves shall be AGA Z21.22 compliant; bronze body with stainless steel internals and threaded blow-off connection. Valves shall be field installed.

2.2 ELECTRIC WATER HEATERS

- A. Heating Elements: Immersion type, replaceable; 75 watts per square inch maximum watt density.
- B. Controls: Adjustable setpoint, interlocked with overheat control, including automatic shut-off.
- C. Wiring: Factory interwired, requiring only a single field electric connection to put the heater into service.
- D. Outer Casing: Steel with baked enamel or acrylic finish. Access door for servicing thermostats and heating elements.

2.3 GAS WATER HEATER

- A. Burner: Power burner, aluminized steel heat exchanger surface, self-adjusting air-gas mixture control.
- B. Controls: Automatic, integrated solid-state temperature and ignition control device with integral diagnostics, graphic user interface, fault history display, and shall have digital temperature readout.
- C. Outer Casing: Steel, with baked enamel or acrylic finish. Access door for servicing controls and burner. Approved for 0" clearance to combustibles.

D. Gas Vent System

1. Condensing Water Heaters:

- a. Flue and Combustion Air: Schedule 40 CPVC. Piping shall be rated for use in a return air plenum
 - 1) All intake piping inside the building to be insulated with 1" fiberglass insulation with all service jacket.
- b. Accessories: Connectors, increasers, & concentric vent kit to be provided by the unit manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install the Work of this section in accordance with the manufacturer's printed installation instructions, unless otherwise specified.
- B. Install the water heater on a level, firm base.
- C. Install the pressure-temperature relief valve in the dedicated tank tapping. Pipe the relief valve blow-off to a point 6 inches above the floor, or as shown on drawings.
- D. Install unions and shut-off valves on hot and cold water connections. Install dielectric unions if required.
- E. Flush and fill tank. Do not switch on heating elements until tank is full and entrapped air is eliminated. Install the Work of this section in accordance with NFPA 54, NFPA 211, and the manufacturer's printed installation instructions, unless otherwise specified.
- F. Install an AGA lubricated plug valve on the gas connection. Gas supply branch shall have a 6" dirt leg with a threaded cap.
- G. Vent Piping
 1. Support horizontal piping on five (5) foot centers, maximum spacing, support vertical piping at every floor or ten (10) foot intervals maximum.
 2. Install manufacturer provided concentric vent kit.
 3. Secure each joint with three (3) sheet metal screws.
 4. Terminate vent extension through roof with a bird proof vent top.

END OF SECTION 223300

SECTION 224000 – PLUMBING FIXTURES AND EQUIPMENT INSTALLATION

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following Plumbing Fixtures and Equipment indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. Refer to the Plumbing Material Lists and Equipment Schedules for additional capacity and equipment requirements.

1.3 SUBMITTALS

- A. Fixture and Equipment Data: Catalog sheets, specifications, rough-in dimensions, and installation instructions for each item specified except fasteners.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements

1. Comply with the most recent version following standards:
 - a. Safe Drinking Water Act (SDWA) and the associated lead content requirements.
 - b. Applicable sections of ANSI/ASME A112 – Standards for Plumbing Equipment
2. Materials and installations designated as handicapped accessible shall conform with the following:
 - a. ANSI A117.1 - Buildings and Facilities - Providing Accessibility and Usability for Physically Handicapped People.
 - b. The Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG), (Appendix A to 28 CFR Part 36).
3. Each fixture carrier support shall be listed by model number in the fixture support manufacturer's Fixture Support Selection Guide as being recommended for support of the appropriate fixture.

- B. Plainly and permanently mark each fixture and fitting with the manufacturer's name or trade mark.

- C. Acid resistant surfaces shall be plainly and permanently marked with the manufacturer's label or symbol indicating acid resistance.

1.5 MAINTENANCE

- A. Special Tools: Deliver to the Owner.

1. Furnish the following tools labeled with names and locations where used.

- a. Keys for stops (furnished with stops).
- b. Tools for Vandal Resistant Fasteners: Two (2) for each type and size.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. The following manufacturers are considered equal to the basis of design listed in the material list and schedules. The basis of design is preferred and will take precedence. Any products from an alternate approved manufacturer need to meet the requirements and performance specified and shall be equal to the basis of design.

Equipment	Acceptable Manufacturers
Backflow	Apollo, Febco, Watts, Zurn/Wilkins
Domestic Water Circulation Pumps	Armstrong, Bell & Gossett, Grundfos, Taco
Drainage Fixtures	Josam, Mifab, Smith, Sun, Wade, Watts, Zurn
Electric Water Coolers	Acorn, Elkay, Halsey Taylor, Haws, Oasis
Expansion Tanks	Amtrol, Armstrong, Bell & Gossett, Elbi, Taco, Watts
Filter	Culligan, Everpure, Marlo, PEP, Watts
Fixture Carriers	Jay R. Smith, Josam, Mifab, Zurn
Flush Valves	Delta Commercial, Moen Commercial, Sloan, Toto, Zurn
Hose Bibbs & Misc. Valves	Apollo, Smith, Watts, Willoughby, Woodford, Zurn
Lavatories, Water Closets (Fixtures)	American Standard, Eljer, Kohler, Sloan, Toto, Zurn
Lavatory & Sink Trim	American Standard, Chicago Faucet, Delta Commercial, Kohler, Moen Commercial, T&S Brass, Sloan, Zurn
Mixing Valves	Armstrong, Bradley, Lawler, Leonard, Powers
Stainless Steel Sinks	Elkay, Just, Kohler
Water Hammer Arrestors	Sioux Chief, Watts, Jay R. Smith, Zurn

- B. All items shall be commercial grade unless specified otherwise.
- C. All items shall be supplied by the same manufacturer.

2.2 FIXTURE MATERIALS

- A. Vitreous China: First quality, smooth, uniform color and texture, with fused on glaze covering surfaces exposed to view.
 - 1. Surfaces shall be free of chips, craze, warpage, cracks and discolorations. Surfaces in contact with walls or floors shall be flat, with warpage not to exceed 1/16 inch per foot.
 - 2. Color: White.
- B. Porcelain Enameled Cast Iron: Smooth, uniform color and texture, having fused on glaze covering surfaces exposed to view.
 - 1. Material shall show no cracks, chips, craze or discolorations.
 - 2. Enameled surfaces shall be acid resistant unless otherwise specified.
 - 3. Color: White.
- C. Fixture Trim: Brass, bronze, or stainless steel construction; consisting of supply and waste fittings, faucets, traps, stop valves, escutcheons, sink strainers, nipples, supplies, and metal trim.
 - 1. Brass piping: Ips standard weight, with standard weight, 125 lb cast brass fittings.
 - 2. Brass tubing: 18 B & S gauge.
 - 3. Stainless steel: 18-8 Type 302 or 304 unless otherwise specified.
- D. Fixture Trim Finishes:
 - 1. Brass or Bronze: Polished or satin finished chrome plating, 0.02 mil chromium over 0.2 mil nickel plating.
 - 2. Stainless Steel: Invisible welds and seams, and unless otherwise specified, polished to No. 4 commercial finish.
- E. Fixture Hold-down Bolts: Steel, plated for corrosion resistance.
 - 1. Cap nuts: Metal, polished and chrome plated.
 - 2. Vandal Resistant Fasteners: Torx head with center pin.

2.3 FIXTURE SUPPORTS AND SUPPORTING DEVICES FOR LAVATORIES, SINKS, AND EQUIPMENT

- A. General: Ferrous metal members of carriers and supporting devices, with the exception of chrome plated or porcelain enameled cast iron, shall be factory painted for corrosion resistance.
- B. Floor Mounted Carrier Supports: Steel pipe uprights, 1-1/4 inch ips minimum diameter, or 1 inch x 2 inch steel tubing uprights, with cast iron or welded steel feet, drilled for bolting to the floor construction. Each carrier shall be provided with the appropriate fixture supporting devices specified, or recommended by the carrier manufacturer's Fixture Support Selection Guide.Floor

mounted carrier supports for banks of multiple adjacent fixtures shall have provisions in the support uprights to allow for waste piping to be concealed in the associated wall.

2. Concealed Arms: Steel, with fixture locking lugs, leveling screws and a means of attaching, positioning and securing the fixture to the carrier.
 - a. Trim: Polished, chrome plated metal escutcheon to space fixture two inches from the wall.
 3. Exposed Arms: Cast iron or steel, porcelain enamel finished, with locking lugs, and leveling screws. Include studs, nuts and washers for fixture to be supported.
 - a. Trim: Polished and chrome plated metal cap nuts and washers.
 - b. Vandal Resistant Trim: Polished, chrome plated metal cap nuts and washers retained with vandal resistant set screws or other approved means of securing trim.
- C. Wall Mounted Carrier Supports: Plate type system, with steel plates on both sides of the wall and through-bolted. On walls having an integral finish, a single plate wall carrier designed for such installations may be used. Each carrier shall be provided with the appropriate fixture supporting devices specified, or recommended by the Carrier manufacturer's Fixture Support Selection Guide.
1. Concealed Arms: Steel, with fixture locking lugs, leveling screws and a means of attaching, positioning and securing the fixture to the carrier.
 - a. Trim: Polished, Chrome plated metal escutcheon to space fixture two inches from the wall.
 2. Exposed Arms: Cast iron or steel, porcelain enamel finished, with locking lugs, and leveling screws. Include studs, nuts, and washers for fixture to be supported.
 - a. Trim: Polished and chrome plated metal cap nuts and washers.
 - b. Vandal Resistant Trim: Polished, chrome plated metal cap nuts and washers retained with vandal resistant set screws.
- D. Bearing Plate: Steel, minimum 1/8 inch thick, and provided with bearing studs, nuts and appurtenances required by the fixture to be supported.
1. Fixture Hanger: Furnished by the fixture manufacturer.
- E. Wood Stud Filler Piece: 2 inch x 8 inch wood planking cut to fit between wood studding. Fasten with four 3/8 inch x 2-1/2 inch lag bolts with washers.

2.4 CIRCULATING WATER PUMPS

- A. In-Line Pump: Pump to be UL listed & rated to a pressure of 125 PSI at 225 degrees Fahrenheit. Pump shall be a sealed wet rotor design, shaft and bearings shall be ceramic and lubricated by the system fluid. Motor shall be non-overloading with thermal overload protection. Pump volute shall be of stainless steel or bronze suitable for domestic hot water. Refer to the schedule and details on the drawings for additional installation, capacity and construction requirements.
- B. Variable Speed In-Line Pump: Pump to be UL listed and rated to a pressure of 125 PSI at 225 degrees Fahrenheit. Pump shall be a sealed wet rotor design. Shaft and bearings shall be ceramic and lubricated by the system fluid. Motor shall be a variable speed permanent-magnet with thermal overload protection. Pump volute shall be of stainless steel or bronze suitable for

domestic hot water. Refer to the schedule and details on the drawings for additional installation, capacity and construction requirements.

2.5 CLEANOUTS

- A. Threaded pipe fitting or cast iron ferrule with gas tight cleanout plug.
- B. Plug: Cast brass or bronze, with threaded end, and raised or countersunk head. Tapped head for attachment of cleanout wall or deck plate covers where required.
- C. Covers: See Plumbing Material List.
- D. Anti-Seize Lubricant: Never-Seez by Bostik Chemical Group, Molycote 1000 by Dow Corning Corp, Anti-Seize Lubricant by Loctite Corp
- E. Membrane flange and clamping collar, secured with corrosion resistant fasteners.

2.6 AIR GAP FITTINGS

- A. Provide when called for in Plumbing Material List.
- B. Coated cast iron body with air gaps, set screw or threaded inlet, and outlet connection to match piping option selected.

2.7 DRAIN VALVES

- A. Provide on all equipment with drain connections and as shown on details.
- B. Cast brass body with renewable units, hose bibb vacuum breaker (ASSE 1011) with drainage feature, and removable cast iron handwheel with vandal resistant fastener.
 - 1. Valve must be completely assembled to make hose connection.
 - 2. Connections: 1/2 or 3/4 inch threaded or solder end inlet, and 3/4 inch hose bibb outlet.

2.8 WATER HAMMER ARRESTERS AND AIR CHAMBERS

- A. Provide water hammer arresters as specified on the Plumbing Material List.
- B. ANSI A112.26.1; sized in accordance with PDI WH-201, pre-charged for operation between -100° F and 300° F and maximum 250 psig working pressure.

PART 3 - EXECUTION

3.1 FIXTURE SUPPORT AND SUPPORTING DEVICE INSTALLATION

- A. Install heavy duty floor mounted carrier supports with specified fixture supporting devices for wall type plumbing fixtures.
 - 1. Secure to building construction with lag bolts and metal expansion shields, or other appropriate means as required by the construction encountered.

- B. Attach fixtures to floor or wall construction as specified in the Plumbing Material List.
- C. Fixture Supporting Devices: Attach fixtures by means of the following fixture supporting devices attached to carrier supports.

FIXTURE	SUPPORTING DEVICE
Lavatory	Concealed arms
Water Cooler (wall mounted)	Fixture hanger

- D. Secure exposed external components in place with vandal resistant fasteners or devices which cannot be removed without the use of special tools.

3.2 FIXTURE INSTALLATION

- A. Install the Work of this section in accordance with the manufacturer's printed installation instructions.
- B. See Architectural Floor Plans and Interior Elevation drawings for final installation locations and heights of all plumbing fixtures. Architectural plans supersede these specifications.
- C. Install fixtures level and at proper height, tighten connections, and install hold-down bolts, cap nuts and cover plates, where required.
- D. Caulk joint between all fixtures and wall or floor with sealant; strike a neat joint.
- E. Secure exposed external components in place with vandal resistant fasteners or devices which cannot be removed without the use of special tools.
- F. Filters
 - 1. Provide adequate service clearance in front of and below units to allow for removal and replacement of filters.
 - 2. Include a shut off valve upstream of the filter to allow for service.
 - 3. Provide pressure gauges upstream and downstream of multi-stage filters to monitor pressure drop for filter replacement.
- G. Lavatories
 - 1. Mount lavatories 31 inches from finished floor to rim unless otherwise specified.
- H. Countertop Fixtures
 - 1. Install fixture with securing devices supplied.
 - 2. Set fixture on bedding of clear sealant, tighten securing devices and remove excess sealant.
- I. Water Closets
 - 1. Floor Supported Fixtures:

- a. Set fixture in bed of setting compound; remove excess.
 2. After connections are tightened, install cap nuts and washers.
- J. Flush Valves
1. Standard Fixtures: Install flush valves on fixture centerline, and at following heights above fixture rim or back to centerline of water inlet to flush valve.
 - a. Water Closet: 11-1/2 inches.
 2. Handicapped Accessible Fixtures: Install flush valves on fixture centerline, and at following height above finished floor to centerline of flush valve operator. Distance between centerline of flush valve operator and centerline of water inlet is 1-1/2 inches.
 - a. Water Closet: Approximately 31-1/2 inches, and mounted on wide side of stall.
 - 1) Coordinate mounting height with General Contractor to avoid interference with grab bar, and to facilitate flush valve servicing.
 3. Slip joints in flush pipe connections allowed only at fixture spud and vacuum breaker ends; others shall be screwed connections.
 4. Score tubing ends before assembling to assure tight slip joint connections. No score marks shall be visible after assembly.
 5. In utility corridors, solder screwed flush pipe connections.
- K. Floor drains
1. Install the Work of this section in accordance with the manufacturer's printed installation instructions, unless otherwise specified.
 2. Protect weep holes from plugging during installation. Rod out weep holes after installation to remove obstructions.
 3. Set drainage flange flush with top of structural floor slab, or at elevation otherwise indicated.
 4. After membrane waterproofing installed and cured, secure clamping ring.
 5. Adjust strainer head to height indicated. If height not indicated, set at 1/2 inch below finished floor elevation.
- L. Drains and Inlets During Construction
1. Provide a temporary cover for all floor, roof, trench and area drains during construction to prevent debris getting into the system and protect drain grates. Remove temporary covers and clean grates at the end of construction.
 2. The contractor is responsible for the flushing of all drains used during construction. This includes main and branch lines. If solids or debris in the system result in flow issues, the contractor will be required to camera and remove obstructions.
- M. Wall Hydrants: Installation Height: Minimum 18 inches above finished grade.
- N. Cleanout Plug: Lubricate threads with anti-seize lubricant before final installation.

O. Water Hammer Arresters

1. Install water hammer arresters in accessible locations. Provide access doors as required. Coordinate type with Architect/Owner.

3.3 PUMP INSTALLATION

- A. Install in-line circulating pumps between pipe flanges in piping systems. Install overhead pipe supports, both sides of in-line pumps, installed in horizontal piping runs.

3.4 CLEANING, FLUSHING AND ADJUSTMENT

- A. Clean fixtures and trim. Remove grease and dirt; polish surfaces but leave stickers and warning labels intact.
- B. Flush supply piping and traps; clean strainers.
- C. Adjust stops for proper delivery.

END OF SECTION 224000

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SECTION 230500 – HVAC COMMON WORK RESULTS

PART 1 - GENERAL

1.1 SCOPE

- A. The work under this section includes basic mechanical requirements, which are applicable to all Division 21, 22 and 23 sections.
- B. Overview of work
 - 1. Demolition / Relocation / Modification
 - 2. HVAC
 - 3. Plumbing
 - 4. Fire Protection
 - 5. Commissioning
- C. In these documents, “Contractor” refers to the mechanical contractor and all their subcontractors, unless listed otherwise. The division of work within the mechanical scope is the responsibility of the lead mechanical contractor.
- D. Contractor is responsible for providing fully functional systems.
- E. If work is shown on the drawings or listed in the specifications, it shall be included by the Contractor.
- F. If equipment is provided by the Contractor, it shall be installed by the Contractor, unless noted otherwise.
- G. The drawings are necessarily diagrammatic by their nature and are not intended to show every connection in detail or every item in its exact location. Carefully investigate structural and finish conditions and coordinate the separate trades in order to avoid interference between the various phases of Work. Organize and lay out Work so that it will be concealed in furred chases and suspended ceilings, etc., in finished portions of the building, unless specifically noted to be exposed. Install all Work parallel or perpendicular to building lines unless otherwise noted.
- H. The intent of the Drawings is to establish the types of systems and functions; not to set forth each item essential to the functioning of the system. Install the Work complete, including minor details necessary to perform the function indicated. Review pertinent Drawings and adjust the Work to conditions shown. Where discrepancies occur between Drawings, Specifications, and actual field conditions, immediately notify the Architect and Engineer for interpretations.
- I. All sizes as given are minimum except as noted.
- J. Materials shall be new (unless noted or stated otherwise), first class, and workmanlike, and shall be subject at all times to the Architect’s, Engineer’s, and Owner’s observations from the commencement until the acceptance of the completed work.
- K. Owner Furnished Equipment

1. The following items are provided by the Owner and installed by the contractor:
 - a. X
2. The following items are provided and set in place by the Owner. Contractor to make final utility connections.
 - a. X

1.2 REFERENCES

- A. Applicable provisions of Division 0 and Division 1 govern work under this Section.
- B. All work shall conform to the most current version of all applicable codes and standards or the version adopted by the jurisdiction.
- C. Codes
 1. International Building Code
 2. International Mechanical Code
 3. Uniform Plumbing Code
 4. International Plumbing Code
 5. International Fuel Gas Code
 6. International Fire Protection Code
 7. International Energy Conservation Code
 8. NFPA – National Fire Protection Association
 9. State or City Codes for the _____
- D. Standards
 1. FGI Guidelines for Design and Construction of Health Care Facilities
 2. ASHRAE Standard 15
 3. ASHRAE Standard 62
 4. ASHRAE Standard 90.1
 5. SMACNA – Sheet Metal and Air Conditioning Contractors National Association, Inc.
 6. AMCA – Air Movement and Control Association
 7. ASME – American Society of Mechanical Engineers
 8. ANSI – American National Standards Institute
 9. ARI – Air Conditioning and Refrigeration Institute

- E. Governing Bodies
 - 1. Owner's Insurance Company
 - 2. State Fire Marshal
 - 3. AHJ – Authority Having Jurisdiction
 - 4. UL - Underwriters Laboratories
 - 5. FM - Factory Mutual

1.3 SUBMITTALS

- A. The review of shop drawings by the Engineer is for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the plans and specifications. Approval of a specific item shall not include approval of an assembly of which the item is a component. The Contractor is responsible for: dimensions to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; coordination with the Work of all trades; and for performing all work in a safe and satisfactory manner.
- B. Refer to individual technical specification sections for specific submittal requirements.
- C. Submission of shop drawings electronically in .PDF format is preferred.
- D. If hard copies of shop drawings are utilized on this project, coordinate the quantity with the Architect and General Contractor. Provide one (1) copy for the Engineer's records.
- E. The Engineer will review one resubmittal for each product. If additional resubmittals are required, the Contractor shall be responsible to bear the cost for the Engineer to recheck and handle the additional shop drawing submittals. Documents will not be reviewed until payment is agreed upon.
- F. Contractor may request electronic AutoCAD files from the Engineer if needed to complete their shop drawings. An Electronic File Request Form will be sent to the contractor if files are requested and must be completed and signed before the AutoCAD files are released to the Contractor.
- G. All submittals for equipment and materials shall be reviewed and approved by the engineer prior to the fabrication or release by the contractor. This includes fabrication drawings for ductwork and fire protection and the coordination of equipment between trades. The release, purchase, installation or fabrication of any items prior to the contractor receiving an approved shop drawing will be at the contractor's own risk. Any rework that results will be provided by the contractor at no cost to the Owner or design team.
- H. Submittals must be reviewed and approved by the Contractor before submitting to the Engineer.
- I. Submittals shall be grouped to include complete submittals of related systems, products, and accessories in a single submittal. Mark dimensions and values in units to match those specified.

1.4 QUALITY ASSURANCE

A. Warranty

1. Equipment warranty shall be a minimum of one (1) year from date of factory supervised startup or from the date of substantial completion, whichever is later.
2. Contractor shall warranty all of their work for one (1) year from the date of substantial completion.

B. Equipment Capacity

1. All equipment submitted shall meet or exceed the capacity listed in the specifications and schedules. This includes airflows / static pressure, heating / cooling capacities, pump flow / head, and all values listed in the construction documents.
2. All submitted motor brake horsepower's submitted shall be at least 5% less than the rated nominal motor horsepower. No motors shall be selected in the motor service factor with the exception of fire pumps.
3. The mechanical contractor shall be responsible for any structural, electrical, piping, ductwork or other utility modifications resulting from an alternate manufacturer than the basis of design being used.

C. These documents are diagrammatical in nature and intended to convey scope and general arrangement of the mechanical systems. Not all fittings, risers, size changes, offsets, valves, accessories, etc. are shown on plan. If items are required to make a system fully operational but not shown on plan or in these specifications, they shall be included by the contractor.

D. The intent of the Drawings is to establish the types of systems and functions; not to set forth each item essential to the functioning of the system. Install the Work complete, including minor details necessary to perform the function indicated. Review pertinent Drawings and adjust the Work to conditions shown. Where discrepancies occur between Drawings, Specifications, and actual field conditions, immediately notify the Architect and Engineer for interpretations.

E. It is the contractor's responsibility to determine all utility routing prior to purchase and installation of material.

F. For remodel or addition projects, the contractor shall visit and survey the site prior to submitting a bid. The contractor shall visit the site to understand the complexity of utility routing, phasing, staging, and all general installation. Submitting a bid means the contractor acknowledges the complexities of the project and has made provisions for overcoming these complexities in their bid.

G. The contractor shall report any discrepancies between these documents and site conditions immediately to the Engineer prior to submitting a bid or starting work. Submittal of a bid indicates that the contractor and the contractor's subcontractors have carefully and thoroughly reviewed the drawings, specifications, and other construction documents and have found them complete and free from ambiguities and sufficient for the purposes intended.

H. Install all equipment per the manufacturer's requirements / recommendations.

I. No equipment provided or installed shall contain mercury.

J. Manufacturer Supplier Inspection & Startup

1. The following equipment shall have a factory representative perform start-up. The procedure shall be documented and submitted to the design team and Owner. Include copies of startup reports in the Operations & Maintenance Manuals.
 - a. Division 21
 - 1) Clean Agent Fire Extinguishing Systems
 - 2) Fire and Jockey Pumps
 - b. Division 22
 - 1) Booster Pumps
 - 2) Reverse Osmosis Systems
 - 3) Water Softeners
 - c. Division 23
 - 1) Air Handling Units
 - 2) Boilers and Feedwater Systems
 - 3) Cooling Towers
 - 4) Chillers
 - 5) Dehumidification Units
 - 6) Energy Recovery Units
 - 7) Fuel Oil System
 - 8) Humidifiers
 - 9) Make Up Air Unit
 - 10) Precision Cooling Equipment
 - 11) Rooftop Units
 - 12) Variable Refrigerant Systems

- K. All equipment shall be FM and UL listed where applicable.

1.5 ELECTRONIC DOCUMENT RELEASE

- A. Electronic versions of the bid documents will be made available to the contractors for use during the bidding process and to help generate fabrication drawings for various systems. A summary of the requirements for the various document types is listed below:
1. PDF
 - a. Contact the Construction Manager or Architect to obtain a PDF version of the Bid Documents. No Document Release Form is required.
 2. AutoCAD
 - a. Bluestone Engineering can provide an AutoCAD version of the bid documents for the contractor to use for generating shop drawings and fabrication drawings. This will include plan drawings with the architectural background. The contractor is responsible for incorporating any modifications that occur during bidding by all disciplines. Details and schedules will not be included.
 - b. A document release form (see attached) will be required to be completed by the contractor to determine the version of AutoCAD and drawings required. No fee is associated with these drawings.
 3. REVIT
 - a. The REVIT drawings will be converted to AutoCAD and then transferred to the contractor.

- b. Bluestone Engineering can provide an AutoCAD version of the bid documents for the contractor to use for generating shop drawings and fabrication drawings. This will include plan drawings with the architectural background. The contractor is responsible for incorporating any modifications that occur during bidding by all disciplines. Details and schedules will not be included.
- c. A document release form (see attached) will be required to be completed by the contractor to determine the version of AutoCad and drawings required.
- d. Submittal of the document release form will be required prior to the AutoCAD files being transmitted.

1.6 SUBSTITUTIONS

- A. All manufacturers listed as Acceptable Manufacturers in each specification section are considered equal to the basis of design. The basis of design is preferred and will take precedence. Any products from an alternate approved manufacturer need to meet the requirements and performance specified and shall be equal to the basis of design.
- B. The Contractor may request permission for a substitution of any item (equipment or material), subject to the following conditions:
 - 1. Submit substitution requests in writing to the Engineer, on a form supplied by the Engineer. A sample copy of this form is included at the end of this section. An electronic copy can also be provided to the Contractor by the Engineer.
 - 2. Where equipment or accessories are used which differ in arrangement, configuration, dimensions, ratings, or engineering parameters from those indicated on the contractor documents, the Contractor is responsible for all costs involved in integrating the equipment or accessories into the system and the assigned space and for obtaining the performance from the system into which these items are placed as well as any re-design costs incurred by the Architect or Engineer. The Contractor is also responsible for coordinating changes required by other trades.
 - 3. Any requests for alternate manufacturers must be submitted to the Architect/Engineer at least ten (10) days prior to bid day. Incomplete substitution requests will not be considered.
- C. Approval
 - 1. No work involving requests for substitution shall commence without written approval on the provided form by the Engineer.
 - 2. Any work started or material ordered/installed by the Contractor without written approval shall be removed/repared at the sole expense of the contractor. The Contractor will also be responsible for any costs incurred by the Owner for such rework.

1.7 COORDINATION DRAWINGS

- A. The mechanical contractor shall be responsible for producing coordination drawings. The drawings will need to incorporate piping, ductwork, equipment, lighting, conduits, building structure and all other building and system components that will need to be coordinated for proper systems installation and operation.
- B. The drawings will be 1/4" scale.

- C. Coordination meetings will be conducted on site with all concerned contractors present. Representatives from the Owner, Architect and Engineer will also be present to review conflicts and approve contractor variations to the contract documents.

1.8 CONTINUITY OF EXISTING SERVICES AND SYSTEMS

- A. No outages shall be permitted on existing systems except at the time and during the interval specified by the Engineer and the Owner. Any outage must be scheduled when the interruption causes the least interference with normal work schedules and business routines. No extra costs will be paid to the Contractor for such outages which must occur outside of regular weekly working hours unless specifically noted in the Specifications or in the bidding requirements.
- B. This Contractor shall restore any mechanical services interrupted as a result of a lack of coordination to proper operation as soon as possible.
- C. Contractor shall notify Owner of any utility service shutdown forty-eight (48) hours in advance. This includes gas, water, sanitary, storm, fire protection, cooling, and heating systems.

1.9 REGULATORY AND UTILITY REQUIREMENTS

- A. Contractor is responsible for coordinating all required site inspections by authorities having jurisdiction. Contractor shall notify General Contractor of all scheduled inspections seven (7) working days prior to site visit.
- B. Contractor is responsible for paying for all fees, permits, and inspections that are required to complete their work.
- C. Contractor shall include all work required to relocate utilities and meters as shown on drawings.
- D. Contractor shall include all work required to install new utilities and meters as shown on drawings. This includes any new service and meter fees in coordination with the utility company.
- E. Utility work 5'-0" from outside of building is by others.

1.10 PROTECTION OF FINISHED SURFACES

- A. Furnish one (1) can of touch-up paint for each different color factory finish for equipment furnished by the Contractor. Deliver touch-up paint with other "loose and detachable parts" as covered in the General Requirements.

1.11 SEALING AND FIRESTOPPING

- A. Sealing and firestopping of sleeves/openings between ducts and piping and the structural or partition opening shall be the responsibility of the contractor whose work penetrates the opening General Contractor. The contractor responsible shall hire individuals skilled in such work to do the sealing and firestopping. These individuals hired shall normally and routinely be employed in the sealing and fireproofing occupation.

1.12 WORK BY OWNER AND/OR OWNER AGENCY

- A. Asbestos abatement, removal and disposal, if required, will be by the Owner under separate contract.

1.13 OMISSIONS

- A. No later than ten (10) days before bid opening, the Contractor shall call the attention of the Architect and Engineer to any materials or apparatus the Contractor believes to be inadequate and to any necessary items of work omitted.

1.14 DELIVERY, STORAGE, AND HANDLING

- A. All equipment and materials shall be protected during shipment and storage against physical damage, vermin, dirt, corrosive substances, fumes, moisture, cold and rain.
- B. Store equipment indoors in clean dry space with uniform temperature to prevent condensation or damage from the elements.
- C. Take such precautions as are necessary to protect apparatus and materials from damage. Damaged equipment shall be, as determined by the Owner and/or Engineer, placed in first class operating condition or be returned to the source of supply for repair or replacement.
- D. Protect factory finish from damage during construction operations until acceptance of the Project. Restore any finishes that become stained or damaged to Owner's satisfaction.

1.15 WORK SEQUENCE AND SCHEDULING

- A. Install work in phases to accommodate the Owner's occupancy requirements. During the construction period coordinate mechanical schedule and operations with the General Contractor.

1.16 DIVISION OF WORK AND COORDINATION

- A. The Electrical Contractor is responsible for providing and installing power wiring up to equipment provided by others for a single point connection. Internal wiring of equipment provided by others shall be the responsibility of the contractor responsible for providing and installing the equipment.
- B. Controls, disconnect switches, starters, variable frequency drives, etc. shall be provided and installed by the contractor noted on the plans and in the specifications. It is the responsibility of the Contractor to request written clarification for any ambiguity regarding division of work and coordination at least ten (10) days prior to bid.
- C. See Section 230900 for scope of wiring required for Temperature Control systems.
- D. Utilities routed within the building shall be installed in an orderly manner. All work will be coordinated with other disciplines prior to installation. The following list ranks the priority of the utilities to be installed:
 - 1. Light fixtures
 - 2. Gravity piping
 - 3. Electrical busduct
 - 4. Ductwork
 - 5. Cable tray

6. All other piping
 7. Electrical conduits
- E. Any installed work that is not coordinated and that interferes with other contractor's work shall be removed or relocated at the installing contractor's expense.
 - F. Coordinate work with the Testing and Balancing (TAB) Contractor. Verify system completion to the TAB Contractor such as pressure testing, chemical treatment, filling of liquid systems, proper pressurization and air venting of hydronic systems, clean filters, clean strainers, controls adjusted and calibrated, fire/smoke damper integration ready for testing, adjusting and balancing work. Install dampers, shutoff and balancing valves, flow measuring devices, gauges, temperature controls, etc., required for functional and balanced systems. Assist the TAB Contractor as needed to complete their work.
 - G. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.
 - H. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
 - I. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

1.17 SALVAGE MATERIALS

- A. No materials removed from this project shall be reused except as specifically noted or allowed on the Drawings. All materials removed shall become the property of, and shall be disposed of by, the Contractor except for items the Owner has designated they will keep.
- B. The following material shall be removed from service and turned over to the Owner, at a site selected by the Owner, in the same condition as when it was removed:
 1. _____

1.18 OPERATION AND MAINTENANCE DATA

- A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.
- B. In addition to the general content specified under GENERAL REQUIREMENTS supply the following additional documentation as applicable:
 1. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment.
 2. A control sequence describing start-up, operation, and shutdown.
 3. Description of the function of each principal item of equipment.
 4. Installation instructions.
 5. Safety precautions for operation and maintenance.

6. Diagrams and illustrations.
7. Periodic maintenance and testing procedures and frequencies, including replacement parts numbers and replacement frequencies.
8. Performance data.
9. Where applicable, pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts, and name of servicing organization.
10. List of factory approved or qualified permanent servicing organizations for equipment repair and periodic testing and maintenance, including addresses and factory certification qualifications.

1.19 RECORD DRAWINGS

- A. The Contractor shall maintain at least one copy each of the Specifications and Drawings on the job site at all times.
- B. The Architect will provide the Contractor with a suitable set of Contract Drawings on which daily records of changes and deviations from contract shall be recorded. Dimensions and elevations on the record drawings shall locate all buried or concealed piping, conduit, or similar items.
- C. The daily record of changes shall be the responsibility of Contractor's field superintendent. No arbitrary mark-ups will be permitted.
- D. At completion of the project, the Contractor shall submit the marked-up record drawings to the General Contractor prior to final payment.

1.20 SPECIAL REQUIREMENTS

- A. Contractor bid shall allow color selection by Architect of any piece of exposed equipment from all available colors. Base bid color selection shall include those considered 'premium' by the manufacturer.

PART 2 - PRODUCTS

2.1 SEALING AND FIRESTOPPING

- A. Fire and/or Smoke Rated Penetrations
 1. Manufacturers
 - a. 3M, STI/SpecSeal, Tremco, Hilti or approved equal.
 2. All firestopping systems shall be by the same manufacturer.
 3. Submittals
 - a. Contractor shall submit product data for each firestop system. Submittals shall include product characteristics, performance and limitation criteria, test data, MSDS sheets, installation details and procedures for each method of installation

applicable to this project. For non-standard conditions where no UL tested system exists, submit manufacturer's drawings for UL system with known performance for which an engineering judgment can be based upon.

4. Product
 - a. Firestop systems shall be UL listed or tested by an independent testing laboratory approved by the Department of Commerce.
 - b. Use a product that has a rating not less than the rating of the wall or floor being penetrated. Reference architectural drawings for identification of fire and/or smoke rated walls and floors.
 - c. Contractor shall use firestop putty, caulk sealant, intumescent wrap strips, intumescent fire stop collars, fire stop mortar or a combination of these products to provide a UL listed system for each application required for this project. Provide mineral wool backing where specified in manufacturer's application detail.

B. Non-Rated Penetrations

1. Piping Penetrations Through Below Grade Walls
 - a. In exterior wall openings below grade, use a modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the piping and the cored opening or a water-stop type wall sleeve.
2. Piping and Ductwork Penetrations
 - a. At penetrations of non-rated interior partitions, floors and exterior walls above grade, use urethane caulk in annular space between pipe/duct and sleeve or opening.

PART 3 - EXECUTION

3.1 DEMOLITION

- A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.
- B. Coordinate work with the Owner to minimize disruption to the existing building occupants.
- C. Disconnect, demolish, and remove mechanical systems, equipment, and components indicated to be removed. Perform demolition that may not be shown but required to accomplish new work. Where ductwork or piping is removed and not reconnected with new work, cap ends of existing services as if they were new work.
- D. Remove portion of ductwork or piping indicated to be removed and cap or plug remaining utility with same or compatible materials.
- E. All pipe, wiring and associated conduit, insulation, ductwork, and similar items demolished, abandoned, or deactivated are to be removed from the site by the Contractor. All piping and ductwork specialties are to be removed from the site by the Contractor unless they are dismantled and removed or stored by the Owner. All designated equipment is to be turned over to the Owner for their use at a place and time so designated. Maintain the condition of material and/or equipment that is indicated to be reused equal to that existing before work began.

- F. Unless noted otherwise, all duct and piping branches shown to be removed shall be removed back to the main and capped. Pressure piping shall have shutoff valves and caps installed.
- G. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations
- D. Install equipment to allow right of way for piping installed at required slope.
- E. Provide clearance for inspection, repair, replacement, and service to all equipment to include a minimum of 36 inches from all obstructions (walls, structure, ductwork, pipes, etc.). Clearance shall maintain access to all electrical panels, access doors, controllers, valves, junction boxes and operators and include the area directly in front of and above the system components.

3.3 EXCAVATION AND BACKFILL

- A. Perform all excavation and backfill work to accomplish indicated mechanical systems installation in accordance with Section 312316.13 - Trenching.

3.4 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 - 1. Construct concrete bases not less than 4 inches larger in both directions than supported unit.
 - 2. All pads to be a minimum of 4" thick unless noted otherwise. Thicken pads as needed to accommodate the slope of slab / grade around the equipment. Exterior pads installed on grade to include frost footings. Coordinate requirements with the civil / structural designers. Refer to equipment schedules for additional requirements. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
 - 6. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 - 7. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 8. Install anchor bolts to elevations required for proper attachment to supported equipment.

9. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
10. Indoor or outdoor equipment meeting any or all of the following requirements shall be installed on housekeeping pads:
 - a. Floor mounted motorized equipment.
 - b. All floor or ground mounted air handling equipment and fans.
 - c. All heating, cooling, plumbing, and fire protection equipment and associated floor mounted accessories located in mechanical spaces.
 - d. Equipment installed in areas with uneven surfaces and surfaces that are not level.
 - e. As required by the equipment manufacturer
11. Refer to plans and details for additional pad locations.

3.5 SEALING AND FIRESTOPPING

A. Fire and/or Smoke Penetrations

1. Install approved product in accordance with the manufacturer's instructions where a pipe/duct penetrates a fire rated surface.
2. Where firestop mortar is used to infill large fire-rated floor openings that could be required to support weight, provide permanent structural forming. Firestop mortar alone is not adequate to support any substantial weight.

B. Non-Rated Surfaces

1. When the opening is through a non-fire rated wall, floor, ceiling or roof the opening must be sealed using an approved type of material.
2. Install escutcheons or floor/ceiling plates where pipe/duct penetrates non-fire rated surfaces in occupied spaces. Occupied spaces for this paragraph include only those rooms with finished ceilings and the penetration occurs below the ceiling.
3. In exterior wall openings below grade, assemble rubber links of mechanical seal to the proper size for the pipe/duct and tighten in place, in accordance with the manufacturer's instructions. Install so that the bolts used to tighten the seal are accessible from the interior of the building or vault.
4. At interior partitions, pipe/duct penetrations are required to be sealed for all clean rooms, laboratories, and most hospital spaces, computer rooms, dormitory rooms, telephone/data/com rooms and similar spaces where the room pressure or odor transmission must be controlled. Apply sealant to both sides of the penetration in such a manner that the annular space between the sleeve and the pipe/duct is completely filled.

3.6 HOUSEKEEPING AND CLEAN UP

- A. The Contractor shall clean up and remove from the premises, on a daily basis, all debris and rubbish resulting from its work and shall repair all damage to new and existing equipment resulting from its work. When job is complete, this Contractor shall remove all tools, excess material and equipment, etc., from the site.

3.7 SITE OBSERVATIONS

- A. Site observations shall be performed by the Engineer at the following project milestones:
 - 1. Prior to enclosure of the following areas:
 - a. Underfloor
 - b. Walls and chases
 - c. Raised floor
 - d. Above the ceiling
 - 2. Final project completion
- B. Contractor shall provide seven (7) working days' notice to Engineer prior to site visit.
- C. The Engineer is only responsible to conduct one (1) final site visit for each phase of the project. If upon visiting the site, the Engineer finds that not enough work is complete for the final site visit, the Contractor shall be responsible to bear the cost for the Engineer to travel to the site and revisit. Revisiting will not occur until payment is agreed upon.

3.8 EQUIPMENT STARTUP

- A. Contractor shall provide startup of equipment by factory certified personnel for equipment listed above.
- B. For all other equipment, Contractor shall perform startup per manufacturer's requirements. Startup shall be performed by personnel qualified for this work.
- C. Contractor shall test equipment to be fully functional. Test all equipment safeties and emergency stops. Test all control set-points and equipment modes.
- D. Contractor shall return to site as needed to adjust equipment for seasonal equipment performance changes.

3.9 OWNER TRAINING

- A. Contractor shall include at least eight (8) hours for each maintenance staff shift group in their bid to provide complete Owner training for all the mechanical systems. Training shall include explanation of system operation, startup/shutdown, routine maintenance, seasonal changes, and controls adjustments. Coordinate acceptable training schedule with Owner.
- B. All training provided for the Owner shall comply with the format, general content requirements and submission guidelines specified under Section 019101, or 019102.
- C. Contractor to provide factory authorized representative and/or field personnel knowledgeable with the operations, maintenance and troubleshooting of the system and/or components defined within this section for a minimum period of XX hours or for the duration noted in the technical Specifications.

3.10 PROJECT CLOSEOUT REQUIREMENTS

- A. Final project closeout tasks

1. Deliver all spare parts listed in each specification section. Deliver to Owner chosen location.
2. All equipment labeled per specifications.
3. All equipment cleaned and ready for use. Install new filters in all equipment with filters; do not use Owner's spare filter sets.

B. Contractor requirements

1. Marked up drawings and specifications provided to Engineer for incorporation of as-built drawings or to serve as the as-built drawings depending on the project requirements. As-built drawings shall be clean and legible.
2. Operation and Maintenance (O & M) Manuals shall include the following:
 - a. Contractor contact for warranty work
 - b. Approved shop drawings, incorporating all review comments
 - c. Warranty copies
 - d. Equipment start-up reports
 - e. Testing and balancing reports
 - f. Operation and maintenance instructions
3. Utility Rebate Forms
 - a. Contractor shall submit completed energy rebate forms for each piece of equipment that is eligible for a rebate. Eligible equipment shall include, but not be limited to the following:
 - 1) Split System Air Conditioners
 - 2) Rooftop Air Conditioning Units
 - 3) Makeup Air Units
 - 4) Building Automation System
 - 5) Motors
 - 6) Variable Frequency Drives
 - 7) Boilers
 - 8) Chillers
 - 9) X
 - b. Contractor to complete information regarding equipment. Submit form to Owner, Owner will complete Owner's contact information and send the completed form to the utility.
4. Three (3) final approved O & M Manuals shall be delivered to Owner. Each manual shall be an appropriately sized three (3) ring binder with a vinyl cover and printed spine and cover labels. Each section shall have a printed divider tab. Each section shall be listed in a table of contents at the beginning of the manual.

END OF SECTION 230500

(ELECTRONIC DOCUMENT RELEASE FORM & SUBSTITUTION REQUEST FORMS ATTACHED)



Document Release Form

Information Requested:

Project Name:

Drawings Requested:

Media Type: (Check all that are applicable)

- | | |
|--|--|
| <input type="checkbox"/> AutoCAD DWG Files (Version _____) | <input type="checkbox"/> Adobe PDF Files |
| <input type="checkbox"/> REVIT Files (Version _____) | <input type="checkbox"/> Other |

Requesting Party:

Name:	Address 1:
Company:	Address 2:
Signature:	Email Address:
Date:	Phone #:

Bluestone Use:

Form Sent By: _____ Date: _____

Bluestone Project #: _____

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Engineer's Review and Action

- Substitution Approved
- Substitution Approved As Noted
- Substitution Rejected
- Substitution Request Received Too Late

Signed by:

Date

Supporting Data Attached:

- Drawings
- Product Data
- Samples
- Tests
- Reports
- Other _____

SECTION 230529 – PIPE HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following Pipe Hangers and Supports indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. Refer to Section 230719, PIPING INSULATION for work related to this section.

1.3 SUBMITTALS

- A. Product Data
 - 1. Manufacturer's catalog sheets and specifications for hangers and supports materials.
 - 2. Installation instructions.
 - 3. Schedule indicating what type of hangers or support will be used for various piping types.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with the applicable requirements of the ASME B31 Piping Codes.
 - 2. Unless otherwise shown or specified, comply with the requirements of the Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS) Standards SP-58, and SP-69.
 - 3. Materials for use in Sprinkler Systems and Standpipe and Hose Systems shall comply with the requirements of NFPA 13 and NFPA 14 as applicable.
 - 4. Hang and support cast iron soil pipe and fittings in accordance with the recommendations of the Cast Iron Soil Pipe's Institute's (CISPI) Cast Iron Soil Pipe and Fittings Handbook.

PART 2 - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

- A. Combination clevis hanger, pipe insulation shield and vapor barrier jacketed high density insulating saddle with companion high density filler piece.
 - 1. Insulating saddles and filler pieces shall be of the same thickness and materials as the adjoining pipe insulation. Saddles shall cover the lower 180 degrees of the pipe or tubing, and companion filler pieces shall cover the upper 180 degrees of the pipe or

tubing. Physical sizes, gages, etc. of the components of insulated hangers shall be in accordance with the following schedule:

PIPE OR TUBING SIZE (Inches)	SHIELD LENGTH (Inches)	SHIELD GAUGE	SADDLE LENGTH (Inches)	VAPOR BARRIER JACKET LENGTH (Inches)
Up to 2-1/2	4	16	6	10
3 to 6	4	14	6	10
8 to 14	10	12	12	16
16 and up	10	10	12	16

- B. Pipe Insulation Shields: Fabricated of steel, with a minimum arc of 180 degrees, unless otherwise indicated. Shields for use with hangers and supports, with the exception of combination clevis type hangers, shall be in accordance with the following schedule:

PIPE OR TUBING SIZE (Inches)	SHIELD LENGTH (Inches)	SHIELD GAUGE
Up to 2-1/2	8	18
3 to 8	10	16
10 to 14	12	12
16 and up	18	10

- C. Pipe Hangers: Height adjustable standard duty clevis type, with cross bolt and nut.
1. Pipe spreaders or spacers shall be used on cross bolts of clevis hangers, when supporting piping ten (10) inches in size and larger.
 2. Swivel ring type hangers will be allowed for sprinkler piping up to a maximum of two (2) inches in size.
- D. Adjustable Floor Rests and Base Flanges: Steel.
- E. Hanger Rods: Mild, low carbon steel, fully threaded or threaded at each end, with two (2) nuts at each end for positioning rod and hanger, and locking each in place.
- F. Riser Clamps: Malleable iron or steel.
- G. Rollers: Cast Iron.
- H. Specialty: Fasteners, supports and hangers for PEX piping shall be specifically designed for PEX piping.

2.2 ANCHORS AND ATTACHMENTS

- A. Sleeve Anchors (Group II, Type 3, Class 3): Molly's Div./USM Corp. Parasleeve Series, Ramset's Dynabolt Series, or Red Head/Phillips AN, HN, or FS Series.
- B. Wedge Anchors (Zinc Plated, Group II, Type 4, Class 1): Hilti's Kwik Bolt Series, Molly's Div./USM Corp. Parabolt PB Series, Ramset's Trubolt T Series, or Red Head/Phillips WS Series.
- C. Self-Drilling Anchors (Group III, Type 1): Ramset's RD Series, or Red Head/Phillips S Series.

- D. Non-Drilling Anchors (Group VIII, Type 1): Ramset's Dynaset DS Series, Hilti's HDI Series, or Red Head/Phillips J Series.
- E. Stud Anchors (Group VIII, Type 2): Red Head/Phillips JS Series.
- F. Beam Clamps: Forged steel beam clamp, with weldless eye nut (right hand thread), steel tie rod, nuts, and washers, Grinnell's Fig No. 292 (size for load, beam flange width, and rod size required).
- G. Metal Deck Ceiling Bolts: B-Line Systems' Fig. B3019.
- H. Continuous Slotted Type Concrete Insert, Galvanized.
- I. Threaded Type Concrete Insert: Galvanized ferrous castings, internally threaded to receive 3/4 inch diameter machine bolts.
- J. Wedge Type Concrete Insert: Galvanized box-type ferrous castings, designed to accept 3/4 inch diameter bolts having special wedge shaped heads.

2.3 FASTENERS

- A. Bolts, Nuts, Washers, Lags, and Screws: Medium carbon steel; size and type to suit application; galvanized for high humidity locations, and treated wood; plain finish for other interior locations. Except where shown otherwise on the Drawings, furnish type, size, and grade required for proper installation of the Work.

2.4 SHOP PAINTING AND PLATING

- A. Hangers, supports, rods, inserts and accessories used for pipe supports, unless chromium plated, cadmium plated or galvanized shall be shop coated with metal primer paint. Electroplated copper hanger rods, hangers and accessories shall be used when hangers are in direct contact with copper pipe or copper tubing.
- B. Hanger supports for chromium plated pipe shall be chromium plated brass.

2.5 ROOFTOP SUPPORT SYSTEMS

- A. Rooftop supports for piping equipment shall be provided for installation without requiring roof penetrations, flashing, or damage to the roofing material. Height-adjustable supports may be used where necessary. Support piping a minimum of 4" above the roof surface.
- B. Materials:
 - 1. Support bases shall be made of an engineered material with appropriate additives for UV protection. All structural steel components shall be hot-dipped galvanized.
 - 2. The support shall have a continuous bottom surface to provide even load distribution and minimize point loading of the roof membrane. The support base will have a radiused edge to enhance compatibility with roof membranes.
 - 3. Coordinate static load rating of the support(s) with the specific application being served.
 - 4. Accessories: Clamps, bolts, nuts, washers, and other devices as required for a complete system.

C. Applications:

1. Fixed Strut Pipe Hanger Supports: Size and load ratings for the application
2. Adjustable Strut Pipe Hanger Supports: Height adjustable, size and load ratings for the application
3. Adjustable Single Piping Supports: Height adjustable, size and load ratings for the application
4. Block Supports: Size and load ratings for the application
5. Roller Supports: Height adjustable, size and load ratings for the application
6. Bridge Assemblies:
 - a. Suitable for multiple piping runs or equipment
 - b. Size and load ratings for the application
7. Post Base Assemblies:
 - a. For use with vertical sections of channel support systems
 - b. Size, channel support configuration, and load ratings for the application

D. Acceptable Manufacturers:

1. Caddy/Pentair
2. Cooper B-Line
3. Mifab, Arlington
4. Rooftop Blox
5. Haydon
6. MAPA Products
7. Miro Industries

PART 3 - EXECUTION

3.1 PREPARATORY WORK

- A. Place inserts into construction form work expeditiously, so as not to delay the work of other trades.

3.2 INSTALLATION

- A. Do not hang or support one (1) pipe from another or from ductwork.
- B. Do not bend threaded rod.
- C. Do not hang or support equipment from the bottom chord of joists.

- D. Support all insulated horizontal piping conveying fluids below ambient temperature, by means of hangers or supports with insulation shields installed outside of the insulation.
- E. Space hangers or supports for horizontal piping on maximum center distances as listed in the documents, and as follows.
1. Cast Iron Soil Pipe:
 - a. General:
 - 1) Where piping is suspended on centers in excess of 18 inches by means of non-rigid hangers, provide sway bracing to prevent horizontal pipe movement.
 - 2) Additionally, brace piping five (5) inches and larger to prevent horizontal movement and/or joint separation. Provide braces, blocks, rodding or other suitable method at each branch opening, or change of direction
 - b. For Bell & Spigot Cast Iron Soil Pipe: Space hangers or support pipe at each joint or on maximum centers of five (5) feet. Place hangers or supports as close as possible to joints and when hangers or supports do not come within one (1) foot of a branch line fitting, install an additional hanger or support at the fitting.
 - c. For Hubless Cast Iron Soil Pipe: Space hangers or support pipe at each joint or on maximum centers of five (5) feet. Place hanger or supports as close as possible to joints and when hangers or supports do not come within one (1) foot of a branch line fitting, install an additional hanger or support at the fitting.
 2. For Directional Changes: Install a hanger or support close to the point of change of direction of all pipe runs in either a horizontal or vertical plane.
 3. For Concentrated Loads: Install additional hangers or supports, spaced as required and directed, at locations where concentrated loads such as in-line pumps, valves, fittings or accessories occur, to support the concentrated loads.
 4. For Branch Piping Runs and Runouts Over 5 feet In Length: Install a minimum of one hanger, and additional hangers if required by the hanger spacing schedules.
 5. Parallel Piping Runs: Where several pipe lines run parallel in the same plane and in close proximity to each other, trapeze hangers may be used. Base hanger spacing for trapeze type hangers on the smallest size of pipe being supported. Design the entire hanger assembly based on a safety factor of five, for the ultimate strength of the material being used.
- F. Size hanger rods in accordance with the following

PIPE SIZE (Inches)	SINGLE ROD HANGER SIZE (Inches)		DOUBLE ROD HANGER SIZE (Inches)	
	PIPE	TUBING	PIPE	TUBING
1/2 to 2	3/8	1/4	3/8	1/4
2-1/2 and 3	1/2	3/8	3/8	1/4
4 and 5	5/8	1/2	1/2	3/8
6	3/4	1/2	5/8	1/2
8, 10 and 12	7/8	5/8	3/4	5/8

1. Secure hanger rods as follows: Install one (1) nut under clevis, angle or steel member; one (1) nut on top of clevis, angle or steel member; one (1) nut inside insert or on top of upper hanger attachment and one (1) nut and washer against insert or on lower side of

upper hanger attachment. A total of four (4) nuts are required for each rod, two (2) at upper hanger attachment and two (2) at hanger.

2. Size hanger rods, for piping over 12 inches in size and multiple line supports, based on a safety factor of five for the ultimate strength of the materials being used.

G. Vertical Piping

1. Support vertical risers of piping systems, by means of heavy duty hangers installed close to base of pipe risers, and by riser clamps with extension arms at intermediate floors, with the distance between clamps not to exceed 25 feet, unless otherwise specified. Support pipe risers in vertical shafts equivalent to the aforementioned. Install riser clamps above floor slabs, with the extension arms resting on floor slabs. Provide adequate clearances for risers that are subject to appreciable expansion and contraction, caused by operating temperature ranges.
2. Support extension arms of riser clamps, secured to risers to be insulated for cold service, 4 inches above floor slabs, to allow room for insulating and vapor sealing around riser clamps.
3. Support cast iron risers, by means of heavy duty hangers installed close to the base of the pipe risers, and 1/4 inch thick malleable iron or steel riser clamps with extension arms at each floor level, with the distance between clamps not to exceed 25 feet. Support cast iron risers in vertical shafts equivalent to the aforementioned.
4. Support hubless cast iron risers, by means of heavy duty hangers installed close to the base of the pipe risers, and by malleable iron or steel riser clamps with the extension arms at each floor level, with the distance between clamps or intermediate supports not to exceed 12 feet. Support risers in vertical shafts equivalent to the aforementioned.

- H. Floor Supports: Install adjustable yoke rests with base flanges, for the support of piping, unless otherwise indicated on the Drawings. Install supports in a manner, which will not be detrimental to the building structure.

- I. Underground Cast Iron Pipe Supports: Firmly bed pipe laid underground, on solid ground along bottom of pipe. Install masonry piers for pipe laid in disturbed or excavated soil or where suitable bearing cannot be obtained. Support pipe, laid proximate to building walls in disturbed or excavated soil, or where suitable bearing cannot be obtained, by means of wall brackets or hold-fasts secured to walls in an approved manner.

3.3 UPPER HANGER ATTACHMENTS

A. General

1. Secure upper hanger attachments to overhead structural steel, steel bar joists, or other suitable structural members.
2. Do not attach hangers to steel decks that are not to receive concrete fill.
3. Do not attach hangers to precast concrete plank decks less than 2-3/4 inches thick.
4. Do not use flat bars or bent rods as upper hanger attachments.

- B. Attachment to Steel Frame Construction: Provide intermediate structural steel members where required by pipe support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of five.
1. Do not use drive-on beam clamps.
 2. Do not support piping over 4 inches in size from steel bar joists. Secure upper hanger attachments to steel bar joists at panel points of joists.
 3. Do not drill holes in main structural steel members.
 4. Beam clamps, with tie rods as specified, may be used as upper hanger attachments for the support of piping, subject to clamp manufacturer's recommended limits.
- C. Attachment to Concrete Filled Steel Decks
1. New Construction: Install metal deck ceiling bolts.
 2. Existing Construction: Install welding studs (except at roof decks). Do not support a load in excess of 250 lbs from any single welded stud.
 3. Do not attach hangers to decks less than 2-1/2 inches thick.
- D. Attachment to Cast-In-Place Concrete: Secure to overhead construction by means of cast-in-place concrete inserts.
- E. Attachment to Existing Cast-In-Place Concrete
1. For piping up to a maximum of 4 inches in size, secure hangers to overhead construction with self-drilling type expansion shields and machine bolts.
 2. Secure hangers to wall or floor construction with single unit expansion shields or self-drilling type expansion shields and machine bolts.
- F. Attachment to Cored Precast Concrete Decks: Toggle bolts may be installed in cells for the support of piping up to a maximum of 2-1/2 inches in size.
- G. Attachment to Hollow Block or Hollow Tile Filled Concrete Decks
1. New Construction: Omit block or tile and pour solid concrete with cast-in-place inserts.
 2. Existing Construction: Break out block or tile to access, and install machine bolt anchors at highest practical point on side of web.
- H. Attachment to Waffle Type Concrete Decks
1. New Construction: Install cast-in-place inserts.
 2. Existing Construction: Install machine bolt expansion anchors at highest practical point on side of web.
- I. Attachment to Precast Concrete Tee Construction
1. New Construction: Tee hanger inserts between adjacent flanges, except at roof deck without concrete fill.

- 2. Existing Construction: Dual unit expansion shields in webs of tees. Install shields as high as possible in the webs.
 - a. Exercise extreme care in the field drilling of holes to avoid damage to reinforcing.
 - b. Do not use powder driven fasteners.

- J. Attachment to Wood Construction: Secure hangers to the sides (only) of wood members, by means of malleable iron side beam connectors, or malleable iron or steel side beam brackets. Do not secure hanger attachments to nailing strips resting on top of steel beams.

- 1. Secure side beam connectors to wood members with two (2) No.18 x 1-1/2 inch long wood screws, or two (2) No.16 x 1-1/2 inch long drive screws. Do not support piping over 1-1/2 inches in size from side beam connectors. Do not hammer in wood screws.
- 2. Secure side beam brackets to wood members with steel bolts or lag screws. Do not use lag screws in wooden members having a nominal thickness (beam face) under two (2) inches in size. Install bolts or lag screws, in the sides of a timber or a joist, at the mid-point or above, not less than 2-1/2 inches from the lower edge when supporting branch lines and not less than three (3) inches from the lower edge when supporting mains. Install heavy gauge steel washers under all nuts.
- 3. Secure side beam brackets to wooden beams or joists, with lag screws or bolts of size as follows:

PIPE SIZE (Inches)	LAG SCREW SIZE (Inches)	BOLT DIAMETER (Inches)
2 and under	3/8 diameter x 1-3/4	3/8
2-1/2 and 3	1/2 diameter x 2	1/2
4 and 5	Use Bolt	5/8

- a. Do not support piping larger than 3 inches with lag screws. Pre-drill holes for lag screws 1/8 inch in diameter less than the root diameter of the lag screw thread.
- b. The minimum width of the lower face of wood beams or joints in which lag screws of size as specified may be used is as follows:

LAG SCREW DIAMETER (Inches)	NOMINAL WIDTH OF BEAM FACE (Inches)
3/8	2
1/2	3

- 4. Do not secure hanger attachment to the diagonals or vertical members of the trusses.

3.4 ANCHORS, RESTRAINTS, RIGID SUPPORTS, STAYS AND SWAY BRACES

- A. Install pipe anchors, restraints and sway braces, at locations noted on the Drawings. Design anchors so as to permit piping to expand and contract freely in opposite directions, away from anchor points. Install anchors independent of all hangers and supports, and in a manner that will not affect the structural integrity of the building.
- B. Cast Iron Soil Piping Systems
 - 1. Where piping is suspended on centers in excess of 18 inches by means of non-rigid hangers, provide sway braces, of design, number and location in accordance with the Cast Iron Soil Pipe Institute's Cast Iron Soil Pipe and Fittings Handbook to prevent horizontal pipe movement.

2. Additionally, brace piping five (5) inches and larger to prevent horizontal movement and/or joint separation. Provide braces, blocks, rodding or other suitable method at each branch opening, or change of direction in accordance with the Cast Iron Soil Pipe Institute's Cast Iron Soil Pipe and Fittings Handbook to prevent horizontal pipe movement.

3.5 COMBINATION CLEVIS HANGER, PIPE INSULATION SHIELD AND VAPOR BARRIER JACKETED HIGH DENSITY INSULATING SADDLES

- A. Install a combination clevis hanger, pipe insulation shield and vapor barrier jacketed high density insulating saddles, at all points of support for piping or tubing to be insulated for cold service. Furnish companion high density vapor barrier jacketed saddle pieces, of the same material, thickness and length, for installation over the top 180 degree surface of pipe or tubing, at each point of support where an insulated clevis hanger is utilized.

3.6 PIPE INSULATION SHIELDS

- A. Unless otherwise specified, install a pipe insulation shield, at all points of support. Center shields on all hangers and supports outside of high density insulation insert, and install in such a manner so as not to cut, or puncture jacket.

3.7 ROOFTOP SUPPORT SYSTEM

- A. Install in accordance with manufacturer's instructions and recommendations.
- B. Provide complete and adequate support of all piping and equipment.
- C. The use of wood blocks for supporting piping or equipment is not permitted.
- D. If gravel top roof, gravel must be removed around and under support.
- E. Consult roofing manufacturer for roof membrane compression capacities. If necessary, a compatible sheet of roofing material (isolation pad) may be installed under rooftop support to disperse concentrated loads and add further membrane protection.
- F. Use properly sized clamps to secure piping or equipment.

END OF SECTION 230529

SECTION 230548 – VIBRATION AND EXPANSION CONTROL

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the Vibration Isolation and Expansion Control Devices indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. All mechanical equipment, piping and ductwork as noted on the equipment schedule or in the specification shall be mounted on or suspended from vibration isolators to reduce the transmission of vibration and mechanically transmitted sound to the building structure. Vibration isolators shall be selected in accordance with the weight distribution so as to produce reasonably uniform deflections.
- C. All isolation materials shall be supplied by the same manufacturer.
- D. Any variance or non-compliance with these specification requirements shall be corrected by the contractor in an approved manner.
- E. Equipment included in This Section
 - 1. Vibration isolation for piping, ductwork and equipment
 - 2. Equipment isolation bases
 - 3. Flexible piping connections

1.2 SUBMITTALS

- A. The manufacturer of vibration isolation shall provide submittals for products as follows
 - 1. Descriptive Data:
 - a. Schedules of flexibly mounted equipment, referencing drawings by number.
 - b. Catalog cuts or data sheets on vibration isolators.
 - 2. Drawings:
 - a. Submit details of equipment bases including dimensions, structural member sizes and support point locations.
 - b. Submit details of isolation hangers for ceiling hung equipment, piping and ductwork.
 - c. Submit details of mountings for floor supported equipment, piping and ductwork.
 - d. All hanger, mounting or pad drawings shall indicate deflections and model numbers as well as any other requirements in the specifications.
 - e. Spring diameters, rated loads and deflections, heights at rated load and closed height shall be provided for all springs shown in the submittals in tabular form.
 - f. Complete flexible connector details.

PART 2 - PRODUCTS

2.1 BASE MOUNTED NEOPRENE MOUNTINGS

- A. Minimum static deflection of 0.35"
- B. All metal surfaces shall be neoprene covered and have friction pads both top and bottom. Bolt holes shall be provided on the bottom and a tapped hole and cap screw on top.
- C. Steel rails shall be used above the mountings under equipment such as small vent sets to compensate for the overhang.
- D. Acceptable Manufacturers
 - 1. Amber/Booth Company, Inc.
 - 2. Kinetics Noise Control
 - 3. Mason Industries
 - 4. Vibro-Acoustics
 - 5. Vibration Eliminator Co., Inc.
 - 6. Vibration Mountings & Controls, Inc.
 - 7. Twin City Hose
 - 8. Patterson
 - 9. Acrefine

2.2 BASE MOUNTED SPRING ISOLATORS – FREE STANDING

- A. Free standing and laterally stable without any housing and complete with a molded neoprene cup or 1/4" neoprene acoustical friction pad between the baseplate and the support.
- B. All mountings shall have leveling bolts that must be rigidly bolted to the equipment. Installed and operating heights shall be equal.
- C. The ratio of the spring diameter divided by the compressed spring height shall be no less than 0.8. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection.
- D. Acceptable Manufacturers
 - 1. Amber/Booth Company, Inc.
 - 2. Kinetics Noise Control
 - 3. Mason Industries
 - 4. Vibro-Acoustics

5. Vibration Eliminator Co., Inc.
6. Vibration Mountings & Controls, Inc.
7. Twin City Hose
8. Patterson
9. Acrefine

2.3 BASE MOUNTED SPRING ISOLATORS - RESTRAINED

- A. Equipment with large variations in the operating and installed weight, such as chillers, boilers, etc., and equipment exposed to the wind such as cooling towers, roof mounted fans and roof mounted air handling equipment shall be mounted on restrained spring mountings. Include neoprene acoustical pad within a rigid sided housing that includes vertical limit stops to prevent spring extension when weight is removed and temporary steel spacers between the upper and lower housings. Housings shall serve as blocking during erection.
- B. When the equipment is at full operating weight, the springs shall be adjusted to assume the weight and the spacers removed, without changing the installed and operating heights.
- C. All restraining bolts shall have large rubber grommets to provide cushioning in the vertical as well as horizontal modes. The hole through the bushing shall be a minimum of 0.75" larger in diameter than the restraining bolt. Horizontal clearance on the sides between the spring assembly and the housing shall be a minimum of 0.5" to avoid bumping and interfering with the spring action.
- D. Vertical limit stops shall be out of contact during normal operation. Cooling tower mounts are to be located between the supporting steel and the roof or the grillage and dunnage as shown on the drawings when there is no provision for direct mounting.
- E. Housings and springs shall be powder coated and hardware electro galvanized.
- F. Acceptable Manufacturers
 1. Amber/Booth Company, Inc.
 2. Kinetics Noise Control
 3. Mason Industries
 4. Vibro-Acoustics
 5. Vibration Eliminator Co., Inc.
 6. Vibration Mountings & Controls, Inc.
 7. Twin City Hose
 8. Patterson
 9. Acrefine

2.4 VIBRATION ISOLATION ROOF CURB

- A. Curb mounted rooftop equipment shall be mounted on vibration isolation bases that fit over the roof curb and under the isolated equipment. The extruded aluminum top member shall overlap the bottom to provide water runoff independent of the seal. Aluminum members shall house electro galvanized or powder coated springs selected for 0.75"(20mm) minimum deflection. Travel to solid shall be 1.5"(40mm) minimum. Spring diameters shall be no less than 0.8 of the spring height at rated load. Wind resistance shall be provided by means of resilient snubbers in the corners with a minimum clearance of 1/4"(6mm) so as not to interfere with the spring action except in high winds. Manufacturer's self adhering closed cell sponge gasketing must be used both above and below the base and a flexible EPDM duct like connection shall seal the outside perimeter. Foam or other sliding or shear seals are unacceptable in lieu of the EPDM duct-like closure. Submittals shall include spring deflections, spring diameters, compressed spring height and solid spring height as well as seal and wind resistance details. Curb mounted bases shall be Type CMAB as manufactured by Mason Industries, Inc.
- B. Curb mounted rooftop equipment shall be mounted on spring isolation curbs. The lower member shall consist of a sheet metal Z section containing adjustable and removable steel springs that support the upper floating section. The upper frame must provide continuous support for the equipment and must be captive so as to resiliently resist wind forces. All directional neoprene snubber bushings shall be a minimum of 1/4"(6mm) thick. Steel springs shall be laterally stable and rest on 1/4"(6mm) thick neoprene acoustical pads. Hardware must be plated and the springs provided with a rust resistant finish. The curbs waterproofing shall consist of a continuous galvanized flexible counter flashing nailed over the lower curb's waterproofing and joined at the corners by EPDM bellows. All spring locations shall have access ports with removable waterproof covers. Lower curbs shall have provision for 2"(50mm) of insulation. Curb shall be type RSC as manufactured by Mason Industries, Inc.

PART 3 - EXECUTION

3.1 GENERAL

- A. All vibration isolators must be installed in strict accordance with the manufacturers written instructions and all certified submittal data.
- B. Installation of vibration isolators must not cause any change of position of equipment, piping, or duct work resulting in stresses or misalignment.
- C. No rigid connections between equipment and the building structure shall be made that degrades the noise and vibration control system herein specified.
- D. The contractor shall not install any equipment, piping, duct or conduit which makes rigid connections with the building unless isolation is not specified. "Building" includes but is not limited to slabs, beams, columns, studs and walls.
- E. Coordinate work with other trades to avoid rigid contact with the building.
- F. Any conflicts with other trades which will result in rigid contact with equipment or piping due to inadequate space or other unforeseen conditions should be brought to the architects/engineers attention prior to installation. Corrective work necessitated by conflicts after installation shall be at the responsible contractor's expense.
- G. Bring to the architects/engineers attention any discrepancies between the specifications and the field conditions or changes required due to specific equipment selection, prior to installation.

Corrective work necessitated by discrepancies after installation shall be at the responsible contractor's expense.

- H. Correct, at no additional cost, all installations which are deemed defective in workmanship and materials at the contractor's expense.
- I. Where piping passes through walls, floors or ceilings the vibration isolation manufacturer shall provide seals.
- J. Locate isolation hangers as near to the overhead support structure as possible.
- K. Air handling equipment and centrifugal fans shall be protected against excessive displacement which results from high air thrust when thrust forces exceed 10% of the equipment weight.
- L. Rooftop equipment isolators must be bolted to the equipment and structure. Mountings must be designed to resist 100m/h wind loads.

END OF SECTION 230548

SECTION 230553 - MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following Equipment Identification indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Items to be labeled
 - 1. Plumbing and Piping Valves
 - 2. Piping
 - 3. Equipment (Including but not limited to the following)
 - a. Air Handling Units (AHU, RTU, ERU, Blower Coil, Makeup Air Units)
 - b. Fans
 - c. Terminal Devices (TAB, Heat Pumps, Fan Coil, Cabinet Heater, Unit Heater)
 - d. Pumps
 - e. Heat Exchangers
 - f. Condensing Units
 - g. Chillers
 - h. Boilers
 - i. Dedicated equipment control panels (sump pumps, sewage ejectors, radiant infloor heat zones)
 - 4. Variable Frequency Drives
 - 5. Thermostats
 - 6. Fire, Smoke and Fire / Smoke Dampers

1.2 REFERENCES

- A. ANSI A13.1 - Scheme for Identification of Piping Systems.

1.3 SUBMITTALS

- A. Product Data
 - 1. Manufacturer's catalog sheets and specifications for mechanical identification materials.
 - 2. Installation instructions.
 - 3. Schedule indicating what type of materials will be used for various equipment, valves, piping, and devices.

PART 2 - PRODUCTS

2.1 EQUIPMENT TAGS

- A. Aluminum Nameplates: Black enamel background with natural aluminum border and engraved letters furnished with two mounting holes and screws.
- B. Plastic Tags: 1/16" thick, UV resistant phenolic plastic. Minimum 1-1/2" square or round laminated with engraved, 1/4" minimum black letters on light contrasting background.
- C. Tags shall be black with white lettering.
- D. Lettering: Lettering shall be supplier's normal font, minimum 1" high

2.2 VALVE TAGS

- A. Brass Tags: 1-1/2" Round 19 gauge brass tags with 1/4" minimum engraved letters.
- B. Plastic Tags: 1/16" thick, UV resistant phenolic plastic. 1-1/2" round laminated with engraved, 1/4" minimum black letters on light contrasting background.
- C. Tags shall be brass or white with solid black lettering.
- D. Provide with brass ball chain or plastic zip connectors to attach tag to valve

2.3 PIPE MARKERS AND ACCESSORIES

- A. Snap-on Marker: One (1) piece wrap around type constructed of pre-coiled acrylic plastic with clear polyester coating, integral flow arrows, legend printed in alternating directions, 3/4 inch adhesive strip on inside edge, and 360 degree visibility.
- B. Strap-On Marker: Strip type constructed of pre-coiled acrylic plastic with clear polyester coating, integral flow arrows, legend printed in alternating directions, factory applied grommets, and pair of stainless steel spring fasteners.
- C. Stick-On Marker: Pressure sensitive adhesive backed type constructed of vinyl with clear polyester coating, and integral flow arrows for applications where flow arrow banding tape is not being used.
- D. Underground Marker: 6" wide, thickness depends on type. Detectable or non-detectable is acceptable. Provide detectable type for non-metallic piping such as plastic gas, water main, or underground PVC piping.
- E. Pipe Marker Legend and Color Field Sizes:

OUTSIDE DIAMETER OF PIPE OR INSULATION (Inches)	LETTER SIZE (Inches)	LENGTH OF COLOR FIELD (Inches)
3/4 to 1-1/4	1/2	8
1-1/2 to 2	3/4	8
2-1/2 to 6	1-1/4	12
8 to 10	2-1/2	24
Over 10	3-1/2	32

- F. Banding Tapes: Pressure sensitive adhesive backed type constructed of vinyl with clear polyester coating.
 - 1. Plain Tape: Unprinted type; color to match pipe marker background.
 - 2. Flow Arrow Tape: Printed type with integral flow arrows; color to match pipe marker background.
- G. Pipe Size Labels: Pressure sensitive adhesive backed type constructed of vinyl with clear polyester coating, vertical reading pipe size in inches, and legend size matching adjacent pipe marker.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Complete testing, insulation and finish painting work prior to completing the Work of this Section.
- B. Clean pipe surfaces with cleaning solvents prior to installing piping identification.
- C. Remove dust from insulation surfaces with clean cloths prior to installing piping identification.

3.2 PIPING IDENTIFICATION

- A. Install the Work of this Section in accordance with the manufacturer’s printed installation instructions, unless otherwise specified.
- B. Stick-On Pipe Markers:
 - 1. Install minimum of two (2) markers at each specified location, 90 degrees apart on visible side of pipe.
 - 2. Encircle ends of pipe markers around pipe or insulation with banding tape with one inch lap. Use plain banding tape on markers with integral flow arrows, and flow arrow banding tape on markers without integral flow arrows.
- C. Pipe Size Labels: Install labels adjacent to each pipe marker and upstream from flow arrow. Install a minimum of two (2) pipe size labels at each specified location, 90 degrees apart on visible side of pipe.
- D. Underground Pipe Markers: Install 8-12” above buried piping. Install along entire length of pipe.

3.3 PIPING IDENTIFICATION SCHEDULE

A. Piping Identification Types

Piping:	Field Color:	Lettering Color:
Domestic Water	Green	White
Sanitary, Vent	Green	White
Acid Waste, Vent	Yellow	Black
Storm	Green	White

Piping:	Field Color:	Lettering Color:
Chilled Water	Green	White
Heating Water	Yellow	Black
Snowmelt	Orange	Black
Refrigerant Piping	Yellow	Black
Steam, Condensate	Yellow	Black
Natural Gas	Yellow	Black
Propane	Yellow	Black
Sprinkler-Fire	Red	White
Compressed Air	Blue	White
Instrument Air	Red	White
Carbon Dioxide	Gray	Black
Medical Air	Yellow	Black
Medical Vacuum	White	Black
Nitrogen	Black	White
Nitrous Oxide	Blue	White
Oxygen	Green	White
WAGD	Violet	White

B. Locate piping identification as follows:

1. Locate piping identification at valve locations; at points where piping enters and leaves a partition, wall, floor or ceiling, and at intervals of 20 feet on straight runs.
2. Where two (2) or more pipes run in parallel, place printed legend and other markers in same relative location.

3.4 EQUIPMENT IDENTIFICATION

- A. Install engraved tags on equipment using metal rivets or stainless steel sheet metal screws with a pan head. For indoor equipment, industrial strength double-sided tape is acceptable if rivets or screws cannot be used. Install label on most visible side of equipment. Place identification along center line of equipment, if possible.
- B. Label all mechanical equipment using the same callout as used on the drawings, by means of engraved tags.
- C. Label all fire, fire/smoke, and smoke dampers with adhesive labels or permanent nameplates. Labels shall read "Fire Damper", "Fire/Smoke Damper", or "Smoke Damper" to match damper type.
- D. Do not label equipment in exposed public spaces, e.g. cabinet unit heaters, diffusers, louvers, etc.
- E. Label hidden equipment such as sump pumps on the control panel or disconnect if it does not make sense to label the equipment itself.
- F. Label thermostats with the corresponding terminal air box or equipment served.

3.5 VALVE TAGS

- A. Valve tags shall be engraved with the following information:

1. Service Abbreviation
 2. Valve number
- B. Service Abbreviation shall match piping nomenclature used on Drawings.
- C. Attach tags to valves, not valve handles or wheels.
- D. Trim excess from connecting strip or chain.
- E. Valve Schedule
1. Provide a valve schedule that lists all valves not installed for individual plumbing fixtures. Valve schedule shall list the following information in order: service, tag number, size, usage (shut-off, balancing, control, etc.), name and number or room location, normally open or closed, pressure rating, manufacturer, model number, and installation date.
 2. Provide three (3) laminated hard copies and one (1) electronic copy in .pdf format. Hard copies shall be clearly legible and a minimum of 11" x 17".
 3. Mount one (1) of the hard copies in a solid metal frame in a location designated by the Owner.

3.6 SPECIAL CONDITIONS

- A. Additional labels shall be installed at the request of the Engineer/Owner.

END OF SECTION 230553

SECTION 230593 - CLEANING AND TESTING

PART 1 - GENERAL

1.1 SCOPE

- A. Cleaning of systems to remove construction debris and prepare for testing and operation.
- B. Perform testing on systems and equipment to confirm they can withstand normal operating and design conditions as outlined in various equipment sections.
- C. Equipment Included in This Section
 - 1. Refrigerant piping
 - 2. Natural gas piping
 - 3. Steam piping systems
 - 4. Hydronic heating and cooling systems
 - 5. Steam and condensate piping systems
 - 6. Domestic water piping
 - 7. Medical gas piping
 - 8. Compressed air piping

1.2 REFERENCES

- A. Balancing of Systems: Section 230594.

1.3 SUBMITTALS

- A. Quality Control Submittals
 - 1. Submit Field Test Reports for all systems to be tested.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements
 - 1. Perform factory testing of factory fabricated equipment in complete accordance with the agencies having jurisdiction.
 - 2. Perform field testing of piping systems in complete accordance with the local utilities and other agencies having jurisdiction and as specified.

1.5 PROJECT CONDITIONS

- A. Protection: During test Work, protect controls, gages and accessories which are not designed to withstand test pressures. Do not utilize permanently installed gauges for field testing of systems.

1.6 SEQUENCING AND SCHEDULING

- A. Transmit written notification of proposed date and time of operational tests to the Architect / Engineer at least five (5) days in advance of such tests.
- B. Perform cleaning and testing Work in the presence of the Owner's Representative Architect / Engineer.
- C. Pressure test piping systems inside buildings, at the roughing-in stage of installation, before piping is enclosed by construction Work, and at other times as directed. Perform test operations in sections as required and directed, to progress the Work in a satisfactory manner and not delay the general construction of the building. Valve or cap-off sections of piping to be tested, utilizing valves required to be installed in the permanent piping systems or temporary valves or caps as required to perform the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Test Equipment and Instruments: Type and kind as required for the particular system under test.
- B. Test Media (air, gas, refrigerant, dry nitrogen, vacuum, water): As specified for the particular piping or system under test.
- C. Cleaning Agent (chemical solution, steam, water): As specified for the particular piping, apparatus or system being cleaned.
- D. Propylene Glycol: Permanent type anti-freeze solution as manufactured by Dow Chemical Co. or Union Carbide.

PART 3 - EXECUTIONPRELIMINARY WORK

- A. Thoroughly clean pipe and tubing prior to installation. During installation, prevent foreign matter from entering systems. Prevent if possible and remove stoppages or obstructions from piping and systems.
- B. Thoroughly clean compressed air, control air, refrigerant pipe and similar systems prior to pressure or vacuum testing.
 - 1. Refrigerant Piping
 - a. Only use factory sealed refrigerant piping.
 - b. Crimp and braze caps on ends of previously cleaned piping at the end of the day if piping was cut.

- c. When brazing, purge lines with dry nitrogen.

3.2 PRESSURE TESTING OF PIPING

- A. Piping shall be tight under test and shall not show loss in pressure or visible leaks, during test operations or after the minimum duration of time as specified. Remove piping which is not tight under test; remake joints and repeat test until no leaks occur.
- B. Water Systems
 - 1. Domestic water (potable cold, domestic hot and recirculation) inside buildings:
 - a. Before fixtures, faucets, trim and accessories are connected, perform hydrostatic test at 125 psig minimum for four (4) hours.
 - b. After fixtures, faucets, trim and accessories are connected, perform hydrostatic retest at 75 psig for four (4) hours.
 - 2. Circulating water systems, including propylene glycol solution systems and cold water make-up piping connections to heating, ventilating, air conditioning and refrigeration systems, unless otherwise specified:
 - a. Before final connections are made perform hydrostatic test at 1-1/2 times the maximum working pressure, but not less than 125 psig, for four (4) hours.
 - b. After final connections are made perform hydrostatic retest at a pressure equal to maximum operating system design pressure, but not less than 30 psig, for four (4) hours.
 - 3. High temperature water systems (supply and return):
 - a. Before final connections are made perform hydrostatic test at 450 psig for four (4) hours.
 - b. After final connections are made perform hydrostatic retest at a pressure equal to maximum operating design pressure, but not less than 250 psig for four (4) hours.
- C. Steam, Condensate Return and Pump Discharge Piping: Before final connections are made perform hydrostatic test at 1-1/2 times maximum working pressure, but not less than 150 psig for one hour.
- D. Gas Piping: Before backfilling or concealment perform air test of duration and pressure as required by the local gas company. However, for gas piping designed for pressures of from 4 inches to 6 inches water column, air test at 15 inches Hg for one (1) hour, without drop in pressure. Test gas piping with air only. Check joints for leaks with soap suds.
- E. Air Piping
 - 1. Compressed Air: Test with air at 150 psig for one (1) hour.
 - 2. Control Air: Test with air at 50 psig for one (1) hour.
 - 3. Check joints for leaks with soap suds.
- F. Vacuum Piping: Perform air test at 150 psig for one (1) hour, followed by a vacuum test of 25 inches Hg for one (1) hour, during which time the mercury shall remain stationary for the last thirty (30) minutes of test.

- G. Fuel Oil Piping (Suction and Return): Perform air test at 150 psig for one (1) hour, followed by a vacuum test of 25 inches Hg for one (1) hour, during which time the mercury shall remain stationary for the last thirty (30) minutes of test.

3.3 TESTING OF EQUIPMENT, APPARATUS AND APPURTENANCES

- A. Low Pressure Steam Boilers: Perform hydrostatic test at 15 psig after installation with all piping connections shut-off.
- B. Hot Water Boilers: Perform hydrostatic test at 30 psig, after installation, with piping connections shut-off.
- C. Relief Valves: Increase pressure in equipment or apparatus to relief valve setting, to test opening of valves at required relief pressures.

3.4 HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS - CLEANING AND OPERATIONAL TESTING

A. Circulating Heating Hot Water and Chilled Water Systems in Buildings

1. Cleaning

- a. Flush systems and apparatus, upon completion of pressure test(s).
- b. Completely open valves and flush each system with clean water, prior to chemical cleaning.
- c. Repeatedly flush at short intervals until twice the system water capacity has been flushed through.
- d. Chemically clean systems immediately following flushing operations.
- e. Circulate a solution consisting of trisodium phosphate, in a proportion of one (1) pound of chemical to every 50 gallons of water in the system.
- f. Completely fill system with cleaning solution; vent as required, and place in operation, with automatic controls operating and valves fully open.
- g. Allow system to reach design operating temperature or an operating temperature designated by the Director's Representative.
- h. Circulate the solution through the system for a minimum of four (4) consecutive hours; immediately drain system and flush with clean water until the pH at the farthest drain matches the clean water input.
- i. Provide temporary pipe and /or hose required to drain system.
- j. Keep strainers unplugged during cleaning operations. Remove and clean strainer screens prior to operational test.
- k. Refill system with clean water and correct pH to 7.
- l. Do not flush steam piping thru steam coils. Provide temporary steam supply and condensate piping to bypass steam coils.
- m. Upon completion of flushing, remove temporary piping and reconnect steam coil.

2. Operational Test

- a. Run system in an automatic mode for a minimum of 120 consecutive hours.
- b. During this time, make final adjustments, including the setting of the balancing valves.

B. Propylene Glycol Systems

- 1. Clean as specified for circulating water systems.

2. Perform operational test as specified for circulating water systems with propylene glycol solution in system.

C. Steam Heating Systems

1. Cleaning

- a. Upon completion of pressure test(s), place the system in automatic operation, at a minimum 7 psig steam pressure unless otherwise directed by the Owner's Representative.
- b. Maintain this pressure for a minimum of forty-eight (48) hours to remove dirt, sludge and foreign substances from the system. This includes all terminal devices.
- c. During this time waste the condensate. Provide temporary piping to transport condensate to blowdown separator.
- d. Allow condensate to cool below 140° F before wasting into sanitary drains.
- e. Periodically blow down strainers during cleaning operations and totally clean strainers and trap elements at end of blow down.
- f. Do not flush.
- g. Test condensate quality periodically to ensure waste and boiler startup chemicals are no longer present prior to returning condensate to the system.

2. Operational Test

- a. Run system in an automatic mode for a minimum of 120 consecutive hours, with final connections made to apparatus, equipment and accessories.
- b. Make final adjustments.

3.5 REFRIGERATION SYSTEMS – TESTING, DEHYDRATION AND CHARGING

A. Leak Test Procedure

1. Refrigerant Piping Systems

- a. Pressurize with dry nitrogen to 50 psig and test for leaks using a bubble type solution.
- b. Release this partial test pressure and correct deficiencies.
- c. Charge system with a trace of refrigerant to 15 psig, then add dry nitrogen until system test pressures are reached and retest for leaks with an electronic leak detector.
- d. Release pressure, repair leaks and retest as necessary until no leaks occur.
- e. Recover refrigerant used for leak testing.

2. System Test Pressures

- a. Charge system with dry nitrogen and trace of refrigerant (HFC 134A, HFC 407C, or HFC 410A) to 350 psig and retest for leaks with an electronic leak detector. The system must stay at 350 psig pressure for 24 hours to pass the system test pressure test.
- b. Release pressure, repair leaks and retest as necessary until no leaks occur.
- c. Recover refrigerant used for leak testing.

B. Dehydration

1. Low and Ultra Low Temperature Refrigeration Systems (-30° F to 32° F):

- a. Following pressure tests dehydrate each system with a vacuum pump.

- b. Draw and hold an initial vacuum of 800 microns. Break this vacuum by pressurizing with dry nitrogen to 10 psig, and change oil in vacuum pump.
 - c. Draw and hold a second vacuum of 500 microns. Break this vacuum by pressurizing with dry nitrogen to 10 psig, and change oil in vacuum pump.
 - d. Draw and hold a third vacuum of 250 microns for eight (8) to twelve (12) hours with an allowable maximum rise of 50 microns. Break this third vacuum by adding liquid refrigerant specified for the equipment to the high side of the system (liquid line).
 - e. Verify vacuum obtained with an electronic vacuum gauge.
2. Medium Temperature Refrigeration Systems (33° F to 55° F), and Air Conditioning Systems:
- a. Following pressure tests dehydrate each system with a vacuum pump.
 - b. Draw and hold an initial vacuum of 500 microns. Break this vacuum by pressurizing with dry nitrogen to 10 psig, and change oil in vacuum pump.
 - c. Draw and hold a second vacuum of 500 microns. Break this vacuum by pressurizing with dry nitrogen to 10 psig, and change oil in vacuum pump.
 - d. Verify vacuum obtained with an electronic vacuum gauge.
- C. Refrigerant Charging: Follow equipment manufacturer's printed charging directions unless otherwise specified.
- 1. Introduce refrigerant of type and quantity required through a filter/drier installed in the temporary charging line.
 - a. Purge small amount of liquid out of the system side of the charging hose.
 - b. Prevent moisture and other contaminants from entering the system.
 - 2. Charge liquid refrigerant through a charging valve provided in the high pressure side of the system.
 - a. Small amounts of gaseous refrigerant may be charged through the compressor suction service valve port.
 - 3. No bubbles shall appear at the moisture-liquid indicator when the system is fully charged and operational. Do not overcharge.
 - 4. Record the weight in pounds of refrigerant charged into each system and submit this record to the Director's Representative.
- D. Compressor Oil Charge: Pump oil into the compressor after the last vacuum has been preformed. Follow all Manufactures Recommended for oil type and amount to be installed.
- E. Adjustments and Operational Testing
- 1. Adjustments: Place the system in operation with automatic controls functioning. Adjust controls and apparatus for proper operation. Test thermometers and gauges for accuracy over the entire range. Remove and replace items found defective.
 - a. Check belts, fan blades, fittings, TXV bulbs, and electrical connections for tightness before start up.
 - b. Check TXV bulb for proper location should be between 8 and 10 o'clock or 2 & 4 o'clock.
 - c. Seal off all holes in the condition space as specified.

- d. Provide a point to point control check of the system to ensure that the specified inputs and outputs are receiving the signal from the proper sensors or controlling the proper device.
- e. Set pressure controls and safety controls.
- f. Close or de-energize all solenoids, and start up the system.
- g. Check that all controls and safety switches are operating properly.
- h. Adjust TXV for proper super heat back to the compressors.
- i. Clean TXV strainers as many times as required.
- j. After one (1) week of run time, change the liquid cores if they are the replaceable type.
- k. After one (1) month of run time, replace the liquid cores and compressor suction socks. Replace the liquid cores as required. Clean the TXV's as required.

3.6 DISINFECTION OF POTABLE WATER SYSTEMS

- A. Disinfect potable water pipe and equipment installed in the Work of this Contract.
 - 1. Completely fill the piping, including water storage equipment if installed, with a water solution containing 50 mg/L available chlorine, and allow stand for twenty-four (24) hours.
 - 2. Operate all valves during this period to assure their proper disinfection.
 - 3. After the retention period, discharge the solution to an approved waste and flush the system thoroughly with water until substantially all traces of chlorine are removed.
 - 4. Drain and flush water storage equipment if installed.
- B. Connect plumbing fixtures and equipment and place the system into service. Prevent recontamination of the piping during this phase of the Work.

END OF SECTION 230593

SECTION 230594 – TESTING ADJUSTING AND BALANCING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required for complete Testing, Adjusting and Balancing of the systems as indicated by the Contract Documents with supplementary items necessary for proper system operation.
- B. Equipment included in This Section
 - 1. Air Handling Equipment
 - a. Air handling units
 - b. Energy recovery units
 - c. Rooftop air handling units
 - d. Makeup air handling units
 - e. Single duct terminal air boxes
 - f. Fan-powered terminal air boxes
 - g. VRF indoor units
 - h. Exhaust fans
 - i. Air inlets and outlets
 - j. Room pressure controls
 - 2. Hydronic Equipment (Cooling)
 - a. Air cooled chillers
 - b. Water cooled chillers
 - c. Cooling towers
 - d. Pumps
 - e. Cooling Coils
 - f. Terminal cooling equipment
 - 3. Hydronic Equipment (Heating)
 - a. Boilers
 - b. Heat exchangers
 - c. Pumps
 - d. Heating coils
 - e. Terminal heating equipment
 - 4. Plumbing Equipment
 - a. Hot water circulation pump
 - b. Hot water circulation branch balancing valves
 - c. Domestic water booster pump
 - 5. Existing Equipment Pre-Balance
 - a. Confirm the existing operating conditions of the following systems:
 - 1) Air Handling Unit, AHU-XX
 - 2) Exhaust fan, EF-XX
 - 3) Pump, P-XX

- b. Verify the following parameters for air systems:
 - 1) Total airflow
 - 2) Airflow in main branches affected in the remodel
 - 3) Airflow at each of the inlets and outlet served
 - 4) Equipment operating parameter (Static, RPM, Amps, etc.)
- c. Verify the following parameter for the hydronic systems:
 - 1) Total flow (gpm)
 - 2) Flow to each component affected in the remodel (gpm)
 - 3) Equipment operating parameters (Head, flow, RPM, Amps, etc.)

1.2 SUBMITTALS

- A. Certified TAB reports

1.3 QUALITY ASSURANCES

- A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC, NEBB, or TABB.
 - 1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC, NEBB, or TABB.
 - 2. TAB Technician: Employee of the TAB contractor and who is certified by AABC, NEBB, or TABB as a TAB technician.

1.4 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An entity engaged to perform TAB Work.

1.5 PROJECT CONDITION

- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.
- B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations

1.6 COORDINATION

- A. Notice: Provide seven (7) days advance notice for each test. Include scheduled test dates and times.

- B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.7 TOLERANCES

- A. Set HVAC system's air flow rates and water flow rates within the following tolerances:
 - 1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent
 - 2. Air Outlets and Inlets: Plus or minus 10 percent
 - 3. Heating-Water Flow Rate: Plus or minus 10 percent
 - 4. Cooling-Water Flow Rate: Plus or minus 10 percent

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 TAB SPECIALISTS

- A. Subject to compliance with requirements, engage one (1) of the following
 - 1. Precision Test and Balance
 - 2. System Works
 - 3. System Management and Balance

3.2 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
- B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they meet the leakage class of connected ducts as specified in Division 23 Section "Metal Ducts" and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- F. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design". Compare results with the design data and installed conditions.
- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.
- K. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.
- L. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.
- M. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- N. Examine system pumps to ensure absence of entrained air in the suction piping.
- O. Examine operating safety interlocks and controls on HVAC equipment.
- P. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.
- 3.3 PREPARATION
- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
- B. Complete system-readiness checks and prepare reports. Verify the following:
1. Permanent electrical-power wiring is complete.
 2. Hydronic systems are filled, clean, and free of air.
 3. Automatic temperature-control systems are operational.
 4. Equipment and duct access doors are securely closed.
 5. Balance, smoke, and fire dampers are open.
 6. Isolating and balancing valves are open and control valves are operational.

7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
8. Windows and doors can be closed so indicated conditions for system operations can be met.

3.4 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in this specification and one of the following:
 1. AABC's "National Standards for Total System Balance"
 2. ASHRAE 111
 3. NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems"
 4. SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing"
- B. Comply with requirements of the adopted version of ASHRAE 62.1, Section on balancing.
- C. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Division 23 Section "HVAC Insulation".
- D. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- E. Take and report testing and balancing measurements in inch-pound (IP).

3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. For variable-air-volume systems, develop a plan to simulate diversity.
- C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- D. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- F. Verify that motor starters are equipped with properly sized thermal protection.

- G. Check dampers for proper position to achieve desired airflow path.
- H. Check for airflow blockages.
- I. Check condensate drains for proper connections and functioning.
- J. Check for proper sealing of air-handling-unit components.
- K. Verify that air duct system is sealed as specified in Division 23 Section "Metal Ducts."

3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - 2. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow
 - 3. Measure fan static pressures as follows to determine actual static pressure:
 - 4. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
 - 5. Measure static pressure a few feet downstream of a fan or in a location that will avoid turbulent or unrepeatable performance.
 - 6. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
 - 7. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
 - 8. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
 - 9. Report the cleanliness status of filters and the time static pressures are measured.
 - 10. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
 - 11. Balancer can adjust fan speeds 15% higher or lower than speed indicated in the approved shop drawing to meet the required capacity. If a fan needs to operate outside these parameters to meet the capacity requirements, balancer to contact the Engineer for approval. Comply with requirements in Division 23 Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance
 - 12. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

- B. Adjust volume dampers for main duct, sub-main ducts, and major branch ducts to indicated airflows within specified tolerances.
 - 1. Measure airflow of sub-main and branch ducts.
 - 2. Where sufficient space in sub-main and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 - 3. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
 - 4. Re-measure each sub-main and branch duct after all have been adjusted. Continue to adjust sub-main and branch ducts to indicated airflows within specified tolerances.
- C. Measure air outlets and inlets without making adjustments.
 - 1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.
- D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
 - 1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
 - 2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.7 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

- A. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a minimum set-point airflow with the remainder at maximum-airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced-airflow terminal units so they are distributed evenly among the branch ducts.
- B. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:
 - 1. Set outdoor-air dampers at minimum, and set return- and exhaust-air dampers at a position that simulates full-cooling load.
 - 2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
 - 3. Measure total system airflow. Adjust to within indicated airflow.

4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
 5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow the same as described for constant-volume air systems.
 6. If air outlets are out of balance at minimum airflow, report the condition but leave outlets balanced for maximum airflow.
 7. Re-measure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.
 8. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.
 9. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure that adequate static pressure is maintained at the most critical unit.
 10. Record final fan-performance data.
- C. Pressure-Dependent, Variable-Air-Volume Systems without Diversity: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:
1. Balance variable-air-volume systems the same as described for constant-volume air systems.
 2. Set terminal units and supply fan at full-airflow condition.
 3. Adjust inlet dampers of each terminal unit to indicated airflow and verify operation of the static-pressure controller. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
 4. Readjust fan airflow for final maximum readings.
 5. Measure operating static pressure at the sensor that controls the supply fan if one is installed, and verify operation of the static-pressure controller.
 6. Set supply fan at minimum airflow if minimum airflow is indicated. Measure static pressure to verify that it is being maintained by the controller.
 7. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow the same as described for constant-volume air systems.
 8. If air outlets are out of balance at minimum airflow, report the condition but leave the outlets balanced for maximum airflow.
 9. Measure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.

10. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.
- D. Pressure-Dependent, Variable-Air-Volume Systems with Diversity: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:
1. Set system at maximum indicated airflow by setting the required number of terminal units at minimum airflow. Select the reduced-airflow terminal units so they are distributed evenly among the branch ducts.
 2. Adjust supply fan to maximum indicated airflow with the variable-airflow controller set at maximum airflow.
 3. Set terminal units at full-airflow condition.
 4. Adjust terminal units starting at the supply-fan end of the system and continuing progressively to the end of the system. Adjust inlet dampers of each terminal unit to indicated airflow. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
 5. Adjust terminal units for minimum airflow.
 6. Measure static pressure at the sensor.
 7. Measure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.
- 3.8 PROCEDURES FOR MULTIZONE SYSTEMS
- A. Set unit at maximum airflow through the cooling coil.
 - B. Adjust each zone's balancing damper to achieve indicated airflow within the zone.
- 3.9 PROCEDURES FOR MOTORS
- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
 1. Manufacturer's name, model number, and serial number.
 2. Motor horsepower rating.
 3. Motor rpm.
 4. Efficiency rating.
 5. Nameplate and measured voltage, each phase.
 6. Nameplate and measured amperage, each phase.
 7. Starter thermal-protection-element rating.

- B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.10 PROCEDURES FOR CONDENSING UNITS

- A. Verify proper rotation of fans.
- B. Measure entering- and leaving-air temperatures.
- C. Record compressor data.

3.11 PROCEDURES FOR BOILERS

- A. Hydronic Boilers: Measure and record entering- and leaving-water temperatures and water flow.
- B. Steam Boilers: Measure and record entering-water temperature and flow and leaving-steam pressure, temperature, and flow.

3.12 PROCEDURES FOR HEAT-TRANSFER COILS

- A. Measure, adjust, and record the following data for each water coil:
 - 1. Entering- and leaving-water temperature
 - 2. Water flow rate
 - 3. Water pressure drop
 - 4. Dry-bulb temperature of entering and leaving air
 - 5. Wet-bulb temperature of entering and leaving air for cooling coils
 - 6. Airflow
 - 7. Air pressure drop
- B. Measure, adjust, and record the following data for each electric heating coil:
 - 1. Nameplate data
 - 2. Airflow
 - 3. Entering- and leaving-air temperature at full load
 - 4. Voltage and amperage input of each phase at full load and at each incremental stage
 - 5. Calculated kilowatt at full load
 - 6. Fuse or circuit-breaker rating for overload protection

- C. Measure, adjust, and record the following data for each steam coil:
 - 1. Dry-bulb temperature of entering and leaving air
 - 2. Airflow
 - 3. Air pressure drop
 - 4. Inlet steam pressure

- D. Measure, adjust, and record the following data for each refrigerant coil:
 - 1. Dry-bulb temperature of entering and leaving air
 - 2. Wet-bulb temperature of entering and leaving air
 - 3. Airflow
 - 4. Air pressure drop

3.13 PROCEDURES FOR TESTING, ADJUSTING, AND BALANCING

- A. Perform a preconstruction inspection of existing equipment that is to remain and be reused. This includes the following units:
 - 1. AHU-XXXX
 - 2. AHU-XXXX

- B. Testing shall include the following
 - 1. Measure and record the operating speed, airflow, and static pressure of each fan.
 - 2. Measure motor voltage and amperage. Compare the values to motor nameplate information.
 - 3. Check the refrigerant charge.
 - 4. Check the condition of filters.
 - 5. Check the condition of coils.
 - 6. Check the operation of the drain pan and condensate-drain trap.
 - 7. Check bearings and other lubricated parts for proper lubrication.
 - 8. Report on the operating condition of the equipment and the results of the measurements taken. Report deficiencies.

- C. Before performing testing and balancing of existing systems, inspect existing equipment that is to remain and be reused to verify that existing equipment has been cleaned and refurbished. Verify the following:
 - 1. New filters are installed.

2. Coils are clean and fins combed.
 3. Drain pans are clean.
 4. Fans are clean.
 5. Bearings and other parts are properly lubricated.
 6. Deficiencies noted in the preconstruction report are corrected.
- D. Perform testing and balancing of existing systems to the extent that existing systems are affected by the renovation work.
1. Compare the indicated airflow of the renovated work to the measured fan airflows, and determine the new fan speed and the face velocity of filters and coils.
 2. Verify that the indicated airflows of the renovated work result in filter and coil face velocities and fan speeds that are within the acceptable limits defined by equipment manufacturer.
 3. If calculations increase or decrease the air flow rates and water flow rates by more than 5 percent, make equipment adjustments to achieve the calculated rates. If increase or decrease is 5 percent or less, equipment adjustments are not required.
 4. Balance each air outlet.

3.14 FINAL REPORT

- A. General: Prepare a certified written report.
1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 2. Include a list of instruments used for procedures, along with proof of calibration.
- B. Final Report Contents: In addition to certified field-report data, include the following:
1. Pump curves
 2. Fan curves
 3. Manufacturers' test data
 4. Field test reports prepared by system and equipment installers
 5. Other information relative to equipment performance; do not include Shop Drawings and product data
- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page
 2. Name and address of the TAB contractor

3. Project name
 4. Project location
 5. Architect's name and address
 6. Engineer's name and address
 7. Contractor's name and address
 8. Report date
 9. Signature of TAB supervisor who certifies the report
 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 - d. Nomenclature sheets for each item of equipment.
 - e. Data for terminal units, including manufacturer's name, type, size, and fittings.
 - f. Notes to explain why certain final data in the body of reports vary from indicated values.
 12. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Face and bypass damper settings at coils.
 - e. Fan drive settings including settings and percentage of maximum pitch diameter.
 - f. Settings for supply-air, static-pressure controller.
 - g. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
 2. Water and steam flow rates.
 3. Duct, outlet, and inlet sizes.
 4. Pipe and valve sizes and locations.
 5. Terminal units.
 6. Balancing stations.
 7. Position of balancing devices.

3.15 INSPECTIONS

A. Initial Inspection

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:
 - a. Measure airflow of at least ten (10) percent of air outlets.
 - b. Measure water flow of at least five (5) percent of terminals.
 - c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
 - d. Verify that balancing devices are marked with final balance position.
 - e. Note deviations from the Contract Documents in the final report.

B. Final Inspection

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Owner..
2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Owner.
3. Owner shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal eight (8)-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than ten (10) percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

D. Prepare test and inspection reports.

3.16 ADDITIONAL TESTS

- A. Within ninety (90) days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 230594

SECTION 230713 - DUCTWORK INSULATION

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following Ductwork Insulation indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment Included in This Section
 - 1. Insulation
 - 2. Fasteners
 - 3. Jacketing
 - 4. Sealants

1.2 REFERENCES

- A. Ductwork schedules located on Drawings.
- B. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed in the following references:
 - 1. NFPA 90
 - 2. ASTM
- C. ABBREVIATIONS
 - 1. K: Thermal Conductivity, in Btu per inch thickness per hour per square foot.
 - 2. PVC: Polyvinylchloride

1.3 SUBMITTALS

- A. Product Data
 - 1. Manufacturer's catalog sheets and specifications for insulation materials and jacket materials.
 - 2. Materials Schedule: Itemize insulation materials and thicknesses for each specified application in Insulation Material Schedules in Part 3 of this Section. Where optional materials are specified, indicate option selected. Schedule should be similar to Ductwork schedule on Drawings.

1.4 QUALITY ASSURANCE

- A. Qualifications: The persons installing the Work of this Section and their Supervisor shall be personally experienced in mechanical insulation work and shall have been regularly employed by a company installing mechanical insulation for a minimum of five (5) years.
- B. Regulatory Requirements
 - 1. Insulation installed inside buildings, including duct lining materials, laminated jackets, mastics, sealants and adhesives shall have a Fire Spread/Smoke Developed Rating of 25/50 or less based on ASTM E 84.

PART 2 - PRODUCTS

2.1 ADHESIVES

- A. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Calcium Silicate Adhesive: fibrous, sodium-silicate-based adhesive with a service temperature range of 50° F - 800° F (10° C - 427° C).
- C. Cellular-Glass, Phenolic, Polyisocyanurate, and Polystyrene Adhesive: Solvent-based resin adhesive, with a service temperature range of -75° F to +300° F (-59° C to +149° C).
- D. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
- E. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, class 2, Grade A.
- F. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
- G. PVC Jacket Adhesive: Compatible with PVC jacket.

2.2 MASTICS

- A. For indoor applications, use mastics that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.

2.3 LAGGING ADHESIVES

- A. For indoor applications, use adhesive that has a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Description: Comply with MIL-A-3316C Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

2.4 JACKETS

A. PVC Jackets

1. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness: 0.030”.
2. Adhesive: As recommended by jacket material manufacturer.
3. 3. Color: White

B. Stainless Steel Jackets:

1. Stainless-Steel Jacket: ASTM A 167 or ASTM A 240/A 240M.
2. Type 304 or Type 316 sheet and roll stock ready for shop or field sizing. Material thickness: 0.030”.
3. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and 2.5mil- thick polysurlyn.

C. Aluminum Jackets:

1. Aluminum Jacket: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005, Temper H-14.
2. Moisture Barrier for Outdoor Applications: 3-mil thick, heat-bonded polyethylene.

D. Self-Adhesive Outdoor Jackets:

1. Self-Adhesive Outdoor Jacket: 60-mil thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with white aluminum-foil facing.

2.5 BANDING

- A. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316 as required to match jacketing material; 0.015 inch thick, 3/4 inch wide with wing seals.
- B. Aluminum: ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing seals.

2.6 SEALANTS

- A. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.7 INSULATION

A. Ductwork Insulation Types

1. Type A: Flexible fiberglass duct wrap. Minimum density 0.75 #/ft³, K of 0.30 at 75° F; ASTM C 553, Type II.
2. Type B: Semi-rigid fiberglass board wrap. Minimum density 3.0 #/ft³, K of 0.23 at 75° F; ASTM C 553, Type III.
3. Type C: Flexible fiberglass duct liner. Minimum density 3.0 #/ft³, K of 0.24 at 75° F; ASTM C 1071. Liner between insulation and airstream side of double-wall ductwork shall have a Fire Spread/Smoke Developed Rating of 25/50 or less based on ASTM E 84.
4. Type D: Preformed rigid fiberglass duct liner. Minimum density 3.0 #/ft³, K of 0.23 at 75°F; ASTM C 1071. Liner shall have a Fire Spread/Smoke Developed Rating of 25/50 or less based on ASTM E 84
5. Type E: Flexible mineral fiber duct wrap (Suitable for Temperatures Up to 1800° F). Minimum density 6 #/ft³; ASTM E 2336, NFPA 96-2011, UL 1978 (Rev. 6-02). Two (2)-hour fire separation rating with zero clearance to combustibles. Thickness shall be as specified or as required by AHJ to meet fire separation requirements.
6. Type F: Flexible fiberglass duct liner for spiral ductwork. Minimum density 3.0 #/ft³, K of 0.23 at 75° F; Liner shall have a Fire Spread/Smoke Developed Rating of 25/50 or less based on ASTM E 84.

- B. Fire resistant, anti-erosion, and anti-microbial coating on lining interior to duct; NFPA 90-A and 90-B.

- C. All insulation densities listed are minimum densities. Contractor shall be responsible for verifying the required insulation thickness & density to meet the minimum installed insulation R-values as listed in the ductwork schedules on the drawings.

PART 3 - EXECUTION

3.1 DUCT INSULATION SCHEDULE

- A. Refer to Ductwork Application Schedule on Drawings for insulation requirements.

3.2 PREPARATION

- A. Perform the following before starting insulation work.
1. Install hangers, supports and appurtenances in their permanent locations.
 2. Complete testing of piping, ductwork, and equipment.

3. Clean and dry surfaces to be insulated.

3.3 INSTALLATION, GENERAL

- A. Install the work of this section in accordance with the manufacturer's printed installation instructions unless otherwise specified.

3.4 INSTALLATION AT HANGERS AND SUPPORTS

- A. Reset and realign hangers and supports if they are displaced while installing insulation.
- B. Insulation inserts for use with fibrous glass insulation:
 1. Ductwork: Install 6 #/ft³ density jacketed fibrous glass board, same thickness as adjoining insulation, sized for full bearing on supporting trapeze member, and as required to enable abutting to adjoining insulation and overlapping of jacketing.

3.5 INSTALLATION OF DUCTWORK INSULATION

A. Exterior to Ductwork

1. Cut insulation to stretch-out dimensions as recommended by insulation manufacturer.
2. Remove two (2) inch wide strip of insulation material from the jacketing on the longitudinal and circumferential joint edges to form an overlapping staple/tape flap.
3. Install insulation with jacketing outside so staple/tape flap overlaps insulation and jacketing on other end.
4. Butt ends of insulation tightly together.
 - a. Rectangular and Square Ductwork: Do not compress insulation at duct corners.
5. Staple longitudinal and circumferential joints with outward clinching staples minimum six (6) inches on center, and seal with pressure sensitive sealing tape.
6. Cut off protruding ends of fasteners flush with insulation surface and seal with pressure sensitive sealing tape.
7. Install duct insulation fasteners on bottom side of horizontal duct runs, when bottom dimension of the duct is in excess of 24 inches in width.
8. Install duct insulation fasteners on sides of duct risers having a dimension over 24 inches in size.
9. Seal tears, punctures, and penetrations of insulation jacketing with sealing tape.

B. Interior to Ductwork

1. Insulate ducts prior to erection in place when ducts are required to be installed proximate to walls, ceilings, equipment or other ductwork, which will not permit adequate space for installation of insulation after ducts are installed.

2. Line interior surfaces of ducts with thermal and acoustic board insulation, when the specified application of exterior insulation is impractical.
 - a. Written permission from the Engineer must be received, prior to the substitution of lined ducts for exterior insulated ducts.
 - b. Maintain interior cross-sectional areas of ducts, as noted on drawings.

3.6 INSTALLATION OF JACKETING MATERIAL

A. PVC Jackets:

1. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.
2. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

B. Metal Jackets:

1. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.7 FIELD QUALITY CONTROL

- A. Field Samples: The Director's Representative, may at his discretion, take field samples of installed insulation for the purpose of checking materials and application. Reinsulate sample cut areas.

3.8 DUCTWORK SERVICE INSULATION SCHEDULE

- A. Insulate all ductwork except where otherwise specified. See Ductwork schedule on Drawings.

B. Notes

1. Equipment: Insulate air handling equipment, not furnished with factory applied insulated jacket or internal insulation, with minimum 1-1/2 inch thick fibrous glass board with an ASTM C 1136 Type I jacket, installed and finished as specified for exposed ductwork in finished spaces.

END OF SECTION 230713

SECTION 230719 - PIPING INSULATION

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the Piping Insulation indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. Pipe Hangers and Supports: Section 230529.
- B. Abbreviations
 - 1. K: Thermal Conductivity, i.e., maximum Btu per inch thickness per hour per square foot.
 - 2. pcf: Pounds per cubic foot.
 - 3. PVC: Polyvinylchloride.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's catalog sheets and specifications for the following:
 - 1. Insulation Materials.
 - 2. Jacket Materials.
 - 3. Sealant and Adhesive Materials.

1.4 QUALITY ASSURANCE

- A. Qualifications: The person(s) directly supervising the installation of this work in the field shall be personally experienced in mechanical insulation work and shall have been regularly employed by a company installing mechanical insulation for a minimum of five (5) years.
- B. Regulatory Requirements
 - 1. Insulation installed inside buildings, including laminated jackets, mastics, sealants and adhesives shall have a Fire Spread/Smoke Developed Rating of 25/50 or less based on ASTM E 84.
 - 2. Insulation shall meet minimum requirements ASHRAE 90.1-2007.

PART 2 - PRODUCTS

2.1 PIPING INSULATION

- A. Fibrous Glass (Mineral Fiber) Insulation: Composed principally of fibers manufactured from rock, slag, or glass, with or without binders, and asbestos free.
1. Preformed Pipe Insulation: Minimum density 3 pcf; ASTM C 547
 - a. Class 1 (Suitable for Temperatures Up to 450° F): K of 0.26 at 75° F.
 2. Premolded Fitting Insulation: Minimum density 4.0 pcf, K of 0.26 at 75° F; ASTM C 547, Class 1.
 3. Insulation Inserts for PVC Fitting Jackets: Minimum density 1.5 pcf, K of 0.28 at 75° F; ASTM C 553, Type III. Suitable for temperatures up to 450° F.
- B. Flexible Elastomeric Foam Insulation
1. FM tested and approved, meeting the following:
 - a. Maximum Water Vapor Transmission: 0.10 perm - inch based on ASTM E 96, Procedure A.
 - b. K of 0.27 at 75° F based on ASTM C 518 or C 177.
 2. Pipe Insulation: ASTM C 534, Type I.
 3. Polyethylene and polyolefin insulation is not acceptable.
- C. High Density Jacketed Insulation Inserts for Hangers and Supports
1. For Use with Fibrous Glass Insulation:
 - a. Cold Service Piping:
 - 1) Polyurethane Foam: Minimum density 4 pcf, K of 0.13 at 75° F, minimum compressive strength of 125 psi.
 - b. Hot Service Piping:
 - 1) Calcium Silicate: Minimum density 15 pcf, K of 0.50 at 300° F; ASTM C 533.
 - 2) Perlite: Minimum density 12 pcf, K of 0.60 at 300° F; ASTM C 610.
 2. For Use with Flexible Elastomeric Foam Insulation: Hardwood dowels and blocks, length or thickness equal to insulation thickness, other dimensions as specified or required.
- D. Cements
1. Fibrous Glass Thermal Insulating Cement: Asbestos free; ASTM C 195.
 2. Fibrous Glass Hydraulic Setting Thermal Insulating and Finishing Cement: ASTM C 449/C 449M.

2.2 INSULATION JACKETS

- A. Laminated Vapor Barrier Jackets for Piping: Factory applied by insulation manufacturer, conforming to ASTM C 1136, Type I.

1. Type I: Reinforced white kraft and aluminum foil laminate with kraft facing out.
 - a. Pipe Jackets: Furnished with integral 1-1/2" self sealing longitudinal lap, and separate 3" wide adhesive backed butt strips.
 2. Laminated vapor barrier jackets are not required for flexible elastomeric foam insulation.
- B. Canvas Jackets: Cotton duck, fire retardant, NFPA 701 compliant, 4 or 6 oz. per square yard as specified.
- C. PVC Jackets and Premolded Fitting Covers
1. Constructed of high impact, UV resistant PVC. 0.020" thickness.
 - a. ASTM D 1784, Class 14253-C.
 - b. Working Temperature: 0-150° F.
- D. Metal Jacketing
1. Aluminum: ASTM B 209, Alloys 1100, 3003, 3105 or 5005, Temper H14, 0.016 inch thick.
 - a. Factory Pre-formed Sectional Pipe Jacketing:
 - 1) Smooth outer finish with integral bonded laminated polyethylene film, kraft paper moisture barrier underside.
 - 2) Pittsburgh or modified Pittsburgh longitudinal lock seams.
 - 3) 2 inch overlapping circumferential joints with integral locking clips, or butt joints sealed with 2 inch wide mastic backed aluminum snap bands.
 - b. Fastening Devices:
 - 1) Strapping: Type 18-8 stainless steel, 0.020" thick, 1/2" and 3/4" wide as specified.
 - 2) Wing Seals: Type 18-8 stainless steel, 0.032" thick.
 - 3) Sheet Metal Screws: Panhead, Type A, hardened aluminum, and stainless steel.
 2. Circumferentially Corrugated Aluminum Jacketing: Childer's Corrolon, or Prior Approved Equal.
 - a. Construction: 3/16" circumferentially corrugated embossed aluminum, ASTM B 209, Types 1100, 3003, 3105, or 505, H-14 temper, 0.016" thick.
 - b. Moisture Barrier: Integrally bonded to jacket over entire surface in contact with insulation.
 - c. Fastening Devices:
 - 1) Strapping: 0.020" thick by 1/2" wide, Type 3003, 3105, 5005, H-14 temper.
 - 2) Wing Seals: 0.032" thick Type 5005, H-14 temper aluminum.
- E. Insulated Safety Wrap: Handi Lav-Guard by Truebro Inc., or Prior Approved Equal.
1. Construction: 1/8" thick chemical resistant vinyl with internal ribs.
 2. Fasteners: Nylon tie laces or reuseable clips.
 3. Kit includes covering for 8" tailpiece, P trap, 8" waste arm, hot and cold lines and valves, and required fasteners.

- F. Removable Insulation Covers: Advance Thermal Corp., or Prior Approved Equal.
1. Construction: Teflon or silicon coated canvas blanket. Insulation shall match insulation thickness or be as thick as possible.
 2. Fasteners: A minimum of Velcro, double-loop d-rings, and laces.
 3. Use materials that are rated for an application's specific temperature requirements, e.g. use high temperature (800° F) rated products for generator exhaust flues.

2.3 ADHESIVES, MASTICS, AND SEALERS

A. Adhesives

1. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D(EPA Method 24).
2. Calcium silicate Adhesive: Fibrous, sodium-silicate-based adhesive with a service temperature range of 50 - 800° F (10 - 427° C).
3. Cellular-Glass, Phenolic, Polyisocyanurate, and Polystyrene Adhesive: Solvent-based resin adhesive with a service temperature range of -75°F to +300°F (-59°C to +149°C)
4. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
5. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
6. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
7. PVC Jacket Adhesive: Compatible with PVC jacket.

B. Mastics

1. For indoor applications, use mastics that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D(EPA Method 24).
2. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.

C. Lagging Adhesives

1. For indoor applications, use adhesive that has a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D(EPA Method 24).
2. Description: Comply with MIL-A-3316C, Class I, Grade A, and shall be compatible with insulation materials, jackets, and substrates.

D. Sealants

1. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D(EPA Method 24).

2. Vapor Seal Adhesive (Fibrous Glass Insulation): Childers' CP-82, Epolux's Cadoprene 400, Foster's 85-75 or 85-20.
3. Vapor Barrier Mastic/Joint Sealer (Fibrous Glass Insulation): Childers' CP-30, Epolux's Cadalar 670, Foster's 95-44 or 30-35.
4. Adhesive (Flexible Elastomeric Foam): Armstrong's 520, Childers' CP-80, Epolux's Cadoprene 488, Foster's 82-40.
5. Sealant (Metal Pipe Jacket): One-part silicone sealant for high temperatures; Dow Corning's Silastic 736 RTV or General Electric's RTV 106.

2.4 MISCELLANEOUS MATERIALS

A. Pressure Sensitive Tape for Sealing Laminated Jackets:

1. Acceptable Manufacturers:
 - a. Alpha Associates
 - b. Childers
 - c. Ideal Tape
 - d. Morgan Adhesive.
2. Type: Same construction as jacket.

B. Wire, Bands, and Wire Mesh:

1. Binding and Lacing Wire: Nickel copper alloy or copper clad steel, gauge as specified.
2. Bands: Galvanized steel, 1/2" wide x 0.015" thick, with 0.032" thick galvanized wing seals.
3. Wire Mesh: Woven 20-gauge steel wire with 1" hexagonal openings, galvanized after weaving.

PART 3 - EXECUTION

3.1 PREPARATION

A. Perform the following before starting insulation Work:

1. Install hangers, supports and appurtenances in their permanent locations.
2. Complete testing of piping.
3. Clean and dry surfaces to be insulated.

3.2 INSTALLATION, GENERAL

- A. Install the Work of this Section in accordance with the manufacturer’s printed installation instructions unless otherwise specified.
- B. Provide continuous piping insulation and jacketing when passing thru interior wall, floor, and ceiling construction.
 - 1. At Through Penetration Firestops: Coordinate insulation densities with the requirements of approved firestop system being installed. See Section 078400.
 - a. Insulation densities required by approved firestop system may vary with the densities specified in this Section. When this occurs use the higher density insulation.
- C. Do not intermix different insulation materials on individual runs of piping.

3.3 INSTALLATION AT HANGERS AND SUPPORTS

- A. Reset and realign hangers and supports if they are displaced while installing insulation.
- B. Install high density jacketed insulation inserts at hangers and supports for insulated piping.
- C. Insulation Inserts For Use with Fibrous Glass Insulation
 - 1. Where clevis hangers are used, install insulation shields and high density jacketed insulation inserts between shield and pipe.
 - a. Where insulation is subject to compression at points over 180° apart, e.g. riser clamps, U-bolts, trapezes, etc.; fully encircle pipe with two (2) protection shields and two (2) high density jacketed fibrous glass insulation inserts within supporting members.
- D. Insulation Inserts For Use with Flexible Elastomeric Foam Insulation:
 - 1. Where clevis hangers are used, install insulation shields with hardwood filler pieces, same thickness as adjoining insulation, inserted in undersized die cut or slotted holes in insulation at support points.
 - 2. Contour hardwood blocks to match the curvature of pipe, and shield.
 - 3. Coat dowels and blocks with insulation adhesive, and insert while still wet.
 - 4. Vapor seal outer surfaces of dowels and blocks with adhesive after insertion.
 - 5. Install filler pieces as follows:

PIPE/TUBING SIZE	FILLER PIECES	POSITION
Thru 1-1/2"	2 dowel plugs	6 o'clock; in tandem
2" thru 4"	1 block, 2 dowel plugs	6 o'clock, and 4 & 8 o'clock respectively

6" thru 8"	2 blocks, 4 dowel plugs	6 o'clock; in tandem and 4 & 8 o'clock; in tandem
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3.4 INSTALLATION OF FIBROUS GLASS COLD SERVICE INSULATION

- A. Install insulation materials with a field or factory applied ASTM C 1136 Type I laminated vapor barrier jacket, unless otherwise specified.
- B. Piping
1. Butt insulation joints together, continuously seal minimum 1-1/2" wide self-sealing longitudinal jacket laps and 3" wide butt adhesive backed strips.
 - a. Substitution: 3" wide pressure sensitive sealing tape, of same material as jacket, may be used in lieu of butt strips.
 2. Bed insulation in a 2" wide band of vapor barrier mastic, and vapor seal exposed ends of insulation with vapor barrier mastic at each butt joint between pipe insulation and equipment, fittings or flanges at the following intervals:
 - a. Horizontal Pipe Runs: 21 ft.
 - b. Vertical Pipe Runs: 9 ft.
- C. Fittings, Valves, Flanges and Irregular Surfaces
1. Piping Systems (less than 40° F)
 - a. Insulate with mitre cut or pre-molded fitting insulation of same material and thickness as pipe insulation.
 - b. Secure insulation in place with 16-gauge wire, with ends twisted and turned down into insulation.
 - c. Butt insulation against pipe insulation and bond with joint sealer.
 - d. Insulate valves up to and including bonnets, without interfering with packing nuts.
 - e. Insulate pump impeller casings on pump systems operating below 45° F.
 - f. Apply leveling coat of insulating cement to smooth out insulation and cover wiring.
 - g. When insulating cement has dried, seal fitting, valve and flange insulation, by imbedding a layer of reinforcing membrane between two (2) flood coats of vapor barrier mastic, each 1/8" thick wet.
 - h. Lap reinforcing membrane or canvas on itself and adjoining pipe insulation at least 2 inches.
 - i. Trowel, brush or rubber glove outside coat over entire insulated surface.
 2. Piping Systems (40 - 60° F)
 - a. Valves, fittings and flanges shall be insulated with pre-molded PVC fitting jackets, with fibrous glass insulation inserts.
 - 1) Additional insulation inserts are required for services with operating temperatures under 45° F or where insulation thickness exceeds 1-1/2". The surface temperature of PVC fitting jacket must not go below 45° F.

3.5 INSTALLATION OF FIBROUS GLASS HOT SERVICE INSULATION

- A. Install insulation materials with field or factory applied ASTM C 1136 Type I laminated vapor barrier jacket unless otherwise specified.

B. Piping

1. Butt insulation joints together, continuously seal minimum 1-1/2" wide self-sealing longitudinal jacket laps and 3" wide adhesive backed butt strips.
 - a. Substitution: 3" wide pressure sensitive sealing tape, of same material as the jacket, may be used in lieu of butt strips.
2. Fill voids in insulation at hanger with insulating cement.
3. Exceptions:
 - a. Piping in Accessible Shafts, Attic Spaces, Crawl Spaces, Unfinished Spaces and Concealed Piping: Butt insulation joints together and secure minimum 1-1/2" wide longitudinal jacket laps and 3" wide butt strips of same material as jacket, with outward clinching staples on maximum 4" centers. Fill voids in insulation at hangers with insulating cement.
 - b. Piping in Tunnels: Butt insulation joints together and secure minimum 1-1/2" wide longitudinal jacket laps and 3" wide butt strips, of same material as jacket, with outward clinching staples on maximum 4" centers and 16 gauge wires a minimum of four (4) loops per section. Fill voids in insulation with insulating cement.

C. Fittings, Valves, Flanges and Irregular Surfaces

1. Insulate with mitre cut or pre-molded fitting insulation of same material and thickness as insulation.
2. Secure in place with 16-gauge wire, with ends twisted and turned down into insulation.
3. Butt fitting, valve and flange insulation against pipe insulation, and fill voids with insulating cement.
4. Insulate valves up to and including bonnets, without interfering with packing nuts.
5. Apply leveling coat of insulating cement to smooth out insulation and cover wiring.
6. After insulating cement has dried, coat insulated surface with lagging adhesive, and apply 4 oz or 6 oz canvas jacket as required by pipe size.
 - a. Lap canvas jacket on itself and adjoining pipe insulation at least 2".
 - b. Size entire canvas jacket with lagging adhesive.
7. Piping Systems (below 250° F)
 - a. Valves, fittings and flanges may be insulated with pre-molded PVC fitting jackets, with fibrous glass insulation inserts.
 - 1) The surface temperature of PVC fitting jacket not to exceed 150° F.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC FOAM INSULATION

A. Where possible, slip insulation over the pipe, and seal butt joints with adhesive.

1. Where the slip-on technique is not possible, slit the insulation and install.
2. Re-seal with adhesive, making sure the mating surfaces are completely joined.

- B. Insulate fittings and valves with miter cut sections. Use templates provided by the manufacturer, and assemble the cut sections in accordance with the manufacturer's printed instructions.
 - 1. Insulate threaded fittings and valves with sleeved fitting covers. Overlap and seal the covers to the adjoining pipe insulation with adhesive.
- C. Carefully mate and seal with adhesive all contact surfaces to maintain the integrity of the vapor barrier of the system.
- D. Piping Exposed Exterior to a Building, Totally Exposed to the Elements:
 - 1. Apply flexible elastomeric foam insulation to piping with adhesive.
 - 2. Apply reinforcing membrane around piping insulation with adhesive or mastic.
 - 3. Adhesive Applied System: Apply two (2) coats of finish.
 - 4. Mastic Applied System: Apply another coat of mastic over reinforcing membrane.

3.7 INSTALLATION OF PVC JACKETING ON PIPING

- A. Secure jacketing to insulated piping and seal with adhesive. All seams shall be secured flat.
- B. Jacket fittings with preformed covers.

3.8 INSTALLATION OF METAL JACKETING ON PIPING

- A. Secure jacketing to insulated piping with preformed aluminum snap straps and stainless steel strapping installed with special banding wrench.
- B. Jacket fittings, valves and flanges with mitred sections of aluminum jacketing.
 - 1. Seal joints with sealant and secure with preformed aluminum bands.
 - 2. Factory fabricated, preformed, sectional aluminum fitting covers may be used in lieu of mitred sections of aluminum jacketing for covering fittings, valves and flanges.

3.9 INSTALLATION OF REMOVABLE INSULATION COVERS

- A. Install Removable Insulation Covers in lieu of field applied insulation on the following items:
 - 1. Steam pressure reducing valve stations. Insulate all non-field insulated surfaces of valve assembly.
 - 2. Generator exhaust piping from generator to silencer.
 - 3. Heating water and steam condensate return pumps.
 - 4. Uninsulated headers of shell-and-tube heat exchangers.
 - 5. Steam boiler gate and non-return valves.

6. Control valves 4" and over.

3.10 FIELD QUALITY CONTROL

- A. Field Samples: The Owner's Representative, may at his discretion, take field samples of installed insulation for the purpose of checking materials and application. Contractor shall reinsulate sample cut areas.

3.11 PIPING INSULATION SCHEDULE

- A. Refer to Drawings for piping application schedule.
- B. Insulate all cold service and hot service piping, and appurtenances except where otherwise specified.
- C. Schedule of items not to be insulated:
 1. Do not insulate the following items:
 - a. Actual heat transfer surfaces.
 - b. Chromium plated piping, unless otherwise specified.
 - c. Flexible vibration eliminators.
 - d. Water meters.
 - e. Drains from heating equipment and appurtenances that flow to waste.
 - f. Chemical feed piping.
 - g. Piping inside convector and finned tube radiation enclosures.
 - h. Boiler blow-off and blow-down piping.
 - i. Safety and relief valves. Discharge piping from relief valves.
 - j. Vent piping to atmosphere installed exposed in Mechanical Rooms, connected to the following: Blow-off tanks, flash tanks, condensate tanks.
 - k. Flanges and unions in piping systems over 140° F.
 - l. Hydronic Specialties: Flow indicators, control valves 3" and under, air vents and air control fittings.
 - m. Steam traps and cooling legs of steam traps.
 - n. Float chambers and level controllers.
 2. Do not insulate mechanical equipment with a factory applied insulated steel jacket, unless specified otherwise.

3.12 INSULATION MATERIAL SCHEDULE

- A. Notes
 1. Cold Condensate Drain Piping: Insulate with same materials and thicknesses specified for domestic cold water.
 - a. Piping connected to drain pans under cooling coils within unit enclosure, except where over drain pans.
 - b. Horizontal condensate drain piping outside unit enclosures.
 - c. Vertical condensate drain piping of less than one (1) story immediately following horizontal run.
 2. Roof Drain Bodies Below Roof, Horizontal Conductor Piping Including Drops, and First Fitting on Vertical conductor: Insulate with same materials and thicknesses specified for domestic cold water.

3. Piping Serving Handicapped Accessible Lavatories:
 - a. Insulate exposed hot and cold water supply, and waste piping with insulated safety wrap. Install fasteners thru each pair of holes in insulated safety wrap.

3.13 SCHEDULE OF PVC JACKETING FOR INSULATED PIPE

- A. For exposed piping, install jacketing from floor to ceiling or from floor to first change of direction in riser, when such change in direction is a minimum of 9'-0" above finished floor, whichever is applicable.
- B. Jacket exposed insulated piping in mechanical rooms and tunnels with PVC jacketing.

END OF SECTION 230719

SECTION 230800 - COMMISSIONING OF HVAC

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide the following commissioning process requirements for HVAC & R systems, assemblies, and equipment as indicated by the Contract Documents.
- B. Commissioning of this project shall meet the current adopted version of the International Energy Conservation Code.
- C. Section includes commissioning process requirements for mechanical system, assemblies and equipment.

1.2 QUALITY ASSURANCE

- A. Installer and Manufacturer Qualifications
 - 1. Installer shall have an established working relationship with Control System Manufacturer.
 - 2. Installer shall have successfully completed Control System Manufacturer's control system training. Upon request, Installer shall present record of completed training including course outlines.
- B. Commissioning Agent Qualifications
 - 1. The testing commissioning agent will need to have a certification that has been accredited by the American National Standards Institute (ANSI).
- C. Regulatory Requirements
 - 1. Work, materials, and equipment shall comply with the most restrictive of local, state, and federal authorities' codes and ordinances or these plans and specifications.
 - a. Current adopted version of the National Electric Code (NEC)
 - b. Current adopted version of the International Building Code (IBC)
 - c. Current adopted version of the International Mechanical Code (IMC)
 - d. ANSI/ASHRAE 135 adopted version: Data Communication Protocol for Building Automation and Control Systems (BACNET)
 - e. Current adopted version of the International Energy Conservation Code
 - f. ASHRAE 90.1 adopted version: Energy Standard for Buildings
- D. Start up of equipment and systems shall be done by or with a trained manufacturer's representative who can check and report on all items such as installation, operation, and see that the equipment or system starts and operates properly.
- E. Testing shall be performed at the convenience of the Owner and with the Owner's representatives present and the manufacturer's representative of the equipment and/or system present.

1.3 ABBREVIATIONS

- A. The following are common abbreviations used in the Specifications and in the Commissioning Plan. Definitions are found in Section 1.5.

A/E- Architect and Design Engineers	GC- General Contractor
CxA- Commissioning Authority	MC- Mechanical Contractor
TC- Temperature Controls Contractor	OR- Owner's Representative
PC- Prefunctional Checklist	
Cx- Commissioning	PM- Project Manager (of the Owner)
Cx Plan- Commissioning Plan	FPT- Functional Performance Test
EC- Electrical Contractor	TAB- Test and Balance Contractor

1.4 DEFINITIONS

- A. **Acceptance Phase:** Phase of construction after startup and initial checkout when functional performance tests, O&M documentation review and training occurs.
- B. **Approval:** Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes in accordance with the contract documents.
- C. **Architect/Engineer (A/E):** The prime consultant (architect) and sub-consultants who comprise the design team, generally the HVAC mechanical designer/engineer and the electrical designer/engineer.
- D. **Basis of Design (BOD):** A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- E. **Commissioning Authority (CxA):** The entity identified by the OR/PM who leads, plans, schedules, and coordinates the commissioning team to implement the commissioning process.
- F. **Commissioning Plan:** An overall plan that provides the structure, schedule and coordination planning for the commissioning process.
- G. **Contractors:** The subcontractors to the GC who provide and install building components and systems.
- H. **Deferred Functional Tests:** Tests that are performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions that disallow the test from being performed.
- I. **Deficiency:** A condition in the installation or function of a component, piece of equipment or system that is not in compliance with the contract documents (that is, does not perform properly or is not complying with the design intent).
- J. **Factory Testing:** Testing of equipment on-site or at the factory by factory personnel.
- K. **Functional Performance Test (FPT):** Test of the dynamic function and operation of equipment and systems using manual or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The CxA develops the functional test procedures in written form. The CxA performs or directs, coordinates,

oversees, and documents the actual testing. The contractor performs the functional tests when requested by the CxA. FPT's are performed after startup are complete.

- L. General Contractor (GC): The prime contractor for this project. Generally responsible for the overall coordination of the project.
- M. Monitoring: The recording of parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of control systems.
- N. Observation/Issue Log: The log of all commissioning related items that require current or future attention. This form is used to track all action taken on each item listed overtime until the items are resolved.
- O. Owner's Project Requirements (OPR): A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
- P. Phased Commissioning: Commissioning that is completed in phases (by floors, for example) due to the size of the structure or other scheduling issues, in order to minimize the total construction time. Commissioning shall be provided for each phase according to the schedule for that phase. Some repetition and/or remobilization may be required.
- Q. Sampling: Functionally testing only a fraction of the total number of identical or near identical pieces of equipment.
- R. Startup: The initial starting or activating of dynamic equipment.
- S. Trending: Monitoring using the building control system.
- T. Warranty Period: Warranty period for entire project, including equipment components. Warranty begins at substantial completion and extends for at least one year, unless specifically noted otherwise in the contract documents and accepted submittals.

1.5 CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor's commissioning responsibilities are as follows (all references apply to commissioned systems and equipment only):
 1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation.
 2. Cooperate with the CxA for resolution of issues recorded in the observation/issue log.
 3. Attend commissioning team meetings.
 4. Include the cost of commissioning assistance in the contract price.
 5. Address incomplete work before functional performance testing.
 6. Assist the CxA as necessary in the seasonal or deferred testing and deficiency corrections required by the specifications.

7. Provide skilled technicians to execute startup of equipment. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.
8. Provide skilled technicians to participate and assist under the direction of the CxA for specified equipment. Provide manufacturer's representative as required and as specified in the specification.
9. Mechanical Contractor shall submit approved equipment data sheets on systems to be commissioned to the CxA for review.
10. Control Contractor shall submit all approved equipment data sheets, approved control drawings and approved sequence of operations to the CxA.
11. TAB Contractor shall submit certification documentation, TAB procedures plan, and preliminary project layout (which shall include an inventory of required flow rates for each air and hydronic system).
12. Provide all training as specified.

1.6 CxA'S RESPONSIBILITIES

- A. The CxA is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CxA may assist with problem-solving, non-conformance or deficiencies, but ultimately that responsibility resides with the GC and the A/E. The primary role of the CxA is to develop and coordinate the execution of a testing, observe and document performance—that systems are functioning in accordance with the documented design intent and contract documents. The contractors will provide all tools or the use of tools to start, check-out and functionally test equipment and systems.
 1. Coordinates and directs the commissioning activities using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
 2. Coordinate the commissioning work with the GC/CM to ensure that commissioning activities are being scheduled into the master schedule.
 3. Revise, as necessary, the commissioning plan.
 4. Plan and conduct a commissioning kickoff meeting and other commissioning meetings.
 5. Request and review additional information required to perform commissioning tasks, including O&M materials, contractor start-up and checkout procedures.
 6. Write the functional performance test procedures for equipment and systems. This may include energy management control system trending, stand-alone datalogger monitoring or manual functional testing.
 7. Analyze any functional performance trend logs and monitoring data to verify performance.
 8. Perform or direct, witness and approve manual functional performance tests. Coordinate retesting as necessary until satisfactory performance is achieved.

9. Maintain the observation/issue log and distribute to the team.
10. Review the training of the owner's operating personnel when defined in the contract documents.
11. Provide a final commissioning report.
12. Perform or direct, witness and supervise required seasonal or deferred testing and deficiency corrections.

1.7 COMMISSIONING DOCUMENTATION

- A. Provide the following information to the CxA for inclusion in the commissioning plan:
1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
 2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
 3. Process and schedule for completing prefunctional checklists and manufacturer's prestart and startup checklists for HVAC&R systems, assemblies, equipment, and components to be verified and tested.
 4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
 5. Certificate of readiness certifying that HVAC&R systems, subsystems, equipment, and associated controls are ready for testing.
 6. Test and inspection reports and certificates.
 7. Testing, adjusting, and balancing reports.
 8. Laser alignment reports.
 9. Vibration testing and analysis reports.
 10. Completion report of pipe cleaning, flushing hydrostatic testing and chemical water treatment.
- B. The CxA shall provide and include the following documentation:
1. Commissioning plan.
 2. Functional performance testing procedures for each series of tests. Submittals shall include samples of data reporting sheets that will be part of the reports.
 3. Final commissioning report.

1.8 SYSTEMS TO BE COMMISSIONED

- A. The following checked systems will be commissioned in this project:

1. HVACR Systems
2. Domestic Water Heating System
3. Energy Management Systems (BAS, EMS, DDC)
4. Items noted in specification section 260800.

PART 2 - EXECUTION

2.1 PRE-STARTUP VERIFICATION (PSV)

- A. Prior to the installation of each piece of equipment, verify that equipment arriving on site is consistent with what was required.
- B. Certify that HVAC & R systems, subsystems, and equipment have been installed according to the Contract Documents.
- C. Certify that HVAC & R instrumentation and control systems have been installed, connected, calibrated and are ready for start-up procedures.
- D. Inspect and verify the position of each device and interlock.

2.2 STARTUP TESTING AND VERIFICATION (STV)

- A. Prior to the startup of each piece of equipment, verify that equipment installed is consistent with what was required.
- B. Certify that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
- C. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- D. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
- E. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

2.3 TESTING, ADJUSTING AND BALANCING (TAB) VERIFICATION

- A. Testing, adjusting and balancing shall be carried out in direct contract with the Owner.
- B. Prior to performance of TAB Work, provide copy of completed system readiness checklists, preliminary report (comprehensive project layout in electronic format), and certification documentation to the CxA.
- C. Notify the CxA at least 10 days in advance of testing and balancing Work, and provide access for the CxA to witness testing and balancing Work.

- D. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of the CxA.
 - 1. The CxA will notify testing and balancing Contractor 10 days in advance of the date of field verification. Notice will not include data points to be verified.
 - 2. The testing and balancing Contractor shall use the same instruments (by model and serial number) that were used when original data were collected.
 - 3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of three (3) dB shall result in rejection of final testing. Variations in background noise must be considered.
 - 4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.
- E. Vibration and Sound Tests: Upon completion of TAB Work, the Owner will provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls. Notify CxA at least ten (10) days prior to testing.

2.4 FUNCTIONAL PERFORMANCE TESTING REQUIREMENTS (FPT)

- A. Certify that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- B. Prior to the functional performance testing of each piece of equipment, verify that equipment has been correctly brought online and TAB report has been accepted (ie, verify that the STV for each piece of equipment has been completed and accepted)
- C. Certify that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.
- D. All members of the Cx team shall provide technicians, instrumentation, and tools as required in the respective FPT test format.
- E. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.
- F. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.
- G. The CxA along with the HVAC&R Subcontractor, testing and balancing Subcontractor, and HVAC&R Instrumentation and Control Subcontractor shall prepare detailed testing plans, procedures, for HVAC&R systems, subsystems, and equipment.
- H. Tests will be performed using design conditions whenever possible.
- I. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments.

Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

- J. The CxA may direct that set points be altered when simulating conditions is not practical.
- K. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.
- L. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.
- M. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

2.5 HVAC & R SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

- A. Boiler Testing and Acceptance Procedures: Testing requirements are specified in Division 23 boiler Sections. Provide submittals, test data, inspector record, and boiler certification to the CxA.
- B. HVAC&R Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls." Assist the CxA with preparation of testing plans.
- C. Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment requirements are specified in Division 23 piping Sections. HVAC&R Contractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include the following:
 1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
 2. Description of equipment for flushing operations.
 3. Minimum flushing water velocity.
 4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.
- D. Refrigeration System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of chillers, cooling towers, refrigerant compressors and condensers, heat pumps, and other refrigeration systems. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.
- E. HVAC & R Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air, steam, and hydronic distribution systems; special exhaust; and other distribution systems, including HVAC & R terminal equipment and unitary equipment.

2.6 DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS

- A. Documentation: The CxA shall perform or direct, witness, and document the results of all functional performance tests using the specific procedural forms developed for that purpose. The CxA will include the filled out forms in the final report.
- B. Non-conformance
1. The CxA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and reported to the GC/CM and the contractors in the observation/issue log.
 2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA.
 3. As testing progresses and deficiencies are identified, the CxA shall discuss such deficiencies with the commissioning team and responsible contractors.
 - a. When there is no dispute on the deficiency and the contractor accepts responsibility to correct the deficiency, the CxA will document it in the observation/issue log and require the responsible contractor to respond to the item in the log. The contractor shall reschedule the test and the test is repeated by the CxA.
 - b. If there is a dispute about a deficiency, specifically whether or not it is a deficiency, the dispute shall be documented in the observation/issue log. Resolutions will be made at the lowest management level possible. Other parties will be brought into the resolution discussions as needed. Final authority is with the A/E. Final acceptance authority is with the OR/PM. The CxA will document the resolution process. Once the resolution has been accepted, the contractor corrects the deficiency, responds in the observation/issue log certifying the equipment is ready to be retested, and sends the log back through the GC/CM to the CxA. The contractor shall reschedule the test and the test is repeated by the CxA until satisfactory performance is achieved.
- C. Cost of Retesting
1. The cost for the contractor to retest a functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the GC/CM.
- D. Failure Due to Manufacturer Defect: If 10%, or three, whichever is greater, of identical pieces of equipment fail to perform to the contract documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance specification, all identical units may be considered unacceptable by the A/E or CxA. In such case, the contractor shall provide the OR/PM or GC/CM with the following:
1. Within one week of notification from the OR/PM or GC/CM, the contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the OR/PM or GC/CM within two weeks of the original notice.
 2. Within two weeks of the original notification, the contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.

3. The A/E will determine whether a replacement of all identical units or a repair is acceptable.
 4. Two examples of the proposed solution will be installed by the contractor and the A/E will be allowed to test the installations for up to one week, upon which the A/E will decide whether to accept the solution.
 5. Upon acceptance, the contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.
- E. Approval: The CxA notes each satisfactorily demonstrated function on the test form. Final approval of the functional tests is made after review by the CxA and by the OR/PM, following recommendations by the A/E.

END OF SECTION 230800

SECTION 230900 – DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following HVAC Control System indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. The control system shall consist of a high-speed, peer-to-peer network of DDC controllers and web server. The system shall control or monitor all equipment specified on the Contract Drawings. See the temperature controls responsibility matrix on the drawings.
- C. Equipment Included in This Section
 - 1. Products (not furnished or installed but integrated with the Work of this section)
 - a. Coordination Meeting: The Installer furnishing the DDC network shall meet with the Installer(s) furnishing mechanical equipment, VFD's, fire alarm, and controllers to coordinate details of the interface between these products and the DDC network. The Owner or his designated representative shall be present at this meeting. Each Installer shall provide the Owner and all other Installers with details of the proposed interface hardware and software identifiers for the interface points, network identifiers, wiring requirements, communication speeds, and required network accessories. The purpose of this meeting shall be to insure there are no unresolved issues regarding the integration of these products into the DDC network. Submittals for these products shall not be approved prior to the completion of this meeting.

1.2 REFERENCES

- A. The General Conditions of the Contract, Supplementary Conditions, and General Requirements are part of this specification and shall be used in conjunction with this section as part of the contract documents.
- B. Related Work
 - 1. Section 230500 - Common Work Results for HVAC
 - 2. Section 260500 - Common Work Results for Electrical
 - 3. Section 260523 – Control Cables
 - 4. Section 280000 - Electronic Safety and Security (includes Fire and Smoke)

1.3 SUBMITTALS

- A. Product Submittal Requirements: Provide a minimum of three (3) copies of Shop Drawings and other submittals on hardware, software, and equipment to be installed or furnished. Begin no work until submittals have been approved for conformity with design intent. Provide drawings as AutoCAD compatible files on CD (file format: .DWG or .DXF) and prints of each drawing on 11" x 17" paper. When manufacturer's cutsheets apply to a product series rather than a specific product, clearly indicate applicable data by highlighting or by other means. Clearly

reference covered specification and drawing on each submittal. General catalogs shall not be accepted as cutsheets to fulfill submittal requirements. Select and show submittal quantities appropriate to scope of work. Submittal approval does not relieve Contractor of responsibility to supply sufficient quantities to complete work.

1. Direct Digital Control System Hardware
 - a. Complete bill of materials indicating quantity, manufacturer, model number, and relevant technical data of equipment to be used.
 - b. Manufacturer's description and technical data such as performance curves, product specifications, and installation and maintenance instructions.
 - c. Diagrams indicating field sensor and controller locations.
 2. Central System Hardware and Software
 - a. Complete bill of material indicating quantity, manufacturer, model number, and relevant technical data of equipment used.
 - b. Manufacturer's description and technical data such as product specifications and installation and maintenance instructions.
 - c. Schematic diagrams of control, communication, and power wiring for central system installation. Show interface wiring to control system.
 3. Controlled Systems
 - a. Riser diagrams showing control network layout, communication protocol, and wire types.
 - b. Schematic diagram of each controlled system. Label control points with point names. Graphically show locations of control elements.
 - c. Instrumentation list (Bill of Materials) for each controlled system. List each control system element in a table. Show element name, type of device, manufacturer, model number, and product data sheet number.
 - d. Complete description of control system operation including sequences of operation. Include and reference schematic diagram of controlled system. List I/O points and software points specified on Drawings. Indicate alarmed and trended points.
 - e. Submittal of control sequences should include the actual control sequence proposed for this project, not a copy of the sequence included in the construction documents. If the actual sequence is not available during the initial submission of the shop drawings it can be issued for review during construction prior to equipment startup.
- B. Control Point Integration List
1. Contractor to provide a master list of all control points for each piece of mechanical equipment with packaged controls.
- C. Control Point Verification List
1. Contractor to provide a list containing all control points after substantial completion. The list shall include the following:
 - a. Operation of the control point was operating as needed per the contract documents / shop drawings.
 - b. Who verified the point operation.
 - c. Date and time of verification.

- D. Training Materials: Provide course outline and materials for each class at least four (4) weeks before first class.
- E. Project Record Documents. Submit three (3) copies of record (as-built) documents upon completion of installation for approval prior to final completion. Submittal shall consist of:
 - 1. Provide three (3) copies of project record drawings. As-built versions of submittal shop drawings provided as AutoCAD compatible files on CD (file format: .DWG or .DXF) and prints of each drawing on 11" x 17" paper.
 - 2. Completed versions of reports, checklists, and trend logs used to meet requirements of Control System Demonstration and Acceptance Section.
 - 3. Operation and Maintenance (O&M) Manual: Printed, electronic, or online help documentation of the following:
 - a. As-built versions of submittal product data.
 - b. Names, addresses, and telephone numbers of installing contractors and service representatives for equipment and control systems.
 - c. Operator's manual with procedures for operating control systems: logging on and off, handling alarms, producing point reports, trending data, overriding computer control, and changing setpoints and variables.
 - d. Programming manual or set of manuals with description of programming language and syntax, statements for algorithms and calculations used, point database creation and modification, program creation and modification, and editor use.
 - e. Engineering, installation, and maintenance manual or set of manuals that explains how to design and install new points, panels, and other hardware; how to perform preventive maintenance and calibration; how to debug hardware problems; and how to repair or replace hardware.
 - f. Documentation of programs created using custom programming language including setpoints, tuning parameters, and object database. Electronic copies of programs shall meet this requirement if control logic, setpoints, tuning parameters, and objects can be viewed using furnished programming tools.
 - g. Graphic files, programs, and database on CD.
 - h. List of recommended spare parts with part numbers and suppliers.
 - i. Complete original-issue documentation, installation, and maintenance information for furnished third-party hardware including computer equipment and sensors.
 - j. Complete original-issue copies of furnished software, including operating systems, custom programming language, operator workstation or web server software, and graphics software.
 - k. Licenses, guarantees, and warranty documents for equipment and systems.
 - l. Recommended preventive maintenance procedures for system components, including schedule of tasks such as inspection, cleaning, and calibration; time between tasks; and task descriptions.

1.4 QUALITY ASSURANCE

- A. Installer and Manufacturer Qualifications
 - 1. Installer shall have an established working relationship with Control System Manufacturer.
 - 2. Installer shall have successfully completed Control System Manufacturer's control system training. Upon request, Installer shall present record of completed training including course outlines.

B. Regulatory Requirements

1. Work, materials, and equipment shall comply with the most restrictive of local, state, and federal authorities' codes and ordinances or these plans and specifications.
 - a. Adopted version of the National Electric Code (NEC)
 - b. Adopted version of the International Building Code (IBC)
 - c. Adopted version of the International Mechanical Code (IMC)
 - d. ANSI/ASHRAE 135 (adopted version): Data Communication Protocol for Building Automation and Control Systems (BACNET)
 - e. Adopted version of the International Energy Conservation Code
 - f. ASHRAE 90.1 (adopted version): Energy Standard for Buildings

- C. Components shall not contain any mercury unless written permission is obtained from Owner.

1.5 WARRANTY

- A. Warrant labor and materials for specified control system free from defects for a period of twelve (12) months after final acceptance. Control system failures during warranty period shall be adjusted, repaired, or replaced at no additional cost or reduction in service to Owner. Respond during normal business hours within twenty-four (24) hours of Owner's warranty service request.
- B. Work shall have a single warranty date, even if Owner receives beneficial use due to early system start-up. If specified work is split into multiple contracts or a multi-phase contract, each contract or phase shall have a separate warranty start date and period. These warranty dates shall be submitted to the Owner.
- C. Provide updates to operator workstation or web server software, project-specific software, graphic software, database software, and firmware that resolve Contractor-identified software deficiencies at no charge during warranty period. If available, Owner can purchase in-warranty service agreement to receive upgrades for functional enhancements associated with above-mentioned items. Do not install updates or upgrades without Owner's written authorization.
- D. Exception: Contractor shall not be required to warrant reused devices except those that have been rebuilt or repaired. Installation labor and materials shall be warranted. Demonstrate operable condition of reused devices at time of Engineer's acceptance.

1.6 OWNERSHIP OF PROPRIETARY MATERIAL

- A. Project-specific software and documentation shall become Owner's property. This includes, but is not limited to:
 1. Graphics
 2. Record drawings
 3. Database
 4. Application programming code
 5. Documentation

PART 2 - PRODUCTS

2.1 GENERAL DESCRIPTION

- A. The control system shall consist of a high-speed, peer-to-peer network of DDC controllers. Depict each mechanical system and building floor plan by a point-and-click graphic. Furnish a network interface card for remote access to the network and for notifying operators when an alarm occurs.
 - 1. Web-based Operators shall be able to access the system through a conventional web browser on each PC connected to the network.
- B. The system shall directly control HVAC equipment as specified on the Drawings. Each zone controller shall provide occupied and unoccupied modes of operation by individual zone. Furnish energy conservation features such as optimal start and stop, night setback, request-based logic, and demand level adjustment of setpoints as specified in the sequence.
- C. Provide for future system expansion to include monitoring of occupant card access, fire alarm, and lighting control systems.
- D. The system for this building shall be accessible from the same front end as the City's existing buildings.

2.2 APPROVED CONTROL SYSTEMS

- A. Distech by Woodman Controls

2.3 MATERIALS

- A. Use new products the manufacturer is currently manufacturing and selling for use in new installations. Do not use this installation as a product test site unless explicitly approved in writing by Owner. Spare parts shall be available for at least five (5) years after completion of this contract.

2.4 SYSTEM PERFORMANCE

- A. System shall conform to the following minimum standards over network connections. Systems shall be tested using manufacturer's recommended hardware and software for operator server and browser.
 - 1. A graphic with twenty (20) dynamic points shall display with current data within ten (10) seconds.
 - 2. A graphic with twenty (20) dynamic points shall update with current data within eight (8) seconds and shall automatically refresh every fifteen (15) seconds.
 - 3. Screens used for configuring, calibrating, or tuning points, PID loops, and similar control logic shall automatically refresh within six (6) seconds.
 - 4. Devices shall react to command of a binary object within two (2) seconds. Devices shall begin reacting to command of an analog object within two (2) seconds.

5. An object that goes into alarm shall be annunciated at the workstation within fifteen (15) seconds.
6. Custom and standard applications shall be capable of running as often as once every five (5) seconds. Select execution times consistent with the mechanical process under control.
7. Programmable controllers shall be able to completely execute DDC PID control loops at a frequency adjustable down to once per second. Select execution times consistent with the mechanical process under control.
8. System shall report values with minimum end-to-end accuracy listed in Table 230900-1.
9. Control loops shall maintain measured variable at setpoint within tolerances listed in Table 230900-2.

Table 230900-1: Reporting Accuracy

Measured Variable	Reported Accuracy
Space Temperature	±1°F
Ducted Air	±1°F
Outside Air Temperature	±2°F
Dew Point Temperature	±3°F
Water Temperature	±1°F
Temperature Difference (Delta-T)	±0.25°F
Relative Humidity	±5% RH
Water Flow	±2% of full scale
Airflow (terminal)	±10% of full scale (Note 1)
Airflow (measuring stations)	±5% of full scale
Airflow (pressurized spaces)	±3% of full scale
Air Pressure (ducts)	±0.1 in. w.g.
Air Pressure (space)	±0.01 in. w.g.
Water Pressure	±2% of full scale (Note 2)
Electrical (A, V, W, Power Factor)	±1% of reading (Note 3)
Carbon Monoxide (CO)	±5% of reading
Carbon Dioxide (CO ₂)	±50 ppm

Notes:

1. Accuracy applies to 10% - 100% of scale
2. For both absolute and differential pressure
3. Not including utility-supplied meters

Table 230900-2: Control Stability and Accuracy

Controlled Variable	Control Accuracy	Range of Medium
Air Pressure	±0.2 in. w.g. ±0.01 in. w.g.	0 to 6 in. w.g. -0.1 to 0.1 in. w.g.

Airflow	±10% of full scale	
Space Temperature	±2.0°F	
Duct Temperature	±3°F	
Relative Humidity	±5% RH	
Fluid Pressure	±1.5 psi ±1.0 in. w.g.	1 to 150 psi 0 to 50 in. w.g. differential

2.5 COMMUNICATION

- A. Control products, communication media, connectors, repeaters, hubs, and routers shall comprise a unified control network. A gateway (translator) shall communicate with third-party equipment furnished or installed by others.
- B. Install new wiring and network devices as required to provide a complete and workable control network.
- C. Each controller shall have a communication port for temporary connection to a laptop computer or other operator interface. Connection shall support memory downloads and other commissioning and troubleshooting operations.
- D. System shall automatically synchronize controller time clocks daily from an operator-designated controller via the internetwork. If applicable, system shall automatically adjust for daylight saving and standard time.
- E. System shall be expandable to at least twice the required input and output objects with additional controllers, associated devices, and wiring.
- F. System shall support Web services data exchange with any other system that complies with XML (extensible markup language) and SOAP (simple object access protocol) standards specified by the Web Services Interoperability Organization (WS-I) Basic Profile 1.0 or higher. Web services support shall as a minimum be provided at the workstation or web server level and shall enable data to be read from or written to the system.

2.6 OPERATOR INTERFACE

- A. Web server shall reside on high-speed network with building controllers. Each standard browser connected to server shall be able to access all system information.
- B. Operator interface shall allow each authorized operator to execute the following functions as a minimum:
 1. System shall require user name and password to log in to operator interface.
 2. Operator interface shall be graphically based and shall allow operators to access graphics for equipment and geographic areas using point-and-click navigation.
 3. Operators shall be able to:
 - a. View controlled equipment status and to adjust operating parameters such as setpoints, PID gains, on and off controls, and sensor calibration.
 - b. View scheduled operating hours of each schedulable piece of equipment on a weekly or monthly calendar-based graphical schedule display, to select and adjust

- each schedule and time period, and to simultaneously schedule related equipment. System shall clearly show exception schedules and holidays on the schedule display.
- c. View a list of currently active system alarms, to acknowledge each alarm, and to clear (delete) unneeded alarms.
 - d. View a trend graph of each trended point and to edit graph configuration to display a specific time period or data range. Operator shall be able to create custom trend graphs to display on the same page data from multiple trended points.
 - e. Run preconfigured reports, to view report results, and to customize report configuration to show data of interest.
 - f. View controller status, to reboot each controller, and to download new control software to each controller.
4. Typically, only a few operators are authorized to manage operator access. Authorized operators shall be able to view a list of operators with system access and of functions they can perform while logged in. Operators shall be able to add operators, to delete operators, and to edit operator function authorization. Operator shall be able to authorize each operator function separately.
- C. System Software
1. Operating System: Web server shall have an industry-standard professional-grade operating system.
 2. System Graphics:
 - a. Operator interface shall be graphically based.
 - b. Each piece of equipment shall include at least one (1) graphic or occupied zone and indicate animations for fans, pumps, dampers, and compressors such that it is intuitive when they are running or when they are stopped.
 - c. Each system graphic shall include a button/tab to a display of the applicable sequence of operation.
 - d. Floorplan layouts showing rooms and temperature are required. Indicate thermal comfort on the floorplan using dynamic colors to represent zone temperature relative to zone setpoint.
 - e. By clicking on the temperature icon, this will direct you to the dedicated graphic with all related information on that piece of equipment i.e. VAV box, AHU, unit heater, etc.
 - f. When the sequence of operation state (adj.), all of these points shall be adjustable by the user from the graphics, i.e. DAT, zone temps, OA enable temps, etc.
 - g. All overridden points shall be highlighted with a unique color to clearly indicate overridden.
- D. System Tools: System shall provide the following functionality to authorized operators as an integral part of the operator interface or as stand-alone software programs. If furnished as part of the interface, the tool shall be available from each workstation or web browser interface. If furnished as a stand-alone program, software shall be installable on standard IBM-compatible PCs with no limit on the number of copies that can be installed under the system license.
1. Each workstation or web server shall store on its hard disk a copy of the current system database, including controller firmware and software. Stored database shall be automatically updated with each system configuration or controller firmware or software change.
 2. Operators shall be able to download memory from the system database to each controller.

3. Context-sensitive online help for each tool shall assist operators in operating and editing the system.
4. System shall require a user name and password to view, edit, add, or delete data.
 - a. Each user name and password combination shall define accessible viewing, editing, adding, and deleting functions in each system application, editor, and object.
 - b. Automatically log out each operator if no keyboard or mouse activity is detected. Operators shall be able to adjust automatic log out delay.
 - c. Store system security data including operator passwords in an encrypted format. System shall not display operator passwords.
5. System shall automatically monitor controller and I/O point operation. System shall annunciate controller failure and I/O point locking (manual overriding to a fixed value).
6. Alarm messages shall use an English language descriptor without acronyms or mnemonics to describe alarm source, location, and nature.
7. The alarm management portion of the user interface shall, at the minimum, provide the following functions:
 - a. Log date and time of alarm occurrence.
 - b. Allow a user, with the appropriate security level, to acknowledge, temporarily silence, or discard an alarm from the workstation or web browser interface.
 - c. Provide an audit trail on hard drive for alarms by recording user acknowledgment, deletion, or disabling of an alarm. The audit trail shall include the name of the user, the alarm, the action taken on the alarm, and a time/date stamp.
 - d. At minimum, direct alarms shall be able to log, print, start programs, display messages, send e-mail, send page, send text message, and audibly annunciate. BMS contractor shall coordinate implementation of this feature with the owner as part of the work of this project.
 - e. Any attribute of any object in the system may be designated to report an alarm.
 - f. The system shall annunciate diagnostic alarms indicating system failures and non-normal operating conditions.
 - g. All specified alarms shall be shown on the correct system graphic, turn red and flash.
 - h. Alarm messages shall use an English language descriptor without acronyms or mnemonics to describe alarm source, location, and nature.
8. Operator shall be able to configure trend sample or change of value (COV) interval, start time, and stop time for each system data object and shall be able to retrieve data for use in spreadsheets and standard database programs. Controller shall sample and store trend data and shall be able to archive data to the hard disk.
9. Operator shall be able to view, and to edit if applicable, the status of each system object and property by menu, on graphics, or through custom programs.
10. Operator shall be able to select, to modify, to create, and to print reports and logs. Operator shall be able to store report data in a format accessible by standard spreadsheet and word processing programs.
11. Furnish the following standard system reports:
 - a. System objects and current values filtered by object type, by status (in alarm, locked, normal), by equipment, by geographic location, or by combination of filter criteria.

- b. Current alarms and closed alarms. System shall retain closed alarms for an adjustable period.
 - c. System shall log the following to a database or text file and shall retain data for an adjustable period:
 - 1) Alarm History.
 - 2) Operator shall be able to select trends to be logged.
 - 3) At a minimum, system shall log operator log in and log out, control parameter changes, schedule changes, and alarm acknowledgment and deletion. System shall date and time stamp logged activity.
12. Graphically based tools and documentation shall allow Operator to edit system graphics, to create graphics, and to integrate graphics into the system. Operator shall be able to add analog and binary values, dynamic text, static text, and animation files to a background graphic using a mouse.
13. Complete library of standard HVAC equipment graphics shall include equipment such as chillers, boilers, air handlers, terminals, fan coils, and unit ventilators. Library shall include standard symbols for other equipment including fans, pumps, coils, valves, piping, dampers, and ductwork. Library graphic file format shall be compatible with graphics generation tools.
14. Operator shall be able to create, edit, debug, and download custom programs. System shall be fully operable while custom programs are edited, compiled, and downloaded.

2.7 CONTROLLER SOFTWARE

- A. Building and energy management application software shall reside and operate in system controllers. Applications shall be editable through operator workstation, web browser interface, or engineering workstation.
- B. System shall provide the following schedule options as a minimum:
 - 1. Provide separate schedules for each day of the week. Each schedule shall be able to include up to five (5) occupied periods (five (5) start-stop pairs or ten (10) events).
 - 2. Operator shall be able to designate an exception schedule for each of the next 365 days. After an exception schedule has executed, system shall discard and replace exception schedule with standard schedule for that day of the week.
 - 3. Operator shall be able to define twenty-four (24) special or holiday schedules of varying length on a scheduling calendar that repeats each year.
- C. System shall stagger controlled equipment restart after power outage. Operator shall be able to adjust equipment restart order and time delay between equipment restarts.
- D. Binary output objects shall be protected from short cycling by means of adjustable minimum on-time and off-time settings.
- E. System shall provide an algorithm that can totalize runtime for each binary input and output. Operator shall be able to enable runtime alarm based on exceeded adjustable runtime limit.

2.8 CONTROLLERS

- A. General. Provide Building Controllers (BC), Advanced Application Controllers (AAC), Application Specific Controllers (ASC), Smart Actuators (SA), and Smart Sensors (SS) as required to achieve performance specified.
- B. Communication
 - 1. Each controller shall provide a service communication port for connection to a Portable Operator's Terminal. Connection shall be extended to space temperature sensor ports where shown on drawings.
 - 2. Each piece of equipment specified on Drawings to controlled or monitored by DDC system shall be controlled by a single controller to provide stand-alone control in the event of communication failure. All I/O points specified for a piece of equipment shall be integral to its controller. Provide stable and reliable stand-alone control using default values or other method for values normally read over the network.
- C. Controller hardware shall be suitable for anticipated ambient conditions.
 - 1. Controllers used in conditioned space shall be mounted in dust-protective enclosures and shall be rated for operation at 32° F to 120° F.
 - 2. Controllers used outdoors or in wet ambient conditions shall be mounted in waterproof enclosures and shall be rated for operation at -20° F to 140° F.
- D. Provide a local keypad and display for each BC and AAC. Operator shall be able to use keypad to view and edit data. Keypad and display shall require password to prevent unauthorized use. If the manufacturer does not normally provide a keypad and display for each BC and AAC, provide the software and any interface cabling needed to use a laptop computer as a Portable Operator's Terminal for the system.
- E. Controllers that perform scheduling shall have a real-time clock.
- F. Serviceability
 - 1. Controllers shall have diagnostic LEDs for power, communication, and processor.
 - 2. Wires shall be connected to a field-removable modular terminal strip or to a termination card connected by a ribbon cable.
 - 3. Each BC and AAC shall continually check its processor and memory circuit status and shall generate an alarm on abnormal operation. System shall continuously check controller network and generate alarm for each controller that fails to respond.
- G. Memory
 - 1. Controller memory shall support operating system, database, and programming requirements.
 - 2. Each BC and AAC shall retain BIOS and application programming for at least 72 hours in the event of power loss.

3. Each ASC and SA shall use nonvolatile memory and shall retain BIOS and application programming in the event of power loss. System shall automatically download dynamic control parameters following power loss.
- H. Controllers shall be able to operate at 90% to 110% of nominal voltage rating and shall perform an orderly shutdown below 80% nominal voltage. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W at 1 m (3 ft).

2.9 INPUT AND OUTPUT INTERFACE

- A. General: Hard-wire input and output points to BCs, AACs, ASCs, or SAs.
- B. Analog inputs shall monitor low-voltage (0-10 Vdc), current (4-20 mA), or resistance (thermistor or RTD) signals. Analog inputs shall be compatible with and field configurable to commonly available sensing devices.
- C. Binary outputs shall send an on-or-off signal for on and off control. Building Controller binary outputs shall have three-position (on-off-auto) override switches and status lights. Outputs shall be selectable for normally open or normally closed operation.
- D. Analog outputs shall send a modulating 0-10 Vdc or 4-20 mA signal as required to properly control output devices. Each Building Controller analog output shall have a two (2)-position (auto-manual) switch, a manually adjustable potentiometer, and status lights. Analog outputs shall not drift more than 0.4% of range annually.
- E. Control three (3)-point floating electronic actuators without feedback with tri-state outputs (two (2) coordinated binary outputs). Tri-State outputs may be used to provide analog output control in zone control and terminal unit control applications such as VAV terminal units, duct-mounted heating coils, and zone dampers.
- F. Universal Inputs and Outputs: Inputs and outputs that can be designated as either binary or analog in software shall conform to the provisions of this section that are appropriate for their designated use.

2.10 AUXILIARY CONTROL DEVICES

- A. Motorized Control Dampers
 1. Acceptable Manufacturers:
 - a. Ruskin
 - b. Tamco
 2. Type: Dampers shall be low-leakage, high performance type.
 3. Frame: Damper frames shall be extruded aluminum with reinforced corner bracing. Provide insulated frames with thermal break as scheduled on the Drawings.
 4. Blades: Damper blades shall not exceed 8 in. in width or 48 in. in length. Blades shall be airfoil type suitable for 2000 fpm face velocity.
 5. Shaft Bearings: Damper shaft bearings shall be as recommended by manufacturer for application, oil impregnated sintered bronze, or better.

6. Seals: Blade edges and frame top and bottom shall have replaceable seals of butyl rubber or neoprene. Blade seals shall be AMCA Class I and leak no more than 8 cfm per ft² at 4 in. w.g. differential pressure.
7. Damper sections shall not exceed 48" – 60". Each section shall have at least one (1) damper actuator.
8. Dampers shall have exposed linkages.

B. Electric Damper Actuators

1. Stall Protection: Mechanical or electronic stall protection shall prevent actuator damage throughout the actuator's rotation.
2. Spring-return Mechanism: Actuators used for power-failure and safety applications shall have an internal mechanical spring-return mechanism or an uninterruptible power supply (UPS).
3. Signal and Range: Proportional actuators shall accept a 0-10 Vdc or a 0-20 mA control signal and shall have a 2-10 Vdc or 4-20 mA operating range. (Floating motor actuators may be substituted for proportional actuators in terminal unit applications as described in paragraph 2.6H.)
4. Wiring: 24 Vac and 24 Vdc actuators shall operate on Class 2 wiring.
5. Manual Positioning: Operators shall be able to manually position each actuator when the actuator is not powered. Non-spring-return actuators shall have an external manual gear release. Spring-return actuators with more than 60 in.-lb torque capacity shall have a manual crank.

C. Binary Temperature Devices

1. Low-Voltage Space Thermostats: Low-voltage space thermostats shall be 24 V, bimetal-operated, with adjustable or fixed anticipation heater, digital temperature and setpoint display, 55° F - 85° F setpoint range, 2° F maximum differential, and vented ABS plastic cover.
2. Line-Voltage Space Thermostats: Line-voltage space thermostats shall be bimetal-actuated, open-contact type or bellows-actuated, enclosed, snap-switch type or equivalent solid-state type, with heat anticipator, UL listing for electrical rating, concealed setpoint adjustment, 55° F - 85° F setpoint range, 2° F maximum differential, and vented ABS plastic cover.
3. Low-Limit Thermostats (Freezestats): Low-limit airstream thermostats shall be UL listed, vapor pressure type. Element shall be at least 20 ft. long. Element shall sense temperature in each 1 ft. section and shall respond to lowest sensed temperature. Low-limit thermostat shall be manual reset only. Sensor shall be installed so the entire coil has coverage (1ft. of sensor / 1 sq. ft. of coil and provide multiple units if necessary to meet this requirement). The sensor shall not be installed more than 6" from the edge of the coil. The location of the reset head must be outside the plenum wall and at the highest point of the assembly. The sensing bulb shall be sloped continuously downward from the reset head.

D. Temperature Sensors

1. Type: Temperature sensors shall be Resistance Temperature Device (RTD) or thermistor.
2. Duct Sensors: Duct sensors shall be single point or averaging as shown. Averaging sensors shall be a minimum of 5 ft in length per 10 ft² of duct cross-section.
3. Immersion Sensors: Provide immersion sensors with a separable stainless steel well. Well pressure rating shall be consistent with system pressure it will be immersed in. Well shall withstand pipe design flow velocities.
4. Space Sensors: Space sensors shall have setpoint adjustment, override switch, display, and communication port as shown.
5. Differential Sensors: Provide matched sensors for differential temperature measurement.

E. Humidity Sensors

1. Duct and room sensors shall have a sensing range of 20% - 80%.
2. Duct sensors shall have a sampling chamber.
3. Outdoor air humidity sensors shall have a sensing range of 10% - 95% RH and shall be suitable for ambient conditions of 40° F - 170° F.
4. Humidity sensors shall not drift more than 1% of full scale annually.

F. Relays

1. Control Relays: Control relays shall be plug-in type, UL listed, and shall have dust cover and LED "energized" indicator. Contact rating, configuration, and coil voltage shall be suitable for application.
2. Time Delay Relays: Time delay relays shall be solid-state plug-in type, UL listed, and shall have adjustable time delay. Delay shall be adjustable $\pm 100\%$ from setpoint shown. Contact rating, configuration, and coil voltage shall be suitable for application. Provide NEMA 1 enclosure for relays not installed in local control panel.

G. Override Timers

1. Unless implemented in control software, override timers shall be spring-wound line voltage, UL Listed, with contact rating and configuration required by application. Provide 0-6 hour calibrated dial unless otherwise specified. Flush mount timer on local control panel face or where shown.

H. Current Transmitters

1. AC current transmitters shall be self-powered, combination split-core current transformer type with built-in rectifier and high-gain servo amplifier with 4-20 mA two (2)-wire output. Full-scale unit ranges shall be 10 A, 20 A, 50 A, 100 A, 150 A, and 200 A, with internal zero and span adjustment. Unit accuracy shall be $\pm 1\%$ full-scale at 500 ohm maximum burden.

2. Transmitter shall meet or exceed ANSI/ISA S50.1 requirements and shall be UL/CSA recognized.
 3. Unit shall be split-core type for clamp-on installation on existing wiring.
- I. Voltage Transmitters
1. AC voltage transmitters shall be self-powered single-loop (two (2)-wire) type, 4-20 mA output with zero and span adjustment.
 2. Adjustable full-scale unit ranges shall be 100-130 Vac, 200-250 Vac, 250-330 Vac, and 400-600 Vac. Unit accuracy shall be $\pm 1\%$ full-scale at 500 ohm maximum burden.
 3. Transmitters shall meet or exceed ANSI/ISA S50.1 requirements and shall be UL/CSA recognized at 600 Vac rating.
- J. Power Monitors
1. Power monitors shall be three (3)-phase type and shall have three (3)-phase disconnect and shorting switch assembly, UL listed voltage transformers, and UL listed split-core current transformers.
 2. Power monitors shall provide selectable output: Rate pulse for kWh reading or 4-20 mA for kW reading. Power monitors shall operate with five (5) A current inputs and maximum error of $\pm 2\%$ at 1.0 power factor or $\pm 2.5\%$ at 0.5 power factor.
- K. Current Switches
1. Current-operated switches shall be self-powered, solid-state with adjustable trip current. Select switches to match application current and DDC system output requirements.
- L. Differential Pressure Switches: Differential pressure switches (air or water service) shall be UL listed, SPDT snap-acting, pilot duty rated (125 VA minimum) and shall have scale range and differential suitable for intended application and NEMA 1 enclosure unless otherwise specified.
- M. Gas Detection Equipment
1. Carbon Dioxide Sensor and Transmitter: Single detectors using solid-state infrared sensors; suitable over a temperature range of 32 to 104° F and calibrated for 0 to 2%, with continuous or averaged reading, 4-20 mA output; for wall mounting.
- N. Local Control Panels
1. Indoor control panels shall be fully enclosed NEMA 1 construction with hinged door key-lock latch and removable sub-panels. A common key shall open each control panel and sub-panel.
 2. Prewire internal and face-mounted device connections with color-coded stranded conductors tie-wrapped or neatly installed in plastic troughs. Field connection terminals shall be UL listed for 600 V service, individually identified per control and interlock drawings, with adequate clearance for field wiring.
 3. Each local panel shall have a control power source power switch (on-off) with overcurrent protection.

2.11 WIRING

A. General Installation and Equipment Requirements

1. The Controls Installer as noted in the scope matrix shall provide and install conduit, hangers, supports, wiring, and cable to meet the requirements noted in applicable sections of the Division 26 specifications. This requirement will maintain a consistent level of quality for all wiring systems in the building.
2. Insulated wire shall use copper conductors and shall be UL listed for 90°C (200°F) minimum service.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Thoroughly examine project plans for control device and equipment locations. Report discrepancies, conflicts, or omissions to Architect or Engineer for resolution before starting rough-in work.
- B. Inspect site to verify that equipment can be installed as shown. Report discrepancies, conflicts, or omissions to Engineer for resolution before starting rough-in work.
- C. Examine drawings and specifications for work of others. Report inadequate headroom or space conditions or other discrepancies to Engineer and obtain written instructions for changes necessary to accommodate temperature controls work with work of others. ATC shall perform at his expense necessary changes in specified work caused by failure or neglect to report discrepancies.

3.2 PROTECTION

- A. Controls Contractor shall protect against and be liable for damage to work and to material caused by Controls Contractor's work or employees.
- B. Controls Contractor shall be responsible for work and equipment until inspected, tested, and accepted. Protect material not immediately installed. Close open ends of work with temporary covers or plugs during storage and construction to prevent entry of dust and foreign objects.

3.3 COORDINATION

A. Site

1. Assist in coordinating space conditions to accommodate the work of each trade where work will be installed near or will interfere with work of other trades. If installation without coordination causes interference with work of other trades, Contractor shall correct conditions without extra charge.
2. Coordinate and schedule work with other work in the same area and with work dependent upon other work to facilitate mutual progress.

B. Test and Balance

1. Provide Test and Balance Contractor a single set of necessary tools to interface to control system for testing and balancing.
2. Train Test and Balance Contractor to use control system interface tools.
3. Provide a qualified technician to assist with testing and balancing the first twenty (20) terminal units.
4. Test and Balance Contractor shall return tools undamaged and in working condition at completion of testing and balancing.

C. Life Safety

1. Duct smoke detectors required for air handler shutdown are provided under Division 28. Interlock smoke detectors to air handlers for shutdown as specified.
2. Smoke dampers and actuators required for duct smoke isolation are provided under Division 23. Interlock smoke dampers to air handlers as specified. Provide wiring to dampers as required.
3. Fire and smoke dampers and actuators required for fire-rated walls are provided under Division 23. Fire and smoke damper control is provided under Division 28.

D. Coordination with Other Controls: Integrate with and coordinate controls and control devices furnished or installed by others as follows.

1. Communication media and equipment shall be provided as specified.
2. Each supplier of a controls product shall configure, program, start up, and test that product to meet the sequences of operation described on Drawings regardless of where within the contract documents those products are described.
3. Coordinate and resolve incompatibility issues that arise between control products provided under this section and those provided under other sections or divisions of this specification.
4. Controls Contractor shall be responsible for integration of control products provided by multiple suppliers regardless of where integration is described within the contract documents.
5. The temperature control contractor shall provide all necessary additional sensors to execute all sequences as indicated on the construction documents. Coordinate additional requirements with equipment manufacturer.

3.4 GENERAL WORKMANSHIP

- A. Install equipment, piping, conduit, and wiring or raceway horizontally, vertically, and parallel to walls wherever possible.
- B. Provide sufficient slack and flexible connections to allow for piping and equipment vibration isolation.

- C. Install equipment in readily accessible locations as defined by National Electrical Code (NEC) Chapter 1 Article 100 Part A.
- D. Verify wiring integrity to ensure continuity and freedom from shorts and ground faults.
- E. Equipment, installation, and wiring shall comply with industry specifications and standards and local codes for performance, reliability, and compatibility.
- F. Continually monitor field installation for code compliance and workmanship quality.

3.5 EXISTING EQUIPMENT AND DEMOLITION

- A. Abandoned wires may not be reused.
- B. Remove all devices shown to be removed on Drawings. Remove all devices that are no longer necessary for controls system function. Deliver all unused controls devices to Owner. Removed devices shall be delivered to Owner in the same condition as they were before being removed.
- C. At Owner's request, items to be delivered to Owner shall instead be properly disposed of. Hazardous materials shall be disposed of under Division 02.
- D. Unless otherwise directed, Contractor is not responsible for repair or replacement of existing energy equipment and systems, valves, dampers, or actuators. Notify Engineer in writing immediately of existing equipment that requires maintenance.
- E. Existing local control panels may be used to locate new equipment. Patch panel face cover to fill holes caused by removal of unused equipment.

3.6 WIRING

- A. Control and interlock wiring and installation shall comply with national and local electrical codes, Division 26, and manufacturer's recommendations. Where the requirements of this section differ from Division 26, this section shall take precedence.
- B. Use color-coded conductors throughout.
- C. Locate control and status relays in designated enclosures only. Do not install control and status relays in packaged equipment control panel enclosures containing Class 1 starters.
- D. Terminate control and interlock wiring related to the work of this section. Maintain at the job site updated (as-built) wiring diagrams that identify terminations.
- E. Low-voltage wiring shall meet NEC Class 2 requirements. Subfuse low-voltage power circuits as required to meet Class 2 current limit.
- F. During installation do not exceed maximum cable pulling, tension, or bend radius specified by the cable manufacturer.
- G. NEC Class 2 (current-limited) wires not in conduit but in concealed and accessible locations such as return air plenums shall be UL listed for the intended application.
- H. Run exposed Class 2 wiring parallel to a surface or perpendicular to it and tie neatly at 10 ft. intervals.

- I. Use structural members to support or anchor plenum cables without conduit. Do not use ductwork, electrical conduits, piping, or ceiling suspension systems to support or anchor cables.
- J. Verify entire network's integrity following cable installation using appropriate tests for each cable.
- K. Install lightning arrestor according to manufacturer's recommendations between cable and ground where a cable enters or exits a building.
- L. Each run of communication wiring shall be a continuous length without splices when that length is commercially available. Runs longer than commercially available lengths shall have as few splices as possible using commercially available lengths.
- M. Label communication wiring to indicate origination and destination.
- N. Ground coaxial cable according to NEC regulations article on "Communications Circuits, Cable, and Protector Grounding."
- O. NEC Class 1 (line voltage) wiring shall be UL listed in approved conduit as specified by NEC and Division 26.
- P. Install wiring in conduit where subject to mechanical damage and at levels below 10ft in mechanical, electrical, or service rooms.
- Q. Install Class 1 and Class 2 wiring in separate conduits. Install communication wiring in separate conduits and enclosures from other wiring.
- R. Boxes and panels containing high-voltage wiring and equipment shall not be used for low-voltage wiring except for the purpose of interfacing the two through relays and transformers.
- S. Do not install wiring in conduit containing pneumatic tubing.
- T. Secure conduits with conduit clamps fastened to structure and spaced according to code requirements. Conduits and pull boxes shall not be hung on or attached to ductwork, electrical conduits, piping, or ceiling suspension systems.
- U. Size conduit and select wire size and type in accordance with manufacturer's recommendations and NEC requirements.
- V. Include one (1) pull string in each conduit 1 in. or larger.
- W. Conceal conduits except within mechanical, electrical, or service rooms. Maintain minimum clearance of 6 in. between conduit and high-temperature equipment such as steam pipes or flues.
- X. Install insulated bushings on conduit ends and enclosure openings. Seal top ends of vertical conduits.
- Y. Flexible metal conduits and liquid-tight flexible metal conduits shall not exceed 3 ft in length and shall be supported at each end. Do not use flexible metal conduit less than 1/2 inch. Use liquid-tight flexible metal conduits in areas exposed to moisture including chiller and boiler rooms.

- Z. Install conduit rigidly, support adequately, ream at both ends, and leave clean and free of obstructions. Join conduit sections with couplings and according to code. Make terminations in boxes with fittings. Make terminations not in boxes with bushings.

3.7 INSTALLATION OF SENSORS

- A. Install sensors according to manufacturer's recommendations.
- B. Mount sensors rigidly and adequately for operating environment.
- C. Install room temperature sensors on concealed junction boxes properly supported by wall framing.
- D. Install all controls devices, sensors, & equipment that is operable or has user adjustment at 42" above finished floor. Dimensions shall be measured from the floor level to the centerline of the device.
- E. Air seal wires attached to sensors in their raceways or in the wall to prevent sensor readings from being affected by air transmitted from other areas.
- F. Use averaging sensors in mixing plenums and hot and cold decks. Install averaging sensors in a serpentine manner vertically across duct. Support each bend with a capillary clip.
- G. Install mixing plenum low-limit sensors in a serpentine manner horizontally across duct. Support each bend with a capillary clip. Provide one (1) ft of sensing element for each one (1) ft² of coil area.
- H. Install pipe-mounted temperature sensors in wells. Install liquid temperature sensors with heat-conducting fluid in thermal wells.
- I. Install outdoor air temperature sensors on north wall at designated location with sun shield.
- J. Differential Air Static Pressure
 - 1. Duct Static Pressure. Pipe high-pressure tap to duct using a pitot tube. Make pressure tap connections according to manufacturer's recommendations.
 - 2. Building Static Pressure. Pipe pressure sensor's low-pressure port to the static pressure port located on the outside of the building through a high-volume accumulator. Pipe high-pressure port to a location behind a thermostat cover.
 - 3. Piping to pressure transducer pressure ports shall contain a capped test port adjacent to transducer.
 - 4. Pressure transducers, except those controlling VAV boxes, shall be located in control panels, not on monitored equipment or on ductwork. Mount transducers in a vibration-free location accessible for service without use of ladders or special equipment.
 - 5. Mount gauge tees adjacent to air and water differential pressure taps. Install shut-off valves before tee for water gauges.
- K. Smoke detectors, freezestats, high-pressure cut-offs, and other safety switches shall be hard-wired to de-energize equipment as described in the sequence of operation. Switches shall require manual reset. Provide contacts that allow DDC software to monitor safety switch status.

3.8 ACTUATORS

- A. General: Mount actuators and adapters according to manufacturer's recommendations.
- B. Electric and Electronic Damper Actuators. Mount actuators directly on damper shafts. Do not link actuators, no jackshafting.
 - 1. For low-leakage dampers with seals, mount actuator with a minimum 5° travel available for damper seal tightening.
 - 2. To compress seals when spring-return actuators are used on normally closed dampers, power the actuator to approximately 5° open position, manually close the damper, then tighten linkage.
 - 3. Check operation of damper-actuator combination to confirm that actuator modulates damper smoothly throughout stroke to both open and closed positions.
 - 4. Provide necessary mounting hardware and linkages for actuator installation.

3.9 WARNING LABELS

- A. Affix permanent warning labels to all equipment that can be automatically started by the control system.
 - 1. Label: Labels shall use white lettering (18-point type or larger) on a red background. Size labels such that they are readily visible when approaching equipment for service.
 - 2. Install labels on equipment in locations of moving parts or electrical hazards such as access doors air handler fan sections, duct mounted heater control panels, pump shaft coupling guards, etc.
 - 3. Warning labels shall read as follows:

CAUTION
This equipment is operating under automatic control and may start or stop at any time without warning.
Switch disconnect to "Off" position before servicing.

- B. Affix permanent warning labels to motor starters and control panels that are connected to multiple power sources utilizing separate disconnects.
 - 1. Labels shall use white lettering (twelve (12)-point type or larger) on a red background.
 - 2. Warning labels shall read as follows:

CAUTION
This equipment is fed from more than one (1) power source with separate disconnects.
Disconnect all power sources before servicing.

3.10 IDENTIFICATION OF HARDWARE AND WIRING

- A. Label wiring and cabling, including that within factory-fabricated panels, with control system address or termination number at each end within two (2) inches of termination.
- B. Permanently label or code each point of field terminal strips to show instrument or item served.

- C. Label control panels per Mechanical Identification specification.
- D. Label each control component with a permanent label. Label plug-in components such that label remains stationary during component replacement.
- E. Label room sensors (not thermostats) related to terminal boxes or valves with nameplates.
- F. Manufacturers' nameplates and UL or CSA labels shall be visible and legible after equipment is installed.
- G. Naming convention shall match Contract Drawings.
- H. Label identifiers shall match record documents.

3.11 CONTROL SYSTEM CHECKOUT AND TESTING

- A. Startup Testing. Complete startup testing to verify operational control system before notifying Owner of system demonstration. Provide Owner with schedule for startup testing. Owner may have representative present during any or all startup testing.
 - 1. Calibrate and prepare for service each instrument, control, and accessory equipment furnished under the scope of the Contract.
 - 2. Verify that control wiring is properly connected and free of shorts and ground faults. Verify that terminations are tight.
 - 3. Enable control systems and verify each input device's calibration. Calibrate each device according to manufacturer's recommendations.
 - 4. Verify that binary output devices such as relays, solenoid valves, two (2)-position actuators and control valves, and magnetic starters, operate properly and that normal positions are correct.
 - 5. Verify that analog output devices such as I/Ps and actuators are functional, that start and span are correct, and that direction and normal positions are correct. Check control valves and automatic dampers to ensure proper action and closure. Make necessary adjustments to valve stem and damper blade travel.
 - 6. Prepare a log documenting startup testing of each input and output device, with technician's initials certifying each device has been tested and calibrated.
 - 7. Verify that system operates according to sequences of operation. Simulate and observe each operational mode by overriding and varying inputs and schedules. Tune PID loops and each control routine that requires tuning.
 - 8. Alarms and Interlocks
 - a. Check each alarm with an appropriate signal at a value that will trip the alarm.
 - b. Trip interlocks using field contacts to check logic and to ensure that actuators fail in the proper direction.
 - c. Test interlock actions by simulating alarm conditions to check initiating value of variable and interlock action.

3.12 CONTROL SYSTEM DEMONSTRATION AND ACCEPTANCE

- A. Demonstration: Prior to acceptance, perform the following performance tests to demonstrate system operation and compliance with specification after and in addition to tests specified in Control System Checkout and Testing. Owner and/or Engineer will witness demonstration. Provide ten (10) days' notice prior to starting demonstration.
1. Complete approved checklists and forms for each system as part of system demonstration.
 2. Demonstrate actual field operation of each specified sequence of operation. Provide at least two (2) persons equipped with two (2)-way communication. Demonstrate calibration and response of any input and output points requested by Engineer. Provide and operate test equipment required to prove proper system operation.
 3. Demonstrate compliance with sequences of operation through each operational mode.
 4. Demonstrate complete operation of operator interface.
 5. Demonstrate each of the following.
 - a. Each sample's trend data shall show setpoint, actuator position, and controlled variable values. Engineer will require further tuning of each loop that displays unreasonably under- or over-damped control.
 - b. Building fire alarm system interface.
 - c. Trend data shall indicate setpoints, operating points, valve positions, and other data as specified in the sequence of operation. Each log shall cover three (3) forty-eight (48)-hour periods and shall have a sample frequency not less than ten (10) minutes or as specified.
 6. Tests that fail to demonstrate proper system operation shall be repeated after Contractor makes necessary repairs or revisions to hardware or software to successfully complete each test.
- B. Acceptance
1. After tests described in this specification are performed to the satisfaction of both Engineer and Owner, Engineer will accept control system as meeting completion requirements. Engineer may exempt tests from completion requirements that cannot be performed due to circumstances beyond Contractor's control. Engineer will provide written statement of each exempted test. Exempted tests shall be performed as part of warranty.

3.13 CLEANING AND REPAIR

- A. On completion of Work, check equipment furnished under this section for paint damage. Repair damaged factory-finished paint to match adjacent areas. Replace deformed cabinets and enclosures with new material and repaint to match adjacent areas.
- B. Clean the outside of all cabinets and sensor enclosures.

3.14 TRAINING

- A. Provide training for a designated staff of Owner's representatives. Training shall be provided via self-paced training, web-based or computer-based training, classroom training, or a combination of training methods.
- B. Training shall enable students to accomplish the following objectives.
 - 1. Proficiently operate system
 - 2. Understand control system architecture and configuration
 - 3. Understand DDC system components
 - 4. Understand system operation, including DDC system control and optimizing routines (algorithms)
 - 5. Operate workstation and peripherals
 - 6. Log on and off system
 - 7. Access graphics, point reports, and logs
 - 8. Adjust and change system setpoints, time schedules, and holiday schedules
 - 9. Recognize common HVAC system malfunctions by observing system graphics, trend graphs, and other system tools
 - 10. Understand system drawings and Operation and Maintenance manual
 - 11. Understand job layout and location of control components
 - 12. Access data from DDC controllers
 - 13. Operate portable operator's terminals
 - 14. Configure and run reports
- C. Divide presentation of objectives into three (3) sessions. Participants will attend one (1) or more of sessions, depending on knowledge level required.
- D. Provide one (1) copy of training manual for each student.
- E. Provide complete training for each shift of staff.
- F. Include a minimum of eight (8) total hours of on-site training in bid.
- G. Instructors shall be factory-trained and experienced in presenting this material.
- H. Perform classroom training using a network of working controllers, representative of installed hardware.

END OF SECTION 230900

SECTION 231126 – NATURAL GAS PIPING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following Natural gas Piping System indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment Included in This Section
 - 1. Piping
 - 2. Regulators
 - 3. Unions
 - 4. Valves

1.2 REFERENCES

- A. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
 - 1. Adopted version of the International Fuel Gas Code.
 - 2. Adopted version of NFPA 54, National Fuel Gas Code.
 - 3. ASME as it pertains to the welding of piping.
 - 4. State Boiler Code

1.3 SUBMITTALS

- A. Product Data
 - 1. Catalog sheets and specifications indicating manufacturer name, type, applicable reference standard, schedule, or class for specified pipe and fittings.
 - 2. Material Schedule: Itemize pipe and fitting materials for each specified application in Pipe and Fittings Schedule in Part 3 of this Section. Where optional materials are specified indicate option selected.
- B. Submit piping layout drawings as per Section 230500.

1.4 QUALITY ASSURANCE

- A. All materials, equipment and Work shall meet or exceed all applicable federal, state and local requirements and conform to codes and ordinances of authorities having jurisdiction.

- B. Valves: Manufacturer's name, size, standards compliance and pressure rating clearly marked on outside of valve body.
- C. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.
- D. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.
- E. Installer Qualifications: Company specializing in performing the Work of this Section with minimum three (3) years documented experience. All installation shall be supervised by a licensed Master Plumber. All testing shall be performed by a licensed Journeyman or Master Plumber. Welders shall be certified in accordance with ASME.

1.5 EXTRA MATERIALS

- A. Provide one (1) plug valve wrench for every ten (10) plug valves sized 2 inches and smaller, minimum of one (1). Provide each plug valve sized 2-1/2 inches and larger with a wrench incorporating a setscrew.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
- B. Natural gas pressures shall not exceed two (2) pounds per square inch gauge on customer side of the meter.
- C. Pipe joint compound shall be lead-free, non-toxic, non-hardening, insoluble in the presence of natural gas and compliant with ANSI/NSF 61 and Federal Specification TT-S-1732. Temperature service range of -15° F to +400° F.

2.2 PIPING

- A. Polyethylene Piping
 - 1. Polyethylene, SDR-11, ASTM D2513 pipe and fittings with heat fusion socket joints.
 - 2. Polyethylene pipe and fitting materials shall be compatible and by same manufacturer to ensure uniform melting and a proper bond. Fabricated fittings shall not be used.
 - 3. Provide connection between buried plastic gas service piping and metallic riser in accordance with the gas code. Provide metallic riser consisting of HDPE fused coating on steel pipe for connection to above ground building distribution piping. Underground horizontal metallic portion of riser shall be at least twenty four (24) inches in length before connecting to the plastic service pipe. An approved transition fitting or adaptor meeting design pressure rating and plastic pipe manufacturers recommendations shall be used where the plastic joins the metallic riser.

B. Steel Piping

1. Schedule 40 black steel, ASTM A53, Grade A or B, seamless or electric resistance welded.
 - a. Malleable Iron, Steam Pattern Threaded Fittings
 - 1) 150 lb Class: ASME B16.3
 - b. Schedule 40 Carbon Steel Fittings
 - 1) ASME B16.9

C. Corrugated Stainless Steel Tubing (CSST) & Fittings

1. Tubing shall be made from 300 series stainless steel strip conforming to ASTM A240 & shall be suitable for operation with fuel gases.
2. Tubing shall be rated for a minimum of 25 PSI operating pressure.
3. Tubing come with a factory installed, integral polyethylene sleeve. The polyethylene sleeve shall have internal vent channels lengthwise to direct any leakage along the pipe to the end fittings. The construction of the pre-sleeved system shall provide the code required encasement & venting capabilities of the system.
4. All fittings shall be non-gasketed, CSA International listed for installation in concealed locations, & constructed of yellow brass with a stainless steel insert.
5. All fittings shall be provided with a plastic containment coupling & a ¼" NPT vent port to provide venting as required.
6. The underground piping system shall be listed by the International Code Council (ICC) or the International Association of Plumbing & Mechanical Officials (IAPMO) for underground or underground beneath building applications
7. Vent pipe material shall be schedule 40 black steel. All vent piping shall be routed & terminated per the International Fuel Gas Code & NFPA 54 requirements.
8. Approved manufacturers: TracPipe PS-II or prior approved equal.

2.3 EXCEPTIONS

- A. All exposed piping located within areas utilized as return air plenums shall have welded joints.
- B. Above Ground Piping Concealed Inside of Building (Includes above all ceilings, within partitions, within chases, and all non-accessible locations):

2.4 VALVES

- A. Acceptable Manufacturers:
 1. Nibco

2. Milwaukee
 3. Nordstrom
 4. Mueller.
- B. All valves shall be designed, manufactured and approved for natural gas service.
- C. Line Shut-off Valves sizes 2" and smaller shall be iron body lubricated plug valve conforming to ASTM-A-126, U.L. Listed, and A.G.A. Approved for natural gas service with threaded ends, wrench operation, rated for 200 WOG service pressure and –20 to 200° F.
- D. Line Shut-off Valves sizes 2 1/2" and larger shall be iron body lubricated plug valve conforming to ASTM-A-126, U.L. Listed, and A.G.A. Approved for natural gas service with flanged ends, wrench operation, rated for 200 WOG service pressure and –20 to 200° F.
- E. Appliance/Equipment Shut-off Valves at local connections sizes two (2) inches and smaller shall be bronze body, full port ball or butterfly type, U.L. Listed, and A.G.A. Approved for natural gas service with threaded ends, quarter turn lever handle operation, rated for 175 W.O.G. service pressure and 30 to 275° F.
- F. Manual Emergency Shut-off Valves 2" and smaller shall be bronze body, full port ball or butterfly type, U.L. Listed, and A.G.A. Approved for natural gas service with threaded ends, quarter turn lever handle operation, rated for 175 W.O.G. service pressure and 30 to 275° F.
- G. Automatic Emergency Shut-off Valves shall be U.L. Listed for natural gas service, two (2)-way electrically tripped solenoid type; fail safe closed; manual reset; Type 1 solenoid enclosure; NBR seals and disc; stainless steel core tube and springs; copper coil.

2.5 PRESSURE REGULATORS

- A. Acceptable Manufacturers:
1. Fisher
 2. Maxitrol
 3. Rockwell
 4. Schlumberger.
- B. All pressure regulators shall be designed, manufactured and approved for natural gas service.
- C. Pressure regulators for individual service lines shall be capable of reducing distribution line pressure to pressures required for equipment. Pressure relief shall be set at a lower pressure than would cause unsafe operation of any connected unit. Regulator shall have a single port with orifice diameter no greater than that recommended by manufacturer for the maximum gas pressure at the regulator inlet. Regulator vent valve shall be of resilient materials designed to withstand flow conditions when pressed against valve port. Regulator shall be capable of limiting build-up of pressure under no-flow conditions to 50 percent or less of the discharge pressure maintained under flow conditions. Commercial grade diaphragm type with internal relief valve, vent valve, cast iron body, Buna-N diaphragm.
- D. Install pressure gauge adjacent to and downstream of each line pressure regulator.

2.6 UNIONS

- A. Unions in 2" and smaller in ferrous lines shall be Class 300 AAR malleable iron unions with iron to brass seats, 2-1/2" and larger shall be ground flange unions. Companion flanges on lines at various items of equipment, machines and pieces of apparatus may serve as unions to permit disconnection of piping.
- B. Unions connecting ferrous pipe to copper or brass pipe shall be Epco dielectric type.
- C. Above grade flexible stainless steel appliance/equipment connectors shall conform with AGA under the ANSI Z21.69 Standard. Hose shall be braided stainless steel with a polyolefin heat-shrink tubing with high flame-retardant qualities. Hose shall be equipped with malleable iron unions and spring loaded brass quick-link couplings. An easily accessible manual shut-off valve shall be installed ahead of all hose connections. Specify T&S Brass "Safe-T-Link" or approved equal.

2.7 FLANGES

- A. All 150 lb. and 300 lb. ANSI flanges shall be domestically manufactured, weld neck forged carbon steel, conforming to ANSI B16.5 and ASTM A-181 Grade I or II or A-105-71. Slip on flanges shall not be used.
- B. Each fitting shall be stamped as specified by ANSI B16.9 and, in addition, shall have the laboratory control number stenciled on each fitting for ready reference as to physical properties and chemical composition of the material. Complete test reports may be required for any fitting selected at random.
- C. Flanges which have been machined, remarked, painted or otherwise produced domestically from imported forges will not be acceptable. Flanges shall have the manufacturer's trademark permanently identified in accordance with MSS SP-25.
- D. Bolts used shall be carbon steel bolts with semi-finished hexagon nuts of American Standard Heavy dimensions. Threaded rods will not be an acceptable alternate for flange bolts. Bolts shall have a tensile strength of 60,000 psi and an elastic limit of 30,000 psi.
- E. Flat-faced flanges shall be required to match flanges on pumps, check valves, strainers, etc. Only one (1) manufacturer of weld flanges will be approved for each project.
- F. All flanges shall be gasketed. Contractor shall place gasket between flanges of flanged joints. Gaskets shall fit within the bolt circle on raised face flanges and shall be full face on flat face flanges. Gaskets shall be cut from 1/16" thick, non metallic, non asbestos gasket material suitable for operating temperatures from -150° F to +75° F.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

- A. Accept piping, fittings, and accessories on Site in shipping containers with labeling in place, inspect for damage and store with a minimum of handling. Store plastic piping under cover out of direct sunlight. Do not store materials directly on the ground.
- B. Provide temporary protective coating on all cast iron and steel devices.

- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work and isolating parts of completed system.

3.2 PREPARATION

- A. Ream pipe ends and remove cutting burrs. Bevel plain end ferrous pipe.
- B. Remove cutting oil, scale and dirt, on inside and outside of piping, before assembly.

3.3 PAINTING

- A. Prepare all piping as needed to allow for proper coverage and adherence.
- B. Piping to be painted includes the following:
 - 1. Exterior to building: Color selected by Architect.
 - 2. Interior to building: Yellow
 - 3. Extension of existing system: Match existing color

3.4 EQUIPMENT CONNECTIONS

- A. Provide specified connections, shutoff valves, regulators and unions at each and every appliance and piece of equipment requiring natural gas, including equipment furnished under other Divisions of these Specifications and/or by the Owner.
- B. Provide and install union type connections at all equipment to permit removal of service piping.
- C. Gas service connections shall have a diameter at least one (1) pipe size larger than that of the inlet connection to the equipment as provided by the manufacturer and be of adequate size to provide the total input demand of the connected equipment.
- D. Provide listed and labeled appliance connectors complying with ANSI Z21.69 and listed for use with food service equipment having casters, or that is otherwise subject to movement for cleaning, and other large movable equipment. Connectors shall have listed and labeled quick-disconnect devices and shall have retaining cables attached to structures and equipment. Connectors shall not be concealed within or extended through wall, floor or partition and shall be located entirely in the same room as the connected equipment. Provide an accessible shut-off valve not less than the nominal size of the equipment connector, immediately ahead of the connector.
- E. Rigid metallic pipe and fittings shall be used at service connections to all permanently stationary equipment.

3.5 INSTALLATION - GENERAL

- A. All gas piping installed in return air plenums shall be welded.

- B. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
- C. All installation shall be in accordance with manufacturer's published recommendations.
- D. Provide support for and connections to natural gas service meter in accordance with requirements of the utility company.
- E. All installation shall be in accordance with manufacturer's published recommendations.
- F. All above ground gas piping shall be electrically continuous and bonded to electrical system ground conductor in accordance with NFPA 70.
- G. Provide and install unions at proper points to permit dismantling or removal of pipe. No unions will be required in welded lines except at equipment connections.
- H. Provide dielectric isolation device where copper lines connect to ferrous lines or equipment, such as dielectric union, coupling or dielectric flange fitting.
- I. Valves, regulators, flanges, unions and similar appurtenances shall be accessible for operation and servicing and shall not be located above ceilings in accessible locations or within partitions.
- J. Route piping in orderly manner and maintain gradient. Install piping to conserve building space. Group piping whenever practical at common elevations.
- K. Install piping to allow for expansion and Contraction without stressing pipe, joints, or connected equipment.
- L. Make service connections at the top of the main, whenever the depth of the main is sufficient to allow top connections. When service connections cannot be made at the top of the main, they shall be made on the side of the main no lower than the horizontal midpoint of the gas main.
- M. Cross type fittings shall not be installed in any gas line. Bushings shall not be used in conjunction with any gas piping.
- N. Slope piping and arrange to drain at low points. Install drip/sediment traps at points where condensate and debris may collect. Locate drip/sediment traps where readily accessible for cleaning and emptying. Do not install where condensate would be subject to freezing. Construct drip/sediment traps using tee fitting with capped nipple connected to bottom outlet. Use minimum-length nipple of three (3) pipe diameters, but not less than 4 inches long, and same size as connected pipe. Cap shall be screwed pattern, black, standard weight, malleable iron. Install with adequate space for removal of cap.
- O. Install valves for shut off and to isolate equipment, parts of systems, or vertical risers. All valves shall be located such that servicing and operation is possible. All flanged valves shown in horizontal lines with the valve stem shall be positioned so that the valve stem is inclined one bolt hole above the horizontal position. Screw pattern valves placed in horizontal lines shall be installed with their valve stems inclined at an angle of a minimum of 30 degrees above the horizontal position. All valves must be true and straight at the time the system is tested and inspected for final acceptance. Valves shall be installed as nearly as possible to the locations indicated in the Contract Drawings. Any change in valve location must be so indicated on the Record Drawings.

- P. Install line shut-off valve at each branch connection to riser. Branch line shut-off valves shall be automatic type where indicated on Drawings.
- Q. Provide adequate clearance for access to and operation of all valves.
- R. Install valves with stems upright or horizontal, not inverted unless required otherwise by the valve manufacturer.
- S. Pipe vents from gas pressure reducing valves and pipe casing sleeves to the exterior of the building and terminated with outlet turned down and capped with corrosion resistant insect screen. Vent terminations shall be at least seven feet above grade or pedestrian traffic and a minimum five (5) feet above or twenty five (25) feet horizontally from all air intakes or building openings.
- T. Above ground horizontal natural gas and encasement piping shall be supported at intervals of no greater than 6 foot for 1/2" piping, 8 foot for 3/4" and 1" piping and 10 foot for 1-1/4" and larger piping. Vertical piping shall be supported at each floor level and at intervals as specified for horizontal piping.
- U. Extension bars shall not be used for supporting gas or encasement piping. Gas or encasement piping shall not be used to support any other piping or component.

3.6 INSTALLATION - UNDERGROUND

- A. All excavation required for plumbing work is the responsibility of the Plumbing Contractor and shall be done in accordance with project Specifications.
- B. Do not install underground piping when bedding is wet or frozen.
- C. Bury all underground piping at least three (3) feet below finished grade. Provide a continuous detectable warning tape on tamped backfill, 12" above all buried non-metallic gas lines. Refer to Mechanical Identification Section 230553 for underground warning tape requirements.
- D. Do not install gas piping in the same trench with other utilities. The minimum horizontal clearance between gas pipe and parallel utility pipe shall be two (2) feet. Do not install gas pipe through catch basins, vaults, manholes or similar underground structures.

3.7 INSTALLATION – POLYEHTYLENE SERVICE PIPING

- A. Install and support all polyethylene piping in accordance with manufacturer's recommendations. All heat fusion welds shall be performed by welders qualified to the manufacturer's procedures.
- B. Polyethylene piping shall not be installed above ground.
- C. Provide connection between buried plastic gas piping and metallic riser in accordance with the gas code.

3.8 INSTALLATION - WELDED PIPING

- A. Welding of pipe in normally occupied buildings is prohibited. Off-Site welding is acceptable. Should welding be required in a normally occupied building for connecting to an existing welded system, obtain written approval from the General Contractor and comply with Owner's fire and life safety requirements.

- B. Piping and fittings shall be welded and fabricated in accordance with ASME/ANSI.
- C. Ensure complete penetration of deposited metal with base metal. Provide filler metal suitable for use with base metal. Maintain inside of fittings free from globules of weld metal. All welded pipe joints shall be made by the fusion welding process, employing a metallic arc or gas welding process. All pipes shall have the ends beveled 37 1/2 degrees and all joints shall be aligned true before welding. Except as specified otherwise, all changes in direction, intersection of lines, reduction in pipe size and the like shall be made with factory-fabricated welding fittings. Mitering of pipe to form elbows, notching of straight runs to form tees, or any similar construction will not be permitted.
- D. Align piping and equipment so that no part is offset more than 1/16". Set all fittings and joints square and true and preserve alignment during welding operation. Use of alignment rods inside pipe is prohibited.
- E. Contractor shall not permit any weld to project within the pipe so as to restrict it. Tack welds, if used, must be of the same material and made by the same procedure as the completed weld. Otherwise, remove tack welded during welding operation.
- F. In no cases shall Schedule 40 pipe be welded with less than three (3) passes including one (1) stringer/root, one (1) filler and one (1) lacer. Schedule 80 pipe shall be welded with not less than four (4) passes including one (1) stringer/root, two (2) filler and one (1) lacer. In all cases, however, the weld must be filled before the cap weld is added.

3.9 INSTALLATION – CORRUGATED STAINLESS STEEL TUBING

- A. Install and support all corrugated stainless steel tubing in accordance with manufacturer's recommendations.
- B. All piping system vents shall be routed to the building exterior per code & local AHJ requirements.

3.10 WELD TESTING

- A. All welds are subject to inspection, visual and/or x-ray, for compliance with Specifications. At the Owner's option, the Owner will provide employees or employ a testing laboratory for the purposes of performing said inspections and/or x-ray testing. Initial visual and x-ray inspections will be provided by the Owner. The Contractor shall be responsible for all labor, material and travel expenses involved in the re-inspection and retesting of any welds found to be unacceptable. In addition, the Contractor shall be responsible for the costs involved in any and all additional testing required or recommended by ASME/ANSI Standards B31.1 and B31.3 due to the discovery of poor, unacceptable or rejected welds.
- B. Welds lacking penetration, containing excessive porosity or cracks, or are found to be unacceptable for any reason, must be removed and replaced with an original quality weld as specified herein. All qualifying tests, welding and stress relieving procedures shall, moreover, be in accord with Standard Qualification for Welding Procedures, Welders and Welding Operators, Appendix A, Section 6 of the Code, current edition.

3.11 TESTING

- A. All natural gas systems shall be inspected, tested, purged and placed into operation in accordance with NFPA 54 and as required herein.

- B. All natural gas piping systems shall be very carefully inspected, tested, purged and placed into operation by a Licensed Plumber.
- C. All necessary apparatus for conducting tests shall be furnished by the Contractor and comply with the requirements of NFPA 54.
- D. All new rough-in distribution piping and affected portions of existing systems connected to, shall be subjected to a pneumatic test pressure utilizing clean, dry air and must be demonstrated to be absolutely tight when subjected to the pressures and time durations listed herein. All equipment and components designed for operating pressures of less than the test pressure shall not be connected to the piping system during test.
- E. Systems on which the normal operating pressure is less than 0.5 pounds per square inch gauge (psig), the test pressure shall be 5.0 psig and the time interval shall be thirty (30) minutes.
- F. Systems on which the normal operating pressure is between 0.5 psig and 5.0 psig, the test pressure shall be 1.5 times the normal operating pressure or 5.0 psig, whichever is greater, and the time interval shall be thirty (30) minutes.
- G. Systems on which the normal operating pressure is 5.0 psig or greater, the test pressure shall be 1.5 times the normal operating pressure, and the time interval shall be one (1) hour.
- H. After testing is complete, the entire gas system shall be purged with dry nitrogen to eliminate all air, debris and moisture from the piping before natural gas is introduced into the system.
- I. After successful results of pressure test and purging have been completed, a leakage test shall be performed in accordance with NFPA 54 Appendix D.
- J. Connect, inspect and purge gas utilization equipment, lab hook-ups, outlets, etc., and place into operation only after successful results of pressure test, leakage test and purging have been completed and accepted.
- K. In all instances in which leaks are then found, they shall be eliminated. Testing operations shall be repeated until gas-piping systems are absolutely tight at the pneumatic test pressures indicated above.
- L. Pressure test gas piping sleeve system with clean, dry compressed air at 15 psig by temporarily sealing all openings between gas carrier pipe and sleeve and vent openings. Sleeve systems must be demonstrated to be absolutely tight when subjected to this pressure for a period of four (4) hours.

END OF SECTION 231126

SECTION 232300 – REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all work required to provide and install the Refrigerant Piping indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment Included in This Section
 - a. Piping
 - b. Equipment
 - c. Valves
 - d. Accessories
 - e. Specialties

1.2 REFERENCES

- A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
- B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."
- C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.3 SUBMITTALS

- A. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.
 - 1. Refrigerant piping indicated on Drawings is schematic only.
 - 2. Size piping and design actual piping layout, including oil traps, double risers, and specialties. Coordinate the number of circuits, required pipe and tube sizes as needed to accommodate the provided cooling coils and condensing units.
 - 3. Verify the equipment to be provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.
- B. Field quality-control test reports.
- C. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

1.4 PERFORMANCE REQUIREMENTS

- A. Line Test Pressure for Refrigerant R-410A

1. Suction Lines for Air-Conditioning Applications: 300 psig
2. Suction Lines for Heat-Pump Applications: 535 psig
3. Hot-Gas and Liquid Lines: 535 psig

PART 2 - PRODUCTS

2.1 REFRIGERANT PIPING

A. Copper Tube and Fittings

1. Copper Tube: ASTM B 280, Type ACR
2. Wrought-Copper Fittings: ASME B16.22
3. Wrought-Copper Unions: ASME B16.22
4. Silver Solder: Cadmium-free high-silver alloy consisting of at least 45% silver
5. Brazing Filler Metals: Phosphorus/copper/silver alloy consisting of 15% silver

B. Flexible Connectors

1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket
2. End Connections: Socket ends
3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch- long assembly
4. Pressure Rating: Factory test at minimum 500 psig
5. Maximum Operating Temperature: 250° F

2.2 VALVES AND SPECIALTIES

A. Provide all necessary valves and specialties as needed to provide an operational system. Components may include the following items:

1. Diaphragm Packless Valves
2. Packed-Angle Valves
3. Check Valves
4. Service Valves
5. Solenoid Valves
6. Safety Relief Valves

7. Thermostatic Expansion Valves
8. Hot-Gas Bypass Valves
9. Strainers
10. Moisture/Liquid Indicators
11. Replaceable-Core Filter Dryers
12. Permanent Filter Dryers
13. Mufflers
14. Receivers
15. Liquid Accumulators

B. Coordinate refrigerant system configuration with equipment manufacturer.

2.3 REFRIGERANTS

A. The following refrigerants are acceptable for comfort cooling related systems.

1. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Suction Lines for Conventional Air-Conditioning Applications: Copper, Type L or ACR, drawn-temper tubing and wrought-copper fittings with brazed or silver soldered joints.
- B. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type L or ACR, drawn-temper tubing and wrought-copper fittings with brazed or silver soldered joints.
- C. Safety-Relief-Valve Discharge Piping: Copper, Type L or ACR, drawn-temper tubing and wrought-copper fittings with brazed or silver soldered joints.

3.2 SYSTEM CONSTRAINTS

- A. Install a full-sized, three (3)-valve bypass around filter dryers and all equipment that require routine servicing.
- B. Design refrigeration system to operate at an ambient temperature of 95°F and a minimum outside air temperature of -20°F.

3.3 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.

- B. Install refrigerant piping according to ASHRAE 15.
- C. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping free of sags and bends.
- F. Install fittings for changes in direction and branch connections.
- G. Arrange piping to allow inspection and service of refrigeration equipment.
- H. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels if valves or equipment requiring maintenance is concealed behind finished surfaces.
- I. Install refrigerant piping in protective conduit where installed belowground.
- J. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- K. Slope refrigerant piping as follows:
 - 1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
 - 2. Install horizontal suction lines with a uniform slope downward to compressor.
 - 3. Use double-suction riser for maximum compressor efficiencies if load variation is expected.
 - 4. Install traps and double risers to entrain oil in vertical runs.
 - 5. Liquid lines may be installed level.
- L. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.
- M. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- N. Install sleeves for piping penetrations of walls, ceilings, and floors.
- O. Install sleeve seals for piping penetrations of concrete walls and slabs.
- P. Install escutcheons for piping penetrations of walls, ceilings, and floors.
- Q. Install safety relief valves where required by ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.

- R. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for device being protected:
 - 1. Solenoid valves.
 - 2. Thermostatic expansion valves.
 - 3. Hot-gas bypass valves.
 - 4. Compressor.
- S. Install flexible connectors at compressors.

3.4 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."
- D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections
 - 1. Comply with ASME.
 - 2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
 - 3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
 - a. Fill system with nitrogen to the required test pressure.
 - b. System shall maintain test pressure at the manifold gage throughout duration of test.
 - c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
 - d. Remake leaking joints using new materials and retest until satisfactory results are achieved.

3.6 SYSTEM CHARGING

- A. Charge system using the following procedures:
 - 1. Install core in filter dryers after leak test but before evacuation.

2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers or manufacturers' required level. If vacuum holds for twelve (12) hours, system is ready for charging.
3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
4. Charge system with a new filter-dryer core in charging line.

3.7 ADJUSTING

- A. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- B. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.
- C. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
 1. Open shutoff valves in condenser water circuit.
 2. Verify that compressor oil level is correct.
 3. Open compressor suction and discharge valves.
 4. Open refrigerant valves except bypass valves that are used for other purposes.
 5. Check open compressor-motor alignment and verify lubrication for motors and bearings.
- D. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 232300

SECTION 233113 – METAL DUCTWORK

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all work required to provide and install the Ductwork Insulation indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. National Fire Protection Association (NFPA)
- B. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
- C. Definition
 - 1. Low Pressure
 - a. 2 inch W.G. Pressure Class: Ductwork systems up to 2 inch w.g. positive or negative static pressure with velocities less than or equal to 1500 fpm.
 - 2. Medium Pressure
 - a. 3 inch W.G. Pressure Class: Ductwork systems over 2 inch w.g. and up to 3 inch W.G. positive or negative static pressure with velocities less than or equal to 2500 fpm.
 - b. 4 inch W.G. Pressure Class: Ductwork systems over 3 inch w.g. and up to 4 inch w.g. positive or negative static pressure with velocities less than or equal to 2500 fpm.
 - c. 6 inch W.G. Pressure Class: Ductwork systems over 4 inch w.g. and up to 6 inch w.g. positive or negative static pressure with velocities less than or equal to 2500 fpm.
 - 3. High Pressure
 - a. 10 inch W.G. Pressure Class: Ductwork systems over 6 inch w.g. and up to 10 inch w.g. positive or negative static pressure with velocities greater than 2500 fpm.

1.3 SUBMITTALS

- A. Shop Drawings
 - 1. Submit CAD drawn duct layout drawings for all project ductwork. Submit detailed elevations and sections where required to convey complete scope of work. Shop drawings shall be based on other trades contract drawings and field dimensions. Submit drawings on full size paper at 1/4" = 1'-0" scale.
 - 2. Layouts for areas in which it may be necessary to deviate substantially from layout shown on the Drawings. Show major relocation of ductwork and major changes in size of ducts. Minor transitions in ductwork, if required due to job conditions, need not be submitted as long as the duct area is maintained.
 - 3. Layout and fabrication details for cooking equipment exhaust ductwork.

4. Layouts of mechanical equipment rooms and penthouses.
 5. Details of intermediate structural steel members required to span main structural steel for the support of ductwork.
 6. Method of attachment of duct hangers to building construction.
- B. Coordinate shop drawings with related contractors prior to submission.
- C. Product Data: Material, gauge, type of joints, sealing materials, and reinforcing for each duct size range, including sketches or SMACNA plate numbers for joints, method of fabrication and reinforcing. Include ACGIH figure numbers for hoods if applicable.

1.4 QUALITY ASSURANCE

- A. SMACNA: Gauges of materials, fabrication, reinforcement, sealing requirements, installation, and method of supporting ductwork shall be in accordance with the following SMACNA manuals, unless otherwise shown or specified:
1. HVAC Duct Construction Standards
 2. Round Industrial Duct Construction Standard
 3. Rectangular Industrial Duct Construction Standard
- B. Unless otherwise shown or specified, follow the Hood Design Data, and Construction Guidelines for Local Exhaust Systems from the ACGIH Industrial Ventilation Manual.
- C. Conform to the applicable requirements of NFPA 90A, 90B, 91, 96, and 101.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Sheet Metal
1. Aluminum: ASTM B-209, Alloy 3003, Temper H-14.
 2. Carbon Steel: 16 gauge black iron
 3. Galvanized Steel: ASTM A653, Class LFQ (lock forming quality), coating designation G-60.
 4. Monel: ASTM B-127.
 5. Stainless Steel: AISI Types 302, 304 and 316, as specified.
- B. Duct Hangers
1. Strap Hangers: Same material as ducts, except that hangers for stainless steel ducts in unfinished spaces may be galvanized steel.

2. Rod Type Hangers: Mild low carbon steel, unless otherwise specified; fully threaded or threaded each end, with 2 removable nuts each end for positioning and locking rod in place. Unless stainless steel, galvanized or cadmium plated; shop coat with metal primer.

C. Miscellaneous Fasteners and Upper Hanger Attachments

1. Sheet Metal Screws, Machine Bolts and Nuts: Same material as duct, unless otherwise specified.
2. Concrete Inserts: Steel or malleable iron, galvanized; continuously slotted or individual inserts conforming with MSS SP-58, Types 18 & 19, Class A-B.
3. C Clamps: Fee & Mason Co.'s 255L with locking nut, and 255S with retaining strap.
4. Metal Deck Ceiling Bolts: B-Line Systems, Inc.'s Fig. B3019.
5. Welding Studs: Erico Fastening Systems, capacitor discharge, low carbon steel, copper flashed.
6. Structural (carbon) Steel Shapes and Steel Plates: ASTM A36, shop primed.
7. Stainless Steel Shapes and Plates: ASTM A276 and ASTM A666.
8. Machine Bolt Expansion Anchors
 - a. Non-caulking single unit type: FS FF-S-325, Group II, Type 2, Class 2, Style 1.
 - b. Non-caulking double unit type: FS FF-S-325, Group II, Type 2, Class 2, Style 2.
 - c. Self-drilling type: FS FF-S-325, Group III, Types 1 and 2.

2.2 FABRICATION – GENERAL

- A. Refer to the ductwork application schedule on the drawings for the types and material usage for the various ductwork types required.
- B. Duct sizes shown on the Drawings are inside clear dimensions available for air movement. Verify with duct construction method to determine exterior dimensions for layout and fabrication purposes.
- C. Fabricate ductwork from galvanized sheet metal, except as follows:
 1. Fabricate the following ductwork from aluminum:
 - a. Inlet and discharge ductwork connected to cooling towers and evaporative condensers.
 - b. Exhaust ductwork from shower, locker, car washing and steam service rooms, and swimming pool areas.
 2. Fabricate the following ductwork from stainless steel:
 - a. Supply, return, and recirculated air ductwork connected to inlet or outlet devices installed in surgical operating, surgical scrub-up, surgical recovery and surgical work rooms. Use AISI Type 302 or 304 stainless steel.
 - b. Exhaust ductwork connected to cooking equipment, dishwashing, and other scullery equipment hoods. Install stainless steel from the individual hood to its

- respective fan and from the fan to the point of discharge to the outside air. Use AISI Type 302 or 304 stainless steel.
- c. Exhaust ductwork connected to laboratory exhaust fume hoods. Install stainless steel from the individual hood to its respective fan and from the fan to the point of discharge to the outside air. Use AISI Type 316 stainless steel.
 - d. Use stainless steel with a No. 4 finish where installed exposed in finished rooms and No. 2B finish in other locations. Use stainless steel fasteners for ductwork installed exposed in finished rooms and where fastener penetrates duct. Galvanized fasteners may be used in unfinished spaces for non-penetrating service.
- D. Dissimilar Metals: Separate dissimilar metals used for ductwork with 12 oz vinyl coated woven fiberglass duct connector fabric, such as Duro Dyne's Glasseal. No separation is required between screws or rivets and the materials in which they are inserted.

2.3 FABRICATION OF STAINLESS STEEL DUCTS

- A. Use minimum No. 18 gauge for exhaust ducts connected to cooking equipment hoods. Use minimum No. 20 gauge for exhaust ducts connected to other hoods.
- B. Use stainless steel reinforcing members for ducts in finished spaces and galvanized steel in unfinished spaces.
- C. Longitudinal Seams For Dishwashing, and Other Scullery Equipment Exhaust Ducts: Form double corner seams, or Pittsburgh lock seams.
 - 1. Fabricate elbows and transitions with Pittsburgh lock seams.
 - 2. Fabricate double compounded elbows and other complex fittings with double corner seams.
 - 3. Locate seams in horizontal ducts at top corners of ducts, unless otherwise approved in writing.
 - 4. Locate seams in vertical ducts at rear corners of ducts.
- D. All exposed stainless steel ductwork shall have a #3 finish.

2.4 REGISTERS AND GRILLES INSTALLED IN EXPOSED DUCTWORK

- A. Frames are not required for registers and grilles installed directly in un-insulated exposed ductwork.
- B. Cut openings in ducts, forming a double thickness of metal, to attach registers or grilles with sheet metal screws. Bend back edges of openings into duct, on all four (4) sides, a minimum of 1 inch to provide the thickness of metal stated above. Provide felt or sponge rubber gasketing, all four (4) sides of duct openings, for supply grilles and supply registers.

2.5 AIR DIFFUSERS INSTALLED IN EXPOSED DUCTWORK

- A. Frames are not required for diffusers installed directly in un-insulated exposed ductwork.

- B. Cut and form openings in ducts, to accommodate the specified volume control damper and adjustable equalizing grid assembly. Reinforce openings as required and approved. Provide felt or sponge rubber gasketing, around duct opening, for supply diffuser assemblies.

2.6 VIBRATION ISOLATION FOR DUCTWORK

- A. Type: Combination rubber and spring type designed for insertion in a split hanger rod for isolating ductwork from the overhead construction.
 - 1. Approved isolators: Amber Booth Type BSSR, Korfund Type VX, Mason Industries, Type DNHS, Vibration Eliminator Co. Type SNRC and Vibration Mountings and Controls Type RSH.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

- A. Install ductwork to allow maximum headroom. Properly seam, brace, stiffen, support and render ducts mechanically airtight. Adjust ducts to suit job conditions. Dimensions may be changed as approved, if cross sectional area is maintained.
- B. Pitch horizontal ducts connected to hoods downward toward hood not less than 1 inch in 10 feet.
- C. Provide necessary transformation pieces, and flexible fabric connections for ductwork connected to air handling equipment or air inlet and outlet devices.

3.2 SEALING SEAMS, JOINTS, AND PENETRATIONS

- A. Seal ductwork in accordance with the SMACNA Manual except for the following:
 - 1. Ductwork Specified to be Insulated: Conform with Seal Class A for all pressure classes.
 - 2. Cooking Equipment Exhaust Ductwork: Conform with NFPA 96.
 - 3. Horizontal Ductwork for Dishwashing, and Other Scullery Equipment Exhausts
 - a. Continuously solder transverse joints vaportite along bottom, and up both sides two (2) inches minimum.
 - b. Continuously solder longitudinal seams vaportite if seams are approved to be located at bottom of duct.

3.3 HANGERS FOR DUCTS, UNDER 2 INCHES W.G.

- A. Install hangers for ducts as specified in the SMACNA Manual, with the following exceptions:
 - 1. Rectangular ducts up to 42 inches wide, not having welded or soldered seams, and supported from overhead construction; extend strap hangers down over each side of the duct and turn under bottom of duct a minimum of two (2) inches. Secure hanger to duct with three (3) full thread sheet metal screws, one (1) in the bottom and two (2) in the side of the duct.

2. Rectangular ducts 43 inches wide and over, and all sizes of duct with welded or soldered seams, and supported from overhead construction; use trapeze hangers.
3. Prime coat plain steel rods threaded at the site immediately after installation with metal primer.

3.4 HANGERS FOR DUCTS, 2 INCHES W.G. AND OVER

A. Install hangers for ducts as specified in the SMACNA Manual, with the following exceptions:

1. Support rectangular ducts with welded seams, regardless of size, by means of trapeze hangers, framed all four (4) sides. Provide minimum 1 x 1 x 1/8 inch angle iron framing for duct having a maximum side dimension up to and including 36 inches in size. Install framing snug to all four (4) sides of duct.

3.5 UPPER HANGER ATTACHMENTS

A. General

1. Secure upper hanger attachments to structural steel or steel bar joists wherever possible.
2. Do not use drive-on beam clamps, flat bars or bent rods, as upper hanger attachments.
3. Do not attach hangers to steel decks which are not to receive concrete fill.
4. Do not attach hangers to precast concrete planks less than 2-3/4 inches thick.
5. Avoid damage to reinforcing members in concrete construction.
6. Metallic fasteners installed with electrically operated or powder driven tools may be used as upper hanger attachments, in accordance with the SMACNA Manual, with the following exceptions:
 - a. Do not use powder driven drive pins or expansion nails.
 - b. Do not attach powder driven or welded studs to structural steel less than 3/16 inch thick.
 - c. Do not support a load, in excess of 250 lbs from any single welded or powder driven stud.
 - d. Do not use powder driven fasteners in precast concrete.

B. Attachment to Steel Frame Construction: Provide intermediate structural steel members where required by ductwork support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of five (5).

1. Secure upper hanger attachments to steel bar joists at panel points of joists.
2. Do not drill holes in main structural steel members.

C. Attachment to Concrete Filled Steel Decks

1. New Construction: Install metal deck ceiling bolts.
2. Existing Construction: Install welding studs (except at roof decks).
3. Do not attach hangers to decks less than 2-1/2 inches thick.

- D. Attachment to Existing Cast-In Place Concrete
1. Secure hangers to overhead construction with self drilling type expansion anchors and machine bolts.
 2. Secure hanger attachments required to be supported from wall or floor construction with single unit expansion anchors or self drilling type expansion anchors and machine bolts.
- E. Attachment to Cored Precast Concrete Decks (Flexicore, Dox Plank, Spancrete, etc.): Toggle bolts may be installed in cells for the support of ducts up to a maximum of 60 inches in width.
- F. Attachment to Hollow Block or Hollow Tile Filled Concrete Decks
1. New Construction: Omit block or tile and pour solid concrete with cast-in-place inserts.
 2. Existing Construction: Break out block or tile to access, and install machine bolt anchors at highest practical point on side of web.
- G. Attachment to Waffle Type Concrete Decks
1. New Construction: Install cast-in-place inserts.
 2. Existing Construction: Install machine bolt expansion anchors at highest practical point on side of web.
- H. Attachments to Precast Concrete Tee Construction
1. Secure hangers to tees by any of the following methods:
 - a. Tee hanger inserts between adjacent flanges.
 - b. Install double unit expansion anchors and machine bolts at highest practical point on side of web.
- I. Attachment to Wood Construction
1. Secure strap hangers to the sides of wood beams with one (1) No. 18 x 1-1/2 inch long (minimum) wood screws or two (2) No. 16 x 1-1/2 inch long (minimum) drive screws. Do not hammer in wood screws.
 2. Secure rod hangers to angle iron clip angles, bolted or screwed to the sides of the wood beams with 3/8 inch bolts or 3/8 inch lag screws. Install hanger rods with a threaded end through a hole in the angle, secured with a double nut, one (1) above and one (1) below the angle. Do not use lag screws in wood beams, having a nominal face width under 2 inches. Install bolts or lag screws in the side of beams at mid-point or above.
 3. Pre-drill holes for lag screws 1/8 inch in diameter less than the root diameter of the lag screw thread.
 4. Where wood trusses are approved to support ductwork, hangers may be attached only to the bottom chord. Method of attachment must be specifically approved.
 5. Do not secure hanger attachments to nailing strips resting on top of steel beams.

3.6 DUCT RISER SUPPORTS, UNDER 2 INCHES W.G.

- A. Support vertical round ducts by means of double-ended split steel pipe riser clamps bearing on floor slabs or adjacent structural members, at every other floor through which the riser passes.
- B. Unless otherwise specified or shown on the drawings, support vertical rectangular ducts by means of two steel angles, secured to duct and resting on floor slab or adjacent structural steel member, at every other floor through which the duct passes. Size supports as follows:

MAX. SIDE DIMENSION (inches)	SUPPORT ANGLE (inches)	SECURE TO DUCT WITH	MIN BEARING AT EACH END (inches)
36	1 x 1 x 1/8	Screws	2
48	1-1/2 x 1-1/2 x 1/8	Bolts	3
60	2 x 2 x 1/8	Bolts	3
61 - up	2-1/2 x 2-1/2 x 3/16	Bolts	4

3.7 DUCT RISER SUPPORTS, 2 INCHES W.G. AND OVER

- A. Support vertical round ducts by means of double-ended split steel pipe riser clamps welded to the ducts and bearing on floor slabs or adjacent structural members, at every other floor through which the riser passes.
- B. Support vertical rectangular ducts by means of two steel angles or channels, anchor bolted to floor slab or adjacent structural member at every other floor through which the riser passes. Secure steel angles or channels to a transverse joint by means of 3/8 inch bolts, or by welding. Size supports as follows:

MAXIMUM SIDE DIMENSION (inches)	SUPPORT ANGLE (inches)	SUPPORT CHANNEL (inches)	MINIMUM BEARING AT EACH END (inches)
36	1 x 1 x 1/8	1 x 1/2 x 1/8	2
48	1-1/2 x 1-1/2 x 1/8	1-1/2 x 3/4 x 1/8	3
60	2 x 2 x 1/8	2 x 1 x 1/8	3
61 - up	2-1/2 x 2-1/2 x 3/16	2 x 1 x 3/16	4

3.8 VIBRATION ISOLATION FOR DUCTWORK

- A. Install vibration isolation in accordance with the manufacturer's printed installation instructions, unless otherwise specified.
- B. Install in locations shown or scheduled on the Drawings.
- C. High Velocity Ductwork Installed within Mechanical Equipment, Machine and Penthouse Mechanical Equipment Rooms: Provide combination rubber and spring type isolators, designed for insertion in a split hanger rod for overhead supported ductwork and double rubber-in-shear isolators for floor supported ductwork. Provide isolators designed for a static deflection of 1/2 inch.

3.9 INSTALLATION

- A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

- B. All installation shall be in accordance with manufacturer's published recommendations.
- C. Cleanliness
1. Before installing ductwork, wipe ductwork to a visibly clean condition.
 2. During construction, provide temporary closures of metal or taped polyethylene on open ductwork and duct taps to prevent construction dust or contaminants from entering ductwork system. Seal ends of ductwork prior to installation to keep ductwork interior clean. Remove closures only for installation of the next duct section.
 3. For ductwork supplying Clean Rooms, Operating Rooms and other Critical Care areas, sanitize ductwork with a biocidal agent EPA approved for HVAC systems immediately prior to sealing ductwork.
 4. During duration of construction, maintain the integrity of all temporary closures until air systems are activated.
 5. Provide openings in ductwork where required to accommodate thermometers, controllers and other devices. Provide pitot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring. Sleeve of pitot tube opening shall be no more than one inch long. Opening shall be one inch wide to accept pitot tube.
 6. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
 7. Slope underground ducts to plenums or low pump out points at 1:500. Provide access doors for inspection.
 8. Coat buried, metal ductwork without factory jacket with one coat and seams and joints with additional coat of asphalt base protective coating.
 9. Set plenum doors 6 to 12 inches above floor. Arrange door swings so that fan static pressure holds door in closed position.
 10. Provide residue traps in kitchen hood exhaust ducts at base of vertical risers with provisions for cleanout. Use polished stainless steel for ductwork exposed to view and mill stainless steel for ducts where concealed.
 11. All visible welds in ductwork between biosafety cabinets, canopy hoods and fume hoods and the ceiling shall be ground and polished.
 12. Slope duct toward grilles for moisture-laden ducts. Provide drain and trap at elbow of main moisture exhaust duct system.
- D. Exposed Ductwork
1. Remove all markings, stickers, and labels.
 2. Completely clean the exterior of all ducts prior to painting, duct is to be painted prior to project completion.

3. All exposed ductwork shall have a 'paintgrip' finish to allow for normal paint application without additional field labor by the painter. See architectural drawings for areas with exposed ceiling to be painted.
4. Any ductwork deemed in unsightly by the Architect/Engineer/Owner will be replaced at the Contractor's expense.

E. Grease Duct

1. All grease duct and components shall meet the requirements of NFPA 96 and the Mechanical Code.
2. The minimum requirements for access doors shall be as follows:
 - a. Label all access doors
 - b. Access doors shall be provided at sides or top of the duct, whichever is more accessible.
 - c. Provide access doors at all changes in direction.
 - d. On horizontal ducts at least one opening shall be provided for personnel entry (20"x20"). Where an opening of this size is not possible, openings large enough to permit cleaning shall be provided at a maximum of 12 foot intervals.
 - e. Where personnel entry is not possible, adequate access for cleaning shall be provided at each floor.
3. Slope all grease duct back to the hood / equipment served.
4. Install ducts with proper clearance to combustible and limited-combustible materials. Furnish and install listed duct insulation material when required to provide proper enclosure of ductwork. Include removable sections of insulation around duct access doors. Include an "Access Door" label.

F. Flexible Duct

1. The terminal ends of the duct core shall be secured by compression coupling or stainless steel worm gear type clamp.
2. Fittings on terminal units and on sheet metal duct shall have flexible duct core slipped over duct and coupling or clamp tightened, then connection sealed with sealant. Insulation of flexible duct shall be slipped over connection to point where insulation abuts terminal unit or insulation on duct.
3. These insulation connections shall be sealed by embedding fiberglass tape in the sealant and coating with more sealant to provide a vapor barrier.
4. Support flexible ducts as per SMACNA standards to prevent sags, kinks and to have 90 degree turns.

G. Hangers and Supports

1. All ductwork supports shall be in accordance with Table 4-1 (rectangular duct) and Table 4-2 (round duct) of the SMACNA Standards, with all supports directly anchored to the building structure.
2. Rectangular duct shall have at least one pair of supports on minimum 8'-0" (eight feet) centers. All horizontal round and flat oval ducts shall have ducts hangers spaced 10'-0" (ten feet) maximum.

3. Lower attachment of hanger to duct shall be in accordance with Table 4-4 of the SMACNA Standards.
4. Vertical ducts shall be supported where they pass through the floor lines with 1-1/2 inch x 1-1/2 inch x 1/4 inch angles for duct widths up to 60 inches. Above 60 inches in width, the angles must be increased in strength and sized on an individual basis considering space requirements.
5. Hanger straps on duct widths 60 inches and under shall lap under the duct a minimum of 1 inch and have minimum of one fastening screw on the bottom and two on the sides.
6. Hanger straps on duct widths over 60 inches shall be bolted to duct reinforcing with 3/8 inch bolts minimum.

3.10 DUCTWORK SYSTEM CLEANING

- A. If the system has been operated without scheduled filters or if the integrity of temporary closures has been compromised, Contractor shall have ductwork cleaned according to National Air Duct Cleaners Association (NADCA) Standards by a Certified Regular Member of the NADCA.
- B. For ductwork supplying Clean Rooms or patient care areas, also sanitize the ductwork interior per NADCA standards with a biocidal agent approved by the EPA for use in HVAC Systems.
- C. Before turning the installation over to the Owner, Contractor shall certify that the air handling systems have only been operated with scheduled filters in place. Otherwise, Contractor shall present evidence that the ductwork was cleaned as required above.

3.11 TESTING

- A. A minimum of 25% of all medium and high pressure duct systems (positive or negative) shall be pressure tested according to SMACNA test procedures (HVAC Air Duct Leakage Test Manual) and ASHRAE Standard 90.1 requirements. The ductwork to be tested shall be 25% of the lineal feet of ductwork mains starting at the air handling unit or fan.
 1. Notify Owner minimum seven (7) calendar days in advance of leakage testing.
 2. Design pressure for testing ductwork shall be determined from the maximum pressure generated by the fan at the nominal motor horsepower selected.
 3. Total allowable leakage shall not exceed 1 percent of the total system design airflow rate.
 4. When partial sections of the duct system are tested, the summation of the leakage for all sections shall not exceed the total allowable leakage.
 5. Leaks identified during leakage testing shall be repaired by:
 - a. Complete removal of the sealing materials.
 - b. Thorough cleaning of the joint surfaces.
 - c. Installation of multiple layers of sealing materials.
 6. The ductwork system to be tested, shall exclude connections downstream of the terminal units (i.e. ductwork shall be capped immediately prior to the terminal units, and tested as described above).

7. After testing has proven that ductwork is installed and performs as specified, the terminal units shall be connected to ductwork and connections sealed with extra care. Contractor shall inform the Owner when joints may be visually inspected for voids, splits, or improper sealing of the joints. If any leakage exists in the terminal unit connections/joints after the systems have been put into service, leaks shall be repaired as specified for other leaks.
- B. All low-pressure duct systems (positive or negative) shall be inspected for visible and audible signs of leakage.
- C. Leaks identified by inspection shall be repaired by
 1. Complete removal of the sealing materials.
 2. Thorough cleaning of the joint surfaces.
 3. Installation of multiple layers of sealing materials.
- D. Discrepancies found during testing and balancing between duct traverses and diffuser/grille readings shall result in re-inspection, repair and retest until discrepancies are eliminated.
- E. Ductwork leakage testing and/or inspection shall be performed prior to installation of external ductwork insulation.

END OF SECTION 233113

SECTION 233117 – NON-FIBROUS, CLOSED CELL, OUTDOOR DUCTWORK

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the non-fibrous, closed cell, outdoor ductwork indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. This Section includes:
 - 1. Non-fibrous, ducts and fittings.
- C. This Section does not include:
 - 1. Air passages rated over a continuous internal static pressure of 6" w.g. positive, 6" negative, or with test pressure rating over: 10" w.g. startup and 10" w.g. negative (as documented on product labeling).

1.2 REFERENCES

- A. Duct Leakage Class, follow SMACNA Leakage Class 3 or less.
- B. Duct shall incorporate a fortified inner liner compliant to UL (C-UL) 181 Standard for Safety Listed, Class 1 system.
- C. Duct outer shell shall be a UV stable 1000 micron high impact resistant titanium infused vinyl with included testing as following:
 - 1. UL-94 Flammability V-0
 - 2. ASTM D-638 Tensile Strength of 6250 psi
 - 3. ASTM D-790 Flexible Strength of 11,000 psi
 - 4. ASTM D-4226 Drop Impact Resistance
 - 5. ASTM D-4216 Cell Classification

1.3 SUBMITTALS

- A. Shop drawings: Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work including:
 - 1. Duct layout indicating sizes and pressure classes.
 - 2. Elevation of top of ducts.
 - 3. Dimensions of main duct runs from building grid lines.
 - 4. Fittings

- 5. Penetrations through fire-rated and other partitions.
 - B. Product data: For each type of product indicated.
 - C. Coordination Drawings: Plans, drawn to scale, showing coordination general construction, building components, and other building services.
- 1.4 QUALITY ASSURANCE
- A. Installer Qualifications:
 - 1. Non-fibrous, closed cell, outdoor network can be installed by competent trained field mechanics who demonstrate competence in the HVAC industry.
- 1.5 PRODUCT DELIVERY AND STORAGE
- A. Prevent objectionable aesthetic damage to the outer surface of duct segments during transport and storage.
 - B. Store duct segments under cover and protect from excessive moisture prior to installation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Koolduct
- B. Q-Duct

2.2 MATERIALS

- A. The panel shall be manufactured of CFC-free closed cell rigid thermoset resin thermally bonded on both sides to a factory applied .001" (25 micron) aluminum foil facing reinforced with a fiberglass scrim. An added UV stable, IR reflective 1000-micron high impact resistant titanium infused vinyl is factory bonded using a full lamination process. The lamination process shall permanently bond the vinyl clad to the outer surfaces of the phenolic foam panel to provide a zero-permeability water tight barrier and to form a structurally insulated panel (SIP) in which to form duct segments. Processes that do not employ a full lamination process are not acceptable. Self-applied adhesives such as tapes, caulks, or cladding that incorporate pressure sensitive or spray adhesives are not acceptable.
- B. The thermal conductivity shall be no greater than 0.146BTU • in/HR •ft2• °F, the thermal conductivity shall be no greater than 0.146BTU • in/HR •ft2• °F
- C. The density of the foam shall not be less than 3.5 pcf with a minimum compressive strength of 28 psi.
- D. Refer to the ductwork application schedule on the drawings for additional pressure class & insulation requirements. The standard panel shall have a minimum of a 1-3/4" thick panel with R-12 & shall be utilized unless indicated otherwise on the print.

1. Maximum Temperature: Continuous rating of 185 degrees F inside ducts or ambient temperature surrounding ducts.
 2. Maximum Thermal Conductivity: 0.146 Btu x in. /h x sq. ft. x deg F at 75 deg F mean temperature.
 3. Permeability: 0.00 perms maximum when tested according to ASTM E 96/E 96M, Procedure A.
 4. Antimicrobial Agent: Additive for antimicrobial shall not be used but instead, raw product must pass UL bacteria growth testing.
 5. Noise-Reduction Coefficient: 0.05 minimum when tested according to ASTM C 423, Mounting A.
 6. Required Markings: All interior duct liner shall bear UL label and other markings required by UL 181 on each full sheet of duct panel; UL ratings for internal closure materials.
 7. All insulation materials shall be closed cell with a closed cell content of >90%.
 8. Panel R-values:
 - a. 1-3/16 inch (31 mm) Thick Panel: 8.1 R
 - b. 1-3/4 (45 mm) Thick Panel: 12 R
 - c. 2-1/16 inch double wall (55 mm): 14.1 R
 - d. 2-3/8 inch double wall (62 mm) Thick Panel: 16.2 R
 - e. 3 inch double wall (76 mm) Thick Panel: 20.1 R
 - f. 3-1/2 inch double wall (100 mm) Thick Panel: 24 R
- E. Closure Materials:
1. V-Groove Adhesive: Silicone (interior only)
 2. UV stable 1000 micron high impact resistant titanium infused vinyl (exterior)
 - a. Factory manufactured seamless corners for zero perms.
 - b. Cohesive bonded over-lap at corner seam covers for zero perms.
 - c. Water resistant titanium infused welded vinyl seams.
 - d. Mold and mildew resistant.
 3. Polymeric Sealing System:
 - a. Structural Membrane: Aluminum scrim with woven glass fiber with UV stable vinyl clad applied
 - b. Minimum Seam Cover Width: 2-7/8 inches
 - c. Sealant: Low VOC
 - d. Color: White (colors, matched by architect optional)
 - e. Water resistant
 - f. Mold and mildew resistant
 4. Duct Connectors
 - a. Factory manufactured cohesive bonded strips (low pressure only)
 - b. Factory manufactured all aluminum grip flange.
 - 1) Grip flange
 - 2) F-flange
 - 3) H-flange

- 4) U-flange
- c. Factory manufactured galvanized 4-bolt flange.

F. Outdoor Cladding

1. Outdoor Installations: Duct segments shall incorporate UV stable 1000 micron high impact resistant titanium infused vinyl which is introduced during the manufacturing process.

G. Flange Coverings

1. Flanges are field sealed airtight before flange covers are installed. Flange covering consists of the following:
 - a. Foam tape insulation with molded 39 mil covers
 - b. Air gap (heating only application) with molded 39 mil covers.

H. Reinforcement

1. The ductwork shall be fabricated and built with adequate reinforcement to both; withstand air pressure forces from within the duct from blower pressure and shall be built to handle expected snow load for the location where the duct is being installed.

PART 3 - EXECUTION

3.1 SHOP FABRICATION

A. Fabrication

1. Fabricated joints, seams, transitions, reinforcement, elbows, branch connections, access doors and panels, and damage repairs according to manufacturer's written and detailed instructions.
2. Fabricated 90-degree mitered elbows to include turning vanes.
3. Fabricated duct segments in accordance with manufacturer's written details.
4. Duct fittings shall include 6 inches of connecting material, as measured, from last bend line to the end of the duct. Connections on machine manufactured duct may be 4 inches.
5. Fabricated duct segments utilizing v-groove method of fabrication. Factory welded or cohesively bonded seams will apply to fully manufactured ductwork and fittings. Internal seams will be supplied with an unbroken layer of low VOC silicone or bonding (for paint shop applications). Each duct segment will be factory supplied with either aluminum grip pro-file or pre-insulated duct connectors in accordance with manufacturer's detailed submittal guide. Applied duct reinforcement to protect against side deformation from both positive and negative pressure per manufacturer's design guide based on specified ductwork size and system pressure.
6. Designed and fabricated duct segments and fittings will be in accordance with "SMACNA Duct Construction Standards" latest edition.

7. Both positive and negative ductwork and fittings shall be constructed to incorporate a UL Listed as a Class 1 air duct to Standard for Safety UL 181 liner with an exterior clad for permanent protection against water intrusion.
8. Duct shall be constructed to exceed requirements for snow and wind loads.

3.2 DUCT INSTALLATION

- A. Install ducts and fittings to comply with manufacturer's installation instruction as follows:
 1. Install ducts with fewest possible joints.
 2. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
 3. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
 4. Protect duct interiors from the moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."
 5. Use prescribed duct support spacing as described in this specification and manufacturer's recommendations.
- B. Air Leakage: Duct air leakage rates to be in compliance with "SMACNA HVAC Duct Construction Standards" latest version per applicable leakage class based on pressure.

3.3 HANGER AND SUPPORT INSTALLATION

- A. Contractor to ensure that the ductwork system is properly and adequately supported.
 1. Ensure that the chosen method is compatible with the specific ductwork system requirements per the manufacturer's installation detail drawings. Pre-installation should be provided prior to work commencement by installing contractor for approval.
 2. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Supports on straight runs of ductwork shall be positioned at centers not exceeding 13 feet for duct sections when fabricated in 13 foot lengths with duct girth less than 84". Larger duct sizes and short segments with duct girth greater than 84" are to be supported at 8 foot centers or less, in accordance with the manufacturer's installation details provided prior to work commencement.
- C. Ductwork shall be supported at changes of direction, at branch duct connections, tee fittings, parallel under turning vanes and all duct accessories such as dampers, etc.
- D. The load of such accessories to the ductwork shall be neutralized by the accessory support.

3.4 FIELD QUALITY CONTROL

- A. Inspection: Arrange for manufacturer's representative to inspect completed installation and provide written report that installation complies with manufacturer's written instructions.

1. Remove and replace duct system where inspection indicates that it does not comply with specified requirements.
- B. Perform additional testing and inspecting, at the Contractor's expense, to determine compliance of replaced or additional work with specified requirements.

END OF SECTION 233117

SECTION 233300 - DUCTWORK ACCESSORIES

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the ductwork accessories indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment Included in This Section
 - 1. Airflow Control Dampers and Spin-In Fittings
 - 2. Fire Dampers, Smoke Dampers, and Combination Fire and Smoke Dampers
 - 3. Flexible Duct
 - 4. Flexible Duct Elbow Supports
 - 5. Flexible Duct Connections
 - 6. Duct Access Doors
 - 7. Duct Test Holes
 - 8. Turning Vanes

1.2 REFERENCES

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
- C. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
 - 1. AMCA 500D – Laboratory Method of Testing Dampers for Rating
 - 2. AMCA 500L – Laboratory Method of Testing Louvers for Rating
 - 3. NFPA 90A - Installation of Air Conditioning and Ventilating Systems
 - 4. NFPA 101 - Life Safety Code
 - 5. SMACNA - HVAC Duct Construction Standards
 - 6. UL 33 - Heat Responsive Links for Fire-Protection Service
 - 7. UL 555 – Standard for Fire Dampers

8. UL 555C – Standard for Ceiling Radiation Dampers
9. UL 555S – Standard for Smoke Dampers

1.3 SUBMITTALS

A. Product Data

1. Provide product data for shop fabricated assemblies including, but not limited to, volume control dampers, duct access doors, and duct test holes. Provide product data for hardware used.

B. Record Documents

1. Fire Dampers: The damper manufacturer's literature submitted for approval prior to the installation shall include performance data developed from testing in accordance with AMCA 500D standards and shall show the pressure drops for all sizes of dampers required at anticipated air flow rates. Maximum pressure drop through fire damper shall not exceed 0.05-inch water gauge.
2. Combination Fire/Smoke Dampers: Assign identification numbers for each damper with corresponding number noted on Drawings. Provide air quantity, size, free area of damper, pressure drop and proposed velocity through each damper. Provide manufacturer's data of damper and its accessories or options. At Owner's request, provide two (2) dampers (18 inch x 12 inch) for the purpose of illustrating damper operation to Owner's operating and maintenance personnel.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 AIR FLOW CONTROL DAMPERS

A. Acceptable Manufacturers

1. Greenheck
2. Nailor Industries
3. Pottorff
4. Ruskin
5. Tamco
6. United Enertech
7. Louvers & Dampers, Inc.

8. NCA Manufacturing
 9. Air Balance
- B. Furnish and install dampers where shown on the Drawings and wherever necessary for complete control of airflow, including all supply, return, outside air, and exhaust branches, "division" in main supply, return and exhaust ducts, and each individual air supply outlet. Where access to dampers through a permanent suspended ceiling (gypsum board) is necessary, the Contractor shall be responsible for the proper location of the access doors.
- C. Dampers larger than three (3) square feet in area shall be controlled by a self-locking splitter damper assembly.
- D. Volume damper blades shall not exceed 48 inches in length or twelve inches in width and shall be of the opposed interlocking type. The blades shall be of not less than No. 16 gauge galvanized steel supported on one-half inch diameter rust-proofed axles. Axle bearings shall be the self-lubricating ferrule type.
- E. Volume dampers and other manual dampers shall be carefully fitted, and shall be manually controlled by damper regulators as follows:
1. On exposed non-insulated ductwork the locking quadrant shall be made with a base plate of 16-gauge cold-rolled steel and a heavy die cast handle designed with a 3/8 inch bearing surface. A 1/4 inch-20 zinc plated wing nut shall firmly lock the handle in place.
 2. On exposed externally insulated ductwork the regulator shall be 4-1/4 inch diameter, for 1/2 inch rod, designed for use on duct with insulation thickness specified for duct, and shall have four (4) 3/16 inch holes provided to rivet or screw regulator to the duct surface. The flange that covers the raw edge of the insulation shall be high enough so that it slightly compresses the insulation and holds insulation in place. The handle shall be 3/8 inch above the flange, and shall easily turn without roughing up the insulation.
 3. On concealed ductwork above inaccessible ceilings, the regulator shall be 2-5/8 inch diameter chromium plated cover plate that telescopes into the base, for 1/2 inch rod. Regulator shall be cast into a box for mounting in ceilings. Base shall be 1-1/2 inch deep. The cover shall be secured by two (2) screws that can be easily removed for damper adjustment.
 4. Furnish and install end bearings for the damper rods on the end opposite the quadrant.
- F. Spin-in fittings may be used for duct taps to air devices and shall include dampers on all ducts to air devices (diffusers and grilles) even though a volume damper is specified for the air device. Spin-in fittings shall be similar to Flexmaster FLD with BO3 including a 2 inch build-out, nylon bushings, locking quadrant similar to Duro Dyne KR-3, and a 3/8 inch square rod connected to the damper with U-bolts. Spin-in fittings shall be sealed at the duct tap with sealant as specified herein. Determine location of spin-in fittings after terminal units are hung or after location of light fixtures are confirmed to minimize flexible duct lengths and sharp bends.

2.3 FIRE DAMPERS

- A. Acceptable Manufacturers
1. Greenheck
 2. Nailor Industries

3. Pottorff
 4. Ruskin
 5. United Enertech
 6. Air Balance
 7. NCA Manufacturing
 8. Leader Industries
- B. Each fire damper shall be constructed and tested in accordance with Underwriters Laboratories Safety Standard 555, latest edition. Dampers shall possess a 1-1/2 hour or 3 hour (as appropriate for the construction shown in the architectural Drawings) protection rating 165° F fusible link, and shall bear a U.L. label in accordance with Underwriters' Laboratories labeling procedures. Construct fire dampers such that damper frame material and curtain material are galvanized.
- C. Fire dampers shall be curtain blade "C" type and damper shall be constructed so that the blades and frame are out of the air stream to provide 100 percent free area of duct in which the damper is housed. NOTE: (Blades only out of the airstream represents "B" type damper which is not 100% free area).
- D. Equip fire dampers for vertical or horizontal installation as required by location shown on Drawings. Install fire dampers in wall and floor openings utilizing steel sleeves, angles and other materials and practices as required to provide an installation equivalent to that utilized by the manufacturer when the respective dampers were tested by Underwriters Laboratories. Mounting angles shall be minimum 1-1/2 inch by 1-1/2 inch by 16 gauge and bolted, tack welded or screwed to the sleeve at maximum spacing of 12 inches and with a minimum of two (2) connections at all sides. Mounting angles shall overlap at least equal to the duct gauge as defined by the appropriate SMACNA Duct Construction Standard, latest edition, and as described in NFPA 90A. The entire assembly, following installation, shall be capable of closure with airflow in both directions at 4 inch water gauge static pressure at temperatures up to and withstanding 350° F.
- E. All fire dampers shall be dynamic rated type.
- F. Completely seal the damper assembly to the building components using manufacturer recommended material(s).

2.4 COMBINATION FIRE/SMOKE DAMPERS

- A. Acceptable Manufacturers
1. Greenheck
 2. Nailor Industries
 3. Pottorff
 4. Ruskin
 5. United Enertech
 6. NCA Manufacturing

7. Air Balance

- B. Provide one (1) damper motor for each 12 square feet of damper area.
- C. Each combination fire/smoke damper shall be 1-1/2 hour fire rated under UL Standard 555, Current Edition, and shall be further classified by Underwriters Laboratories as a Leakage Rated Damper for use in smoke control systems under the latest version of UL555S, and bear a UL label attesting to same. Damper manufacturer shall have tested and qualified with UL, a complete range of damper sizes covering all dampers required by this Specification. Testing and UL qualifying a single damper size is not acceptable. The leakage rating under UL555S shall be no higher than Leakage Class II 20 CFM per square foot at 4 inches water gauge pressure). Maximum air pressure drop through each combination fire/smoke damper shall not exceed 0.10-inch water gauge at the design air quantity. (Note that this may require a larger damper than the connected duct size.) All ratings shall be dynamic.
- D. Damper frame shall be minimum 20-gauge galvanized steel formed into a structural hat channel shape with tabbed corners for reinforcement, as approved in testing by Underwriters Laboratories. Bearings shall be integral high surface area non electrolytic materials construction to incorporate a friction free frame blade lap seal, or molybdenum disulfide impregnated stainless steel or bronze oilite sleeve type turning in an extruded hole in the frame or an extruded frame raceway. Dampers may be either parallel or opposed blade type. Blades shall be constructed with a minimum of 14-gauge equivalent thickness. Blade edge seal material shall be able to withstand 450° F. Jamb seals shall be flexible stainless steel compression type.
- E. In addition to the leakage ratings specified herein, combination fire/smoke dampers and their operators shall be qualified under UL555S to an elevated temperature of 350° F. Electric operators shall be installed by the damper manufacturer at the time of damper fabrication. Damper and operator shall be supplied as a single entity that meets all applicable UL555 and UL555S qualifications for both dampers and operators. Manufacturer shall provide a factory-assembled sleeve. Sleeve shall be minimum 20-gauge for dampers where neither width nor height exceeds 48 inches or 16-gauge where either dimension equals or exceeds 48 inches.
- F. As part of the UL qualification, dampers shall have demonstrated a capacity to operate (open and close) under HVAC system operation conditions, with pressures at least 4 inches water gauge in the closed position, and 2000 fpm air velocity at 350° F in the open position.
- G. Each combination fire/smoke damper, except as noted hereinafter, shall be equipped with a UL Classified firestat/releasing device. The firestat/releasing device shall electrically lock the damper in a closed position when the duct temperatures exceed 165° F and still allow the appropriate authority to operate the damper as may be required for smoke control functions. Damper must be operable while the temperature is above 350° F. Actuator/operator package shall include two (2) damper position indicator switches linked directly to damper blade to provide capability of remotely indicating damper position. One (1) switch shall close when the damper is fully open, and the other switch shall close when the damper is fully closed. The firestat/releasing device and position indicator switches shall be capable of interfacing electricaly with the smoke detectors, building fire alarm system, and remote indicating/control stations or building automation system (BAS).
- H. Damper releasing device shall be mounted within the airstream. Device shall be activated and the damper shall close and lock when subjected to duct temperatures in excess of approximately 350° F.
- I. Motors for operation of smoke dampers shall be smoke system fail safe, spring return normally open supplies and normally closed returns, or as indicated on the Drawings, and shall be furnished and installed by the damper manufacturer as required by the U.L. rating mentioned above. Motors shall be electric to match the type of temperature control system specified else-

where in this Specification. Furnish all required relays, EP switches, wiring piping and other labor and material necessary to completely interconnect the smoke detector system.

- J. Furnish each damper in a square or rectangular configuration. Furnish and install sleeves manufactured by the approved damper manufacturer for each damper. Construct sleeves with square or rectangular to square, rectangular, round, or oval adapters as required. Dampers shall be installed in the sleeves in accordance with manufacturer's U.L. installation instructions. The entire assembly, following installation, shall operate smoothly and be capable of withstanding 6 inch water gauge static pressure.
- K. Each combination fire/smoke damper shall be equipped with a Damper Test Switch. The damper test switch will have the ability to "cycle test" the fire/smoke damper by pushing and holding the test button until the damper has cycled.
- L. All combination fire/smoke dampers shall be dynamic type.
- M. Completely seal the damper assembly to the building components using manufacturer recommended material(s).

2.5 SMOKE DAMPERS

- A. Acceptable Manufacturers
 - 1. Greenheck
 - 2. Nailor Industries
 - 3. Pottorff
 - 4. Ruskin
 - 5. United Enertech
- B. Provide one (1) damper motor for each 12 square feet of damper area.
- C. Each smoke damper shall be dynamic rated type and shall be further classified by Underwriters Laboratories as a Leakage Rated Damper for use in smoke control systems under the latest version of UL555S, and bear a UL label attesting to same. Damper manufacturer shall have tested, and qualified with UL, a complete range of damper sizes covering all dampers required by this Specification. Testing and UL qualifying a single damper size is not acceptable. Leakage rating under UL555S shall be no higher than Leakage Class II (20 CFM per square foot at 4 inches water gauge pressure). Maximum air pressure drop through each smoke damper shall not exceed 0.10-inch water gauge at the design air quantity. (Note that this may require a larger damper than the connected duct size.) All ratings shall be dynamic.
- D. Damper frame shall be minimum 20-gauge galvanized steel formed into a structural hat channel shape with tabbed corners for reinforcement, as approved in testing by Underwriters Laboratories. Bearings shall be stainless steel sleeve type turning in an extruded hole in the frame or an extruded frame raceway. Dampers shall be opposed blade type. Blades shall be airfoil shaped double skin construction. Blade edge seal material shall be silicone rubber designed to withstand 450° F. Jamb seals shall be Stainless Steel metal compression type.
- E. In addition to the leakage ratings specified herein, smoke dampers and their operators shall be qualified under UL555S to an elevated temperature of 350° F. electric operators shall be installed by the damper manufacturer at the time of damper fabrication. Damper and operator

shall be supplied as a single entity that meets all applicable UL555 and UL555S qualifications for both dampers and operators. Manufacturer shall provide factory-assembled sleeve. Sleeve shall be minimum 20-gauge for dampers where neither width nor heights exceeds 48 inches or 16-gage where either dimensions equals or exceeds 48 inches.

- F. As part of the UL qualification, dampers shall have demonstrated a capacity to operate (open and close) under HVAC system operation conditions, with pressures of at least 4 inches water gauge in the closed position, and 2000 fpm air velocity in the open position.
- G. The damper must be operable while the temperature is above 350° F. The actuator/operator package shall include two (2) damper position indicator switches linked directly to damper blade to provide capability of remotely indicating damper position. One (1) switch shall close when the damper is fully open, and the other switch shall close when the damper is fully closed. Position indicator switches shall be capable of interfacing electrically with the smoke detectors, building fire alarm systems, and remote indicating/control stations (BAS).
- H. Motors for operation of smoke dampers shall be smoke system fail safe, spring return normally open supplies and normally closed returns, or as indicated on the Drawings, and shall be furnished and installed by the damper manufacturer as required by the UL rating mentioned above. Motors shall be electric to match the type of temperature control system specified elsewhere in this Specification. Furnish all required relays, EP switches, wiring piping and other labor and material necessary to completely interconnect the smoke detector system.
- I. Furnish each damper in a square or rectangular configuration. Furnish and install sleeves manufactured by the approved damper manufacturer for each damper. Construct sleeves with square or rectangular to square, rectangular, round, or oval adapters as required. Install dampers in the sleeves in accordance with manufacturer's UL installation instructions. The entire assembly, following installation, shall be capable of closure with airflow in both directions at 4 inch water gauge static pressure at temperatures up to and withstanding 350° F.
- J. Each smoke damper shall be equipped with a damper test switch. The damper test switch will have the ability to "cycle test" the fire/smoke damper by pushing and holding the test button until the damper has cycled.
- K. All smoke dampers shall be dynamic type.
- L. Completely seal the damper assembly to the building components.

2.6 FLEXIBLE DUCTS

A. Acceptable Manufacturers

1. Flexmaster U.S.A., Inc.
2. McGill AirFlow LLC.
3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
4. Thermaflex

B. Insulated, Flexible Duct:

1. Certifications:
 - a. UL 181,

- b. ETL Class 1
 - c. NFPA 90A and 90B
 - d. Greenguard
2. Construction:
- a. Single ply inner liner constructed of chlorinated polyethylene
 - b. Corrosion resistant galvanized steel core
 - c. Fibrous glass insulation with a minimum value of R-6.
 - d. Polyethylene vapor barrier film
3. Pressure Rating: 6-inch wg positive and 2-inch wg negative
4. Maximum Air Velocity: 5000 fpm
5. Temperature Range: -10° F to 160° F
6. Flame spread rating less than 25
7. Smoke developed rating of less than 50

2.7 FLEXIBLE DUCT ELBOW SUPPORTS

1. Acceptable Manufacturers
- a. Build Right Products - FlexRight
 - b. Thermaflex – FlexFlow Elbow
 - c. RPS - FlowRite
2. Construction
- a. Universal-mount, 1-piece, fully adjustable, radius-forming brace to support 4-inch through 16-inch diameter flexible air ducts.
 - b. Classified: UL 2043.
 - c. Material: 100 percent recycled copolymer polypropylene.
 - d. Support Frame Radius: 8 inches.
 - e. Compliance for Flexible Duct Radius:
 - 1) SMACNA HVAC Duct Construction Standards.
 - 2) ASHRAE Advanced Energy Design Guides.
 - 3) ADC Flexible Duct Performance and Installation Standards.

2.8 FLEXIBLE CONNECTIONS

- A. Where ducts connect to equipment, flexible connections shall be made using “Flexmaster TL-M” or “Ventglas” fabric that is temperature-resistant, fire-resistant, waterproof, mildew-resistant and practically airtight, weighing approximately thirty ounces (30 oz.) per square yard. Ventglas is good for connections for inside building environments where ultra-violet light is not present.
- B. Material used outdoors shall be resistant to ultra-violet sunrays. There shall be a minimum of 1/2" slack in the connections, and a minimum of 2 1/2" inches distance between the edges of the. This does not apply to air handling units with internal isolation. A more rugged flexible material that is resistant to ultra-violet rays needs to be used when connecting an exhaust fan or exhaust air plenum to ductwork. Mercer Rubber supplies a more durable flex connection for outdoor use.

2.9 DUCT ACCESS DOORS

A. Acceptable Manufacturers

1. Greenheck
2. Kees
3. Nailor Industries
4. Pottorff
5. Ruskin

B. Furnish and install in the ductwork, hinged rectangular, or round "spin-in" access doors to provide access to the following items:

1. Major changes of direction in horizontal ducts connected to cooking equipment hoods and vertical grease duct risers as required by code for system cleaning. Refer to NFPA 96 and Specification Section 233113 for additional requirements.
2. Motor operated dampers.
3. Manually operated volume control devices.
4. Fire, fire/smoke, and smoke dampers.
5. Mixed air plenums
6. In-line damper actuators installed in air stream.
7. Heating coils (install upstream)
8. Air filters replacement doors
9. All locations where operating parts of any kind are installed in the ductwork and elsewhere as indicated on the plans.

C. Access doors are not required, where a manually operated damper has an exposed damper regulator, with an indicating quadrant.

D. Where ductwork is insulated, access doors shall be double skin doors with 1" of insulation in the door.

E. Door Size

1. Door opening shall be adequately sized and positioned to allow for maintenance / replacement of any components located inside the ductwork. Based on the maximum duct dimension the following access door size minimum requirements are as follows:
 - a. 8" max duct dimension - One (1)-Hand or Inspection Access: 8" x 6" access door
 - b. 12" max duct dimension - Two (2)-Hand Access: 12" x 10" or 10" diameter access door
 - c. 18" max duct dimension - Head and Hand Access: 16" x 12" or 16" diameter access door

- d. 26" max duct dimension - Head and Shoulders Access: 24" x 16" or 22" diameter access door
 - e. 30" max duct dimension - Body Access: 26" x 14" or 24" diameter access door
 - f. All other sizes - Body plus Ladder Access: 26" x 18" or 26" diameter access door
- 2. For duct access doors smaller than 16" x 12" Ventlok No. 90 sash style latches shall be used. For duct access doors 16" x 12" or larger Ventlok No. 260 latches shall be used.
 - 3. A minimum of two latches are required for all access doors are required. Provide additional latches as needed to ensure the access door is sealing properly and there is not noticeable air leakage or air noise associated with the access door.
- F. All access doors shall have a continuous gasket.
 - G. Round access doors shall be "Inspector Series" spin-in type door as manufactured by Flexmaster USA.
 - H. Where access doors are installed above a gyp board ceiling, this Contractor shall be responsible for providing and installing a ceiling access door of adequate size to utilize the access door and position it in the proper location.

2.10 TURNING VANES

- A. Acceptable Manufacturers
 - 1. Ductmate Industries, Inc.
 - 2. Duro Dyne Inc.
 - 3. METALAIRE, Inc.
 - 4. SEMCO Incorporated.
 - 5. Hart & Cooley, Inc.
- B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
 - 1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
- D. Contractor fabricated turning vanes are acceptable provided they meet the requirements in this section.
- E. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-3, "Vanes and Vane Runners," and 2-4, "Vane Support in Elbows."
- F. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Volume Dampers
 - 1. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
 - 2. Install steel volume dampers in steel ducts.
 - 3. Install aluminum volume dampers in aluminum ducts.
 - 4. Set dampers to fully open position before testing, adjusting, and balancing.
 - 5. Position damper adjacent to the branch connection to the main when possible. Locate as far as from the opening it serves in all other instances.
- D. Test Holes
 - 1. Install test holes at fan inlets and outlets and elsewhere as indicated.
 - 2. Install duct test holes where required for testing and balancing purposes.
 - 3. Install test holes in locations as required to measure pressure drops across each item in the system, e.g., outside air louvers, filters, fans, coils, intermediate points in duct runs, etc.
- E. Fire, Fire / Smoke, Smoke Dampers
 - 1. Install fire, fire / smoke and smoke dampers according to UL listing.
 - 2. Provide fire dampers, and combination fire and smoke dampers at locations indicated, where ducts and outlets pass through fire rated components. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.
 - 3. Fire and combination fire and smoke damper access panels shall be labeled with the words "Fire Damper" in letters not less than 1 inch (25 mm) in height.
 - 4. Install each fire and combination fire and smoke damper square and true to the building. The installation shall not place pressure on the damper frame, but shall enclose the damper as required by UL555 and UL555S.

F. Duct Access Doors

1. Install duct access doors on sides or bottoms of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
 - a. On both sides of duct coils.
 - b. Upstream from duct filters.
 - c. At outdoor-air intakes and mixed-air plenums.
 - d. At drain pans and seals.
 - e. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
 - f. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links may be pressure relief access doors. If pressure relief access doors are used, they shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
 - g. At each change in direction and at maximum 50-foot spacing.
 - h. Upstream or downstream from duct silencers.
 - i. Control devices requiring inspection.
 - j. Elsewhere as indicated.
2. Install access doors with swing against duct static pressure.
3. Label access doors according to Division 23 Section "Mechanical Identification" to indicate the purpose of access door.

G. Flexible Connections

1. Install flexible connectors to connect ducts to equipment.
2. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
3. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment. Cover connections to medium and high pressure fans with leaded vinyl sheet, held in place with metal straps.
4. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop of fans.

H. Flexible Duct

1. Connect terminal units to supply ducts directly or with maximum 36-inch lengths of flexible duct. Do not use flexible ducts to change directions.
2. Connect diffusers to ducts directly or with maximum 60-inch lengths of flexible duct clamped or strapped in place.
3. Connect flexible ducts to metal ducts with adhesive liquid adhesive plus tape draw bands adhesive plus sheet metal screws.

I. Flexible Duct Elbow Supports

1. Install flexible duct elbow supports in accordance with manufacturer's instructions.

2. Install flexible duct elbow supports over outer jacket of flexible ducts to form smooth, 90-degree bends to eliminate flexible duct kinks and airflow restrictions.
3. Make bends in flexible ducts with minimum of 1-duct diameter centerline radius.
4. Install flexible duct elbow supports at flexible duct 90-degree bends at following locations:
 - a. Diffusers.
 - b. Grilles.
 - c. Registers.
 - d. Duct take-offs and taps.
 - e. Air devices with round inlets and outlets.
 - f. HVAC equipment with round inlets and outlets.
 - g. As indicated on the Drawings.

J. Balancing Dampers

1. Provide balancing dampers at points on low pressure supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing.
2. Provide all dampers furnished by the BAS Provider in strict accordance with manufacturer's written installation instruction and requirements of these Specifications.

K. Backdraft Dampers

1. Provide backdraft dampers on exhaust fans or exhausts ducts where indicated. Install dampers so that they will open freely.

L. General Installation

1. All installation shall be in accordance with manufacturer's published recommendations.
2. Furnish and install Ventlok No. 699 instrument test holes in the return air duct and in the discharge duct of each fan unit.
3. Access doors as specified elsewhere shall be provided for access to all parts of the fire and combination fire and smoke dampers. Doors shall open not less than 90 degrees following installation and shall be insulated type where installed in insulated ducts.

3.2 TESTING

- A. After each fire damper, smoke damper and combination fire and smoke damper has been installed and sealed in their prescribed openings and prior to installation of ceilings, Contractor shall, as directed by Owner, activate part or all dampers as required to verify "first-time" closure.
- B. Activation of damper shall be accomplished by manually operating the resettable link, disconnecting the linkage at the fire damper fusible link, and manually operating the fire/smoke damper through the electronic controls as appropriate.
- C. Failure of damper to close properly and smoothly on the first attempt will be cause to replace the entire damper assembly.
- D. Coordinate smoke damper system interlock requirements with the fire alarm system.

END OF SECTION 233300

SECTION 233305 – HVAC AIR DUCT CLEANING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all work required for the cleaning of the ductwork systems indicated in this section. Include any supplemental items necessary to meet this specification section.

1.2 QUALIFICATION OF THE HVAC SYSTEM CLEANING CONTRACTOR

- A. Membership: The HVAC system cleaning contractor shall be a certified member of the National Air Duct Cleaners Association (NADCA), or shall maintain membership in a nationally recognized non-profit industry organization dedicated to the cleaning of HVAC systems.
- B. Certification: The HVAC system cleaning contractor shall have a minimum of one each of the following:
 - 1. Air System Cleaning Specialist (ASCS)
 - 2. Ventilation Systems Mold Remediator (VSMR) certified by NADCA on a full time basis, or shall have staff certified by a nationally recognized certification program and organization dedicated to the cleaning and mold remediation of HVAC systems.
- C. Supervisor Qualifications: A person certified as an ASCS by NADCA, or maintaining an equivalent certification by a nationally recognized program and organization, shall be responsible for the total work herein specified.
- D. Experience: The HVAC system cleaning contractor shall submit records of experience in the field of HVAC system cleaning. Bids shall only be considered from firms, which are regularly engaged in HVAC system maintenance with an emphasis on HVAC system cleaning, mold remediation and decontamination.
- E. Equipment, Materials and Labor: The HVAC system cleaning contractor shall possess and furnish all necessary equipment, materials and labor to adequately perform the specified services.
 - 1. The contractor shall assure that its employees have received safety equipment training, medical surveillance programs, individual health protection measures, and manufacturer's product and material safety data sheets (MSDS) as required for the work by the U.S. Occupational Safety and Health Administration, and as described by this specification.
 - 2. The contractor shall maintain a copy of all current MSDS documentation and safety certifications at the site at all times, as well as comply with all other site documentation requirements of applicable OSHA programs and this specification.
 - 3. Contractor shall submit all Material Safety Data Sheets (MSDS) for all chemical products proposed to be used in the cleaning process.

- F. Licensing: The HVAC system-cleaning contractor shall provide proof of maintaining the proper license(s), if any, as required to do work in this state. Contractor shall comply with all Federal, state and local rules, regulations, and licensing requirements.

1.3 STANDARDS

- A. NADCA Standards: The HVAC system cleaning contractor shall perform the services specified here in accordance with the current published standards of the National Air Duct Cleaners Association (NADCA).
1. All terms in this specification shall have their meaning defined as stated in the NADCA Standards.
 2. NADCA Standards must be followed with no modifications or deviations being allowed.

1.4 DOCUMENTS

- A. Mechanical Drawings: The Prime Contractor shall provide the HVAC system-cleaning contractor with one (1) copy of the following documents:
1. Project drawings and specifications.
 2. Approved construction revisions pertaining to the HVAC system.
 3. Any existing indoor air quality (IAQ) assessments or environmental reports prepared for the facility.

PART 2 - (PRODUCTS) SYSTEM SPECIFICATIONS

2.1 SCOPE OF WORK

- A. This section defines the minimum requirements necessary to render HVAC components clean, and to verify the cleanliness through inspection and/or testing in accordance with items specified herein and applicable NADCA Standards.
- B. The Contractor shall be responsible for the removal of visible surface contaminants and deposits from within the HVAC system in strict accordance with these specifications.
- C. The HVAC system includes any interior surface of the facility's air distribution system for conditioned spaces and/or occupied zones. This includes the entire new and/or existing heating, air-conditioning and ventilation system from the points where the air enters the system to the points where the air is discharged from the system as defined hereafter.
- D. The Return air grilles, Return air ducts (except ceiling plenums) to the air handling units (AHU's), the Mechanical room (if part of the return air system), Supply air ducts, turning vanes, balancing/ noise reduction boxes, Supply diffusers, Exhaust grills, Exhaust ductwork and Outside air ductwork/intakes (O.A.) are all considered part of the HVAC system cleaning specification. .

2.2 HVAC SYSTEM INSPECTIONS AND SITE PREPARATIONS

- A. HVAC System Evaluation: Prior to the commencement of any cleaning work, the HVAC system cleaning contractor shall perform a visual inspection of the HVAC system to determine appropriate methods, tools, and equipment required to satisfactorily complete this project.
 - 1. Damaged system components found during the inspection shall be documented and brought to the attention of the Owner/Agent.
- B. Site Evaluation and Preparations: Contractor shall conduct a site evaluation, and establish a specific, coordinated plan which details how each area of the building will be protected during the various phases of the project.

2.3 GENERAL HVAC SYSTEM CLEANING REQUIREMENTS

- A. Containment: Debris removed during cleaning shall be collected and precautions must be taken to ensure that Debris is not otherwise dispersed outside the HVAC system during the cleaning process.
- B. Particulate Collection: Where the Particulate Collection Equipment is exhausting inside the building, HEPA filtration with 99.97% collection efficiency for 0.3-micron size (or greater) particles shall be used. When the Particulate Collection Equipment is exhausting outside the building, Mechanical Cleaning operations shall be undertaken only with Particulate Collection Equipment in place, including adequate filtration to contain Debris removed from the HVAC system. When the Particulate Collection Equipment is exhausting outside the building, precautions shall be taken to locate the equipment down wind and away from all air intakes and other points of entry into the building. Use of high powered Duct Vacuum Trucks is the preferred method of cleaning for this project.
- C. Controlling Odors: All reasonable measures shall be taken to control offensive odors and/or mist vapors during the cleaning process.
- D. Component Cleaning: Cleaning methods shall be employed such that all HVAC system components must be Visibly Clean as defined in applicable standards (see NADCA Standards). Upon completion, all components must be returned to those settings recorded just prior to cleaning operations.
- E. Air-Volume Control Devices: Dampers and any air-directional mechanical devices inside the HVAC system must have their position marked prior to cleaning and, upon completion, must be restored to their marked position.
- F. Service Openings: The contractor shall utilize service openings, as required for proper cleaning, at various points of the HVAC system for physical and mechanical entry, and inspection.
 - 1. Contractor shall utilize the existing service openings already installed in the HVAC system where possible.
 - 2. Other openings shall be created where needed and they must be created so they can be sealed in accordance with industry codes and standards.
 - 3. Closures must not significantly hinder, restrict, or alter the airflow within the system.
 - 4. Closures must be properly insulated to prevent heat loss/gain or condensation on surfaces within the system.

5. Openings must not compromise the structural integrity of the system.
 6. Construction techniques used in the creation of openings should conform to requirements of applicable building and fire codes, and applicable NFPA, SMACNA and NADCA Standards.
 7. Cutting service openings into flexible duct is not permitted. Flexible duct shall be disconnected at the ends as needed for proper cleaning and inspection.
 8. Rigid fiberglass duct board duct systems shall be resealed in accordance with NAIMA recommended practices. Only closure techniques, which comply with UL Standard 181 or UL Standard 181a, are suitable for fiberglass duct system closures.
 9. All service openings capable of being re-opened for future inspection or remediation shall be clearly marked and shall have their location reported to ACT in project report documents.
- G. Ceiling sections (tile): The contractor may remove and reinstall ceiling sections to gain access to HVAC systems during the cleaning process.
- H. Air distribution devices (registers, grilles & diffusers): The contractor shall clean all air distribution devices.
- I. The contractor shall insure that any specified supply, exhaust, and return fans and blowers are thoroughly cleaned. Areas to be cleaned may include blowers, fan housings, plenums (except ceiling supply and return plenums), scrolls, blades, or vanes, shafts, baffles, dampers and drive assemblies. All visible surface contamination deposits shall be removed in accordance with NADCA Standards. Contractor shall:
1. Assure that a suitable operative drainage system is in place prior to beginning wash down procedures.
- J. Duct Systems: Contractor shall:
1. Create service openings in the system as necessary in order to accommodate cleaning of otherwise inaccessible areas.
 2. Mechanically clean all duct systems to remove all visible contaminants, such that the systems are capable of passing Cleaning Verification Testings (see NADCA Standards).
- 2.4 HEALTH AND SAFETY
- A. Safety Standards: Cleaning contractors shall comply with all applicable federal, state, and local requirements for protecting the safety of the contractors' employees, building occupants, and the environment. In particular, all applicable standards of the Occupational Safety and Health Administration (OSHA) shall be followed when working in accordance with this specification.
- B. Occupant Safety: No processes or materials shall be employed in such a manner that they will introduce additional hazards into occupied spaces.
- C. Disposal of Debris: All Debris removed from the HVAC System shall be disposed of in accordance with applicable federal, state and local requirements.

2.5 MECHANICAL CLEANING METHODOLOGY

- A. Source Removal Cleaning Methods: The HVAC system shall be cleaned using Source Removal mechanical cleaning methods designed to extract contaminants from within the HVAC system and safely remove contaminants from the facility. It is the contractor's responsibility to select Source Removal methods which will render the HVAC system Visibly Clean and capable of passing cleaning verification methods (See applicable NADCA Standards) and other specified tests, in accordance with all general requirements. No cleaning method, or combination of methods, shall be used which could potentially damage components of the HVAC system or negatively alter the integrity of the system.
1. All methods used shall incorporate the use of truck mounted/powered vacuum collection devices that are operated continuously during cleaning. A vacuum device shall be connected to the downstream end of the section being cleaned through a predetermined opening. The vacuum collection device must be of sufficient power to render all areas being cleaned under negative pressure, such that containment of debris and the protection of the indoor environment is assured. No portable vacuum equipment is to be used on this project without the expressed authorization of the owner/agent.
 2. All vacuum devices exhausting air inside the building shall be equipped with HEPA filters (minimum efficiency), including hand-held vacuums and wet-vacuums.
 3. All vacuum devices exhausting air outside the facility shall be equipped with Particulate Collection including adequate filtration to contain Debris removed from the HVAC system. Such devices shall exhaust in a manner that will not allow contaminants to re-enter the facility. Release of debris outdoors must not violate any outdoor environmental standards, codes or regulations.
 4. All methods require mechanical agitation devices to dislodge debris adhered to interior HVAC system surfaces, such that debris may be safely conveyed to vacuum collection devices. Acceptable methods will include those, which will not potentially damage the integrity of the ductwork, nor damage porous surface materials such as liners inside the ductwork or system components.
- B. Methods of Cleaning Fibrous Glass Insulated Components:
1. Fibrous glass thermal or acoustical insulation elements present in any equipment or ductwork shall be thoroughly cleaned with HEPA vacuuming equipment, while the HVAC system is under constant negative pressure, and not permitted to get wet in accordance with applicable NADCA and NAIMA standards and recommendations.
 2. Cleaning methods used shall not cause damage to fibrous glass components and will render the system capable of passing Cleaning Verification Tests (see NADCA Standards).
- C. Damaged Fibrous Glass Material
1. If there is any evidence of damage, deterioration, delamination, friable material, mold or fungus growth, or moisture such that fibrous glass materials cannot be restored by cleaning or resurfacing with an acceptable insulation repair coating, they shall be identified for replacement.
 2. When requested or specified, Contractor must be capable of remediating exposed damaged insulation in air handlers and/or ductwork requiring replacement.

3. Replacement material: In the event fiberglass materials must be replaced, all materials shall conform to applicable industry codes and standards, including those of UL and SMACNA.
4. Removal and/or Replacement of damaged insulation is not covered by this specification. If recommended, submittal of a change order request for consideration to the owner/agent will be required.

D. Biocidal Agents and Coatings

1. Biocidal agents shall only be applied if active fungal growth is reasonably suspected, or where unacceptable levels of fungal contamination have been verified through testing.
2. Application of any biocidal agents used to control the growth of fungal or bacteriological contaminants shall be performed after the removal of surface deposits and debris.
3. Only biocidal agents registered by the U.S. Environmental Protection Agency (EPA) specifically for use within HVAC system shall be used.
4. Biocidal agents shall be applied in strict accordance with manufacturer's instructions.
5. Biocidal coating products for both porous and non-porous surfaces shall be EPA registered, water soluble solutions with supporting efficiency data and MSDS records.
6. Biocidal coatings shall be applied according to manufacturer's instructions. Coatings shall be sprayed directly onto interior ductwork surfaces, rather than "fogged" downstream onto surfaces. A continuous film must be achieved on the surface to be treated by the coating application. Application of any biocidal coatings shall be in strict accordance with manufacturer's minimum millage surface application rate standards for effectiveness. *If the application of Biocidal coatings is recommended or required, this is considered as an addition to this specification. Proper notification and acceptance of any proposed changes must be approved by the owner/agent prior to commencement of such services.

2.6 CLEANLINESS VERIFICATION

- A. General: Verification of HVAC System cleanliness will be determined after mechanical cleaning and before the application of any treatment or introduction of any treatment-related substance to the HVAC system, including biocidal agents and coatings.
- B. Visual Inspection: The HVAC system shall be inspected visually to ensure that no visible contaminants are present.
 1. If no contaminants are evident through visual inspection, the HVAC system shall be considered clean; however, The owner reserves the right to further verify system cleanliness through gravimetric or wipe testing analysis testing as specified herein.
 2. If visible contaminants are evident through visual inspection, those portions of the system where contaminants are visible shall be re-cleaned and subjected to re-inspection for cleanliness.

- C. Gravimetric Analysis: At the discretion and expense of owner/agent, sections of the HVAC system may be tested for cleanliness using the NADCA Vacuum Test (gravimetric analysis) as specified in applicable NADCA Standards. Levels of debris collected shall be equal to or less than acceptable levels defined in applicable NADCA Standards.
1. If gravimetric analysis determines that levels of debris are equal to or lower than those levels specified in applicable NADCA standards, the system shall be considered clean and shall have passed cleanliness verification.
 2. If gravimetric analysis determines that levels of debris exceed those specified in applicable NADCA standards, the system shall not be considered clean and those sections of the system which failed cleanliness verification shall be re-cleaned at the expense of the HVAC system cleaning contractor.
 3. Gravimetric analysis shall be performed by a qualified third party experienced in testing of this nature.
 4. Cleanliness verification shall be performed immediately after mechanical cleaning and before the HVAC system is restored to normal operation.

2.7 PRE-EXISTING SYSTEM DAMAGE

- A. Contractor is not responsible for problems resulting from prior inappropriate or careless cleaning techniques of others.

2.8 POST-PROJECT REPORT

- A. At the conclusion of the project, the Contractor shall provide a report to the Owner indicating the following:
1. Success of the cleaning project, as verified through visual inspection and/or gravimetric analysis.
 2. Areas of the system found to be damaged and/or in need of repair.

2.9 APPLICABLE STANDARDS AND PUBLICATIONS

- A. The following current standards and publications of the issues currently in effect form a part of this specification to the extent indicated by any reference thereto:
1. National Air Duct Cleaners Association (NADCA): NADCA 1992-01, "Mechanical Cleaning of Non-Porous Air Conveyance System Components," 1992.
 2. National Air Duct Cleaners Association (NADCA): "Understanding Microbial Contamination in HVAC Systems," 1996.
 3. National Air Duct Cleaners Association (NADCA): "Introduction to HVAC System Cleaning Services," 1995.
 4. National Air Duct Cleaners Association (NADCA) NADCA Standard 05 "Requirements for the Installation of Service Openings in HVAC Systems," 1997.

5. Underwriters' Laboratories (UL): UL Standard 181.
6. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE): Standard 62-89, "Ventilation for Acceptable Indoor Air Quality".
7. Environmental Protection Agency (EPA): "Building Air Quality" December, 1991.
8. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): "HVAC Duct Construction Standards - Metal and Flexible," 1985.
9. North American Insulation Manufacturers Association (NAIMA): "Cleaning Fibrous Glass Insulated Air Duct Systems." 1993.
10. ACR 2006 "Assessment, Cleaning and Restoration of HVAC Systems" 2006.

PART 3 - EXECUTION

3.1 SYSTEMS TO BE CLEANED

- A. Existing ductwork to be reused as noted on plans.

END OF SECTION 233305

SECTION 233425 - HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all work required to provide and install the Power Ventilators indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment Included in This Section:
 - 1. Centrifugal roof ventilators.

1.2 REFERENCES

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
- C. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
 - 1. AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings
 - 2. AFBMA 11 - Load Ratings and Fatigue Life for Roller Bearings
 - 3. AMCA 99 - Standards Handbook
 - 4. ACMA 203 - Fan Application Manual - Field Performance Measurements
 - 5. AMCA 204 - Balance Quality and Vibration Levels For Fans
 - 6. AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating
 - 7. AMCA 300 - Reverberant Room Method for Sound Testing of Fans
 - 8. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data
 - 9. NEMA MG1 - Motors and Generators
 - 10. NFPA 70 - National Electrical Code
 - 11. SMACNA - HVAC Duct Construction Standards - Metal and Flexible
 - 12. UL 705 – Power Ventilators

1.3 SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:

1. Certified fan performance curves with system operating conditions indicated
 2. Certified fan sound-power ratings
 3. Motor ratings and electrical characteristics, plus motor and electrical accessories
 4. Material thickness and finishes, including color charts
 5. Dampers, including housings, linkages, and operators
 6. Roof curbs
 7. Fan speed controllers
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
1. Wiring Diagrams: Power, signal, and control wiring.
 2. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
 3. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, and base weights.
- C. Coordination Drawings: Reflected ceiling plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
1. Roof framing and support members relative to duct penetrations.
 2. Ceiling suspension assembly members.
 3. Size and location of initial access modules for acoustical tile.
 4. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.
- 1.4 QUALITY ASSURANCE
- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - B. Performance Ratings: Conform to AMCA 210 and bear the AMCA Certified Rating Seal.

- C. Sound Ratings: AMCA 301, tested to AMCA 300, and bear AMCA Certified Sound Rating Seal. The sound power levels must not exceed those indicated on Drawings.
- D. Fabrication: Conform to AMCA 99.
- E. Performance Base: 50 feet above sea level.
- F. Fans shall be capable of operating stably at reduced loads imposed by means of variable speed drives.
- G. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.
- H. UL Standard: Power ventilators shall comply with UL 705.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fans as factory-assembled unit, to the extent allowable by shipping limitations, with protective crating and covering.
- B. Disassemble and reassemble units, as required for moving to final location, according to manufacturer's written instructions.
- C. Lift and support units with manufacturer's designated lifting or supporting points.

1.6 COORDINATION

- A. Coordinate size and location of structural-steel support members.
- B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- C. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 CENTRIFUGAL ROOF VENTILATORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Acme
 - 2. Twin City
 - 3. Greenheck
 - 4. Loren Cook Company.

5. Pennbarry
 6. Soler & Palau
 7. Captiveaire
- C. Description: Direct- or belt-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base, and accessories.
- D. Housing: Removable, spun-aluminum, dome top and outlet baffle square, one-piece, aluminum base with venturi inlet cone.
1. Upblast Units: Provide spun-aluminum discharge baffle to direct discharge air upward, with rain and snow drains and grease collector.
 2. Hinged Sub-base: Galvanized-steel hinged arrangement permitting service and maintenance.
- E. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.
- F. Accessories
1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
 2. Disconnect Switch: Non-fusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
 3. Bird Screens: Removable, 1/2-inch mesh, aluminum or brass wire.
 4. Gravity Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.
 5. Motorized Dampers: Parallel-blade dampers mounted in curb base with electric actuator; wired to close when fan stops.
- G. Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2-inch-thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to suit roof opening and fan base.
1. Configuration: Self-flashing for membrane roofs; with built-in cant for bituminous or built-up roofs
 2. Height: Minimum 12 inches above finished roof level
 3. Sound Curb: Curb with sound-absorbing insulation matrix.
 4. Pitch Mounting: Manufacture curb for roof slope.
 5. Metal Liner: Galvanized steel.
 6. Burglar Bars: 1/2-inch-thick steel bars welded in place to form 6-inch squares.
 7. Mounting Pedestal: Galvanized steel with removable access panel.

H. Capacities and Characteristics:

1. As scheduled on Drawings

2.2 MOTORS

- A. Enclosure Type: Totally enclosed, fan cooled.

2.3 SOURCE QUALITY CONTROL

- A. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.
- B. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install power ventilators level and plumb.
- B. Support units using mounts and isolators as scheduled on drawings having a static deflection as scheduled. Vibration- and seismic-control devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
1. Secure vibration and seismic controls to concrete bases using anchor bolts cast in concrete base.
- C. Secure roof-mounting fans to roof curbs with cadmium-plated hardware. Refer to Division 07 Section "Roof Accessories" for installation of roof curbs.
- D. Install units with clearances for service and maintenance.
- E. Label units according to requirements specified in Division 23 Section "Identification for HVAC Piping and Equipment."

3.2 CONNECTIONS

- A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Division 23 Section "Air Duct Accessories."
- B. Install ducts adjacent to power ventilators to allow service and maintenance.
- C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

- D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Verify that shipping, blocking, and bracing are removed.
 - 2. Verify that unit is secure on mountings and supporting devices and verify connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
 - 3. Verify that cleaning and adjusting are complete.
 - 4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
 - 5. Adjust belt tension.
 - 6. Adjust damper linkages for proper damper operation.
 - 7. Verify lubrication for bearings and other moving parts.
 - 8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
 - 9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
 - 10. Shut unit down and reconnect automatic temperature-control operators.
 - 11. Remove and replace malfunctioning units and retest as specified above.
- B. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

- A. Adjust damper linkages for proper damper operation.
- B. Adjust belt tension.
- C. Refer to Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.
- D. Replace fan and motor pulleys as required to achieve design airflow.
- E. Lubricate bearings.

END OF SECTION 233425

SECTION 233700 – AIR INLETS AND OUTLETS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the air inlets and outlets indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment Included in This Section:
 - 1. Grilles, Registers and Diffuser
 - 2. Linear Diffusers

1.2 REFERENCES

- A. Equipment and Installation shall meet the requirements outlined in the following references:
 - 1. ACGIH: American Conference of Governmental Industrial Hygienists
 - 2. AMCA: Air Movement and Control Association
 - 3. NFPA: National Fire Protection Association
 - 4. SMACNA: Sheet Metal and Air Conditioning Contractors National Association, Inc.
 - 5. UL: Underwriters Laboratories, Inc.
 - 6. AMCA 500 – Test Method for Louvers, Dampers and Shutters
 - 7. ANSI/NFPA 90A – Installation of Air Conditioning and Ventilating Systems

ASHRAE 70 – Method of Testing for Rating the Air Flow Performance of Outlets and Inlets

1.3 SUBMITTALS

- A. Product Data: (For Each Product)
 - 1. Catalog cut-sheets
 - 2. Indicate materials of construction, finish and mounting details
 - 3. Mounting details
 - 4. Installation instructions
 - 5. Performance data (at actual operating conditions)
 - a. Throw and drop
 - b. Static-pressure drop

c. Noise ratings

6. Inlet and Outlet Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

B. Submit color and finish samples for all louvers.

1.4 QUALITY ASSURANCE

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. Grilles, registers and diffusers shall be as scheduled on the Drawings. Grilles, registers and diffusers shall be provided with sponge rubber or soft felt gaskets where noted on the Drawings. Grilles, slot diffusers and laminar flow bars shall not be internally insulated.

C. If a manufacturer other than the one scheduled is used, the sizes shown on the Drawings shall be checked for performance, noise level, face velocity, throw, pressure drop, etc., before the submittal is made. Selections shall meet the manufacturer's own published data for the above performance criteria. The throw shall be such that the velocity at the end of the throw in the five (5) foot occupancy zone will not exceed 50 fpm or be less than 25 fpm except where indicated otherwise. Noise levels shall not exceed those published in ASHRAE for the type of space being served (NC level).

D. Locations of air distribution devices on Drawings are approximate and shall be coordinated with other trades to make symmetrical patterns and shall be influenced by the established general pattern of the lighting fixtures or architectural reflected ceiling plan, but primarily located to maintain proper air distribution. Where called for on Drawings, grilles, registers and diffusers shall be provided with deflecting devices and manual dampers. These grilles, registers, and diffusers shall be the standard product of the manufacturer, and subject to review by the Architect.

E. Provide a frame compatible with the type of ceiling or wall in which the devices are installed. Refer to Architectural Drawings for exact type of ceiling specified.

F. Coordinate color and finish of the devices with the Architect.

PART 2 - PRODUCTS

2.1 GRILLES, REGISTERS, AND DIFFUSERS

A. Acceptable Manufacturers

1. Anemostat
2. Carnes
3. Krueger
4. Nailor
5. Price

6. Titus
 7. Tuttle & Baily
- B. Square Panel Face diffuser – Supply and Return
1. Architectural diffuser with a square panel face, centered within a square housing. The exposed surface of the face panel shall be smooth, flat and free of visible fasteners.
 2. The diffuser shall have a 22-gauge steel face panel that captures a secondary 22-gauge panel. The panel shall project a maximum of 1/4" below the outside border of the diffuser.
 3. For area of high moisture content or requiring non-ferrous materials, the diffuser shall be constructed of 22-gauge aluminum. This includes a 22-gauge aluminum panel that captures a secondary panel.
 4. The face panel size shall be a minimum of 18" x 18" for 24" x 24" diffusers and 9" x 9" for 12" x 12" diffusers.
 5. Accessories:
 - a. Although the manufacturers show this model being used only as a supply air device, this same diffuser can also be used as a return air device. The neck connection shall be the largest available neck size provided by the manufacturer.
- C. Registers and Grilles – Supply
1. Aluminum or Steel, as scheduled.
 2. 1 1/4" wide borders to have a minimum of thickness of 0.032" for sizes under 24" x 24". Larger sizes shall be constructed of 0.040" or thicker material.
 3. Screw holes to be used for mounting, shall be countersunk.
 4. Blades shall be spaced on 3/4" centers.
 5. Opposed blade damper with removable key operator, operable from face, shall only be provided with registers or as noted on the Drawings.
- D. Registers and Grilles – Return and Exhaust
1. Aluminum or Steel, as scheduled.
 2. 1 1/4" wide borders to have a minimum thickness of 0.032" for sizes under 24" x 24". Larger sizes shall be constructed of 0.040" or thicker material.
 3. Screw holes to be used for mounting, shall be countersunk.
 4. Blades shall be spaced on 3/4" centers.
 5. Opposed blade damper with removable key operator, operable from face shall only be provided with registers or as noted on the Drawings.

E. Linear Slot Diffusers – General Requirements

1. Continuous linear flow bar slot with adjustable vanes for left, right, or vertical discharge, with volume control. Provide slot width, length and number of slots as scheduled on the Drawings.
2. Fabricate of aluminum extrusions with factory baked enamel finish.
3. Provide support clips and gasket as required for ceiling system.
4. Provide alignment strips for hairline joints and end caps where the slot terminates. Provide mitered corners.
5. Provide black matte finish for all interior exposed-to-view components.
6. Provide externally insulated supply air plenum by diffuser manufacturer.
7. Provide return slot diffuser same as supply, except without the adjustable vane control. Provide return air plenum for ducted return where indicated on Drawings.
8. Provide with concealed fasteners.

F. Linear Slot Diffusers and Plenum

1. Provide diffusers with number of slots, slot width and length as noted on the Drawings.
2. Diffusers available as one (1) piece lengths up to 6 ft and from one (1) to eight (8) slots.
3. The pattern controller to be an aerodynamically curved “ice-tong” configuration, capable of 180° pattern adjustment. Maximum pattern controller length to be 3’. If the diffuser is longer than 3’, multiple pattern controllers will be used.
4. Units shall be constructed of 24-gauge steel.
5. Provide unit with insulated galvanized sheet metal plenums as noted on the Drawings. Inlets shall have a minimum of 1 1/2” depth for duct connection. Inlet connection to be flat oval. Contractor shall provide a sheet metal flat oval-to-round transition for a sealed connection to the inlet flex duct or spiral branch ductwork.
6. Provide diffuser with all necessary mounting accessories and borders to match the ceiling or wall where the diffusers shall be installed. Unit is capable of installation in lay-in or hard ceiling as well as sidewall applications.

G. Linear Bar Diffusers

1. Streamlined blades with 0 to 15° deflection, as scheduled, 1/8” x 3/4” or 1/4” centers.
2. Fabricate of aluminum extrusions, with factory clear anodized finish.
3. Fabricate 1/2” margin frame with concealed mounting and gasket.
4. Provide concealed fastening, straightening grids and alignment bars.
5. Provide externally insulated plenums by diffuser manufacturer.

6. Provide return bar diffusers same as supply with return air plenum.
7. Silhouette finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

1. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
2. All installation shall be in accordance with manufacturer's published recommendations.

B. Diffusers

1. Check location of air outlets and inlets and make necessary adjustments in position to conform to architectural features, reflected ceiling plans, symmetry, and lighting arrangement.
2. Install air outlets and inlets to ductwork with airtight connection.
3. Provide balancing dampers on duct take-off to diffusers, grilles and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.
4. Provide all specialties and frames for air distribution devices as required for proper installation in ceiling type as indicated on Architectural Drawings. Provide all cutting and patching of T-bars, gypsum board, and other ceiling systems as required for installation of air devices.

C. Special Requirements

1. Paint ductwork visible behind air outlets and inlets matte black. Refer to Division 09.

END OF SECTION 233700

SECTION 233732 – DOMESTIC RANGE HOODS – TYPE II

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the hoods indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment Included in This Section:
 - 1. UL Listed and HVI-2100 Certified Hood
 - 2. Lighting

1.2 SUBMITTALS

- A. Product Data:
 - 1. Standard hoods.
 - 2. Filters/baffles.
 - 3. Lighting fixtures.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer.
 - 1. Show plan view, elevation view, sections, roughing-in dimensions, service requirements, duct connection sizes, and attachments to other work.
 - 2. Indicate performance, exhaust airflow, and pressure loss at actual Project-site elevation.
 - 3. Show control cabinets.
 - 4. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 5. Design Calculations: Calculate requirements for selecting seismic restraints.
 - 6. Wiring Diagrams: Power, signal, and control wiring.

1.3 QUALITY ASSURANCE

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
- B. Coordinate color and finish of the devices with the Architect.
- C. Coordinate trim pieces and skirts required around the hood to match the actual space conditions.

PART 2 - PRODUCTS

2.1 DOMESTIC RANGE HOODS

A. Acceptable Manufacturers

1. Broan
2. NuTone
3. Denlar
4. Greenheck
5. Halton

B. Construction

1. Hood shall be constructed of 18 gauge minimum, 300 Series stainless steel.
2. Hood shall be either 30 in. long (to cover 30 in. range) or 36 in. long (to cover 36 in. range).
3. Hood shell shall be manufactured and assembled with no visible outer welds or weld marks. All internal seams shall be sealed with NSF-approved caulk, standard.
4. An aluminum filter shall be provided.
5. One (1) LED hood light shall provide lighting on the range below.

C. Configuration

1. Kitchen ventilation hood shall be exhaust only, and cover a domestic range.
2. A manufacturer provided exhaust fan shall be included to maintain the system rating. Fan to be inline or roof mounted as indicated on the plans / schedule.

D. Performance

1. User controls shall be provided to control fan, and lights.
 - a. All hood controls must be accessed by switches on the hood itself unless supplied with an ADA Switch that is mounted remotely.
2. The hood system shall be configured with either a factory-supplied integral fan, factory-supplied external fan, or fan by others.
3. Rear discharge shall direct the air to exit the back of the hood, to discharge through a wall to the outside.
4. External fan options include either a factory-provided inline fan (with plug and play cable), wall mount fan, or roof fan with top discharge hood configuration. Top discharge shall direct the air to exit the top of the hood, to discharge through a roof or wall to the outside.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

1. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
2. All installation shall be in accordance with manufacturer's published recommendations.
3. Check, Test and Balance: The kitchen exhaust system shall be inspected, tested and balanced by a qualified contractor. The contractor shall ensure proper and satisfactory operation of the kitchen exhaust system and shall provide a written and detailed report of this check, test and startup to the Engineer and Owner.

END OF SECTION 233732

SECTION 234100 – FILTERS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install filters, housings and frames and filter gauges necessary for proper installation in air handling.

1.2 REFERENCES

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
- C. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
 - 1. AMCA 99 - Standards Handbook.
 - 2. ARI 850 - Commercial and Industrial Air Filter Equipment.
 - 3. ASHRAE 52.1 - Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter.
 - 4. ASHRAE 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
 - 5. ASHRAE 62 - Ventilation for Acceptable Indoor Air Quality.
 - 6. IEST RP-CC001 - HEPA and ULPA Filters.
 - 7. NFPA 70 - National Electrical Code.
 - 8. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
 - 9. UL 586 - High Efficiency, Particulate Air Filter Units.
 - 10. UL 900 - Air Filter Units.

1.3 SUBMITTALS

- A. Product Data
 - 1. Submit Shop Drawings, product data and installation instructions, including airflow, pressure drop, and MERV rating.
- B. Operation and Maintenance Data
 - 1. Submit manufacturer's operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three (3) years documented experience, who issues complete catalog data on total product. Performance characteristics shall be published in the manufacturer's literature.
- B. Where installation instructions are not included in the Contract Documents, the manufacturer's instructions shall be followed. All equipment affected by altitude shall be rated to operate at the altitude where it is installed.

1.5 DEFINITIONS

- A. IEST: Institute of Environmental Sciences and Technology.
- B. HEPA: High Efficiency Particulate Air.
- C. MERV: Minimum Efficiency Reporting Value.
- D. ULPA: Ultra-Low Penetration Air.

1.6 EXTRA MATERIALS

- A. Provide specified filters for temporary use during construction, and replace with new filters when the differential pressure is at 70 percent of dirty filter reading.
- B. Replace filters at start of Commissioning and again at final acceptance by Owner.
- C. Furnish one (1) extra set of new filters for each filter bank after Substantial Completion, including but not limited to the following:
 - 1. Replaceable throwaway.
 - 2. Replaceable dry type medium and high efficiency.
 - 3. High efficiency casings.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
- B. In general, all capacities and characteristics are shown in schedules on the Drawings. Reference shall be made to the schedules for such information. Capacities shown are minimum capacities. Variations in capacities of scheduled equipment supplied under this Contract will be permitted only with the written direction of Owner.
- C. All equipment shall be shipped to the Project Site with not less than a prime coat of paint or as specified hereinafter.

2.2 AVAILABLE MANUFACTURERS

- A. American Air Filter.
- B. Camfil-Farr.
- C. Flanders-Precisionaire.
- D. Koch Filter.
- E. Purafil Inc.

2.3 FILTERS

- A. All medium efficiency air filters shall be listed as Class 1 in accordance with UL 900 and shall be tested and reported in accordance with ASHRAE Test Standard 52.1 and ASHRAE Test Standard 52.2. Dust spot efficiencies listed are results when tested by ASHRAE Standard 52.1. MERV values listed are results when tested by ASHRAE Standard 52.2.
- B. Filter Descriptions
 - 1. MERV 8 (25 - 30% Dust Spot Efficiency) Filter media shall be a cotton and synthetic blend, lofted to a uniform depth, and formed into a uniform radial pleats.
 - b. A welded wire grid, spot-welded on centers and treated for corrosion resistance, shall be bonded to the downstream side of the media to maintain the radial pleat and prevent media oscillation.
 - c. An enclosing frame, of biodegradable Kraft board shall provide a rigid and durable enclosure. The frame shall be made of virgin board produced under an initiative for sustainable forest management. The frame shall be bonded to the media to prevent air bypass, and include integral diagonal support members on the air entering and air exiting side to maintain uniform pleat spacing in varying airflows.
 - d. Refer to drawings for size and quantity requirements
 - e. Filter Performance
 - 1) 2" deep filter
 - a) 15 pleats / linear foot
 - b) 17.3 sq. ft. total media area for a 24" x 24" filter
 - c) Initial pressure drop: 0.25" @ 500 fpm
 - d) Final pressure drop: 1.00" @ 500 fpm
 - 2) Manufacturer shall guarantee integrity of product to 2.0" w.g.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
- B. All installation shall be in accordance with manufacturer's published recommendations.
- C. Prevent passage of unfiltered air around filters with neoprene gaskets. This is a minimum standard. If more stringent gasketing is required for a particular filter application, the more stringent gasketing will govern.

- D. Install static pressure taps upstream and downstream of filters. Mount on outside of filter housing or filter plenum, in accessible position. Adjust and level. Where a prefilter is specified immediately upstream of a high-efficiency filter, the differential pressure taps shall be installed across each filter.
- E. Provide differential pressure sensor at filter bank assembly for all filter banks.
- F. Install in conformance with UL 900.
- G. Assemble high pressure units by welding/bolting sections together. Refer to air handling unit Specifications for assembly of manufactured air units and assemble filter banks in similar fashion.
- H. Do not operate fans, air handlers, etc., for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated and fan has been test run under observation.

3.2 TESTING

- A. Verify the proper installation of the filter housings and filters. Inspect thoroughly for proper fit and seal of all filters, especially filters of 60 percent or greater efficiency, comparing relative tightness of seal to that specified.
- B. Visually inspect filters below 99 percent specified efficiency for proper installation and limited leakage.
- C. Filters of 99 percent and above specified efficiency shall be tested by subjecting the installed filter and filter installation to a DOP "Challenge" as specified in the Institute of Environmental Standard (IES), IES-RP-CC-001-86, "HEPA Filters."
 - 1. Testing shall be witnessed and certified by the TAB Firm and hood certification firm (see Testing and Balancing Specification Section).
 - 2. Certification shall be performed utilizing a dry silica challenge of a minimum of 300,000 particles (a portion of which shall be as small as 0.10 micron) per cubic foot. Particle concentration measurement will require at least one laser particle counter (Particle Measuring System Model PMS 110 or equal). Counter shall have been calibrated in accordance with IES-RP-CC-013-86-T, "Equipment Calibration or Validation Procedures." Leakage shall be limited to no greater than that recommended by IES-RP-CC-001-86.

END OF SECTION 234100

SECTION 237100 – ENERGY RECOVERY UNITS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all work required to provide and install the energy recovery units indicated by the contract documents with supplementary items necessary for proper installation.
- B. Equipment included in this section includes factory-assembled packaged energy recovery units (ERU) that includes but is not limited to the following:
 - 1. Exhaust Fan
 - 2. Supply Fan
 - 3. Energy Recovery Wheel
 - 4. Electric Preheat Coil
 - 5. Cooling Coil
 - 6. Hot-gas Reheat Coil
 - 7. Gas Fired Heating Coil
 - 8. Dampers
 - 9. Controls
 - 10. Filters
 - 11. Access Sections

1.2 REFERENCES

- A. AHRI Standard 920 “Performance Rating of DX dedicated Outdoor Air System Units”.
- B. ANSI/ASHRAE 15 - Safety Code For Mechanical Refrigeration.
- C. ANSI/ASHRAE/IESNA 90.1 - Current Adopted Version - Energy Standard For New Buildings Except Low-Rise Residential Buildings.
- D. ANSI Z21.47/UL Current Adopted Version - Unitary Air Conditioning Standard For Safety Requirements.
- E. ANSI/NFPA 70 – Current Adopted Version - National Electric Code.

F. International Fuel Gas Code

G. ARI Compliance:

1. Capacity ratings for air-to-air energy recovery equipment shall comply with ARI 1060, "Performance Rating of Air-to-Air Heat Exchangers for Energy Recovery Ventilation Equipment."
2. Capacity ratings for air coils shall comply with ARI 410, "Forced-Circulation Air-Cooling and Air-Heating Coils."

H. ASHRAE Compliance:

1. Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 – "Construction and Startup."
2. Capacity ratings for air-to-air energy recovery equipment shall comply with ASHRAE 84, "Method of Testing Air-to-Air Heat Exchangers."

I. NFPA 90 A & B - Installation of air conditioning and ventilation systems and installation of warm air heating and air conditioning systems.

J. Unit shall conform to the appropriate standards listed in section 103 as well as be listed and labeled by a nationally recognized testing laboratory (NRTL) for compliance with the following applicable standards:

1. Standard for Safety Heating and Cooling Equipment-Fourth Edition, UL 1995/CSA C22.2#236 Issue: 2011/10/14.
2. Standard for Gas Unit Heaters And Gas-Fired Duct Furnaces ANSI Z83.8:2016 Ed. 6, CSA 2.6:2016 Ed. 6
3. Standard for Non-Recirculating Direct Gas-Fired Industrial Air Heaters, ANSI Z83.4:2017 Ed. 5, CSA 3.7:2017 Ed: 5
4. Packaged heat recovery ventilators shall comply with requirements in UL 1812, "Ducted Heat Recovery Ventilators"; or UL 1815, "Nonducted Heat Recovery Ventilators."
5. In the event the unit is not approved by an NRTL for compliance with the appropriate standards, the manufacturer shall, at manufacturer's expense, provide for a field certification and labeling of unit by an NRTL to the appropriate standards. Manufacturer shall, at manufacturer's cost, complete any and all modifications required by NRTL prior to certification and field labeling. Manufacturer shall include coverage of all modifications in unit warranty.

K. 230512 Motors

L. 230548 Vibration Isolation

M. 234100 Air Filters

1.3 SUBMITTALS

A. Unit performance data including: capacity, nominal and operating performance.

- B. Mechanical specifications for unit and accessories describing construction, components and options.
- C. Drawings indicating overall dimensions as well as installation, operation and services clearances. Indicate lift points and recommendations and center of gravity. Indicate unit shipping, installation and operating weights including dimensions.
- D. Data on electrical requirements and connection points. Include recommended wire and fuse sizes or MCA, sequence of operation, safety and start-up instructions.
- E. Include information on all control components, wiring diagrams, sequence of operation, and points list.
- F. Include instructions for lubrication, filter replacement, wheel maintenance, motor and drive replacement, spare parts lists, and wiring diagrams.
- G. Provide operating and maintenance (O&M) manuals for air handling units. In addition to a full set of manuals with closeout documentation, each unit shall ship with its own manual permanently mounted inside the unit casing fan section in a watertight enclosure.
- H. Permanently mount condensate trapping calculation instructions on the unit and in the O&M manual that illustrates the unit casing at the condensate drain connection.
- I. Manufacturer's Instructions: Provide Start-up information and maintenance required prior to Start-up.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
- B. Units to be secured via base rail tie-down locations.
- C. Accept products on site in factory-fabricated protective containers or covered to protect from weather and construction debris, with factory-installed shipping skids and lifting lugs. Inspect for damage and make any necessary repairs at no expense to the owner.
- D. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish. Replace damaged equipment.
- E. Protect openings in casing and seal them with plastic wrap to keep dirt and debris, also protect coils from entry of dirt and debris with pipe caps or plugs.

1.5 EXTRA MATERIALS

- A. Filters: install new filters in unit at substantial completion and provide one extra set of all filters.
- B. Fan belts: furnish one set of belts and sheaves for each belt – driven fan in units.
- C. Wheel belts: furnish one set of belts and sheaves for each heat wheel.

1.6 WARRANTY

- A. Provide parts warranty extending either 12-months from date of unit start-up or a maximum of 18-months from unit ship date.
- B. Provide ten-year heat exchanger limited warranty from unit ship date.
- C. Provide 5-year compressor warranty

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. AAON
- B. Addison
- C. Trane – Horizon
- D. Valent

2.2 GENERAL REQUIREMENTS

- A. Furnish and install packaged outdoor air unit(s) as scheduled on contract documents and described in these specifications.
- B. Unit(s) shall be designed for dehumidification, cooling and / or heating of 100% outdoor air.
 - 1. For dehumidification and cooling modes, the evaporator temperature shall be monitored, reported at unit controller.
 - 2. Compressor controls shall modulate capacity to maintain evaporator leaving set point for dehumidification mode.
 - 3. Hot gas bypass shall not be used to control compressor capacity. Compressor hot gas reheat (HGRH) shall be factory installed. To prevent rehydration of evaporator condensate the reheat coil face shall be located a minimum of 6" downstream from the leaving face of the evaporator coil.
 - 4. Heating system shall include modulating controls.
 - 5. Compressor on-off only or primary heating on-off only controls shall not be acceptable control strategies.
- C. Unit(s) shall have labels, decals, and/or tags to aid in the service of the unit and indicate caution areas.
- D. Unit discharge airflow configuration shall be as indicated on the documents and shall be one of the following options:
 - 1. Vertical discharge thru unit base.

2.3 CABINET

- A. Cabinet panels: 22" double-wall foamed panel construction throughout the indoor section of unit to provide nonporous, cleanable interior surfaces. All interior seams exposed to airflow shall be sealed.
- B. Insulation: 2" polyurethane foam metal encapsulated with no exposed edges. Initial R value of 6.6 per inch of thickness.
- C. Cabinet base shall be double wall construction designed to prevent trapping or ponding of water within the unit base. Cabinet base pan shall be insulated with 2" thick polyurethane foam. Foam insulation shall be fully enclosed with galvanized steel insulation cover. Insulation shall not be applied to underside of unit base.
- D. Cabinet base rails: side and end base rails shall include openings for forklift and tie-down access. To protect unit base from fork damage side rails shall include removable heavy gauge fork pockets.
- E. Shipping anchors attach to and/or through unit base rails. Straps over unit shall not be used to secure unit for shipping.
- F. Cabinet material interior and base rails: shall be G-90 zinc-coated galvanized steel. Material gauge shall be a minimum of 14-gauge for base rails, 16-gauge for structural members and 22-gauge for access doors and cabinet panels.
- G. Exterior corrosion protection: exterior cabinet panels shall be a base coat of G90 galvanized steel with both exterior and interior surfaces cleaned, phosphatized and finished with a weather-resistant baked enamel finish. Unit's surface shall be in compliance with ASTM B45 salt spray testing at a minimum of 750 hour duration.
- H. Cabinet construction shall provide hinged panels providing easy access for all parts requiring routine service. Panels shall be required in the following locations:
- I. Cabinet top cover shall be one-piece construction or where seams exist, it shall be double-hemmed and gasket-sealed.
- J. Hinged access panels:
 - 1. Water- and air-tight hinged access panels shall provide access to all areas requiring routine service. This includes the following areas:
 - a. Fans
 - b. Filters
 - c. Coils
 - d. Dampers
 - e. Energy recovery devices
 - f. Power and controls components
 - g. Utility connections
 - 2. Hold-open devices shall be factory installed on all hinged access doors. Chains shall not be used as hold-open devices.
 - 3. Latches with locking hasp or tool operated closure devices shall be factory installed on all hinged access panels.

- K. Drain pan material shall be type 304 stainless steel drain and constructed to slope in two directions to ensure positive drainage with corners exposed to standing water and drain fittings welded liquid tight to prevent leaks. Pan shall have a minimum depth of 2". Base of drain pan shall be insulated with 1" thick foam insulation minimum.
- L. Provide openings either on side of unit or thru the base for power, control and gas connections.
- M. Air inlet hood shall be factory installed and shall not require field assembly. Hood shall include 2" thick removable aluminum mesh mist eliminators sized for a velocity not to exceed 500 fpm at maximum unit rated airflow. Service access shall be hinged and held in place with thumb latches that shall not require tools for service access.
- N. Unit shall be equipped with a 6" filter rack upstream of the evaporator. Frame shall be field-adjustable to match any filter combination specified in the following section.

2.4 AIR FILTERS

- A. Unit inlet hood shall include 2" thick aluminum mesh removable mist eliminators with hinged access cover. Inlet velocity shall not exceed 500 fpm.
- B. Evaporator inlet shall include a full complement of pleated media air filters.
- C. Refer to the equipment schedules for specific depth and efficiency.
- D. Filters shall be one of the following configurations.
 - 1. 2" deep MERV 8

2.5 DAMPERS

- A. Unit shall include an insulated, motor operated, outdoor and exhaust air damper constructed of galvanized steel.
- B. Damper blades shall be v-groove design with rubber edge seals designed not to exceed a 4 cfm/sq ft leakage rate exceeding ASHRAE 90.1 damper leakage requirements.
- C. Damper actuator shall be factory mounted and wired sealed spring return and either two-position or fully modulating.
- D. Dampers air velocity shall not exceed 2000 fpm.
- E. A recirculation damper shall be provided as noted in the schedules. Damper shall be of the same material, construction and leakage rate as outdoor air damper. Damper actuator shall be factory mounted and wired sealed spring fully modulating and operate based on outdoor air damper feedback signal to properly regulate airflow.

2.6 DEHUMIDIFICATION / COOLING

- A. Compressors
 - 1. All units shall have direct-drive, scroll type compressors.

2. Digital Scroll Compressor
 - a. One circuit or All circuits
 3. Motor shall be suction gas-cooled and shall have a voltage utilization range of plus or minus 10 percent of unit nameplate voltage.
 4. Internal overloads shall be provided with the scroll compressors.
 5. Each compressor shall have a crankcase heater or equivalent to minimize the amount of liquid refrigerant present in the oil sump during off cycles.
 6. Each compressor shall be mounted on rubber vibration isolators, to reduce the transmission of noise.
 7. Provide unit(s) with the number of circuits noted in the equipment schedules. Circuits to be hermetically sealed refrigerant circuit(s) factory-supplied completely piped with liquid line filter-drier, liquid line charging port, suction and liquid line pressure ports, sight glass, and thermal expansion valve.
 8. Provide each circuit with automatic reset high and low pressure and high temperature switches for safety control.
- B. Coils
1. Evaporator, Condenser and Hot Gas Reheat coils shall be constructed with copper tubes mechanically bonded to configured aluminum plate fins.
 2. Coils shall be factory leak tested in accordance ANSI/ASHRAE 15-1992 at a minimum pressure of 500 PSIG.
 3. The condenser coil shall have a fin designed for ease of cleaning.
 4. Evaporator coil shall include (six) rows of cooling interlaced for superior sensible and latent cooling with a maximum of 14 FPI for ease of cleaning.
 5. Reheat coil shall be fully integrated into the supply airstream and be capable of delivering design supply air temperature.
 6. To prevent re-hydration of condensate from evaporator coil, the evaporator face and the hot gas reheat coil face shall use a separate fin pack.
 7. Condenser coil hail guards shall be factory installed.
- C. Condenser
1. Outdoor fans: shall be direct drive vertical discharge design with low-noise corrosion resistant glass reinforced polypropylene props, powder coated wire discharge guards and electro-plated motor mounting brackets.
 2. Fans shall be statically and dynamically balanced.
- D. Compressor Capacity Control
1. Electronic control: (requires digital scroll compressor or variable speed compressor). Compressor output capacity shall be controlled by the main control module.

2.7 FANS AND MOTORS

- A. Indoor fan shall be direct drive plenum fan, factory installed and wired to on-board variable frequency drive and shall be equipped with slide out service access.
- B. All fan motors shall be premium efficiency ODP and meet the U.S. Energy Policy Act of 2005/10 (EPACT).
- C. All fan motors shall either be permanently lubricated and/ or have internal thermal overload protection.
- D. Outdoor fans shall be direct drive with premium efficiency motors, statically and dynamically balanced, draw through in the vertical discharge position.
- E. Provide shafts constructed of solid hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.
- F. Fans to utilize spring isolators and flexible connections to allow for them to be isolated from the unit casing.

2.8 HEATING

- A. Modulating indirect gas fired heating system:
 - 1. Completely assembled and factory installed heating system shall be located in the primary heating position located beneath the indoor fan assembly and be integral to unit and approved for use downstream from refrigerant cooling coils in units mounted outdoors. Threaded gas connection shall terminate at field provided manual shut-off valve. Provide capability for sidewall gas piping.
 - 2. Heaters shall include high turn-down burners firing into individual stainless-steel tubular heat exchangers. Heat exchangers shall be constructed of type 439 stainless steel and be a high efficiency dimpled tubular design capable of draining internal condensate. Units with multiple heaters shall include one fully modulating high turndown heater with additional on-off heater sections.
 - 3. Total heater turndown shall be based on heater gas input capacity:
 - a. 5:1 when ≤ 150 MBH.
 - b. 10:1 when 150-600 MBH.
 - c. 20:1 when > 600 MBH
 - 4. Heater outdoor air inlet shall be hooded and include internal baffle system to prevent rain blow thru. To prevent recirculation of flue gas and to prevent flue gas condensate from draining onto and obstructing the heater air inlet the inlet shall be hooded and shall be located a minimum of 8" beneath the flue outlet. Inlet hood shall include bird screen.
 - 5. Heater flue outlet(s) shall include hooded outlet with wire cloth all constructed of Type 430 stainless steel. Hooded outlet shall be sealed to prevent flue gas recirculation.
 - 6. Gas Burner Safety Controls: Provide safety controls for the proving of combustion air prior to ignition, continuous air proving monitoring following ignition and continuous electronic flame supervision.

7. Unit controls shall monitor heat output and shall discontinue all heating attempts and or unit operation in the event the heating section fails to ignite or fails to maintain programmed supply air temperature/time.
8. Inducer fan shall be direct drive high pressure centrifugal type with two speeds and shall include built- in thermal overload protection.
9. Limit controls: High temperature automatic reset limits shall be located on blower wall and in indoor fan chamber to shut off gas flow in the event of excessive temperatures resulting from restricted indoor airflow, or loss of indoor airflow.
10. Flame roll-out safeties shall provide continuous monitoring of proper burner operation.

B. Modulating Electric Resistance Heating System

1. Completely assembled and factory installed electric heating system shall be fully modulating, SCR controlled and listed for use in roof top handler.
2. The heating section will include open coil heating elements, automatic and manual cut-outs, low voltage controls, air proving switch, maximum 48 amps per circuit and fusing for heaters over 48 amps.
3. Electric heater shall be located:In a pre-heating position to upstream of the energy recovery wheel to prevent frosting of the wheel.
 - b. In the Primary heating position located beneath the indoor fan assembly.
 - c. In the Secondary heating position located upstream of the unit return air section and will be staged and of fin tubular type.
4. Heater shall be UL or CSA listed and approved and provide single point power connection.

2.10 ELECTRICAL RATINGS AND CONNECTIONS

- A. All high voltage power components such as fuses, switches and contactors shall include a service personnel protection barrier or shall be a listed as touch-safe design.
- B. Field wiring access to be provided thru unit base into isolated enclosure with removable cover.
- C. Power wiring to be a single point connection.
- D. Wiring internal to the unit shall be colored and numbered for identification.
- E. Unit shall be factory wired to field wiring terminal block mounted in isolated enclosure.
- F. Factory wired main power disconnect and overcurrent device shall be rated for total unit connected power
- G. Factory wired voltage / phase monitor shall be included as standard. In the event of any of the following, the units will be shut down and a fault code will be stored in the monitor for the most recent 25 faults. Upon correction of the fault condition the unit will reset and restart automatically.
- H. Phase unbalance protection: factory set 2%
- I. Over /under/brown out voltage protection: +/-10% of nameplate voltage phase loss / reversal

- J. Factory mounted 120-volt convenience outlet.
- K. All low voltage field wiring connections shall be made at factory installed low voltage terminal strip.

2.11 UNIT CONTROLS

- A. Main Unit Controller (MCM) shall be a microprocessor-based controller with resident control logic.
 - 1. Refer to the temperature controls drawings and equipment schedules for additional requirements.
- B. Controller shall be capable of the following:
 - 1. Discharge Air control with unit conditioning modes enabled based on outdoor air conditions and controlled to maintain discharge air setpoints. Unit capable of constant speed or variable speed operation.
 - 2. Space control with unit conditioning modes enabled and controlled to maintain space setpoints. Unit capable of constant speed or variable speed operation.
 - 3. Unit shall include stand-alone controls package with no interface to a BAS system.
 - 4. Unit shall interface with the Building Automation System via a protocol coordinated with the Temperature Controls Contractor. Provide all necessary components to allow for the following functionality:
 - a. Enable / disable of the unit
 - b. Setpoint adjustment (temperature, occupied / unoccupied mode, static pressures)
 - c. General alarm monitoring
 - 5. MCM shall:
 - a. Prevent simultaneous operation of any conditioning modes.
 - b. Accept separate setpoints for Occupied and Unoccupied states.
 - c. Call for Dehumidification based on dew point setpoints. When no call for Dehumidification is present MCM shall control calls for Cooling, Heating and Economizer modes based on sensible or enthalpy temperature setpoints. MCM shall have onboard clock and scheduling function for occupancy.
 - d. Include non-volatile memory to retain all programmed values without the use of a battery, in the event of a power failure.
 - e. Enable HGRH dehumidification and cooling modes and control modulation to maintain (discharge air temperature / space temperature).
 - f. Unit shall include minimum discharge air control.
 - 6. System Sensors
 - a. Provide all necessary sensors to perform all functionality required in this specification and the temperature controls drawings.
 - b. At a minimum include the following factory installed and wired sensors:
 - 1) Outdoor Air Temperature
 - 2) Outdoor Air Humidity
 - 3) Evaporator Leaving Air Temperature
 - 4) Discharge Air Temperature

- c. System controls shall include:
 - 1) Anti-cycle timing
 - 2) Minimum compressor run/off-times

2.12 POWER EXHAUST – BAROMETRIC RELIEF

- A. Provide a factory installed power exhaust assembly that shall be designed to ventilate return air to atmosphere.
- B. Plenum mounted direct drive airfoil design exhaust wheel material shall be heavy gauge aluminum, welded construction and rated for up to class iii speed/pressure performance. Factory install and wire fan motor to on-board variable frequency drive. Belt-drive and/or forward curve plenums fans shall not be used.
- C. Exhaust to discharge through dampers located on each side of unit cabinet.
 - 1. Powered isolation damper.
 - 2. Barometric relief dampers with counterbalance weight.

2.13 OUTDOOR AIR SECTION ENERGY RECOVERY (ERV)

- A. The rotor media shall be made of aluminum, formed into a honeycomb structure to minimize pressure loss and avoid plugging.
- B. Paper, plastic or fibrous media are not acceptable. The rotor media must be coated to resist corrosion.
- C. All surfaces must be coated with a non-migrating desiccant layer to ensure that adequate latent capacity is provided. The desiccant coating must be firmly bonded to the aluminum surface and will not be dislodged when challenged with high velocity air up to 5000 feet per minute.
- D. Products that lose desiccant when served with high velocity air are not acceptable.
- E. The cassette must be a slide out design for serviceability. The media shall be cleanable with low temperature steam, hot water or light detergent without degrading the latent recovery.
- F. Sensible and latent recovery efficiencies must be clearly documented through a testing program conducted in accordance with ASHRAE Standard 84 and AHRI 1060. The testing must have been conducted by a qualified independent organization. The performance test reports must be provided for engineering review as part of the submittals for this project.
- G. The rotor design shall ensure laminar airflow to minimize parasitic pressure loss and to optimize the operating efficiency of the system fans. The pressure loss across the media shall be no greater than the scheduled pressure loss values. The energy wheel shall operate effectively up to 180 degrees F.
- H. The rotor media shall be permanent, with an anticipated life of 20 years. It must be tested in accordance with ASTM Standard E-84 and provide smoke and flame spread ratings of less than 25 and 50 as required by NFPA 90a and UL 1995. A copy of the ASTM E-84 test report confirming the method of test and results shall be provided with the submittal. Heat recovery wheels incorporating “throw-away” media and tested to UL900 for class 2 filters are not acceptable.

- I. The wheel manufacturer must have been producing energy recovery wheels for a minimum of ten years.
- J. The rotor shall be supplied with perimeter brush seals and face contact seals to minimize air leakage and wheel bypass.
- K. The rotor media shall be supported by a structural aluminum hub and aluminum reinforcing spoke system. The rotor bearings must be greaseable and provide L10 life in excess of 20 years.
- L. The cassette framework shall be made of galvanized steel to prevent corrosion.
- M. The rotor must be driven by long-life polyurethane / polyester composite link belt system. The rotor/cassette shall be designed so that belt can be removed or serviced without the removal of the bearing. A 3 Phase A/C gear motor shall be utilized to accommodate variable speed applications.

2.14 ROOF CURB

- A. Contractor shall provide factory supplied 14" tall roof curb, 18-gauge perimeter made of zinc coated steel with supply and return air gasketing and wood nailer strips. Ship knocked down and provided with instructions for easy assembly.
- B. Curb shall be manufactured in accordance with the national roofing contractors association guidelines.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Contractor shall install in accordance with manufacturer's instructions.
- B. Mount units on factory-built roof mounting frame providing watertight enclosure to protect ductwork and utility services. Install roof mounting curb level.
- C. Manufacturer's field services
 - 1. Unit start-up and commissioning shall be completed by a factory-trained and factory-certified technician.

END OF SECTION 237100

SECTION 238126 – SPLIT SYSTEM AIR CONDITIONERS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the split system air conditioning units indicated by the Contract Documents with supplementary items necessary for proper installation
- B. Equipment Included in This Section
 - 1. Split system air conditioner system with Variable Speed Inverter Compressor technology. The system shall consist of a horizontal discharge, single phase outdoor unit and a matched capacity indoor section that shall be equipped with a wired wall mounted and/or wireless handheld remote controller.
- C. The indoor units shall be one (1) of the following configurations
 - 1. Wall-mounted
 - a. 9,000 – 36,000 Btuh
 - b. Minimum 14.0 SEER
 - 2. Ceiling-mounted recessed cassette
 - a. 12,000 – 42,000 Btuh
 - b. Minimum 13.6 SEER
 - 3. Ceiling surface mounted
 - a. 24,000 – 42,000 Btuh
 - b. Minimum 14.4 SEER
 - 4. Concealed ducted type
 - a. 12,000 – 42,000 Btuh
 - b. Minimum 13.8 SEER

1.2 REFERENCES

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASHRAE Compliance
 - 1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
- C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1 (adopted version).

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For computer-room air conditioners. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Wiring Diagrams: For power, signal, and control wiring.
- C. Color Samples: For unit cabinet, discharge grille, and exterior louver and for each color and texture specified.
- D. Coordination Drawings: Plans, elevations, and other details, drawn to scale, using input from Installers of the items involved.
- E. Field quality-control reports.
- F. Operation and Maintenance Data: For computer-room air conditioners to include in emergency, operation, and maintenance manuals.
- G. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL) and shall bear the ETL label.
- B. All wiring shall be in accordance with the National Electrical Code (N.E.C.) and local codes as required.
- C. The units shall be rated in accordance with Air-conditioning, Heating, and Refrigeration Institute's (AHRI) Standard 210 and bear the ARI Certification label.
- D. The units shall be manufactured in a facility registered to ISO 9001 and ISO 14001, which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).

1.5 WARRANTY

- A. The units shall have a manufacturer's parts and defects warranty for a period five (5) year from date of installation. The compressor shall have a warranty of seven (7) years from date of installation. If, during this period, any part should fail to function properly due to defects in workmanship or material, it shall be replaced or repaired at the discretion of the manufacturer. This warranty does not include labor.

1.6 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

- 1. Filters: One (1) set of filters for each unit.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- 1. Daikin
- 2. Fujitsu
- 3. LG
- 4. Mitsubishi Electric
- 5. Panasonic
- 6. Samsung

2.2 OUTDOOR UNITS - GENERAL

- A. The outdoor unit shall be compatible with the four different types of indoor units as noted above. The connected indoor unit shall be of the same capacity as the outdoor unit.
- B. The outdoor unit shall be equipped with a control board that interfaces with the indoor unit to perform all necessary operation functions.
- C. Outdoor unit shall be capable of operating at 0° F ambient temperature without additional low ambient controls.
 - 1. Optional wind baffle shall be required for operation down to -5° F ambient temperature.
- D. The outdoor unit shall be able to operate with a maximum height difference of 100 feet (30 meters) between indoor and outdoor units.
- E. The system shall have the following maximum tubing length restrictions between indoor and outdoor units. Line size changes, traps or additional oil will not be required using these parameters.
 - 1. 9,000 – 18,000 Btuh: 100 feet
 - 2. 24,000 – 42,000 Btuh: 165 feet
- F. The outdoor unit shall be completely factory assembled, piped, and wired. Each unit must be test run at the factory.
- G. Outdoor unit sound level shall not exceed:

Capacity	Max dBA
12,000 / 18,000 Btuh	46

24,000 / 30,000 / 36,000 Btuh	48
42,000 Btuh	51

2.3 OUTDOOR UNITS – CONSTRUCTION

A. Cabinet

1. The casing shall be constructed from galvanized steel plate, finished with an electrostatically applied, thermally fused acrylic or polyester powder coating for corrosion protection and have a Munsell 3Y 7.8/1.1 finish.
2. Mounting feet shall be provided and shall be welded to the base of the cabinet and be of sufficient size to afford reliable equipment mount and stability.
3. Easy access shall be afforded to all serviceable parts by means of removable panel sections.
4. The fan grill shall be of ABS plastic.
5. Cabinet mounting and construction shall be sufficient to withstand 155 MPH wind speed conditions for use in Hurricane condition areas. Mounting, base support, and other installation to meet Hurricane Code Conditions shall be by others.

B. Fan

1. AC fan motor or DC fan motors are acceptable and will vary based on unit capacity.
2. The fan blade(s) shall be of aerodynamic design for quiet operation, and the fan motor bearings shall be permanently lubricated.
3. The outdoor unit shall have horizontal discharge airflow. The fan shall be mounted in front of the coil, pulling air across it from the rear and dispelling it through the front. The fan shall be provided with a raised guard to prevent external contact with moving parts

C. Coil

1. The L shaped condenser coil shall be of copper tubing with flat aluminum fins to reduce debris build up and allow maximum airflow. The coil shall be protected with an integral metal guard.
2. Refrigerant flow from the condenser shall be controlled by means of an electronic linear expansion valve (LEV) metering device. The LEV shall be control by a microprocessor controlled step motor.

D. Refrigerant Lines

1. All refrigerant lines between outdoor and indoor units shall be of annealed, refrigeration grade copper tubing, ARC Type, meeting ASTM B280 requirements.
2. Lines shall be individually insulated in twin-tube, flexible, closed-cell, CFC-free (ozone depletion potential of zero), elastomeric material for the insulation of refrigerant pipes and

tubes. Insulation to have a thermal conductivity equal to or better than 0.27 BTU-inch/hour per Sq Ft / °F, a water vapor transmission equal to or better than 0.08 Perm-inch and superior fire ratings such that insulation will not contribute significantly to fire and up to 1" thick insulation shall have a - Flame-Spread Index of less than 25 and a Smoke-development Index of less than 50 as tested by ASTM E 84 and CAN / ULC S-102.

E. Compressor

1. The compressor for units with a capacity between 12,000 and 36,000 Btuh shall be a DC twin-rotor rotary compressor with Variable Speed Inverter Drive Technology.
2. The compressor for units with a capacity of 42,000 Btuh shall be a Frame Compliant Scroll compressor with Variable Speed Inverter Drive Technology.
3. The compressor shall be driven by inverter circuit to control compressor speed. The compressor speed shall dynamically vary to match the room load for significantly increasing the efficiency of the system which shall result in significant energy savings.
4. To prevent liquid from accumulating in the compressor during the off cycle, a minimal amount of current shall be automatically, intermittently applied to the compressor motor windings to maintain sufficient heat to vaporize any refrigerant. No crankcase heater is to be used.
5. The outdoor unit shall have an accumulator and high pressure safety switch. The compressor shall be mounted to avoid the transmission of vibration.

F. Electrical

1. The electrical power of the unit shall be 208 volts or 230 volts, single phase, 60 hertz. The unit shall be capable of satisfactory operation within voltage limits of 198 volts to 253 volts.
2. Power for the indoor unit shall be supplied from the outdoor unit.
3. The outdoor unit shall be controlled by the microprocessor located in the indoor unit.

2.4 INDOOR UNITS – GENERAL

- A. The indoor units shall be factory assembled, wired and tested. Contained within the unit shall be all factory wiring and internal piping, control circuit board and fan motor.
- B. The unit, in conjunction with the wired, wall mounted controller shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, and a test run switch.
- C. Indoor unit and refrigerant pipes shall be purged with dry nitrogen before shipment from the factory.
- D. Fans
 1. The indoor unit fan shall have multiple high performance, double inlet, forward curve fans driven by a single motor.
 2. The fans shall be statically and dynamically balanced and run on a motor with permanently lubricated bearings.

3. The indoor fan shall consist of four (4) speeds: Low, M1, M2, and Hi plus AUTO fan setting. The fan shall have a selectable Auto fan setting that will adjust the fan speed based on the difference between controller set-point and sensed space temperature.
- E. Filter: Return air shall be filtered by means of an easily removable washable filter. An optional MERV 8 filter shall be furnished
- F. Coil
1. The evaporator coil shall be of nonferrous construction with pre-coated aluminum strake fins on copper tubing.
 2. The multi-angled heat exchanger shall have a modified fin shape that reduces air resistance for a smoother, quieter airflow.
 3. All tube joints shall be brazed with PhosCopper or silver alloy. The coils shall be pressure tested at the factory.
 4. A condensate pan and drain shall be provided under the coil. An optional drain lift mechanism, capable of lifting condensate 23-5/8”(600mm) above the drain pan, shall be provided
- G. Electrical
1. The electrical power of the unit shall be 208 volts or 230 volts, 1 phase, 60 hertz. The system shall be capable of satisfactory operation within voltage limits of 198 volts to 253 volts.
 2. The power to the indoor unit shall be supplied from the outdoor unit.
- H. Control
1. The control system shall consist of a minimum of two (2) microprocessors, one (1) on each indoor and outdoor unit, interconnected by a single non-polar two-wire cable.
 2. Field wiring shall run directly from the indoor unit to the wall mounted controller with no splices. The microprocessor located in the indoor unit shall have the capability of monitoring return air temperature and indoor coil temperature, receiving and processing commands from the wired controller, providing emergency operation and controlling the outdoor unit. The control voltage from the wired controller to the indoor unit shall be 12/24 volts, DC. The control signal between the indoor and outdoor unit shall be pulse signal 24 volts DC. Up to two wired controllers shall be able to be used to control one unit.
 3. The system shall be capable of automatic restart when power is restored after power interruption. The system shall have self-diagnostics ability, including total hours of compressor run time. Diagnostics codes for indoor and outdoor units shall be displayed on the wired controller panel.

2.5 INDOOR UNIT – WALL MOUNTED

- A. The cabinet shall be formed from high strength molded plastic with smooth finish, flat front panel design with access for filter.
- B. Cabinet color shall be white. The unit shall be wall mounted by means of a factory supplied, pre-drilled, mounting plate.

2.6 INDOOR UNIT – CEILING MOUNTED RECESSED CASSETTE

- A. The cabinet shall be formed from galvanized sheet metal coated with high-density foam insulation. Cabinet shall be for recessed mounting and provided with four (4) corner mounting supports behind removable corner pockets in Grille assembly allowing adjustment of mounting height from front of unit.
- B. The cabinet panel shall have provisions for a field installed filtered outside air intake.
- C. There shall be a knock-out to provide a branch air duct for conditioning a secondary space.
- D. There shall be an optional multi-function casement which will mount between the unit cabinet and the Grille assembly to provide a second field installed filtered outside air intake and provide a mount for a high-efficiency filter element.
- E. A separate grill assembly shall be attached to the front of the cabinet to provide supply air vanes in four directions and a center mounted return air section. The four-way grill shall be fixed to bottom of cabinet allowing two, three or four-way blow. The grill vane angles shall be individually adjustable from the wired remote controller to customize the airflow pattern for the conditioned space. Grill assembly color shall be white.

2.7 INDOOR UNIT – SURFACE MOUNTED CEILING

- A. The casing shall be ABS plastic and have a white finish.
- B. Cabinet shall be designed for suspension mounting from above and horizontal operation.
- C. Indoor unit shall have removable mounting brackets. A mounting template with suspension bolt locations shall be furnished with indoor unit. Mounting bolts or threaded rod of 3/8" diameter shall be used to suspend unit and unit shall not require direct contact with ceiling or panel for proper operation.
- D. Mounting support shall be of sufficient strength and design to support full weight of indoor unit.
- E. The rear cabinet panel shall have knock-out provisions for a field installed filtered 4-5/16 diameter ventilation air intake connection.

2.8 INDOOR UNIT – DUCTED TYPE

- A. The cabinet shall be space saving, low profile, horizontal, ducted type. Formed cabinet shall be constructed of G-60 galvanized steel with factory applied foam surface insulation to prevent condensation on outer surfaces.
- B. The cabinet shall be provided with four mounting brackets to accommodate suspension from threaded rod or structural support located on the side panels in all four corners. Brackets shall be suitable for supporting the weight of the indoor unit.
- C. The indoor unit cabinet shall be equipped with a ducted air outlet and ducted rear return air connection. Units shall have selectable rear or bottom return as a standard feature.
- D. The units shall be equipped with a 3-15/16" diameter ventilation air intake knock-out.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units level and plumb, maintaining manufacturer's recommended clearances.
- B. Air-Cooled Refrigerant Condenser Mounting: Install using elastomeric pads. Comply with requirements for vibration isolation devices specified in Division 23 Section "Vibration Controls for HVAC Piping and Equipment."

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to machine to allow service and maintenance.
- C. Drainage Connections: Comply with applicable requirements in Division 22 Section "Domestic Water Piping." Provide adequate connections for condensate drains.
- D. Refrigerant Piping: Comply with applicable requirements in Division 23 Section "Refrigerant Piping." Provide shutoff valves and piping.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Tests and Inspections
 - 1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. After startup service and performance test change filters.

END OF SECTION 238126

SECTION 238130 - VARIABLE REFRIGERANT FLOW SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all work required to provide and install the following Variable Refrigerant System indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 SUBMITTALS

- A. Provide literature that indicates dimensions, weights, capacities, ratings, fan performance, efficiencies, gauges and finishes of materials, electrical characteristics and connection requirements. Unit capacities shall include the de-rated values based on actual outdoor conditions specified.
- B. Provide a riser diagrams indicating refrigeration piping layout, control wiring and power requirements.
- C. Submit sound power level data for both fan outlet and casing radiation at rated capacity, as tested and certified per AMCA and ARI standards. Include for both indoor and outdoor units. All fan data shall be generated from specified testing. Provide data on all coils as tested and certified per ARI standards.
- D. Include information on all control components, wiring diagrams, sequence of operation, and points list.
- E. Operation and maintenance data.
- F. Manufacturer start up reports and checklists.

1.3 QUALITY ASSURANCE

- A. The units shall be listed by Electrical Testing Laboratories (ETL) and bear the ETL label.
- B. All wiring shall be in accordance with the adopted version of the National Electrical Code (N.E.C.).
- C. The units shall be manufactured in a facility registered to ISO 9001 and ISO14001 which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).
- D. All units must meet or exceed the minimum efficiency requirements for the adopted version of the IECC and / or the adopted version of ASHRAE 90.1 efficiency requirements for VRF systems. Efficiency shall be published in accordance with the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Standard 1230.

1.4 SYSTEM DESCRIPTION

- A. Equipment in this section includes variable refrigerant flow systems that is not limited to the following:
 - 1. Outdoor units
 - 2. Indoor units
 - 3. Branch circuit controllers
 - 4. Refrigerant piping
 - 5. Controls
- B. Simultaneous heating / cooling (heat recovery) system shall consist of an outdoor unit, BC (Branch Circuit) Controller (or comparable branch devices), multiple indoor units, and an integral DDC (Direct Digital Controls) system.
- C. Each indoor unit or group of indoor units shall be capable of operating in any mode independently of other indoor units or groups. System shall be capable of changing mode (cooling to heating, heating to cooling) with no interruption to system operation.
- D. Air-source VRF system shall be designed specifically for cold weather heating performance. The system shall be capable of providing the capacity listed in the equipment schedules at an outside air temperature of -20 deg F. The units shall be capable of operating down to -25 deg F without tripping the units off.
- E. Bidding “over-sized” systems (providing outdoor units with greater nominal tonnage than the basis of design) to meet system heat requirements is not permissible.
- F. No additional branch circuit controllers (or comparable branch devices) than shown on the drawings / schedule may be connected to any one outdoor unit. Contractors proposing alternate systems requiring more branch devices than those included as the basis of design are responsible for additional piping & electrical costs and are required to identify additional costs & installation time required of other trades with their bid.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Unit shall be stored and handled according to the manufacturer’s recommendation.

1.6 EFFICIENCY

- A. All units must meet or exceed the 2010 Federal minimum efficiency requirements and the ASHRAE 90.1 efficiency requirements for VRF systems. Efficiency shall be published in accordance with the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Standard 1230.

1.7 STARTUP

- A. System start-up supervision shall be a required service to be completed by the manufacturer or a duly authorized, competent representative that has been factory trained in system configuration and operation.

- B. The representative shall provide proof of manufacturer certification indicating successful completion within no more than two (2) years prior to system installation.
- C. This certification shall be included as part of the equipment and/or controls submittals.

1.8 WARRANTY

- A. The units shall be covered by the manufacturer's limited warranty for a period of one (1) year parts and seven (7) year compressor to the original owner from date of installation.
- B. All manufacturer technical and service manuals must be readily available for download by any local contractor should emergency service be required. Registering and sign-in requirements which may delay emergency service reference are not allowed.
- C. The system shall be installed by a contractor with extensive install and service training. The mandatory contractor service and install training should be performed by the manufacturer.

1.9 COMPLETE SYSTEM

- A. The manufacturer is responsible for providing a fully operation system with all necessary components.
- B. If a manufacturer is selected other than the basis of design, any additional material, cost, and labor to meet the system performance of the specification or drawings shall be incurred by the contractor. This includes but is not limited to the following:
 - 1. Availability
 - 2. Physical dimensions
 - 3. Weight
 - 4. Control functionality
 - 5. Electrical requirements
 - 6. Performance
 - 7. Ambient operating range

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Daikin
- B. LG
- C. Mitsubishi
- D. Samsung

2.2 OUTDOOR UNITS

A. General

1. The outdoor unit modules shall be air-cooled, direct expansion (DX), multi-zone units used specifically with VRF components described in this section and in the controls section.
2. The outdoor unit modules shall be equipped with a single compressor which is inverter-driven and multiple circuit boards—all of which must be manufactured by the branded VRF manufacturer. Each outdoor unit module shall be completely factory assembled, piped and wired and run tested at the factory.
3. Outdoor unit systems may be comprised of multiple modules with differing capacity. All units requiring a factory supplied twinning kits shall be piped together in the field, without the need for equalizing line(s). If an alternate manufacturer is selected, any additional material, cost, and labor to install additional lines shall be incurred by the contractor.
4. Outdoor units shall have a sound rating of no higher than 65 dB(A) individually and 68 dB(A) twinned. Units shall have a sound rating no higher than 55 dB(A) individually or 58 dB(A) twinned while in night mode operation.
5. Refrigerant lines from the outdoor unit to the BC (Branch Circuit) Controller or comparable branch devices shall be insulated to prevent condensation on the unit in the installed location.
6. The outdoor unit shall have the capability of installing the main refrigerant piping through the bottom of the unit.
7. The outdoor unit shall have an accumulator with refrigerant level sensors and controls.
8. The outdoor unit shall have a high-pressure safety switch, over-current protection, crankcase heater and DC bus protection.
9. VRF system shall meet performance requirements per schedule and be within piping limitations & acceptable ambient temperature ranges as described in respective manufacturers' published product catalogs. Non-published product capabilities or performance data are not acceptable.
10. The outdoor unit shall be capable of continuous operation in heating mode down to -20°F ambient temperatures, simultaneous heating / cooling mode from 14 - 70°F ambient temperatures, and cooling mode up to 109°F without additional restrictions on line length and vertical separation beyond those published in respective product catalogs.
 - a. Models with capacity data for required temperature range published as “for reference only” are not considered capable of continuous operation at those conditions and are not acceptable.
11. The outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained. Oil return sequences must be enabled only during extended periods of reduced refrigerant flow to ensure no disruption to correct refrigerant flow to individual zones during peak loads.
12. Unit must be capable of defrost of all circuits.

13. The outdoor unit shall be provided with a manufacturer supplied 20-gauge hot dipped galvanized snow / hail guard. The snow / hail guard protects the outdoor coil surfaces from hail damage and snow build-up in severe climates.
14. VRF four-legged outdoor unit mounting systems shall be provided by manufacturer. Stand shall be made from 7-gauge plate steel with thermally fused polyester powder coat finish that meets ASTM D3451-06 standards. Stands shall be provided with galvanized mounting hardware and meets all ASCE 7 overturning safety requirement.

B. Unit Cabinet

1. The casing(s) shall be fabricated of galvanized steel, bonderized and finished.
2. The outdoor unit shall be tested in compliance with ISO9277 such that no unusual rust shall develop after 960 hours of salt spray testing.
3. Panels on the outdoor unit shall be scratch free at system startup. If a scratch occurs the salt spray protection is compromised, and the panel should be replaced immediately.

C. Fan

1. Each outdoor unit module shall be furnished with direct drive, variable speed propeller type fan(s) only.
2. Fans shall be factory set for operation at 0 in. wg external static pressure, but capable of normal operation with a maximum of 0.24 in. WG external static pressure via dipswitch.
3. All fan motors shall have inherent protection, have permanently lubricated bearings, and be completely variable speed.
4. All fans shall be provided with a raised guard to prevent contact with moving parts.

D. Refrigerant and Refrigerant Piping

1. R410A refrigerant shall be required for systems.
2. PVE or POE oil shall be used in the system. Prior to bidding, manufacturers using alternate oil types shall submit material safety data sheets (MSDS) and comparison of hygroscopic properties for alternate oil with list of local suppliers stocking alternate oil for approval at least two weeks prior to bidding.
3. Refrigerant piping shall be phosphorus deoxidized copper (copper and copper alloy seamless pipes) of sufficient radial thickness as defined by the VRF equipment manufacturer and installed in accordance with manufacturer recommendations.
4. All refrigerant piping must be insulated with closed cell, CFC-free foam insulation with flame-Spread Index of less than 25 and a smoke-development Index of less than 50 as tested by ASTM E 84 and CAN / ULC S-102. Refer to the piping usage schedule for insulation thickness requirements based on pipe size. Refer to the piping specification for additional requirements.
5. Refrigerant line sizing shall be in accordance with manufacturer specifications.

E. Coil

1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
2. The coil fins shall have a factory applied corrosion resistant blue-fin finish. Uncoated aluminum coils/fins are not allowed.
3. The coil shall be protected with an integral metal guard.

F. Compressor

1. Each outdoor unit module shall be equipped with only inverter driven scroll hermetic compressors. Non-inverter-driven compressors, which may cause inrush current (demand charges) and require larger generators for temporary power shall not be allowed.
2. Compressor (or compressor circuit) must utilize hot gas injection circuit or two-stage compression to allow compression ratio (thus heating output) to increase during extreme cold ambient temperatures.
3. Crankcase heat shall be provided via induction-type heater utilizing eddy currents from motor windings. Energy-wasting “belly-band” type crankcase heaters are not allowed.
4. All compressors shall have an inverter to modulate capacity. The capacity for each module / system shall be variable with a minimum turndown not greater than 20% of the scheduled nominal capacity.
5. The compressor shall be equipped with an internal thermal overload.
6. Field-installed oil equalization lines between modules are not allowed. Prior to bidding, manufacturers requiring equalization must submit oil line sizing calculations specific to each system and module placement for this project.

G. Basepan Heater

1. Each outdoor unit module shall be equipped with a basepan heater to protect coil against ice build-up during prolonged winter operation. Basepan heater shall activate only if compressor is operating in heating mode at an outdoor ambient temperature of 39 deg F or below

H. Controls

1. Outdoor unit shall include Variable Evaporator Temperature or comparable method of varying system evaporator (refrigerant) temperature in order to reduce compression ratio and power consumption during light load or mild ambient temperatures.
2. Multiple evaporator refrigerant temperature settings shall be required in order to optimize efficiency within required system-specific performance and installation constraints.
3. System shall reduce compression ratio only when / if all indoor units are within 1.8 deg F of setpoint; reducing compression ratio based solely on ambient temperature risks discomfort and is not allowed.

4. Variable Evaporator Temperature or comparable method shall incorporate override or disable capability based on external signal to allow for space humidity control or load demand. The unit shall be an integral part of the system & control network described in the Controls section and react to heating / cooling demand as communicated from connected indoor units over the control circuit.
5. Required field-installed control voltage transformers and/or signal boosters shall be provided by the manufacturer.
6. Each outdoor unit module shall have the capability of 4 levels of demand control based on external input.

I. Electrical

1. The outdoor unit electrical power shall match the equipment schedules.
2. The outdoor unit shall be controlled by integral microprocessors.
3. The control circuit between the indoor units, BC Controller and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

2.3 BRANCH CIRCUIT (BC) CONTROLLERS

A. General

1. BC (Branch Circuit) Controllers (or comparable branch devices) shall include multiple branches to allow simultaneous heating and cooling by allowing either hot gas refrigerant to flow to indoor unit(s) for heating or subcooled liquid refrigerant to flow to indoor unit(s) for cooling.
2. BC Controllers (or comparable branch devices) shall be equipped with a circuit board that interfaces to the controls system and shall perform all functions necessary for operation. The unit shall have a galvanized steel finish and be completely factory assembled, piped and wired.
3. Each unit shall be run tested at the factory. This unit shall be mounted indoors, with access and service clearance provided for each controller. BC Controllers (or comparable branch devices) shall be suitable for use in plenums in accordance with UL1995 ed 4.
4. Each BC Controller unit shall include a minimum of 1 extra refrigerant circuit. Extra circuits shall be 23.3Bd and capped for future usage.
5. BC Unit Cabinet:
 - a. The casing shall be fabricated of galvanized steel.
 - b. Each cabinet shall house a liquid-gas separator and multiple refrigeration control valves.

B. Refrigerant Piping (specifications in addition to those for outdoor unit):

1. All refrigerant pipe connections shall be brazed.

2. Future changes to indoor unit quantities or sizes served by a BC controller or comparable branch device must be possible
3. Refrigerant valves:
 - a. Service shut-off valves shall be factory provided and installed with the BC Controller for each branch to allow service to any indoor unit without field interruption to overall system operation.
4. Condensate Management:
 - a. BC Controller (or comparable branch device) must have integral resin drain pan or insulate refrigeration components with removable insulation that allows easy access for future service needs.
5. Electrical:
 - a. The unit electrical power shall be 208/230 volts, 1 phase, 60 Hertz.
 - b. The unit shall be capable of satisfactory operation within voltage limits of 187-228 (208V/60Hz) or 207-253 (230/60Hz).
 - c. Refer to the equipment schedules for additional requirements.
 - d. The BC Controller shall be controlled by integral microprocessor.
 - e. The control circuit between the indoor units and outdoor units shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total.

2.4 WALL MOUNTED INDOOR UNIT

A. General

1. The wall-mounted indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor.
2. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, and a test run switch.
3. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

B. Unit Cabinet

1. All casings, regardless of model size, shall have the same white finish
2. Multi directional drain and refrigerant piping offering four (4) directions for refrigerant piping and two (2) directions for draining are required
3. There shall be a separate back plate which secures the unit firmly to the wall.

C. Fan

1. The indoor fan shall be statically and dynamically balanced to run on a single motor with permanently lubricated bearings.
2. A manual adjustable guide vane shall be provided with the ability to change the airflow from side to side (left to right).

3. A motorized air sweep louver shall provide an automatic change in airflow by directing the air up and down to provide uniform air distribution.

D. Filter

1. Return air shall be filtered by means of an easily removable, washable filter.

E. Coil

1. Basis of design indoor units include factory-installed LEV / EEV. Alternative brands which require field-installed, accessory LEV or EEV kits are permissible only with written Engineer and Architect approval for the location of kits being submitted two weeks prior to bid date. EEV kits mounted in cavities inside fire-rated interior walls shall be mounted inside three hour fire rated enclosures with access panels supplied by the manufacturer. Enclosure type and placement require prior approval.
2. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy
3. The coils shall be pressure tested at the factory.

F. Electrical

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

G. Controls

1. The unit shall include an IR receiver for wireless remote control flexibility
2. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode. Disabling of compensation shall be possible for individual units to accommodate instances when compensation is not required.
3. Indoor unit shall include no less than four (4) digital inputs capable of being used for customizable control strategies.
4. Indoor unit shall include no less than three (3) digital outputs capable of being used for customizable control strategies.

2.5 4 – WAY CEILING RECESSED CASSETTE WITH GRILLE INDOOR UNIT

A. General

1. The ceiling-recessed indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor.

2. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function, a test run switch, and the ability to adjust airflow patterns for different ceiling heights.
3. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory. The unit shall be suitable for use in plenums in accordance with UL1995 ed 4.

B. Unit Cabinet

1. The cabinet panel shall have provisions for a field installed filtered outside air intake.
2. Branch ducting shall be allowed from cabinet.
3. Four-way grille shall be fixed to bottom of cabinet allowing two, three or four-way blow.
4. The grille vane angles shall be individually adjustable from a wired remote controller to customize the airflow pattern for the conditioned space

C. Fan

1. The indoor fan shall be an assembly with a statically and dynamically balanced turbo fan direct driven by a single motor with permanently lubricated bearings.
2. The indoor unit shall include an AUTO fan setting capable of maximizing energy efficiency by adjusting the fan speed based on the difference between controller set-point and space temperature. The indoor fan shall be capable of five (5) speed settings, Low, Mid1, Mid2, High and Auto.
3. The indoor unit shall have an adjustable air outlet system offering 4-way airflow, 3-way airflow, or 2-way airflow.
4. The indoor unit fan logic must include multiple setting that can be changed to provide optimum airflow based on ceiling height and number of outlets used.
5. The indoor unit vanes shall have 5 fixed positions and a swing feature that shall be capable of automatically swinging the vanes up and down for uniform air distribution.
6. The vanes shall have an Auto-Wave selectable option in the heating mode that shall randomly cycle the vanes up and down to evenly heat the space.
7. Grille shall include a factory-installed "i-see" sensor, or equal, to work in conjunction with indoor unit control sequence to prevent unnecessary cooling or heating in unoccupied areas of the zone without decreasing comfort levels. Sensor must detect occupancy (not simply motion) and location of occupants by measuring size & temperature of objects within a 39' detecting diameter (based on 8.8ft mounting height) with 1,856 or more measuring points.

D. Filter

1. Return air shall be filtered by means of a long-life washable filter

E. Coil

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.
2. The coils shall be pressure tested at the factory.
3. The unit shall be provided with an integral condensate lift mechanism that will be able to raise drain water 33 inches above the condensate pan.

F. Electrical

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

G. Controls

1. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode. Disabling of compensation shall be possible for individual units to accommodate instances when compensation is not required.
2. Indoor unit shall include no less than four (4) digital inputs capable of being used for customizable control strategies.
3. Indoor unit shall include no less than three (3) digital outputs capable of being used for customizable control strategies.
4. A factory-installed drain pan sensor shall provide protection against drain pan overflow by sensing a high condensate level in the drain pan. Should this occur the control shuts down the indoor unit before an overflow can occur. A thermistor error code will be produced should the sensor activate indicating a fault which must be resolved before the unit re-starts.

2.6 4 – WAY CEILING RECESSED CASSETTE WITH GRILLE INDOOR UNIT (2 X 2 CEILING GRID MODEL)

A. General

1. The indoor unit shall be a four-way cassette style indoor unit that recesses into the ceiling with a ceiling grille. The indoor unit shall be factory assembled, wired and run tested.
2. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor.
3. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function and a test run switch.
4. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory. The unit shall be suitable for use in plenums in accordance with UL1995 ed 4.

B. Unit Cabinet

1. The cabinet shall be a compact 22-7/16" wide x 22-7/16" deep so it will fit within a standard 24" square suspended ceiling grid.
2. The cabinet panel shall have provisions for a field installed filtered outside air intake.
3. Four-way grille shall be fixed to bottom of cabinet allowing two, three or four-way blow.

C. Fan

1. The indoor fan shall be an assembly with a turbo fan direct driven by a single motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor unit shall include an AUTO fan setting capable of maximizing energy efficiency by adjusting the fan speed based on the difference between controller set-point and space temperature. The indoor fan shall be capable of five (4) speed settings, Low, Mid, High and Auto.
4. The indoor unit shall have an adjustable air outlet system offering 4-way airflow, 3-way airflow, or 2-way airflow.
5. The auto air swing vanes shall be capable of automatically swinging up and down for uniform air distribution.
6. Grille shall include a factory-installed "i-see" sensor, or equal, to work in conjunction with indoor unit control sequence to prevent unnecessary cooling or heating in unoccupied areas of the zone without decreasing comfort levels. Sensor must detect occupancy (not simply motion) and location of occupants by measuring size & temperature of objects within a 39' detecting diameter (based on 8.8ft mounting height) with 1,856 or more measuring points.

D. Filter

1. Return air shall be filtered by means of a long-life washable filter.

E. Coil

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.
2. The coils shall be pressure tested at the factory.
3. The unit shall be provided with an integral condensate lift mechanism that will be able to raise drain water 19-3/4" inches above the condensate pan.

F. Electrical

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

G. Controls

1. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode. Disabling of compensation shall be possible for individual units to accommodate instances when compensation is not required.
2. Control board shall include contacts for control of external heat source. External heat may be energized as second stage with 1.8°F – 9.0°F adjustable deadband from set point.
3. Indoor unit shall include no less than three (3) digital outputs capable of being used for customizable control strategies
4. A factory-installed drain pan sensor shall provide protection against drain pan overflow by sensing a high condensate level in the drain pan. Should this occur the control shuts down the indoor unit before an overflow can occur. A thermistor error code will be produced should the sensor activate indicating a fault which must be resolved before the unit re-starts

2.7 CONCEALED HORIZONTAL DUCTED INDOOR UNIT

A. General

1. The ceiling-concealed ducted indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor.
2. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, and an auto restart function.
3. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory. The unit shall be suitable for use in plenums in accordance with UL1995 ed 4.

B. Unit Cabinet

1. The unit shall be ceiling-concealed, ducted—with a 2-position, field adjustable return and a fixed horizontal discharge supply.
2. The cabinet panel shall have provisions for a field installed filtered outside air intake.

C. Fan

1. Indoor unit shall feature multiple external static pressure settings ranging from 0.3 to 1.0 in. WG. Refer to the equipment schedules for specific unit requirements.
2. The indoor unit fan shall be an assembly with statically and dynamically balanced fan(s) direct driven by a single motor with permanently lubricated bearings.
3. The indoor fan shall consist of three (3) speeds, High, Mid, and Low plus the Auto-Fan function

D. Filter

1. Filter boxes shall be provided and installed by the contractor to allow for the appropriate size and access for the space allowed.
2. Filter boxes shall be included by the manufacturer to allow for the appropriate size and access for the space allowed.
3. Return filter boxes (rear or bottom placement) with filter efficiency as noted on equipment schedule.
4. Filter access doors shall be gasketed and hinged.
5. Filter area shall be greater than or equal to the return air connection to the unit and use readily accessible filter sizes. Maximum filter velocity shall be less than 500 fpm.

E. Coil

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.
2. The coils shall be pressure tested at the factory.
3. Coil shall be provided with a sloped drain pan. Units without sloped drain pans which must be installed cockeyed to ensure proper drainage are not allowed.
4. The unit shall be provided with an integral condensate lift mechanism able to raise drain water 27 inches above the condensate pan.

F. Electrical

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

G. Controls

1. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode. Disabling of compensation shall be possible for individual units to accommodate instances when compensation is not required
2. Indoor unit shall include no less than three (3) digital outputs capable of being used for customizable control strategies
3. Control board shall include contacts for control of external heat source. External heat may be energized as second stage with 1.8 degree F deadband from set point.

2.8 VERTICAL/HORIZONTAL DUCTED INDOOR UNIT

A. General

1. The multi-position indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor.
2. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, and an auto restart function.
3. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.
4. The unit shall be suitable for use in air handling spaces in accordance with Section 18.2 of UL 1995 4th Edition, be tested in accordance with ANSI/ASHRAE 193 and have less than 2% air leakage at maximum airflow setting.

B. Unit Cabinet

1. The cabinet shall include a fixed bottom return, a fixed vertical discharge supply and be pre-painted, pre-insulated, 22 gauge galvanized steel.

C. Fan

1. The indoor unit fan shall be an assembly with a single, statically and dynamically balanced direct drive fan with a high efficiency DC motor with permanently lubricated bearings.
2. The fan shall have 3-speeds with the capability to operate between 0.3 - 0.8 In.WG selectable.

D. Filter

1. Filter boxes shall be provided and installed by the contractor to allow for the appropriate size and access for the space allowed.
2. Filter boxes shall be included by the manufacturer to allow for the appropriate size and access for the space allowed.
3. Return filter boxes (rear or bottom placement) with filter efficiency as noted on equipment schedule.
4. Filter access doors shall be gasketed and hinged.
5. Filter area shall be greater than or equal to the return air connection to the unit and use readily accessible filter sizes. Maximum filter velocity shall be less than 500 fpm.

E. Coil

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.
2. The coils shall be pressure tested at the factory.

F. Electrical

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

G. Controls

1. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode. Disabling of compensation shall be possible for individual units to accommodate instances when compensation is not required
2. Indoor unit shall include no less than three (3) digital outputs capable of being used for customizable control strategies
3. Control board shall include contacts for control of external heat source. External heat may be energized as second stage with 1.8 degree F deadband from set point.

2.9 SYSTEM CONTROL

A. Overview

1. The control system shall consist of a low voltage communication network and a web-based interface.
2. The controls system shall gather data and generate web pages accessible through a conventional web browser on each PC connected to the network. Operators shall be able to perform all normal operator functions through the web browser interface.
3. Furnish energy conservation features such as optimal start, request-based logic, and demand level adjustment of overall system capacity as specified in the sequence.
4. System shall be capable of remote alarm annunciation.
5. The VRF control systems shall be capable of interfacing with a building automation system using a BACNET protocol. Coordinate with the temperature controls contractor with the preferred protocol and provide any necessary components to allow for seamless integration.

B. Electrical Characteristics

1. General
 - a. Controller power and communications shall be via a common non-polar communications bus and shall operate at 30VDC.
2. Wiring:
 - a. Control wiring shall be installed in a daisy chain configuration from indoor unit to indoor unit, to the BC controller (main and subs, if applicable) and to the outdoor unit. Control wiring to remote controllers shall be run from the indoor unit terminal block to the controller associated with that unit.

- b. Control wiring for centralized controllers shall be installed in a daisy chain configuration from outdoor unit to outdoor unit, to the system controllers (centralized controllers and/or integrated web based interface), to the power supply.
 - 3. Wiring type
 - a. Wiring shall be 2-conductor, twisted, stranded, shielded wire as defined by the Diamond System Builder output.
 - b. Network wiring shall be CAT-5 with RJ-45 connection.
- C. Controls Network
 - 1. The Controls Network consists of remote controllers, centralized controllers, and/or integrated web-based interface communicating over a high-speed communication bus.
 - 2. The network shall support operation monitoring, scheduling, occupancy, error email distribution, personal web browsers, tenant billing, online maintenance support, and integration with Building Management Systems (BMS) using either LonWorks® or BACnet® interfaces.
- D. Graphical User Interface
 - 1. A Graphical User Interface (GUI) shall be included with each master and sub-panel.
 - 2. The GUI shall be capable of operating all the units included with this system.
- E. System Functionality
 - 1. The system software shall be capable of the following functions:

Controller Operation Capabilities			
Item	Description	Operation	Display
ON/OFF	Run and stop operation.	Each Block, Group or Collective	Each Group or Collective
Operation Mode	<ul style="list-style-type: none"> • Switches between Cool/Dry/Auto/Fan/Heat. • Switches Ventilation Unit between; automatic ventilation/vent-heat/interchange/normal ventilation • Operation modes vary depending on the air conditioner unit. 	Each Block, Group or Collective	Each Group
Temperature Setting	Sets the temperature from 57°F – 87°F depending on operation mode and indoor unit.	Each Block, Group or Collective	Each Group
Fan Speed Setting	Available fan speed settings depending on indoor unit.	Each Block, Group or Collective	Each Group
Air Flow Direction Setting	Air flow direction settings vary depending on the indoor unit model.	Each Block, Group or Collective	Each Group

Schedule Operation	<ul style="list-style-type: none"> Annual/weekly/today schedule can be set for each group of air conditioning units. Optimized start setting is also available. The system follows either the current day, annual schedule, or weekly, which are in the descending order of overriding priority. Twenty-four events can be scheduled per day, including ON/OFF, Mode, Temperature Setting, Air Direction, Fan Speed and Operation Prohibition. Five types of weekly schedule (seasonal) can be set. Settable items depend on the functions that a given air conditioning unit supports. 	Each Block, Group or Collective	Each Group
Optimized Start	Unit starts 5 - 60 minutes before the scheduled time based on the operation data history in order to reach the scheduled temperature at the scheduled time.	Each Block, Group or Collective	Each Block, Group or Collective
Night Setback Setting	The function helps keep the indoor temperature in the temperature range while the units are stopped and during the time this function is effective.	Each Group	Each Group
Permit / Prohibit Local Operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). Centrally Controlled is displayed on the remote controller for prohibited functions.	Each Block, Group or Collective	Each Group
Room Temp	Displays the room temperature of the group. Space temperature displayed on the indoor unit icon on the touch screen interface.	N/A	Each Group
Error	<p>When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed.</p> <p>When an error occurs, the LED flashes. The operation monitor screen shows the abnormal unit by flashing it. The error monitor screen shows the abnormal unit address, error code and source of detection. The error log monitor screen shows the time and date, the abnormal unit address, error code and source of detection</p>	N/A	Each Unit or Collective
Outdoor Unit Status	Compressor capacity percentage and system pressure (high and low) pressure	Each ODU	Each ODU
Connected Unit Information	Addresses of all connected systems	Each IDU, ODU and BC	Each IDU, ODU and BC

<p>Ventilation Equipment</p>	<ul style="list-style-type: none"> • This interlocked system settings can be performed by the master system controller. • When setting the interlocked system, use the ventilation switch. • When setting a group of ventilation units, you can switch between “Normal ventilation”, “Interchange ventilation” and “Automatic ventilation”. 	<p>Each Group</p>	<p>Each Group</p>
<p>External Input / Output</p>	<p>By using accessory cables you can set and monitor the following:</p> <ul style="list-style-type: none"> • Input <ul style="list-style-type: none"> ○ By level: “Batch start/stop”, “Batch emergency stop” ○ By pulse: “batch start/stop”, “Enable/disable remote controller” • Output: “start/stop”, “error/Normal” 	<p>Collective</p>	<p>Collective</p>

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all piping, fittings, and insulation to meet manufacturer’s requirements. Install units level and plumb. Evaporator-fan components shall be installed using manufacturer's standard mounting devices securely fastened to building structure. Install and connect refrigerant tubing and fittings.
- B. Installer shall supply isolation ball valves for zoned refrigerant isolation.

3.2 STARTUP SERVICE

- A. Engage manufacturer or factory-authorized service representative to perform startup service. Manufacturer shall provide on-site startup and commissioning assistance through job completion. Complete installation and startup checks according to manufacturer's written instructions.

3.3 DEMONSTRATION

- A. Engage manufacturer or factory-authorized service representative to train owner's maintenance personnel to adjust, operate and maintain units.

3.4 QUALITY ASSURANCE

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field assembled components and equipment installation, including connections, and to assist in field testing.
- B. Installer shall perform the following field tests and inspections and prepare test reports:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 238130

SECTION 238200 – TERMINAL HEATING EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all work required to provide and install the following Terminal Heating Devices indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment Included in This Section
 - 1. Electric Terminal Heat
 - a. Unit Heaters
 - b. Cabinet Unit Heaters

1.2 SUBMITTALS

- A. Product Data: Catalog cuts, specifications, installation and maintenance instructions for each type of heater specified.
- B. Schedule: List manufacturer, unit type, model number, and performance data for each unit heater.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements: Heaters shall be UL listed.
- B. Certification: Affidavit from finned tube radiation manufacturer certifying that element has been tested in accordance with the requirements of IBR Testing and Rating Standard for finned tube radiation.

1.4 MAINTENANCE

- A. Special Tools: One (1) tool for each type and size vandal resistant fastener.

PART 2 - PRODUCTS

2.1 CONFIGURATION AND PERFORMANCE

- A. Refer to the equipment schedules for additional configuration and performance requirements.

2.2 ELECTRIC TERMINAL HEAT

- A. Electric Unit Heaters
 - 1. Acceptable Manufacturers
 - a. Berko
 - b. Indeeco

- c. King Electric
 - d. Markel
 - e. Q-Mark
 - f. Raywall
 - g. Redd-I
 - h. Trane
 - i. TPI Corp
2. Unit Casing: Constructed of steel sheet formed, reinforced, and braced for rigidity, with steel louvers or deflectors with sufficient rigidity to prevent vibration at all fan speeds.
- a. Materials:
 - 1) Galvanized Steel Sheet: ASTM A 653, coating designation G90.
 - 2) Cold-Rolled Steel Sheet: ASTM A 366, cleaned, degreased and phosphatized.
 - b. Factory Finish: Minimum two (2) coat baked enamel finish on exposed surfaces, color as directed.
3. Provide with discharge nozzle for units to throw air from the specified mounting height to the floor or as specified on the drawings. At a minimum, units shall include the following:
- a. Horizontal Delivery Units: Adjustable horizontal and vertical louvers.
 - b. Vertical Delivery Units: Louvered deflector mounted outside fan orifice.
4. Provide all necessary mounting hardware to support the heater.
5. Electric-Resistance Heating Elements: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in steel or corrosion-resistant metallic sheath with fins no closer than 0.16 inch. Element ends shall be enclosed in terminal box. Fin surface temperature shall not exceed 550° F at any point during normal operation.
6. Circuit Protection: One (1)-time fuses in terminal box for overcurrent protection and limit controls for high-temperature protection of heaters.
7. Wiring Terminations: Stainless-steel or corrosion-resistant material.
8. Fan Assembly (Refer to schedule for fan type)
- a. Fan (Propeller): Multiple blade propeller type, statically and dynamically balanced, and directly connected to electric motor.
 - b. Fan (Blower): Double width, double inlet (DWDI), forward curved, belt driven, assembly with spider ball bearings.
9. Motor: Single phase, totally enclosed electric motor of the permanent split capacitor or shaded pole type, with resilient mounting, terminal box for wiring connections, built-in overload protection, and ball or sleeve bearings with oilers, or permanently lubricated bearings.
10. Refer to schedule for control type and electrical requirements for the unit.
- B. Electric Cabinet Unit Heaters
- 1. Acceptable Manufacturers
 - a. Berko
 - b. Indeeco

- c. King Electric
 - d. Markel
 - e. Q-Mark
 - f. Raywall
 - g. Redd-I
 - h. Stelpro
 - i. Trane
 - j. TPI Corp
2. Unit Casing: Constructed of steel sheet formed, reinforced and braced for rigidity, with stamped grilles.
- a. Materials:
 - 1) Galvanized Steel Sheet: ASTM A 653, coating designation G90.
 - 2) Cold-Rolled Steel Sheet: ASTM A 366, cleaned, degreased and phosphatized.
 - b. Factory Finish: Minimum two (2) coat baked enamel finish on exposed surfaces, color as directed.
 - c. Insulation: Insulate interior surfaces of casing panels with 1/2 inch glass fiber meeting NFPA 90A requirements.
 - d. Vertical Units: Minimum 18 gauge construction with removable front panel.
 - e. Horizontal Units: Minimum 18 gauge construction with hinged bottom panel.
3. Electric-Resistance Heating Elements: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in steel or corrosion-resistant metallic sheath with fins no closer than 0.16 inch. Element ends shall be enclosed in terminal box. Fin surface temperature shall not exceed 550° F at any point during normal operation.
- a. Circuit Protection: One (1)-time fuses in terminal box for overcurrent protection and limit controls for high-temperature protection of heaters.
 - b. Wiring Terminations: Stainless-steel or corrosion-resistant material.
4. Fan Assembly: Blow thru design.
- a. Fans: Forward curved centrifugal type, double width, statically and dynamically balanced, and directly connected to electric motor.
5. Motors: Three (3) speed, single phase electric motors of the permanent split capacitor or shaded pole type, with resilient mounting, built-in overload protection with automatic reset, and ball or sleeve bearings with accessible oilers, or permanently lubricated bearings.
6. Filter Section: Built-in filter frame mounted at air inlet with disposable air filters.
- a. Vertical Units: Filters removable without removing front panel for cabinet type units.
 - b. Horizontal Units: Filters removed by pivoting hinged bottom panel.
7. Refer to schedule for cabinet style, control type and electrical requirements for the unit.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install the Work of this section in accordance with the manufacturer's printed installation instructions, unless otherwise specified.

END OF SECTION 238200

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SECTION 260500 – COMMON WORK RESULTS

PART 1 - GENERAL

1.1 SCOPE

- A. The work under this section includes basic electrical requirements, which are applicable to all Division 26, 27 and 28 sections.
- B. Overview of Work
 - 1. Demolition/Relocation/Modification
 - 2. Power Distribution
 - 3. Branch Power
 - 4. Equipment Connections
 - 5. Lighting and Lighting Controls
 - 6. Low Voltage Systems (such as: fire alarm, etc.)
 - 7. Technology cabling systems
 - 8. Audio/Visual Systems
 - 9. Security, Access Control, and CCTV
 - 10. Commissioning
- C. In these documents, "Contractor" refers to the Electrical Contractor and all their subcontractors, unless listed otherwise. The division of Work with the electrical scope is the responsibility of the General Contractor/.
- D. The Contractor is responsible for providing and installing fully functional systems.
- E. If the Work is shown on the drawings or noted in the specifications, it shall be included by the Contractor.
- F. If equipment is provided by the Contractor, it shall be installed by the Contractor, unless noted otherwise.
- G. Drawings are necessarily diagrammatic by their nature and are not intended to show every connection in detail or every conduit in its exact location. Carefully investigate structural and finish conditions and coordinate the separate trades in order to avoid interference between the various phases of Work. Organize and lay out Work so that it will be concealed in furred chases and suspended ceilings, etc., in finished portions of the building, unless specifically noted to be exposed. Install all Work parallel or perpendicular to building lines unless otherwise noted.
- H. The intent of the Drawings is to establish the types of systems and functions; not to set forth each item essential to the functioning of the system. Install the Work complete, including minor details necessary to perform the function indicated. Review pertinent Drawings and adjust the Work to

conditions shown. Where discrepancies occur between Drawings, Specifications, and actual field conditions, immediately notify the Architect and Engineer for interpretations.

- I. All sizes as given are minimum except as noted.
- J. Materials shall be new (unless noted or stated otherwise), first class, and workmanlike, and shall be subject at all times to the Architect's, Engineer's, and Owner's observations from the commencement until the acceptance of the completed work.

1.2 RELATED WORK

- A. Applicable provisions of Division 0 and Division 1 govern work under this Section.

1.3 REFERENCES

- A. All work shall conform to the most current version of all applicable codes and standards or the version adopted by the jurisdiction.

- B. Codes

- 1. International Building Code
- 2. International Fire Protection Code
- 3. International Energy Conservation Code
- 4. NFPA – National Fire Protection Association
 - a. NFPA 70 (National Electric Code)
 - b. NFPA 72 (National Fire Alarm and Signaling Code)
 - c. NFPA 101 (Life Safety Code)
- 5. State or City Codes for the City of Cedar Falls

- C. Standards

- 1. ANSI

- D. Governing Bodies

- 1. Owner's Insurance Company
- 2. State Fire Marshall
- 3. AHJ – Authority Having Jurisdiction
- 4. UL - Underwriters Laboratories

1.4 SUBMITTALS

- A. The review of Shop Drawings by the Engineer is for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the Plans and Specifications.

Approval of a specific item shall not include approval of an assembly of which the item is a component. The Contractor is responsible for: dimensions to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; coordination with the Work of all trades; and for performing all work in a safe and satisfactory manner.

- B. Refer to individual technical Specification sections for specific submittal requirements.
- C. Submission of Shop Drawings electronically in .PDF format is required.
- D. If hard copies of shop drawings are required for this project, coordinate the quantity with the Architect and General Contractor. Provide one (1) copy for the Engineer's records.
- E. The Engineer will review one (1) resubmittal for each product. If additional resubmittals are required, the Contractor shall be responsible to bear the cost for the Engineer to recheck and handle the additional shop drawing submittals. Documents will not be reviewed until payment is agreed upon.
- F. Contractor may request electronic AutoCAD files from the Engineer if needed to complete their Shop Drawings. An Electronic File Request Form will be sent to the contractor if files are requested and must be completed and signed before the AutoCAD files are released to the Contractor.
- G. All submittals for equipment and materials shall be reviewed and approved by the Engineer prior to the fabrication or release by the contractor. This includes the coordination of equipment between trades. The release, purchase, installation or fabrication of any items prior to the contractor receiving an approved shop drawing will be at the contractor's own risk. Any rework that results will be provided by the contractor at no cost to the Owner or design team.
- H. Submittals must be reviewed and approved by the Contractor before submitting to the Engineer.
- I. Submittals shall be grouped to include complete submittals of related systems, products, and accessories in a single submittal. Mark dimensions and values in units to match those specified. Include wiring diagrams of electrically powered equipment.

1.5 ELECTRONIC DOCUMENT RELEASE

- A. Electronic versions of the bid documents will be made available to the contractors for use during the bidding process and to help generate fabrication drawings for various systems. A summary of the requirements for the various document types is listed below:
 - 1. PDF
 - a. Contact the Architect to obtain a PDF version of the Bid Documents. No Document Release Form is required.
 - 2. REVIT
 - a. The REVIT drawings will be converted to AutoCAD and then transferred to the contractor.
 - b. Bluestone Engineering can provide an AutoCAD version of the bid documents for the contractor to use for generating shop drawings and fabrication drawings. This will include plan drawings with the architectural background. The contractor is responsible for incorporating any modifications that occur during bidding by all disciplines. Details and schedules will not be included.

- c. A document release form (see attached) will be required to be completed by the contractor to determine the version of AutoCad and drawings required.
- d. Submittal of the document release form fee will be required prior to the AutoCAD files being transmitted.

1.6 SUBSTITUTIONS

- A. All manufacturers listed as Acceptable Manufacturers in each specification section are considered equal to the basis of design. The basis of design is preferred and will take precedence. Any products from an alternate approved manufacturer need to meet the requirements and performance specified and shall be equal to the basis of design.
- B. The Contractor may request permission for a substitution of any item (equipment or material), subject to the following conditions:
 - 1. Submit substitution requests in writing to the Engineer, on a form supplied by the Engineer. A sample copy of this form is included at the end of this section. An electronic copy can also be provided to the Contractor by the Engineer.
 - 2. Where equipment or accessories are used which differ in arrangement, configuration, dimensions, ratings, or engineering parameters from those indicated on the contractor documents, the Contractor is responsible for all costs involved in integrating the equipment or accessories into the system and the assigned space and for obtaining the performance from the system into which these items are placed as well as any re-design costs incurred by the Architect or Engineer. The Contractor is also responsible for coordinating changes required by other trades.
 - 3. Any requests for alternate manufacturers must be submitted to the Architect/Engineer at least ten (10) days prior to bid day. Incomplete substitution requests will not be considered.
- C. Approval
 - 1. No work involving requests for substitution shall commence without written approval on the provided form by the Engineer.
 - 2. Any work started or material ordered/installed by the Contractor without written approval shall be removed/repared at the sole expense of the contractor. The Contractor will also be responsible for any costs incurred by the Owner for such rework.

1.7 QUALITY ASSURANCE

- A. Warranty
 - 1. Equipment warranty shall be a minimum of one (1) year from date of factory supervised startup or from the date of substantial completion, whichever is later.
 - 2. Contractor shall warranty all of their work for one (1) year from the date of substantial completion
- B. These documents are diagrammatical in nature and intended to convey scope and general arrangement of the electrical and technology systems. Not all conduits, junction boxes, accessories, etc. are shown on Plan. If items are required to make a system fully operational but not shown on Plan or in these Specifications, they shall be included by the Contractor.

- C. The intent of the Drawings is to establish the types of systems and functions; not to set forth each item essential to the functioning of the system. Install the Work complete, including minor details necessary to perform the function indicated. Review pertinent Drawings and adjust the Work to conditions shown. Where discrepancies occur between Drawings, Specifications, and actual field conditions, immediately notify the Architect and Engineer for interpretations.
- D. It is the contractor's responsibility to determine all utility routing prior to purchase and installation of material.
- E. For remodel or addition projects, the contractor shall visit and survey the site prior to submitting a bid. The contractor shall visit the site to understand the complexity of utility routing, phasing, staging, and all general installation. Submitting a bid means the contractor acknowledges the complexities of the project and has made provisions for overcoming these complexities in their bid.
- F. The Contractor shall report any discrepancies between these documents and site conditions immediately to the Engineer prior to submitting a bid or starting work. Submittal of a bid indicates that the contractor and the contractor's subcontractors have carefully and thoroughly reviewed the Drawings, Specifications, and other construction documents and have found them complete and free from ambiguities and sufficient for the purposes intended.
- G. Install all equipment per the manufacturer's requirements / recommendations.
- H. No equipment provided or installed shall contain mercury.
- I. Manufacturer / Supplier Inspection & Startup
 - 1. The following equipment shall have a factory representative perform start-up. The procedure shall be documented and submitted to the design team and Owner. Include copies of startup reports in the Operations & Maintenance Manuals.
 - a. Lighting Control Systems, including occupancy sensor controls
 - b. Variable Frequency Drives
- J. All equipment shall be UL listed where applicable.

1.8 CONTINUITY OF EXISTING SERVICES AND SYSTEMS

- A. No outages shall be permitted on existing systems except at the time and during the interval specified by the Engineer and the Owner. Any outage must be scheduled when the interruption causes the least interference with normal work schedules and business routines. No extra costs will be paid to the Contractor for such outages which must occur outside of regular weekly working hours unless specifically noted in the Specifications or in the bidding requirements.
- B. This Contractor shall restore any electrical services interrupted as a result of a lack of coordination to proper operation as soon as possible.
- C. Contractor shall notify Owner of any utility service shutdown forty-eight (48) hours in advance. This includes power, telephone, cable TV, and other utilities related to this Contractor's scope of work.

1.9 REGULATORY AND UTILITY REQUIREMENTS

- A. Contractor is responsible for coordinating all required site inspections by authorities having jurisdiction. Contractor shall notify General Contractor of all scheduled inspections seven (7) working days prior to site visit.
- B. Contractor is responsible for paying for all fees, permits, and inspections that are required to complete their work.

1.10 PROTECTION OF FINISHED SURFACES

- A. Furnish one (1) can of touch-up paint for each different color factory finish for equipment furnished by the Contractor. Deliver touch-up paint with other "loose and detachable parts" as covered in the General Requirements.

1.11 SEALING AND FIRESTOPPING

- A. Sealing and firestopping of sleeves/openings between conduits, cable trays, wireways, troughs, cablebus, busduct, etc. and the structural or partition opening shall be the responsibility of the General Contractor. The contractor responsible shall hire individuals skilled in such work to do the sealing and firestopping. These individuals hired shall normally and routinely be employed in the sealing and fireproofing occupation.

1.12 WORK BY OWNER AND/OR OWNER AGENCY

- A. Asbestos abatement and PCB equipment (other than light fixture ballasts) removal and disposal, if required, will be by the Owner under separate contract.
- B. Electrical testing not described in these contract documents will be by the Owner under separate contract(s).

1.13 OMISSIONS

- A. No later than ten (10) days before bid opening, the Contractor shall call the attention of the Architect and Engineer to any materials or apparatus the Contractor believes to be inadequate and to any necessary items of work omitted.

1.14 DELIVERY, STORAGE, AND HANDLING

- A. All equipment and materials shall be protected during shipment and storage against physical damage, vermin, dirt, corrosive substances, fumes, moisture, cold and rain.
- B. Store equipment indoors in clean dry space with uniform temperature to prevent condensation. Equipment shall include but not be limited to switchgear, switchboards, panelboards, transformers, motor control centers, motor controllers, uninterruptible power systems, enclosures, controllers, circuit protective devices, cables, wire, light fixtures, electronic equipment, and accessories.
- C. During installation, equipment shall be protected against entry of foreign matter; and be vacuum-cleaned both inside and outside before testing and operating. Compressed air shall not be used to clean equipment. Remove loose packing and flammable materials from inside equipment.

- D. Take such precautions as are necessary to protect apparatus and materials from damage. Damaged equipment shall be, as determined by the Owner and/or Engineer, placed in first class operating condition or be returned to the source of supply for repair or replacement.
- E. Protect factory finish from damage during construction operations until acceptance of the Project. Restore any finishes that become stained or damaged to Owner's satisfaction.

1.15 DIVISION OF WORK AND COORDINATION

- A. The Electrical Contractor is responsible for providing and installing power wiring up to equipment provided by others for a single point connection. Internal wiring of equipment provided by others shall be the responsibility of the manufacturer or the contractor responsible for providing and installing the equipment.
- B. Controls, disconnect switches, starters, variable frequency drives, etc. shall be provided and installed by the contractor noted on the plans and in the specifications. It is the responsibility of the Contractor to request written clarification for any ambiguity regarding division of work and coordination at least ten (10) days prior to bid.
- C. See Section 230900 for scope of wiring required for Temperature Control systems.
- D. Utilities routed within the building shall be installed in an orderly manner. All work will be coordinated with other disciplines prior to installation. The following list ranks the priority of the utilities to be installed:
 - 1. Light fixtures
 - 2. Gravity piping
 - 3. Electrical busduct
 - 4. Ductwork
 - 5. Cable tray
 - 6. All other piping
 - 7. Electrical conduits
- E. Any installed work that is not coordinated and that interferes with other contractor's work shall be removed or relocated at the installing contractor's expense.
- F. Coordinate work with the Testing and Balancing (TAB) Contractor. Verify system completion to the TAB Contractor such as fire/smoke damper integration ready for testing, power provided to control panels and control devices as specified, and power provided to all equipment and dampers that are required to operate for testing and balancing. Assist the TAB Contractor as needed to complete their work.
- G. Arrange for conduit and raceway spaces, chases, slots, and openings in building structure during progress of construction, to allow for electrical installations.
- H. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

- I. Coordinate requirements for access panels and doors for electrical items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

1.16 SALVAGE MATERIALS

- A. No materials removed from this project shall be reused except as specifically noted or allowed on the Drawings. All materials removed shall become the property of, and shall be disposed of by, the Contractor except for items the Owner has designated they will keep.

1.17 OPERATION AND MAINTENANCE DATA

- A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.
- B. In addition to the general content specified under GENERAL REQUIREMENTS supply the following additional documentation as applicable:
 - 1. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment.
 - 2. A control sequence describing start-up, operation, and shutdown.
 - 3. Description of the function of each principal item of equipment.
 - 4. Installation instructions.
 - 5. Safety precautions for operation and maintenance.
 - 6. Diagrams and illustrations.
 - 7. Periodic maintenance and testing procedures and frequencies, including replacement parts numbers and replacement frequencies.
 - 8. Performance data.
 - 9. Where applicable, pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts, and name of servicing organization.
 - 10. List of factory approved or qualified permanent servicing organizations for equipment repair and periodic testing and maintenance, including addresses and factory certification qualifications.

1.18 RECORD DRAWINGS

- A. The Contractor shall maintain at least one (1) copy each of the Specifications and Drawings on the job site at all times.
- B. The Architect will provide the Contractor with a suitable set of Contract Drawings on which daily records of changes and deviations from contract shall be recorded. Dimensions and elevations on the record drawings shall locate all buried or concealed piping, conduit, or similar items.

- C. The daily record of changes shall be the responsibility of Contractor's field superintendent. No arbitrary mark-ups will be permitted.
- D. At completion of the project, the Contractor shall submit the marked-up record drawings to the General Contractor prior to final payment.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Equipment and control systems should match, integrate, communicate or cooperate with Owner's existing systems, such as power monitoring systems, building automation, fire alarm, motor control centers, switchboards, breakers, transformers, and lighting dimming systems.
- B. Conditions: Provide new products of manufacturers regularly engaged in production of such equipment. Provide the manufacturer's latest standard design for the type of product specified.
- C. Space Limitations: Equipment selected shall conform to the building features and shall be coordinated with all components. Do not provide equipment that will not meet arrangement and space limitations.
- D. Common Source: Equipment specified in 262416 Panelboards, 262728 Disconnect Switches, 262730 Contactors, 262900 Motor Controllers shall be provided by the same manufacturer.

2.2 ACCESS PANELS AND DOORS

- A. Provide access panels and/or doors where required to maintain access to the electrical installation and where noted on the Drawings.
- B. Lay-in Ceilings
 - 1. Removable lay-in ceiling tiles in 2 x 2 foot or 2 x 4 foot configuration provided under other divisions are sufficient; no additional access provisions are required unless specifically indicated.
- C. Concealed Spline Ceilings
 - 1. Removable sections of ceiling tile held in position with metal slats or tabs compatible with the ceiling system used will be provided under other divisions.
- D. Metal Pan Ceilings
 - 1. Removable sections of ceiling tile held in position by pressure fit will be provided under other divisions.
- E. Plaster/Gypsum Walls and Ceilings
 - 1. 16 gauge frame with not less than a 20 gauge hinged door panel, prime coated steel for general applications, stainless steel for use in toilets, showers and similar wet areas, concealed hinges, screwdriver operated cam latch for general application, key lock for use in public areas, UL listed for use in fire rated partitions if required by the application. Use the largest size access opening possible, consistent with the space and the equipment needing service; minimum size is 12" by 12".

2.3 IDENTIFICATION

- A. See Electrical Section 260553 – Identification.

2.4 SEALING AND FIRESTOPPING

- A. Fire and/or Smoke Rated Penetrations

- 1. Manufacturers

- a. 3M, STI/SpecSeal, Tremco, Hilti or approved equal.

- 2. All firestopping systems shall be by the same manufacturer.

- 3. Submittals

- a. Contractor shall submit product data for each firestop system. Submittals shall include product characteristics, performance and limitation criteria, test data, MSDS sheets, installation details and procedures for each method of installation applicable to this project. For non-standard conditions where no UL tested system exists, submit manufacturer's drawings for UL system with known performance for which an engineering judgement can be based upon.

- 4. Product

- a. Firestop systems shall be UL listed or tested by an independent testing laboratory approved by the Department of Commerce.
 - b. Use a product that has a rating not less than the rating of the wall or floor being penetrated. Reference architectural drawings for identification of fire and/or smoke rated walls and floors.
 - c. Contractor shall use firestop putty, caulk sealant, intumescent wrapstrips, intumescent firestop collars, firestop mortar or a combination of these products to provide a UL listed system for each application required for this project. Provide mineral wool backing where specified in manufacturer's application detail.

- B. Non-Rated Penetrations

- 1. Conduit Penetrations Through Below Grade Walls

- a. In exterior wall openings below grade, use a modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the uninsulated conduit and the cored opening or a water-stop type wall sleeve.

- 2. Conduit and Cable Tray Penetrations

- a. At conduit and cable tray penetrations of non-rated interior partitions, floors and exterior walls above grade, use urethane caulk in annular space between conduit and sleeve, or the core drilled opening.

PART 3 - EXECUTION**3.1 CONCRETE WORK**

- A. The Division 3 Contractor will perform all cast-in-place concrete unless noted otherwise elsewhere. Provide all layout drawings, anchor bolts, metal shapes, and/or templates required to be cast into concrete or used to form concrete for the support of electrical equipment.

3.2 CUTTING AND PATCHING

- A. Refer to Division 1, General Requirements, Cutting and Patching.

3.3 BUILDING ACCESS

- A. Arrange for the necessary openings in the building to allow for admittance of all apparatus. When the building access was not previously arranged and must be provided by this Contractor, restore any opening to its original condition after the apparatus has been brought into the building.

3.4 EQUIPMENT ACCESS

- A. Install all conduit, raceways, and accessories to permit access to equipment for maintenance. Coordinate the exact location of wall and ceiling access panels and doors with the General Contractor making sure that access is available for all equipment and specialties. Where access is required in plaster or drywall walls or ceilings, furnish the access doors to the General Contractor and reimburse the General Contractor for installation of those access doors.

3.5 COORDINATION

- A. The Contractor shall cooperate with other trades in locating work in a proper manner. Should it be necessary to raise or lower or move longitudinally any part of the electrical work to better fit the general installation, such work shall be done at no extra cost provided such decision is reached prior to actual installation. The Contractor shall check location of electrical outlets with respect to other installations before installing.
- B. The Contractor shall verify that all devices are compatible for the surfaces on which they will be used. This includes, but is not limited to light fixtures, panelboards, devices, etc. and recessed or semi-recessed heating units installed in/on architectural surfaces.
- C. Coordinate all work with other contractors prior to installation. Any installed work that is not coordinated and that interferes with other contractor's work shall be removed or relocated at the installing Contractor's expense.
- D. Coordinate clearances in front of and above electrical distribution equipment with other trades to avoid interference issues. Maintain clearances as defined in the National Electrical Code. Pipes, ducts, etc. shall not be installed above electrical distribution equipment.
- E. Coordinate exact locations of floor boxes, furniture wall feeds, and power poles with the Owners' furniture vendor.

3.6 SLEEVES

- A. Pipe sleeves for conduits 6" in diameter and smaller, in new poured concrete construction, shall be schedule 40 steel pipe, plastic removable sleeve or sheet metal sleeve, all cast in place.
- B. In wet area floor penetrations, top of sleeve to be 2 inches above the adjacent floor. In existing wet area floor penetrations, core drill sleeve openings large enough to insert schedule 40 sleeve and grout the area around the sleeve. If a pipe clamp resting on the sleeve supports the pipe penetrating the sleeve, weld a collar or struts to the sleeve that will transfer weight to the existing floor structure. Wet areas for this paragraph are rooms or spaces containing air handling unit coils, converters, pumps, chillers, boilers, and similar waterside equipment.
- C. Pipe penetrations in existing concrete floors that are not in wet areas may omit the use of schedule 40 sleeve and use the core drilled opening as the sleeve.

3.7 SEALING AND FIRESTOPPING

- A. Fire and/or Smoke Penetrations
 - 1. Install approved product in accordance with the manufacturer's instructions where a raceway (i.e. cable tray, bus, cable bus, conduit, wireway, trough, etc.) penetrates a fire rated surface.
 - 2. Where firestop mortar is used to infill large fire-rated floor openings that could be required to support weight, provide permanent structural forming. Firestop mortar alone is not adequate to support any substantial weight.
- B. Non-Rated Surfaces
 - 1. When the opening is through a non-fire rated wall, floor, ceiling or roof the opening must be sealed using an approved type of material.
 - 2. Install escutcheons or floor/ceiling plates where conduit penetrates non-fire rated surfaces in occupied spaces. Occupied spaces for this paragraph include only those rooms with finished ceilings and the penetration occurs below the ceiling.
 - 3. In exterior wall openings below grade, assemble rubber links of mechanical seal to the proper size for the conduit and tighten in place, in accordance with the manufacturer's instructions. Install so that the bolts used to tighten the seal are accessible from the interior of the building or vault.
 - 4. At interior partitions, conduit penetrations are required to be sealed for all clean rooms, laboratories, and most hospital spaces, computer rooms, dormitory rooms, telephone/data/com rooms and similar spaces where the room pressure or odor transmission must be controlled. Apply sealant to both sides of the penetration in such a manner that the annular space between the conduit sleeve and the conduit is completely filled.

3.8 HOUSEKEEPING AND CLEAN UP

- A. The Contractor shall clean up and remove from the premises, on a daily basis, all debris and rubbish resulting from its work and shall repair all damage to new and existing equipment resulting from its work. When job is complete, this Contractor shall remove all tools, excess material and equipment, etc., from the site.

3.9 TESTING

A. Test Conditions

1. Place circuits and equipment into service under normal conditions, collectively and separately, as may be necessary to determine satisfactory operation. Perform specified tests in the presence of the Owner's representative(s). Furnish all instruments, wiring, equipment and personnel required for conducting tests. Demonstrate that the equipment operates in accordance with requirements of the Contract Documents. Special tests on certain items are specified hereinafter.
2. Where specified that the testing be performed by an independent testing company, an Owner-approved National Electrical Testing Association (NETA) certified testing company shall be used. Submit copies of test reports.

3.10 OWNER TRAINING

- #### A.
- Contractor to provide factory authorized representative and/or field personnel knowledgeable with the operations, maintenance and troubleshooting of the system and/or components defined within this section for a minimum period of two (2) hours.

3.11 PROJECT CLOSEOUT REQUIREMENTS

A. Final project closeout tasks

1. Deliver all spare parts listed in each specification section. Deliver to Owner chosen location.
2. All equipment labeled per specifications.
3. All equipment cleaned and ready for use. Install new fuses in all equipment with fuses; do not use Owner's spare fuses.

B. Contractor requirements

1. Marked up drawings and specifications provided to Engineer for incorporation of as-built drawings or to serve as the as-built drawings depending on the project requirements. As-built drawings shall be clean and legible.
2. Operation and Maintenance (O & M) Manuals shall include the following:
 - a. Contractor contact for warranty work
 - b. Approved shop drawings, incorporating all review comments
 - c. Warranty copies
 - d. Equipment start-up reports
 - e. Operation and maintenance instructions
3. Utility Rebate Forms
 - a. Contractor shall submit completed energy rebate forms for each piece of equipment that is eligible for a rebate. Eligible equipment shall include, but not be limited to the following:
 - 1) Interior Lighting
 - 2) Exterior Lighting
 - 3) Occupancy Sensors

- 4) Variable Frequency Drives
 - b. Contractor to complete information regarding equipment. Submit form to Owner; Owner will complete Owner's contact information and send the completed form to the utility.

- C. Three (3) final approved O & M Manuals shall be delivered to Owner. Each manual shall be an appropriately sized three (3) ring binder with a vinyl cover and printed spine and cover labels. Each section shall have a printed divider tab. Each section shall be listed in a table of contents at the beginning of the manual.

END OF SECTION 260500

(ELECTRONIC DOCUMENT RELEASE FORM & SUBSTITUTION REQUEST FORMS ATTACHED)



Document Release Form

Information Requested:

Project Name:
Drawings Requested:

Media Type: (Check all that are applicable)

- AutoCAD DWG Files (Version _____)
- Adobe PDF Files
- REVIT Files (Version _____)
- Other

Requesting Party:

Name: _____ Address 1: _____
 Company: _____ Address 2: _____
 Signature: _____ Email Address: _____
 Date: _____ Phone #: _____

Bluestone Use:

Form Sent By: _____ Date: _____
 Bluestone Project #: _____

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SUBSTITUTION REQUEST FORM (DURING BIDDING)

We submit for your consideration the following product instead of the specified item for the following project:

PROJECT: _____

SPEC. SECTION	SPEC. TITLE	PARAGRAPH	SPECIFIED ITEM
_____	_____	_____	_____

Proposed Substitution: _____

MANUFACTURER	TRADE NAME	MODEL NO.
_____	_____	_____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including Architectural and Engineering design, detailing, and construction costs caused by the substitution.

Submitted by:

Signature _____

Firm _____

Telephone _____ Email _____ Date _____

Engineer's Review and Action

- Substitution Approved
- Substitution Approved As Noted
- Substitution Rejected
- Substitution Request Received Too Late

Signed by:

Date

Supporting Data Attached:

- Drawings
- Product Data
- Samples
- Tests
- Reports
- Other _____

SUBSTITUTION REQUEST FORM (AFTER BIDDING)

We submit for your consideration the following product instead of the specified item for the following project:

PROJECT: _____

SPEC. SECTION	SPEC. TITLE	PARAGRAPH	SPECIFIED ITEM
_____	_____	_____	_____

Proposed Substitution: _____

MANUFACTURER	TRADE NAME	MODEL NO.
_____	_____	_____

INSTALLER	PHONE NO.
_____	_____

History: New Product 2-5 years old 5-10 years old More than 10 years old

Differences between proposed substitution and specified product: _____

Proposed substitution affects other parts of Work: No Yes; explain _____

Proposed substitution changes Contract Time: No Yes [Add] [Deduct] _____ days

Savings to Owner for accepting substitution: \$ _____

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including Architectural and Engineering design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

SECTION 260502 - ELECTRICAL DEMOLITION FOR REMODELING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide the following demolition indicated by the Contract Documents with supplementary items necessary for proper installation. Refer to the demolition drawings for scope.

1.2 REFERENCES

- A. Applicable provisions of Division 1 govern work under this Section.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work as specified in the individual Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify field measurements and circuiting arrangements as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Verify whether or not PCB ballasts exist in light fixtures which will be disposed of. If PCB light fixture ballasts exist, then follow requirements in PCB BALLAST HANDLING AND DISPOSAL below.
- D. Demolition drawings are based on casual field observation and/or existing record documents. It is the responsibility of the Contractor to visit the site prior to bidding and include any necessary demolition, or relocation of items required to complete the work. Any work not included shall be clarified with the submittal of the Contractor's bid. Report discrepancies to the Architect and Engineer before disturbing existing installation.
- E. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

- A. Disconnect electrical systems in structures, walls, floors, and ceilings scheduled for removal.
- B. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations. In particular, all security and safety systems must be

maintained in operation at all times as required by the Owner. This includes security and safety lighting.

- C. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Obtain permission from the Owner and local Authority Having Jurisdiction at least 48 hours before partially or completely disabling system. Minimize outage duration. If required, make temporary connections to maintain service in areas adjacent to work area.
- D. Existing Communication/Data System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from the Owner and local Telephone Utility. If required, make temporary connections to maintain service in areas adjacent to work area.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work to meet all requirements of these Specifications.
- B. If certain raceways and boxes are abandoned but not scheduled for removal, those items must be shown on the "As Built Drawings".
- C. Remove, relocate, and extend existing installations to accommodate new construction.
- D. Remove abandoned wiring to source of supply.
- E. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- F. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
- G. Disconnect and remove abandoned panelboards and distribution equipment.
- H. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- I. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- J. Repair adjacent construction and finishes damaged during demolition and extension work.
- K. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- L. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified. This includes the extension of the circuit from the last active device to the next device in the system to be activated.

3.4 PCB BALLAST HANDLING AND DISPOSAL

- A. Generally, all high power factor fluorescent light ballasts manufactured before 1978 and some HID ballasts contain PCB compounds in their capacitors. The Contractor shall inspect all

ballasts in all light fixtures (which will become the property of the Contractor and will be removed from the project site as part of this project) and take the actions described below.

1. All ballasts labeled as "NON-PCBs" or "NO PCBs" shall become the property of the Contractor. If the PCB content is not stated on the ballast label, the ballast shall be handled as a PCB ballast.
2. All PCB ballasts shall be removed from the light fixtures and shall have the wires clipped off. However, before removal, all PCB ballasts shall be carefully inspected for leaks. If a ballast appears to be leaking (evidenced by potting compound leaking out or by an oily film on the ballast surface) the ballast must be handled per EPA and DNR PCB regulations. Basically, this means the ballast is to be carefully removed from the fixture and placed in an approved drum. See paragraph below for the drum specifications. The person removing the ballast from the fixture shall wear protective gloves, eye protection, and protective clothing as necessary.
3. If the fixture has also been contaminated, it must be cleaned to less than ten (10) micrograms/100 square centimeters contamination before disposal. This cleaning must be done by an approved PCB contractor and is not considered a part of this contract.
4. The ballasts shall then be placed in US DOT approved type 17C or type 17H drums (barrels) furnished by the Contractor. 55 gallon and 30 gallon drums are available from most drum suppliers. The quantity and size of the drums will be determined by the Contractor at the time of construction.
5. These barrels shall be placed in storage with the cover that came with the barrels, in a location within a building, as designated by the General Contractor or the Owner. The barrels are not to be placed outside where they are exposed to weather.
6. THESE BALLASTS ARE NOT TO BE REMOVED FROM THE WORK SITE BY THE CONTRACTOR. To do so, would be a violation of DNR and DOT hazardous waste regulations and may result in a fine to the Contractor.
7. The Contractor shall label and mark the PCB storage drums with EPA approved PCB labels.
8. The Contractor shall also provide approved PCB absorbent materials to be stored immediately adjacent to the drum storage area. Do not place loose absorbent material in the drums.
9. The Contractor shall provide to the General Contractor, in written form, a total count of these ballasts (or their total weight by barrel) and where they are stored.
10. When the ballast demolition is completed and all PCB ballasts are placed in drums ready to be picked up for disposal, the Owner or Owner's Agent will make arrangements for pickup and disposal of the PCB ballasts.

3.5 LAMP HANDLING AND DISPOSAL

- A. All lamps (fluorescent, incandescent, and HID) contain mercury and/or lead (in the base) as well as other heavy metals and compounds which are regulated by the EPA and DNR during the disposal process. As a result, regulations have been issued covering the handling and disposal of all lamps. Therefore, lamps which have been removed from service for disposal shall be handled as follows by the Contractor.
- B. The Contractor shall very carefully remove all lamps (fluorescent, incandescent, and HID) from light fixtures before removal of the fixture from its mounted position. This is to reduce the likelihood that the lamp(s) will be broken. If the Contractor breaks more than 1% of the total lamps removed for the project, the Contractor will be charged the cost difference between

disposal of broken lamps and disposal of unbroken lamps for all lamps broken in excess of 1% of the total lamps removed in the project.

- C. The Contractor shall obtain containers from an approved lamp and ballast recycling vendor. Removed lamps shall be placed in containers provided by the Contractor and marked with the number and type of lamps. Containers shall be placed in storage in a location on the Owner's property (this may be in another building) arranged by the Owner's representative. The Contractor shall label the area as "Hazardous Material Storage - Mercury".
- D. The Contractor shall provide to the General Contractor, in written form, a count of all stored lamps by type at the completion of the project.
- E. The Owner will make arrangements for the lamps to be picked up.

3.6 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Panelboards:
 - 1. Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
- C. Luminaires:
 - 1. Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts (if required) and broken electrical parts.

3.7 INSTALLATION

- A. Install relocated materials and equipment under the provisions of other sections.

END OF SECTION 260502

SECTION 260504 – CLEANING AND TESTING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide the required cleaning, repair, adjustment, calibration, maintenance and testing of electrical equipment, as specified herein. This applies only to new electrical and existing electrical equipment being furnished, modified, worked on or serviced by this contractor for this project.

1.2 REFERENCES

- A. Applicable provisions of Division 1 govern work under this Section.

PART 2 - PRODUCTS – (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL INSPECTION AND CLEANING OF ALL ELECTRICAL EQUIPMENT

- A. Inspect for physical damage and abnormal mechanical and electrical conditions.
- B. Any item found to be out of tolerance, or in any other way defective as a result of the required testing, shall be reported to the Engineer. Procedure for repair and/or replacement will be outlined. After appropriate corrective action is completed the item shall be re-tested.
- C. Compare equipment nameplate information with the latest single line diagram and report any discrepancies.
- D. Verify proper auxiliary device operation and indicators.
- E. Check tightness of accessible bolted electrical joints. Use torque wrench method.
- F. Make a close examination of equipment and remove any shipping brackets, insulation, packing, etc. that may not have been removed during original installation.
- G. Make a close examination of equipment and remove any dirt or other forms of debris that may have collected in existing equipment or in new equipment during installation.
- H. Clean All Equipment:
 - 1. Vacuum inside of panelboards, switchboards, switchgear, transformer core and coils, horizontal and vertical busducts, MCC's, fire alarm panels, comm/data, security panel, etc.
 - 2. Loosen attached particles and vacuum them away.
 - 3. Wipe all insulators with a clean, dry, lint free rag.

4. Clean insulator grooves.
5. Inspect equipment anchorage.
6. Inspect equipment and bus alignment.
7. Check all heater elements for operation and control.
8. Lubricate nonelectrical equipment per manufacturer's recommendations.

3.2 GROUNDING SYSTEMS

- A. Inspect the ground system for adequate termination at all devices.

3.3 INSTRUMENT TRANSFORMERS

- A. Inspect for physical damage.
- B. Inspect nameplate information for compatibility with one-line drawings.
- C. Verify the transformers' connections with the system requirements.
- D. Verify tightness of all bolted connections and assure adequate clearances exist from primary circuits to secondary circuit wiring and to grounds.
- E. Verify that all required grounding and shorting connections exist and that those connections have good contact; i.e. sufficient surface area, good cleanliness, and proper pressure.
- F. Test the proper operation of transformer withdrawal mechanism and the grounding operation when applicable.
- G. Verify proper primary and secondary fuses and required sizes.

3.4 PROTECTIVE RELAYS

- A. All relays shall be inspected for physical damage.
- B. Inspect cover gaskets and cover glass for presence of foreign material and moisture and then clean.

3.5 BATTERY SYSTEMS

- A. Inspect for physical damage and evidence of corrosion. Clean units.
- B. Measure system charging voltage and each individual cell voltage.
- C. Measure the electrolyte specific gravity and level.
- D. Verify and compare measured values with manufacturer's specifications.

3.6 MECHANICAL AND ELECTRICAL INTERLOCK SYSTEM

- A. Physically test each system to insure proper function, operation and sequencing.
- B. Closure attempt shall be made on locked open devices.
- C. Opening attempt shall be made on locked closed devices.
- D. Key exchange shall be made with devices operated in off normal positions.

3.7 GROUND FAULT SYSTEMS

- A. Inspect for physical damage.
- B. Inspect the neutral main bonding connection to assure:
 - 1. Zero sequence system is grounded upstream of sensor.
 - 2. Ground strap systems are grounded down stream from the sensing device.
 - 3. Ground connection is made ahead of the neutral disconnect link.

3.8 SWITCHBOARDS (LOW VOLTAGE)

- A. Visual and Mechanical Inspection:
 - 1. Inspect for physical, electrical and mechanical conditions. Re-torque all bolted connections.
 - 2. Compare equipment nameplate information with latest single line diagram and report discrepancies.
 - 3. Inspect for proper alignment, anchorage and grounding
 - 4. All doors, panels and sections shall be inspected for paint, dents, scratches, and fit.
 - 5. Inspect cleanliness.
 - 6. Clean switchboard enclosure using the following methods:
 - a. Loosen attached particles and vacuum them away.
 - b. Wipe all porcelain with a clean, dry, lint-free rag.
 - c. Clean all insulator grooves.
 - d. Vacuum inside of switchgear enclosure
 - e. Lubricate per manufacturer's recommendations.
- B. All active components shall be exercised and cleaned where possible.
- C. All indicating devices shall be inspected for proper operation.

3.9 CABLES

- A. Visual and Mechanical Inspections:
 - 1. Inspect exposed sections for physical damage.

2. Verify cable is supplied and connected in accordance with single line diagram.
3. Inspect for shield grounding, cable support and termination.
4. If cables are terminated through window type C.T.'s make an inspection to verify that neutrals and grounds are properly terminated for normal operation of protective devices.
5. Inspect for visual jacket and insulation condition.
6. Visible cable bends shall be checked against ICEA or manufacturer's minimum allowable bending radii -- 12 times the diameter for tape shielded cables.
7. Inspect for proper fireproofing in common cable areas.
8. There shall be NO tests performed on existing cable without specific direction from the Engineer.

B. Electrical Tests -- Below 600 Volts:

1. All secondary cables from the utility transformer(s) to the secondary switchboard(s) shall be subjected to insulation tests using a 500 vdc megger.
2. Visually inspect cables, lugs, connectors and all other components for physical damage and proper connections
3. Check all cable connectors for tightness (with a torque wrench) and clearances. Torque test conductor and bus terminations to manufacturer's recommendations.
4. Check for proper grounding resistance at all services and at transformers. Resistance shall be 5 ohms maximum.

3.10 PANELBOARDS

- A. Torque all the connections per the manufacturers spec. Verify phase wires, color coding, separate neutral and mechanical bonding. Verify circuit breaker operation. Verify the directory is typed and reflects as-built conditions.

3.11 LIGHT FIXTURES

- A. Check the bonding and proper lamping. Verify that recessed fixtures are installed with hold down clips where required. Confirm operation of the fixture with the proper switch or sensor.

3.12 OCCUPANCY SENSORS

- A. Confirm operation of the sensor per the manufacturers spec.

3.13 AUTOMATIC TRANSFER SWITCHES

- A. Coordinate with the generator and the subsequent tests.

3.14 MOTOR STARTERS AND MOTOR CONTROL CENTERS

- A. Verify the control circuits. Confirm the fusing and the grounding of the control transformers. Torque all of the connections. Confirm the overload elements and the circuit breakers (fuse) for proper sizing. Verify all grounding. Operate and test each motor starter for proper operation.

END OF SECTION 260504

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLE

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required for furnishing and installing required wiring and cabling systems including pulling, terminating and splicing.

1.2 REFERENCES

- A. Applicable provisions of Division 1 govern work under this Section
- B. Section 260533 Raceway and Boxes
- C. Section 260553 Identification
- D. Section 260800 Commissioning of Electrical Systems

1.3 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Conductor sizes are based on copper.
- C. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet project conditions.
- D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All wire shall be new, delivered to the site in unbroken cartons and shall be less than one year old out of manufacturer's stock.
- B. All conductors shall be copper.
- C. Insulation shall have a 600 volt rating.
- D. Conductors may be solid or stranded.
- E. Stranded conductors may only be terminated with UL OR ETL Listed type terminations or methods: e.g. stranded conductors may not be wrapped around a terminal screw but must be terminated with a crimp type device or must be terminated in an approved back wired method.

2.2 BUILDING WIRE

- A. Acceptable Manufacturers: American Insulated Wire Corp., BICC General Cable Industries Inc., Cerro Wire & Cable Co. Inc., Pirelli Cable Corp., Rome Cable Corp., or Southwire Co.
- B. Single Conductor Insulated Wire.
 - 1. FEP, THHN, THW, THW-2, THWN, THWN-2, XHH, XHHW, or XHHW-2: Wiring in dry or damp locations (except where special type insulation is required).
 - 2. THWN, THWN-2, XHHW, XHHW-2, USE, or USE-2: Wiring in wet locations (except where type USE or USE-2 insulated conductors are specifically required, or special type insulation is required).
 - 3. THHN, THWN or THWN-2: Wiring installed in existing raceway systems (except where special type insulation is required).

2.3 WIRING CONNECTORS

- A. Split Bolt Connectors: Not acceptable unless noted otherwise.
- B. Solderless Pressure Connectors: High copper alloy terminal. May be used only for cable termination to equipment pads or terminals. Not approved for splicing.
- C. Spring Wire Connectors: Solderless spring type pressure connector with insulating covers for copper wire splices and taps. Use for conductor sizes 10 AWG and smaller.
- D. All wire connectors used in underground or exterior pull boxes shall be gel filled twist connectors or a connector designed for damp and wet locations.
- E. Mechanical Connectors:
 - 1. Bolted type tin-plated; high conductivity copper alloy; spacer between conductors; beveled cable entrances.
- F. Insulated Connector Blocks:
 - 1. Conductor count, size, and entry configuration to match application.
 - 2. UV rated.
 - 3. Dual rated for use with copper or aluminum conductors.
 - 4. 600 volt, 90° C termination rating.
 - 5. Caps for sealing wrench access port.
- G. Compression (crimp) Connectors:
 - 1. Long barrel; seamless, tin-plated electrolytic copper tubing; internally beveled barrel ends. Connector shall be clearly marked with the wire size and type and proper number and location of crimps.

2.4 TAGS

- A. Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inches high.
 - 1. Phenolic: Two (2) color laminated engraver's stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (white).
 - 2. Aluminum: Standard aluminum alloy plate stock, minimum .032 inches thick, engraved areas enamel filled or background enameled with natural aluminum engraved characters.

2.5 WIRE MANAGEMENT

- A. Cable Clamps and Clips, Cable Ties, Spiral Wraps, etc: Catamount/T&B Corp., or Ideal Industries Inc.

PART 3 - EXECUTION

3.1 GENERAL WIRING METHODS

- A. Install electrical cable, wire and connectors as indicated, in accordance with the manufacturer's written instructions, the applicable requirements of NEC, and as required to ensure that products serve the intended functions.
- B. Cables shall be selected on the basis of their purpose and UL listing.
 - 1. Generally, use Types THWN, XHHW and THHN in building interiors and other dry locations.
 - 2. Outdoors and in underground raceways, use Type THWN or other conductor type rated for wet location as required by NEC 300.5(B).
 - 3. Conductors subject to abrasion, such as in lighting poles, shall be Type THWN or THHN.
- C. All wire and cable shall be installed in conduit.
- D. Do not use wire smaller than 12 AWG for power and lighting circuits. Minimum size for control circuits shall be 14 AWG copper stranded.
- E. All conductors shall be sized to prevent excessive voltage drop at rated circuit ampacity.
- F. As a minimum use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 100 feet, and for 20 ampere, 277 volt branch circuit home runs longer than 200 feet.
- G. Make conductor lengths for parallel conductors equal.
- H. Splice only in junction or outlet boxes.
- I. No conductor less than 10 AWG shall be installed in exterior underground conduit.
- J. Neatly train and lace wiring inside boxes, equipment, and panelboards.

3.2 WIRING INSTALLATION IN RACEWAYS

- A. Pull all conductors into a raceway at the same time. Use Listed wire pulling lubricant for pulling 4 AWG and larger wires and for other conditions when necessary. Do NOT use pulling lubricant on isolated (ungrounded) power systems.
- B. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.
- C. Completely and thoroughly swab raceway system before installing conductors.
- D. Place all conductors of a given circuit (this includes phase wires, neutral (if any), and ground conductor) in the same raceway. If parallel phase and/or neutral wires are used, then place an equal number of phase and neutral conductors in same raceway or cable.

3.3 WIRING CONNECTIONS AND TERMINATIONS

- A. Splice only in accessible junction boxes.
- B. Wire splices and taps shall be made firm, and adequate to carry the full current rating of the respective wire without soldering and without perceptible temperature rise.
- C. All splices shall be so made that they have an electrical resistance not in excess of two feet (600 mm) of the conductor.
- D. Use solderless spring type pressure connectors with insulating covers for wire splices and taps, 10 AWG and smaller.
- E. Use mechanical or compression connectors for wire splices and taps, 8 AWG and larger. Tape uninsulated conductors and connectors with electrical tape to 150 percent of the insulation value of conductor.
- F. Thoroughly clean wires before installing lugs and connectors.
- G. At all splices and terminations, leave tails long enough to cut splice out and completely re-splice.
- H. Protect wiring in device and junction boxes from paint overspray. Wiring covered with paint shall be removed and replaced where needed by the Contractor.

3.4 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 260504 Cleaning and Testing.

3.5 WIRE COLOR

- A. For wire sizes 10 AWG and smaller - Wire shall be colored as indicated below.
- B. For wire sizes 8 AWG and larger – Use colored wire, or identify wire with colored ½” or ¾” tape bands at all terminals, splices and boxes. Tape bands shall be installed at every 12” for the entire visible length. Colors to be as indicated below.

- C. In existing facilities, use existing color scheme if it complies with NFPA 70.
- D. In new facilities, use the following color scheme:
 - 1. Black and red for single phase circuits at 120/240 volts
 - 2. Phase A black, Phase B red and Phase C blue for circuits at 120/208 volts single or three phase.
 - 3. Conductor 1 orange with at least one distinctive colored stripe other than white, green, or gray, Conductor 2 brown with at least one distinctive colored stripe other than white, green, or gray for isolated (ungrounded) circuits at 120 volts single phase.
 - 4. Conductor 1 orange with at least one distinctive colored stripe other than white, green, or gray, Conductor 2 brown with at least one distinctive colored stripe other than white, green, or gray, Conductor 3 yellow with at least one distinctive colored stripe other than white, green, or gray for isolated (ungrounded) circuits at 120/208 volts three phase.
 - 5. Neutral Conductors: White for 120/208V and 120/240V systems. Where there are two or more neutrals in one conduit, each shall be individually identified with a different stripe.
 - 6. Note: This includes fixture whips except for Listed whips mounted by the fixture manufacturer on the fixture and Listed as a System.
- E. All switch legs shall be the same color as their associated circuit. Traveler conductors run between 3 and 4 way switches shall be colored pink or purple.
- F. Ground Conductors: Green for 2 AWG and smaller. For 1 AWG and larger, identify with green colored wire, or with green tape at both ends and at all access points, such as panelboards, motor starters, disconnects and junction boxes. When isolated grounds are required, contractor shall provide green with yellow tracer.
- G. More Than One Nominal Voltage System Within A Building: Permanently post the color coding scheme at each branch-circuit panelboard.

3.6 IDENTIFICATION

- A. Identification Tags: Use tags to identify feeders and designated circuits. Install tags so that they are easily read without moving adjacent feeders or requiring removal of arc proofing tapes. Attach tags with non-ferrous wire or brass chain.
 - 1. Interior Feeders: Identify each feeder in pullboxes and gutters. Identify by feeder number and size.
- B. Identification Plaque: Where a building or structure is supplied by more than one service, or has any combination of feeders, branch circuits, or services passing through it, install a permanent plaque or directory at each service, feeder and branch circuit disconnect location denoting all other services, feeders, or branch circuits supplying that building or structure or passing through that building or structure and the area served by each. Minimum engraved plaque size of 8"x6".

3.7 WIRE MANAGEMENT

- A. Use wire management products to bundle, route, and support wiring in junction boxes, pullboxes, wireways, gutters, channels, and other locations where wiring is accessible.

3.8 BRANCH CIRCUITS

- A. The use of single-phase, multi-wire branch circuits with a common neutral is not permitted. All branch circuits shall be furnished and installed with an individual accompanying neutral, sized the same as the phase conductors.
- B. The use of a common neutral for modular furniture will be allowed with the following conditions:
 - 1. (Three) 3-phase circuit breaker is used.
 - 2. Neutral is sized one (1) wire gauge larger than phase conductor. For example, if phase conductors are #12 AWG, use #10 AWG neutral.

3.9 EMERGENCY CIRCUITS

- A. All emergency system wiring (Level 1 and Level 2) shall be installed in separate raceways after their associated transfer switches. The wiring shall be separate from each other and from all normal system wiring.

END OF SECTION 260519

SECTION 260523 - CONTROL CABLES

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the required remote control and signal cabling indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. Applicable provisions of Division 1 govern work under this Section.
- B. Section 260533 Raceway and Boxes.
- C. Section 260553 Identification.
- D. NFPA 70 National Electrical Code.

1.3 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Conductor sizes are based on copper.
- C. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.
- D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All wire shall be new, delivered to the site in unbroken cartons and shall be less than one year old out of manufacturer's stock.
- B. All conductors shall be copper.
- C. Insulation shall have a 600 volt rating.
- D. All conductors must be suitable for the application intended. Conductors #12 and smaller may be solid or stranded with the following requirements or exceptions:
 - 1. All conductors terminated with crimp type devices must be stranded.
 - 2. Stranded conductors may only be terminated with UL OR ETL Listed type terminations or methods: e.g. stranded conductors may not be wrapped around a terminal screw but

must be terminated with a crimp type device or must be terminated in an approved back wired method.

2.2 REMOTE CONTROL AND SIGNAL CABLE

- A. Refer to Division 28 for requirements for cable to be used on safety and security systems.
- B. Refer to Division 27 for requirements for cable to be used on communication systems.
- C. All other systems cabling shall meet the requirements of NEC Article 725 and the following:
 - 1. Control Cable for Class 1 Remote Control and Signal Circuits: 600 volt insulation, individual conductors twisted together, shielded (where required), and covered with an overall PVC jacket.
 - a. Cable shall be Listed, temperature rated, and plenum or non-plenum rated for the application as required in the National Electrical Code.
 - 2. Control Cable for Class 2 or Class 3 Remote Control and Signal Circuits shall be constructed, Listed, temperature rated, and plenum or non-plenum rated for the application as required in the NEC Article 725.

2.3 WIRING CONNECTORS

- A. Split Bolt Connectors: Not acceptable.
- B. Spring Wire Connectors: Solderless spring type pressure connector with insulating covers for copper wire splices and taps. Use for conductor sizes 10 AWG and smaller.
- C. All wire connectors used in underground or exterior pull boxes shall be gel filled twist connectors or a connector designed for damp and wet locations.

PART 3 - EXECUTION

3.1 GENERAL WIRING METHODS

- A. Low voltage control and signal cables shall be installed in conduit. However, they may be installed without conduit above accessible ceilings if the cable meets NEC requirements for the application, unless specified to be in conduit in other sections of the specifications. See requirements for free-air cabling installation below.
- B. Do not use wire smaller than 14 AWG for control wiring greater than 60 volts, or 18 AWG for voltages less than 60 volts, all sizes subject to NEC 725 requirements.
- C. Splice only in junction boxes.
- D. Identify wire per section 260553.
- E. Neatly train and lace wiring inside boxes, and equipment.

3.2 WIRING INSTALLATION IN RACEWAYS

- A. Pull all conductors into a raceway at the same time.
- B. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.
- C. Completely and thoroughly swab raceway system before installing conductors.
- D. Place all conductors of a given circuit (this includes phase wires, neutral (if any), and ground conductor in the same raceway.

3.3 FREE-AIR CABLE INSTALLATION

- A. Free-air installation is allowed for low voltage cabling associated with the following systems:
 - 1. Fire alarm
 - 2. Technology cabling (where cable tray is not available)
 - 3. Control cables (DDC, digital lighting control system, etc.)
- B. 'Free-Air' wiring runs shall avoid areas of high traffic (i.e. aisle way), open structure when possible, be run as close as possible to outlining walls and above accessible ceilings when possible.
- C. Cabling shall be neatly run at right angles and be kept clear of other trades work.
- D. Cabling shall be supported at a maximum of 4-foot intervals utilizing mounting bridal rings or J-hooks anchored to the wall, overhead structure, piping supports or structural steel beams. If cable sag at mid-span exceeds 12-inches, another support shall be provided. **Fire alarm cabling shall be installed in a dedicated support system of J-hooks and/or bridal rings separate from all other low voltage cabling.**
- E. Mounting rings/hooks shall be designed to maintain cables bend to larger than the minimum bed radius (typically 4 x cable diameter).
- F. Bundle cabling together, where possible, using Velcro straps. **The use of zip ties for cable bundling is NOT allowed.**
- G. Cabling being routed above an inaccessible ceiling exceeding 6' in length shall be sleeved using raceway for ease of cable installation and replacement.
- H. Cabling shall not be attached to or supported by existing system, including but not limited to: cabling, plumbing or piping, ductwork, suspended ceiling supports or electrical conduit. Additionally, cabling shall not be laid directly on the ceiling grid.
- I. To reduce or eliminate Electro-Magnetic Interference (EMI), the following minimum separation distances for 'Free-Air' cabling installations shall be adhered to:
 - 1. Twelve (12) inches from power lines of less than 5kV.
 - 2. Thirty-nine (39) inches from power lines of 5kV or greater.

3. Eighteen (18) inches from lighting fixtures.
 4. Thirty-nine (39) inches from transformers and motors.
- J. A coil of six (6) feet in each cable shall be placed in the ceiling at each 'free-air' wire device. These coils shall be secured (wire tied) at the last cable support before the cable reaches the device and shall be coiled from 100% to 200% of the cable recommended minimum bend radius.
 - K. All cable shall be free of tension at both ends. Nylon strain relief connectors shall be provided at each device and junction box where cables enter. In cases where the cable must bear some stress, Kellum type grips may be used to spread the strain over a longer length of cable.
 - L. Cable manufacturers minimum bend radius shall be observed in all instances. Care should be taken in the use of cable ties to secure and anchor the station cabling. Ties should not be over tightened as to compress the cable jacket. No sharp burrs should remain where excess length of the cable tie has been cut.
 - M. All exposed vertical cable extensions to devices located below the finished ceiling shall be in conduit.
 - N. Provide protection for exposed cables where subject to damage.
 - O. Use suitable cable fittings and connectors.

3.4 WIRING CONNECTIONS AND TERMINATIONS

- A. Splice only in accessible junction boxes.
- B. All splices shall be so made that they have an electrical resistance not in excess of two (2) feet (600 mm) of the conductor.
- C. Use solderless spring type pressure connectors with insulating covers for wire splices and taps, 10 AWG and smaller.
- D. Thoroughly clean wires before installing lugs and connectors.
- E. At all splices and terminations, leave tails long enough to cut splice out and completely re-splice.
- F. Protect wiring in device and junction boxes from paint overspray. Wiring covered with paint shall be removed and replaced where needed by the Contractor.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 260504.

END OF SECTION 260523

SECTION 260526 - GROUNDING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following grounding indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment included in this Section
 - 1. Grounding electrodes and conductors
 - 2. Equipment grounding conductors
 - 3. Bonding.

1.2 REFERENCES

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
- C. All design, materials, installation and testing pertaining to grounding and bonding system shall comply with the latest edition of applicable requirements and standards addressed within the following references:
 - 1. Applicable provisions of Division 1 govern work under this Section
 - 2. Section 260519 – Low Voltage Electrical Power Conductors and Cable
 - 3. NFPA 70 - National Electrical Code.
 - 4. ANSI/IEEE 142 (Latest edition) - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
 - 5. IEEE 81 - Guide for Measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Ground System.
 - 6. IEEE 1100 - Recommended Practice for Powering and Grounding Electronic Equipment (IEEE Emerald Book).
 - 7. IEEE C2 - National Electrical Safety Code (NESC).
 - 8. UL 467 – Grounding and Bonding Equipment.
 - 9. UL 497 - Protectors for Paired-Conductor Communications Circuits.
 - 10. UL 497A - Secondary Protectors for Communications Circuits.
 - 11. UL 497B - Protectors for Data Communications and Fire-Alarm Circuits

12. UL 1449 - Standard for Safety Surge Protective Devices
13. BICSI Telecommunications Distribution Methods Manual (TDMM), Latest Edition.
14. ANSI J-STD-607-A – Commercial Building Grounding and Bonding Requirements for Telecommunications.

1.3 QUALITY ASSURANCE

- A. See Part 3 of this Specification for system requirements and performance requirements.

1.4 SUMMARY

- A. Provide communications system-grounding conductor at point of service entrance and connect to telecommunications grounding busbars. Bond together the communications system grounding.
- B. Bond together system service equipment enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, metal cable trays, auxiliary gutters, meter fittings, boxes, cable armor, cable sheath, ground bus in electrical rooms, metal frame of the building or structure, ground ring, lightning down lead conductor, grounding conductor in raceways and cables, receptacle ground connectors, and metallic plumbing systems.

1.5 CERTIFICATIONS

- A. Two (2) weeks prior to final inspection, submit four (4) copies of the following to the Engineer and General Contractor/Construction Manager:
 1. Certification that the materials and installation is in accordance with the drawings and specifications.
 2. Certification, by the Contractor, that the complete installation has been properly installed and tested.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
- B. Grounding system components shall be as required to comply with the design and construction of the system indicated. Components shall be as indicated in manufacturer's submittal data.

2.2 PLATE ELECTRODE

- A. Copper plates minimum 0.06 inches thick by 2'-0" square feet of surface area.

2.3 MECHANICAL CONNECTORS

A. Products:

1. Ground Clamps (Cable to Pipe):
 - a. Blackburn/T&B Corp.'s GUV
 - b. Framatome Connectors/Burndy Corp.'s GAR, GD, GP, GK
 - c. OZ/Gedney Co.'s ABG, CG
2. Ground Clamps (Cable to Rod):
 - a. Blackburn/T&B Corp.'s GG, GGH, JAB, JABH, GUV
 - b. Dossert Corp.'s GN, GPC
 - c. Framatome Connectors/Burndy Corp.'s GP, GX, GRC
 - d. OZ/Gedney Co.'s ABG
3. Ground Lugs - Copper, one (1) or two (2) hole style (to suit conditions), long barrel:
 - a. Anderson/Hubbell's VERSAtile VHCL
 - b. Blackburn/T&B Corp.'s Color-Coded CTL, LCN
 - c. Framatome Connectors/Burndy's Hylug YA
 - d. Electrical Products Div./3M Scotchlok 31036 or 31145 Series
 - e. Ideal Industries Inc.'s CCB or CCBL
 - f. Thomas & Betts Corp.'s 54930BE or 54850BE Series

- B. The mechanical connector bodies shall be manufactured from high strength, high conductivity cast copper alloy material. Bolts, nuts, washers and lockwashers shall be made of Silicon Bronze and supplied as a part of the connector body and shall be of the two bolt type.
- C. Split bolt connector types are NOT allowed. Exception: the use of split bolts is acceptable for grounding of wire-basket type cable tray, and for cable shields/straps of medium voltage cable.
- D. The connectors shall meet or exceed UL 467 and be clearly marked with the catalog number, conductor size and manufacturer.

2.4 COMPRESSION CONNECTORS

- A. The compression connectors shall be manufactured from pure wrought copper.
- B. The conductivity of this material shall be no less than 99% by IACS standards.
- C. The connectors shall meet or exceed the performance requirements of IEEE 837, latest revision.
- D. The installation of the connectors shall be made with a compression, tool and die system, as recommended by the manufacturer of the connectors.
- E. The connectors shall be clearly marked with the manufacturer, catalog number, conductor size and the required compression tool settings.
- F. Each connector shall be factory filled with an oxide-inhibiting compound.

2.5 EXOTHERMIC CONNECTIONS

- A. As manufactured by Erico (Cadweld), T&B (Furseweld) or similar.

2.6 GROUND CONDUCTORS

A. Material:

1. Provide 600-volt insulated copper (aluminum not permitted) conductors having a green-colored insulation for grounding electrode and equipment grounding conductors. Use stranded conductors.
2. Conduit grounding conductors shall be insulated copper conductor, green in color to size 2 AWG. Insulated conductors larger than 2 AWG shall be same as phase conductors but identified with green or green/yellow tape at each accessible opening or location in raceway.
3. Provide bare conductors for bonding jumpers.
4. Communications cable tray grounding conductors shall be a minimum of 6 AWG bare copper conductor.

B. Grounding Electrode Conductor: Size as shown on drawings, specifications or as required by NFPA 70, whichever is larger.

C. Feeder and Branch Circuit Equipment Ground: Size as shown on drawings, specifications or as required by NFPA 70, whichever is larger. Differentiate between the normal ground and the isolated ground when both are used on the same facility.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.2 GENERAL

- A. Install Products in accordance with manufacturer's instructions.
- B. Install grounding conductors continuous, without splice or connection, between equipment and grounding electrodes.
- C. Size: When grounding and bonding conductors are not sized on Drawings, size the grounding conductors in accordance with NEC. Size bonding jumper so that minimum cross-sectional area is greater than or equal to that of the equivalent grounding conductor as determined from NEC.
- D. Mechanical connections shall be accessible for inspection and checking. No insulation shall be installed over mechanical ground connections.
- E. Ground connection surfaces shall be cleaned and all buried or inaccessible connections shall be made so that it is impossible to move them.
- F. Attach grounds permanently before permanent building service is energized.
- G. All grounding electrode conductors shall be installed in PVC conduit, in exposed locations.

3.3 LESS THAN 600 VOLT SYSTEM GROUNDING

- A. System Grounding:
 - 1. Main Bonding Jumper: Bond the secondary service neutral to the ground bus in the service equipment.
- B. Metallic Piping, Building Steel, and Supplemental Electrode(s)
 - 1. Provide a grounding electrode conductor sized per NEC between the service equipment ground bus and all metallic water and gas pipe systems, building steel, and supplemental or made electrodes. Jumper insulating joints in the metallic piping. All connections to electrodes shall be made with fittings that conform to UL 467.
- C. Equipment Grounding: Metallic structures (including ductwork and building steel), enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits shall be bonded and grounded.
- D. Conduit System:
 - 1. Ground all metallic conduit systems. All metallic conduit systems shall contain an equipment grounding conductor.
 - 2. Non-metallic conduit systems shall contain an equipment grounding conductor, except that non-metallic feeder conduits which carry a grounded conductor from exterior transformers to interior or building-mounted service entrance equipment need not contain an equipment grounding conductor.
 - 3. Install an insulated grounding conductor internally to all flexible metal conduits. All flexible metal conduit containing power circuits shall utilize grounding bushings. The grounding bushing shall contain a bonding jumper and shall be terminated at the equipment ground bus. The grounding conductor shall terminate at the equipment ground bus. Install external ground wire on liquid tight flexible metal conduit. Provide suitable grounding bushing at each end of liquid tight flexible metal conduit at transformers. External ground wire shall be in addition to grounding conductors installed internal to raceway system.
 - 4. Conduit containing only a grounding conductor, and which is provided for mechanical protection of the conductor, shall be bonded to that conductor at the entrance and exit from the conduit.
- E. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders and power and lighting branch circuits.
- F. Boxes, Cabinets, Enclosures, and Panelboards:
 - 1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes (except for special grounding systems for intensive care units and other critical units shown).
 - 2. Provide lugs in each box and enclosure for equipment grounding conductor termination.
 - 3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs to terminate the equipment grounding conductors.
- G. Motors and Starters: Provide lugs in motor terminal box and starter housing or motor control center compartment to terminate equipment grounding conductors.

- H. Receptacles shall not be grounded through their mounting screws. Ground with a jumper from the receptacle green ground terminal to the device box ground screw and the branch circuit equipment grounding conductor.
- I. Ground lighting fixtures to the equipment grounding conductor of the wiring system when the green ground is provided; otherwise, ground the fixtures through the conduit systems. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.
- J. Fixed electrical appliances and equipment shall be provided with a ground lug for termination of the equipment grounding conductor.

3.4 CONDUCTIVE PIPING

- A. Bond all conductive piping systems, interior and exterior, to the building to the grounding electrode system. Bonding connections shall be made as close as practical to the equipment ground bus.

3.5 COMMUNICATIONS SYSTEM GROUNDING

- A. General:
 - 1. Route ground conductors to provide the shortest, most direct path from point to point. Telecommunications ground must be bonded to the lightning protection system grounding and may need additional bonding depending on: spacing, building dimensions, and construction.
 - 2. Bonding conductors should not be placed in ferrous metallic conduit. If it is necessary to place bonding conductors in ferrous metallic conduit that exceeds 3 feet in length, the conductors shall be bonded to each end of the conduit with a conductor sized as a No. 6 AWG, minimum (this makes the conduit a parallel path with the cable). The connections of the bonding conductors for telecommunications shall utilize listed two-hole compression lugs.
 - 3. A continuous ground path shall be provided in all telecommunications raceways. Grounded cable trays shall be considered continuous ground path.
 - 4. Any grounding or bonding conductor that is run through a metallic conduit shall be bonded to the conduit.
 - 5. Telecommunications primary protector grounding conductor shall be bonded to the TMGB. A minimum of 1 foot separation shall be maintained between this insulated conductor and any DC power cables, switchboard cables, or high frequency cables, even when placed in metal raceway.
 - 6. In buildings where the backbone telecommunications cabling incorporates a shield or metallic member, this shield or metallic member shall be bonded to the TMGB where the cables are terminated or where pairs are broken out.

3.6 GROUND RESISTANCE

- A. Grounding system resistance to ground shall not exceed 5 ohms. Make necessary modifications or additions to the grounding electrode system for compliance without additional cost to the Owner. Final tests shall assure that this requirement is met.

- B. Resistance of the grounding electrode system shall be measured using a four-terminal fall-of-potential method as defined in IEEE 81. Ground resistance measurements shall be made before the electrical distribution system is energized and shall be made in normally dry conditions not less than 48 hours after the last rainfall. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together below grade. The combined resistance of separate systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.
- C. Engineer has the option to observe below-grade connections prior to backfilling. The Contractor shall notify the Engineer 24 hours before the connections are ready for observation.

3.7 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

END SECTION 260526

SECTION 260529 – HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following hangers and supports indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment included in this Section
 - 1. Conduit and equipment supports
 - 2. Straps
 - 3. Clamps
 - 4. Steel channel, etc.
 - 5. Fastening hardware for supporting electrical work.

1.2 REFERENCES

- A. Applicable provisions of Division 1 govern work under this Section.

1.3 QUALITY ASSURANCE

- A. Support systems shall be adequate for the weight of equipment and conduit, including wiring, which they carry.

PART 2 - PRODUCTS

2.1 ANCHORING DEVICES

- A. Sleeve Anchors
 - 1. Molly/Emhart's Parasleeve Series
 - 2. Phillips' Red Head Dynabolt Series
 - 3. Ramset's Dynabolt Series
- B. Wedge Anchors
 - 1. Hilti's Kwik Bolt Series
 - 2. Molly/Emhart's Parabolt Series
 - 3. Phillips' Red Head Trubolt
 - 4. Ramset's Trubolt Series

- C. Concrete Screw Anchors
 - 1. Phillips' Red Head Tapcon
- D. Non-Drilling Anchors
 - 1. Hilti's Drop-In Anchor Series
 - 2. Phillips' Red Head Multi-Set II Series
 - 3. Ramset's Dynaset Series
- E. Stud Anchors
 - 1. Phillips' Red Head JS Series

2.2 CAST-IN-PLACE CONCRETE INSERTS

- A. Continuous Slotted Type Concrete Insert, Galvanized:
 - 1. Load Rating 1300 lbs./ft.: Kindorf's D-986
 - 2. Load Rating 2400 lbs./ft.: Kindorf's D-980
 - 3. Load Rating 3000 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-H
 - 4. Load Rating 4500 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-HD
- B. Threaded Type Concrete Insert: Galvanized ferrous castings, internally threaded.
- C. Wedge Type Concrete Insert: Galvanized box-type ferrous castings, designed to accept bolts having special wedge shaped heads.

2.3 HAMMER SET ANCHOR

- A. Zinc plated steel drive pin with expanding alloy body:
 - 1. Phillips' Red Head HS Series
 - 2. Hilti HIT Series
 - 3. Ramset Shuredrive Series

2.4 MISCELLANEOUS FASTENERS

- A. Except where shown otherwise on the Drawings, furnish fastener type, size, and grade required for proper installation of the Work. Select from the following:
 - 1. Cadmium or Zinc Coated Fasteners: Dry locations.
 - 2. Galvanized Fasteners: For exterior use, or for items anchored to exterior walls, except where stainless steel is indicated.

3. Stainless Steel Fasteners: Type 302 for interior Work; Type 316 for exterior Work; Phillips head screws and bolts for exposed Work unless otherwise specified.

2.5 HANGER RODS

- A. Mild low carbon steel, unless otherwise specified; fully threaded or threaded each end, with nuts as required to position and lock rod in place. Unless galvanized or cadmium plated, provide a shop coat of red lead or zinc chromate primer paint.
- B. Minimum sized threaded rod for supports shall be 3/8" for trapezes and single conduits 1-1/4" and larger, and 1/4" for single conduits 1" and smaller.

2.6 "C" BEAM CLAMPS

A. With Conduit Hangers

1. For 1 Inch Conduit Maximum:
 - a. B-Line Systems Inc.'s BG-8, BP-8 Series
 - b. Caddy/Erico Products Inc.'s BC-8P and BC-8PSM Series
 - c. GB Electrical Inc.'s HIT 110-412 Series
2. For 3 Inch Conduit Maximum:
 - a. Appleton Electric Co.'s BH-500 Series beam clamp with H50W/B Series hangers
 - b. Kindorf's 500 Series beam clamp with 6HO-B Series hanger
 - c. OZ/Gedney Co.'s IS-500 Series beam clamp with H-OWB Series hanger
3. For 4 Inch Conduit Maximum:
 - a. Kindorf's E-231 beam clamp and E-234 anchor clip and C-149 series lay-in hanger
 - b. Unistrut Corp.'s P2676 beam clamp and P-1659A Series anchor clip with J1205 Series lay in hanger

B. For Hanger Rods

1. For 1/4 Inch Hanger Rods:
 - a. B-Line Systems Inc.'s BC
 - b. Caddy/Erico Products Inc.'s BC
 - c. GB Electrical Inc.'s HIT 110
 - d. Kindorf's 500, 510
 - e. Unistrut Corp.'s P1648S, P2398S, P2675, P2676
2. For 3/8 Inch Hanger Rods:
 - a. Caddy/Erico Products Inc.'s BC
 - b. Kindorf's 231-3/8, 502
 - c. Unistrut Corp.'s P1649AS, P2401S, P2675, P2676
3. For 1/2 Inch Rods:
 - a. Appleton Electric Co. BH-500 Series
 - b. Kindorf's 500 Series, 231-1/2
 - c. OZ/Gedney Co.'s IS-500 Series
 - d. Unistrut Corp.'s P1650AS, P2403S, P2676

4. For 5/8 Inch Rods: Unistrut Corp.'s P1651AS beam clamp and P1656A Series anchor clip.
5. For 3/4 Inch Rods: Unistrut Corp.'s P1653S beam clamp and P1656A Series anchor clip.

2.7 CHANNEL SUPPORT SYSTEM

- A. Channel Material: 12 gauge steel.
- B. Finishes
 1. Phosphate and baked green enamel/epoxy.
 2. Pre-galvanized.
 3. Electro-galvanized.
 4. Hot dipped galvanized.
 5. Polyvinyl chloride (PVC), minimum 15 mils thick.
- C. Fittings: Same material and finish as channel.
- D. UL Listed Systems
 1. B-Line Systems Inc.'s B-22 (1-5/8 x 1-5/8 inches), B-12 (1-5/8 x 2-7/16 inches), B-11 (1-5/8 x 3-1/4 inches).
 2. Grinell Corp.'s Allied Power-Strut PS 200 (1-5/8 x 1-5/8 inches), PS 150 (1-5/8 x 2-7/16 inches), PS 100 (1-5/8 x 3-1/4 inches).
 3. Kindorf's B-900 (1-1/2 x 1-1/2 inches), B-901 (1-1/2 x 1-7/8 inches), B-902 (1-1/2 x 3 inches).
 4. Unistrut Corp.'s P-3000 (1-3/8 x 1-5/8 inches), P-5500 (1-5/8 x 2-7/16 inches), P-5000 (1-5/8 x 3-1/4 inches).
 5. Versabar Corp.'s VA-1 (1-5/8 x 1-5/8 inches), VA-3 (1-5/8 x 2-1/2 inches).

2.8 MISCELLANEOUS FITTINGS

- A. Side Beam Brackets
 1. B-Line Systems Inc.'s B102, B103, B371-2
 2. Kindorf's B-915
 3. Versabar Corp.'s VF-2305, VF-2507
- B. Pipe Straps (Heavy Duty Type):
 1. Two (2) Hole Steel Conduit Straps:
 - a. B-Line Systems Inc.'s B-2100 Series

- b. Kindorf's C-144 Series
 - c. Unistrut Corp.'s P-2558 Series
- 2. One (1) Hole Malleable Iron Clamps:
 - a. Kindorf's HS-400 Series
 - b. OZ/ Gedney Co.'s 14-G Series, 15-G Series (EMT)
- C. Deck Clamps: Caddy/Erico Products Inc.'s DH-4-T1 Series.
- D. Fixture Stud and Strap: OZ/Gedney Co.'s SL-134, or Steel City's FE-431.
- E. Supporting Fittings for Pendant Mounted Industrial Type HID, Fluorescent or LED Fixtures on Exposed Conduit System:
 - 1. Ball Hanger: Appleton Electric Co.'s AL Series, or Crouse-Hinds Co.'s AL Series
 - 2. Flexible Fixture Hanger: Appleton Electric Co.'s UNJ-50, UNJ-75, or Crouse-Hinds Co.'s UNJ115
 - 3. Flexible (Hook Type) Fixture Hanger: Appleton Electric Co.'s FHFF, or Crouse-Hinds Co.'s UNH-1
 - 4. Eyelet: Unistrut Corp.'s M2250
 - 5. Eyelet with Stud: Kindorf's H262, or Unistrut Corp.'s M2350
 - 6. Conduit Hook: Appleton Electric Co.'s FHSN, or Crouse-Hinds Co.'s UNH-13
- F. Supporting Fasteners (Metal Stud Construction): Metal stud supports, clips and accessories as produced by Caddy/Erico Products Inc.

2.9 ROOFTOP SUPPORT SYSTEMS

- A. Rooftop supports for conduit, cable tray or equipment shall be provided for installation without requiring roof penetrations, flashing or damage to the roofing material. Height-adjustable supports may be used where necessary. Support conduit a minimum of 4' above the roof surface.
- B. Materials:
 - 1. Support bases shall be made of an engineered material with appropriate additives for UV protection. All structural steel components shall be hot-dipped galvanized.
 - 2. The support shall have a continuous bottom surface to provide even load distribution and minimize point loading of the roof membrane. The support base will have a radiused edge to enhance compatibility with roof membranes.
 - 3. Coordinate static load rating of the support(s) with the specific application being served.
 - 4. Accessories: Clamps, bolts, nuts, washers, and other devices as required for a complete system.

C. Applications:

1. Fixed Strut Supports: Size and load ratings for the application
2. Adjustable Strut Supports: Height adjustable, size and load ratings for the application
3. Adjustable Single Conduit Supports: Height adjustable, size and load ratings for the application
4. Bridge Assemblies:
 - a. Suitable for multiple conduit runs, cable tray or equipment
 - b. Size and load ratings for the application
5. Post Base Assemblies:
 - a. For use with vertical sections of channel support systems
 - b. Size, channel support configuration, and load ratings for the application
6. Manufacturers:
 - a. Caddy/Pentair, Cooper B-Line, Mifab, Arlington, Rooftop Blox, Haydon, MAPA Products

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Where specific fasteners are not specified or indicated for securing items to in-place construction, provide appropriate type, size, and number of fasteners for a secure, rigid installation.
- B. Install anchoring devices and other fasteners in accordance with manufacturer's printed instructions.
- C. Make attachments to structural steel wherever possible.

3.2 FASTENER SCHEDULE

- A. Material
 1. Use cadmium or zinc coated anchors and fasteners in dry locations.
 2. Use hot dipped galvanized or stainless steel anchors and fasteners in damp and wet locations.
 3. For corrosive atmospheres or other extreme environmental conditions, use fasteners made of materials suitable for the conditions.
- B. Types and Use: Unless otherwise specified or indicated use:
 1. Cast-in-place concrete inserts in fresh concrete construction for direct pull-out loads such as shelf angles or fabricated metal items and supports attached to concrete slab ceilings.

2. Anchoring devices to fasten items to solid masonry and concrete when the anchor is not subjected to pull out loads, or vibration in shear loads.
3. Toggle bolts to fasten items to hollow masonry and stud partitions.
4. Metallic fasteners installed with electrically operated or powder driven tools for approved applications, except:
 - a. Do not use powder driven drive pins or expansion nails.
 - b. Do not attach powder driven or welded studs to structural steel less than 3/16 inch thick.
 - c. Do not support a load, in excess of 250 lbs from any single welded or powder driven stud.
 - d. Do not use powder driven fasteners in precast concrete
5. Metallic hammer set anchors may be used in wall and ceiling applications. Maximum conduit size supported with hammer set anchors is 1 Inch.

3.3 ATTACHMENT SCHEDULE

- A. General: Make attachments to structural steel or steel bar joists wherever possible. Provide intermediate structural steel members where required by support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of 5.
 1. Make attachments to steel bar joists at panel points of joists.
 2. Do not drill holes in main structural steel members.
 3. Use "C" beam clamps for attachment to steel beams.
- B. Where it is not possible to make attachments to structural steel or steel bar joists, use the following methods of attachment to suit type of construction unless otherwise specified or indicated on the drawings.
 1. Attachment to Steel Roof Decking (No Concrete Fill):
 - a. Decking With Hanger Tabs: Use deck clamps.
 - b. Decking Without Hanger Tabs:
 - 1) Before Roofing Has Been Applied: Use 3/8 inch threaded steel rod welded to a 4 x 4 x 1/4 inch steel plate and installed through 1/2 inch hole in roof deck.
 - 2) After Roofing Has Been Applied: Use welding studs, or self-drilling/tapping fasteners. Exercise extreme care when installing fasteners to avoid damage to roofing.
 2. Attachment to Concrete Filled Steel Decks (Total thickness, 2-1/2 inches or more):
 - a. Before Fill Has Been Placed:
 - 1) Use thru-bolts and fish plates.
 - 2) Use welded studs. Do not support a load in excess of 250 pounds from a single welded stud.
 - b. After Fill Has Been Placed: Use welded studs. Do not support a load in excess of 250 lbs from a single welded stud.

3. Attachment to Cast-In-Place Concrete:
 - a. Fresh Concrete: Use cast-in-place concrete inserts.
 - b. Existing Concrete: Use anchoring devices.
4. Attachment to Hollow Block or Tile Filled Concrete Deck:
 - a. New Construction: Use cast-in-place concrete inserts by having Construction Work Contractor omitting blocks and pouring solid blocks with insert where required.
 - b. Existing Construction: Use anchoring devices.
5. Attachment to Waffle Type Concrete Decks:
 - a. New Construction:
 - 1) Use cast-in-place concrete inserts in fresh concrete.
 - 2) If concrete fill has been applied over deck, thru-bolts and fish plates may be used where additional concrete or roofing is to be placed over the deck.
 - b. Existing Construction: Use anchoring devices.
6. Attachment to Precast Concrete Planks: Use anchoring devices, except do not make attachments to precast concrete planks less than 2-3/4 inches thick.
7. Attachment to Precast Concrete Tee Construction:
 - a. New Construction:
 - 1) Use tee hanger inserts between adjacent flanges.
 - 2) Use thru-bolts and fish plates, except at roof deck without concrete fill.
 - b. Existing Construction:
 - 1) Use anchoring devices installed in webs of tees. Install anchoring devices as high as possible in the webs.
 - c. Do not use powder driven fasteners.
 - d. Exercise extreme care in drilling holes to avoid damage to reinforcement.
8. Attachment to Metal Stud Construction: Use supporting fasteners manufactured specifically for the attachment of raceways and boxes to metal stud construction.
 - a. Support and attach outlet boxes so that they cannot torque/twist by using one of the following:
 - 1) Bar hanger assembly.
 - 2) Box hanger with far side support.
 - 3) Between stud mounting bracket.

3.4 CONDUIT SUPPORT SCHEDULE

- A. Provide number of supports as required by National Electrical Code. Exception: Maximum support spacing allowed is 4'-0" for conduit sizes 3 inches and larger supported from wood trusses.
- B. Use pipe straps and specified method of attachment where conduit is installed proximate to surface of wood or masonry construction.
 1. Use hangers secured to surface with specified method of attachment where conduit is suspended from the surface.
- C. Use "C" beam clamps and hangers where conduit is supported from steel beams.

- D. Use deck clamps and hangers where conduit is supported from steel decking having hanger tabs.
 - 1. Where conduit is supported from steel decking that does not have hanger tabs, use clamps and hangers secured to decking, utilizing specified method of attachment.
- E. Use channel support system supported from structural steel for multiple parallel conduit runs.
- F. Where conduits are installed above ceiling, do not rest conduit directly on runner bars, T-Bars, etc.
 - 1. Conduit Sizes 2-1/2 Inches and Smaller: Support conduit from ceiling supports or from construction above ceiling.
 - 2. Conduit Sizes Over 2-1/2 Inches: Support conduit from concrete deck, beams, joists, or trusses above ceiling.

3.5 LIGHTING FIXTURE SUPPORT SCHEDULE

- A. General: Do not support fixtures from ceilings or ceiling supports unless it is specified or indicated on the drawings to do so.
 - 1. Support fixtures with hanger rods attached to beams, joists, or trusses. Hanger rod diameter, largest standard size that will fit in mounting holes of fixture.
 - a. Where approved, channel supports may span and rest upon the lower chord of trusses and be utilized for the support of lighting fixtures.
 - b. Where approved, channel supports may span and be attached to the underside of beams, joists, or trusses and be utilized for the support of lighting fixtures.
 - 2. Use two (2) nuts and two (2) washers on lower end of each hanger rod to hold and adjust fixture (one (1) nut and washer above top of fixture housing, one (1) nut and washer below top of fixture housing).
 - a. Where specified that an adequately supported outlet box is to support a fixture or be utilized as one (1) point of support, support the box so that it may be adjusted to bring the face of the outlet box even with surface of ceiling
- B. Specific Installations Where Fixtures May Be Supported From New Ceilings Being Installed by the General Contractor:
 - 1. Support surface mounted fluorescent, LED, and incandescent fixtures directly from plywood backed gypsum board ceilings.
 - 2. Support surface mounted fluorescent, LED, and incandescent fixtures directly from framing or furring members of fire rated suspended ceilings (double gypsum board).
 - 3. Support recessed mounted fluorescent, LED, and incandescent fixtures directly from furring members of furred gypsum board ceilings.
 - 4. Support recessed mounted fluorescent, LED, and incandescent fixtures directly from the suspension system of suspended acoustical ceilings. Exception: Support each fixture weighing more than 50 pounds (including lamps) independent of the suspended ceiling grid.

5. Deliver documents that state actual fixture weights and indicate fixture locations to the General Contractor/Construction Manager.
- C. Number of Supports for Ceiling Mounted Lighting Fixtures: Provide at least the following number of supports. Provide additional supports when recommended by fixture manufacturer, or shown on the drawings.
1. Commercial and Industrial Fluorescent or LED Fixtures:
 - a. Support individual fixtures less than two (2) feet wide at two (2) points.
 - b. Support continuous row fixtures less than two (2) feet wide at points equal to the number of fixtures plus one (1). Uniformly distribute the points of support over the row of fixtures.
 - c. Support individual fixtures two (2) feet or wider at four (4) corners.
 - d. Support continuous row fixtures two (2) feet or wider at points equal to twice the number of fixtures plus two (2). Uniformly distribute the points of support over the row of fixtures.
 - e. An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.
- D. Number of Supports for Wall Mounted Lighting Fixtures: Provide at least the following number of supports. Provide additional supports when recommended by fixture manufacturer, or shown on the drawings.
1. Commercial and Industrial Fluorescent or LED Fixtures:
 - a. Support individual fixtures two (2) feet long or less at two (2) points.
 - b. Support individual fixtures over two (2) feet long at three (3) points.
 - c. Support continuous row fixtures at points equal to twice the number of fixtures. Uniformly distribute the points of support.
 - d. An adequately supported outlet box may be utilized as one (1) point of support for fixtures weighing less than 50 pounds.

3.6 CHANNEL SUPPORT SYSTEM SCHEDULE

- A. Use channel support system where specified or indicated on the drawings.
- B. Channel supports may be used, as approved, to accommodate mounting of equipment.
- C. Material and Finish:
 1. Dry Locations: Use 12 gauge steel channel support system having any one of the specified finishes.
 2. Damp Locations: Use 12 gauge steel channel support system having any one of the specified finishes except green epoxy/enamel.
 3. Wet locations: Use 12 gauge steel channel support system having hot dipped galvanized, or PVC finish.

3.7 ROOFTOP SUPPORT SYSTEM

- A. Install in accordance with manufacturer's instructions and recommendations.
- B. Provide complete and adequate support of all conduit, cable tray, or equipment.

- C. The use of wood blocks for supporting conduit, cable tray, or equipment is not permitted.
- D. If gravel top roof, gravel must be removed around and under support.
- E. Consult roofing manufacturer for roof membrane compression capacities. If necessary, a compatible sheet of roofing material (isolation pad) may be installed under rooftop support to disperse concentrated loads and add further membrane protection.
- F. Use properly sized clamps to secure conduit, cable tray, or equipment.

END OF SECTION 260529

SECTION 260533 – RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following conduits, surface raceways, multi-outlet assemblies, auxiliary gutters, wall duct, and boxes for electrical systems including wall and ceiling outlet boxes, floor boxes, and junction boxes.

1.2 REFERENCES

- A. Applicable provisions of Division 1 govern work under this section.
 - 1. Section 260529 – Hangers and Supports.
 - 2. Section 262726 – Wiring Devices.
 - 3. Section 262702 – Equipment Wiring.
 - 4. Section 270000 – Communications Cable and Equipment.
 - 5. Section 283100 – Fire Detection and Alarm.

PART 2 - PRODUCTS

2.1 RIGID METAL CONDUIT AND FITTINGS

- A. Conduit: Heavy wall, galvanized steel, schedule 40, threaded.
- B. Fittings and Conduit Bodies: Use all steel threaded fittings and conduit bodies.

2.2 INTERMEDIATE METAL CONDUIT (IMC) AND FITTINGS

- A. Conduit: Galvanized steel, threaded.
- B. Fittings and Conduit Bodies: Use all steel threaded fittings and conduit bodies.

2.3 ELECTRICAL METALLIC TUBING (EMT) AND FITTINGS

- A. Conduit: Steel, galvanized tubing.
- B. Fittings:
 - 1. All steel, set screw, concrete tight. No push-on or indenter types permitted.
 - 2. Raintight Fittings:
 - a. All steel construction with zinc electroplate finish provides for durable corrosion resistance
 - b. Distinct color to provide quick raintight identification

- c. Integral gasketed compression ring secures and seals for reliable installation
- d. Gasket on male threads of box connector seals installation for raintight connection between the box and the connector

C. Conduit Bodies: All steel threaded conduit bodies.

2.4 FLEXIBLE METAL CONDUIT AND FITTINGS

- A. Conduit: steel, galvanized, spiral strip.
- B. Fittings and Conduit Bodies: All steel, galvanized, or malleable iron (except as allowed in Specification 265113).

2.5 LIQUIDTIGHT FLEXIBLE METAL CONDUIT AND FITTINGS

- A. Conduit: flexible, steel, galvanized, spiral strip with an outer Liquidtight, nonmetallic, sunlight-resistant jacket.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1, compression type. There shall be a metallic cover/insert on the end of the conduit inside the connector housing to seal the cut conduit end.

2.6 CONDUIT SUPPORTS

- A. See Section 260529.

2.7 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: galvanized steel, with stamped knockouts.
- B. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 3/8 inch male fixture studs where required.
- C. Concrete Ceiling Boxes: Concrete type.
- D. Cast Boxes: Cast ferroalloy, or aluminum type deep type, gasketed cover, threaded hubs.

2.8 FLOOR BOXES

- A. Floor Boxes for Installation in Cast-In-Place Concrete Floors: Semi-adjustable, cast iron.
- B. Formed steel boxes in slab-on-grade applications shall be epoxy coated.

2.9 PULL AND JUNCTION BOXES

- A. Pull boxes and junction boxes shall be minimum 4 inch square by 2 1/8th inches deep for use with 1 inch conduit and smaller. On conduit systems using 1 1/4 inch conduit or larger, pull and junction boxes shall be sized per NEC but not less than 4 11/16 inch square.
- B. For telecommunication, fiber optic, security, and other low voltage cable installations the NEC box size requirements shall apply. All boxes, used on telecommunication, security, other low voltage and fiber optic systems with conduits of 1 1/4" and larger, shall be sized per the NEC

conduit requirements. For determining box size, the conduit is the determining factor not the wire size.

- C. Sheet Metal Boxes: code gauge galvanized steel, screw covers, flanged and spot welded joints and corners.
- D. Sheet metal boxes larger than twenty-four (24) inches in any dimension shall have a hinged cover or a chain installed between box and cover.
- E. The use of box extension rings is discouraged. If they must be used only one ring per box is allowed and wiring must extend a minimum of 6" beyond the front edge of the extension ring.
- F. Box extensions and adjacent boxes within 48" of each other are not allowed for the purpose of creating more wire capacity.
- G. Junction boxes 6" x 6" or larger size shall be without stamped knock-outs.
- H. Wireways shall not be used in lieu of junction boxes.

2.10 GENERAL

- A. All steel fittings and conduit bodies shall be galvanized.
- B. No cast metal or split-gland type fittings permitted.
- C. Mogul-type condulets larger than two (2) inch not permitted except as approved or detailed.
- D. All conduit covers must be fastened to the conduit body with screws and be of the same manufacture.
- E. Wireways, gutters and c-condulets shall not be used in lieu of pull boxes and condulets.
- F. All boxes shall be of sufficient size to provide free space for all conductors enclosed in the box and shall comply with NEC requirements.

PART 3 - EXECUTION

3.1 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT

- A. EMT is permitted to be used in sizes 4" and smaller for power and telecommunication systems. See CONDUIT INSTALLATION SCHEDULE below for other limitations for EMT and other types of conduit.
- B. Size power conductor raceways for conductor type installed. Conduit size shall be 1/2 inch minimum except all homerun conduits shall be 3/4", or as specified elsewhere. Caution: Per the NEC, the allowable conductor ampacity is reduced when more than three (3) current-carrying conductors are installed in a raceway. Contractor must take the NEC ampacity adjustment factors into account when sizing the raceway and wiring system.
- C. Size conduit for all other wiring, including but not limited to data, control, security, fire alarm, telecommunications, signal, video, etc. shall be sized per number of conductors pulled and their cross-section. 40% fill shall be maximum for all new conduit fills.

- D. Arrange conduit to maintain headroom and present a neat appearance.
- E. Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping.
- F. Maintain minimum six (6) inch clearance between conduit and piping. Maintain twelve (12) inch clearance between conduit and heat sources such as flues, steam pipes, and heating appliances.
- G. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized pipe straps, conduit racks (lay-in adjustable hangers), clevis hangers, or bolted split stamped galvanized hangers.
- H. Group conduit in parallel runs where practical and use conduit rack (lay-in adjustable hangers) constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit.
- I. Do not fasten conduit with wire or perforated pipe straps. Before conductors are pulled, remove all wire used for temporary conduit support during construction.
- J. Support and fasten metal conduit at a maximum of eight (8) feet on center.
- K. Supports shall be independent of the installations of other trades, e.g. ceiling support wires, HVAC pipes, other conduits, etc., unless so approved or detailed.
- L. In general, all conduits shall be concealed except where noted on the drawings or approved by the Architect/Engineer. Contractor shall verify with Architect/Engineer all surface conduit installations except in mechanical, electrical or utility rooms that are not occupied spaces.
- M. Changes in direction shall be made with symmetrical bends, cast steel boxes, stamped metal boxes or cast steel conduit bodies.
- N. For indoor conduits, no continuous conduit run shall exceed 100 feet without a junction box.
- O. All conduits installed in exposed areas shall be installed with a box offset before entering box.

3.2 CONDUIT INSTALLATION

- A. Cut conduit square; de-burr cut ends.
- B. Conduit shall not be fastened to the corrugated metal roof deck.
- C. Bring conduit to the shoulder of fittings and couplings and fasten securely.
- D. Use conduit hubs for fastening conduit to cast boxes. Use sealing locknuts or conduit hubs for fastening conduit to sheet metal boxes in damp or wet locations.
- E. All conduit terminations (except for terminations into conduit bodies) shall use conduit hubs, or connectors with one (1) locknut, or shall use double locknuts (one (1) each side of box wall) and insulated bushing. Provide bushings for the ends of all conduit not terminated in box walls. Refer to Section 260526 – Grounding and Bonding for Electrical Systems for grounding bushing requirements.
- F. Install no more than the equivalent of four (4) 90 degree bends between boxes.

- G. Use hydraulic one (1)-shot conduit bender or factory elbows for bends in conduit larger than two (2) inch size unless sweep elbows are required.
- H. Conduit shall be bent according to manufacturers' recommendations. Torches or open flame shall not be used to aid in bend of PVC conduit.
- I. Use suitable conduit caps or other approved seals to protect installed conduit against entrance of dirt and moisture.
- J. Provide 1/8 inch nylon pull string in empty conduit, except sleeves and nipples.
- K. Install expansion-deflection joints where conduit crosses building expansion joints. Note: expansion-deflection joints are not required where conduit crosses building control joints if the control joint does not act as an expansion joint. Install expansion fitting in PVC conduit runs as recommended by the manufacturer.
- L. Avoid moisture traps where possible. Where moisture traps are unavoidable, provide junction boxes with drain fittings at conduit low points.
- M. Where conduit passes between areas of differing temperatures such as into or out of cool rooms, freezers, unheated and heated spaces, buildings, etc., provide Listed conduit seals to prevent the passage of moisture and water vapor through the conduit.
- N. Route conduit through roof openings for piping and ductwork where possible.
- O. Conduit is not permitted in any slab topping of two inches or less. Consult Structural Engineer for approval of conduit installed in topping slabs greater than two inches.
- P. Ground and bond conduit under provisions of Section 260526.
- Q. Maximum Size Conduit in Slabs Above Grade: 3/4 inch. Do not route conduits to cross each other in slabs above grade.
- R. PVC conduit shall transition to galvanized rigid metal conduit before it enters a concrete pole base, foundation, wall (where exposed) or up through a concrete floor.
- S. All conduit installed underground (exterior to building) shall be buried a minimum of 24" below finished grade, whether or not the conduit is concrete encased.
 - 1. All underground conduits shall be installed with "DANGER – BURIED ELECTRICAL CONDUIT" red flagging tape 6-inches above conduit. Tape shall be continuous along the conduit run.
 - 2. Tracer wire shall be installed on all exterior electrical utilities. Trace wire to be fourteen (14) gauge minimum solid copper with thermoplastic insulation recommended for direct burial. Wire connectors to be 3M DBR, or approved equal, and shall be watertight to provide electrical continuity. Install trace wire in the same trench with the conduit during installation and secure to conduit as required to ensure that the wire remains adjacent to the conduit. Trace wire access points shall in general be no more than 500' apart.
- T. PVC conduit shall be cleaned with solvent, and dried before application of glue. The temperature rating of glue/cement shall match weather condition. Apply full even coat of cement/glue to entire area that will be inserted into fitting. The entire installation shall meet manufacturers' recommendations.

3.3 CONDUIT INSTALLATION SCHEDULE

- A. Conduit other than that specified below for specific applications shall not be used.
- B. Conduit in patient care areas shall be metallic to maintain dual ground paths as required by the NEC.
- C. Under Slab on Grade Installations: Schedule 40 PVC conduit.
- D. Exposed Outdoor Locations: Rigid steel conduit.
- E. Concealed in Concrete and Block Walls: Electrical metallic tubing.
- F. Within Concrete Slab: Schedule 40 PVC conduit.
- G. Wet Interior Locations: Rigid steel conduit.
- H. Concealed Dry Interior Locations: Electrical metallic tubing.
- I. Exposed Dry Interior Locations: Electrical metallic tubing.
- J. Motor and equipment connections: Flexible PVC coated metal conduit (all locations). Minimum length shall be one foot, maximum length shall be three feet. Conduit must be installed perpendicular to direction of equipment vibration to allow conduit to freely flex.
- K. Light fixtures: Direct box or conduit connection for surface mounted and recessed fixtures. Flexible metal conduit from a J-box for recessed lay-in light fixtures. Conduit size shall be 3/8" minimum diameter and six (6) foot maximum length. Conduit length shall allow movement of fixture for maintenance purposes.

3.4 COORDINATION OF BOX LOCATIONS

- A. Provide electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance.
- B. Electrical box locations shown on Contract Drawings are approximate unless dimensioned. Verify location of floor boxes and outlets in offices and work areas prior to rough-in.
- C. No outlet, junction, or pull boxes shall be located where it will be obstructed by other equipment, piping, lockers, benches, counters, etc.
- D. Boxes shall not be fastened to the metal roof deck.
- E. It shall be the Contractor's responsibility to study drawings pertaining to other trades, to discuss location of outlets with workmen installing other piping and equipment and to fit all electrical outlets to job conditions.
- F. In case of any question over the location of an outlet, the Contractor shall refer the matter to the Architect/Engineer and install outlet as instructed by the Architect/Engineer.
- G. The proper location of each outlet is considered a part of this contract and no additional compensation will be paid to the Contractor for moving outlets which were improperly located.

- H. Locate and install boxes to allow access to them. Where installation is inaccessible, coordinate locations and provide 18 inch by 24 inch access doors.
- I. Locate and install to maintain headroom and to present a neat appearance.
- J. Install boxes to preserve fire resistance rating of partitions and other elements, using approved materials and methods.
- K. Install boxes to preserve room acoustic ratings using approved material and methods as well as details provided by the Acoustic Consultant.

3.5 OUTLET BOX INSTALLATION

- A. Do not install boxes back-to-back in walls. Provide minimum 6 inch separation, except provide minimum 24 inch separation in acoustic-rated walls.
- B. Power
 - 1. Recessed (1/4" maximum) outlet boxes in masonry, concrete or tile construction shall be minimum 4 inch square, with device rings. Device covers shall be square-cut except rounded corner plaster rings are allowed in drywall applications. Angle cut plaster rings are not permitted. Coordinate masonry cutting to achieve neat openings for boxes.
- C. Low Voltage
 - 1. Recessed (1/4" maximum) outlet boxes in masonry, concrete or tile construction shall be minimum 4-11/16" square, 2-1/8" deep. Device covers shall be square-cut except rounded corner plaster rings are allowed in drywall applications. Angle cut plaster rings are not permitted. Coordinate masonry cutting to achieve neat openings for boxes.
- D. Provide knockout closures for unused openings.
- E. Support boxes independently of conduit except for cast boxes that are connected to two (2) rigid metal conduits, both supported within twelve (12) inches of box.
- F. Use multiple-gang boxes where more than one device are mounted together; do not use sectional boxes. Provide non-metallic barriers to separate wiring of different voltage systems.
- G. Install boxes in walls without damaging wall insulation.
- H. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- I. Ceiling outlets shall be four (4) inch square, minimum 2-1/8 inch deep except that concrete boxes and plates will be approved where applicable. Position outlets to locate luminaires as shown on reflected ceiling plans.
- J. In inaccessible ceiling areas, position outlets and junction boxes within 6 inches of recessed luminaire, to be accessible through luminaire ceiling opening.
- K. Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.

- L. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.
- M. Provide cast ferroalloy or aluminum outlet boxes in exterior and wet locations.
- N. Surface wall outlets shall be four (4) inch square with raised covers for one (1) and two (2) gang requirements. For three (3) gang or larger requirements, use gang boxes with non-overlapping covers.

3.6 FLOOR BOX INSTALLATION

- A. Set boxes level and flush with finish flooring material and parallel to the walls of the room.

3.7 PULL AND JUNCTION BOX INSTALLATION

- A. Locate pull boxes and junction boxes above accessible ceilings, in unfinished areas or furnish and install access panels in non-accessible ceilings where boxes are installed. All boxes are to be readily-accessible.
- B. Support pull and junction boxes independent of conduit.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the labeling of power, lighting, general wiring, signal, fire alarm, and cabling.

1.2 REFERENCES

- A. Applicable provisions of Division 1 shall govern work under this section.
- B. Section 260519 – Low Voltage Electrical Power Conductors and Cables
- C. Section 260523 – Control Cables
- D. Section 271010 – Telecommunication Cabling Systems

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Labels: All labels shall be permanent, and machine generated. NO HANDWRITTEN OR NON-PERMANENT LABELS ARE ALLOWED. Exception: back side of device plates and junction boxes may use handwritten, legible labeling on box covers, unless specifically prohibited by other specification sections.
- B. Cable label size shall be appropriate for the conductor or cable size(s), outlet faceplate layout and patch panel design. All labels shall be self-laminating, white/transparent vinyl and be wrapped around the cable or sheath. Labels for power conductors (600V and lower) shall be cloth-type. Flag type labels are not allowed. The labels shall be of adequate size to accommodate the circumference of the cable being labeled and properly self-laminate over the full extent of the printed area of the label.
- C. Nameplates: Engraved three-layer laminated plastic, white letters on a black background. Emergency system (Level 1 and Level 2) shall use white letters on red background.
- D. Tape (phase identification only): Scotch #35 tape in appropriate colors for system voltage and phase.
- E. Adhesive type labels not permitted except for phase and wire identification. Machine generated adhesive labels shall be permitted for device plates, 4-11/16" and smaller junction boxes, fire alarm and control devices.

PART 3 - EXECUTION

3.1 GENERAL

- A. Where mixed voltages are used in one building (e.g. 4160 volt, 480 volt, 208 volt) each switch, switchboard, junction box, equipment, etc., on each system must be labeled for voltage in addition to other requirements listed herein.
- B. All branch circuit and power panels must be identified with the same symbol used in circuit directory in main distribution center.
- C. Clean all surfaces before attaching labels with the label manufacturer's recommended cleaning agent.
- D. Install all labels firmly as recommended by the label manufacturer.
- E. Labels shall be installed plumb and neatly on all equipment.
- F. Install nameplates parallel to equipment lines.
- G. Secure nameplates to equipment fronts using screws, rivets or manufacturer approved adhesive or cement.
- H. Embossed tape will not be permitted for any application.

3.2 JUNCTION AND PULLBOX IDENTIFICATION

- A. Provide circuit numbers, and source panel designations for power wiring. Other system shall be identified as shown on details or approved shop drawings. Temperature control shall identify the source.

3.3 POWER AND CONTROL WIRE IDENTIFICATION

- A. Provide wire markers on each conductor in panelboard gutters, pull boxes, outlet and junction boxes, and at load connection. Identify with branch circuit or feeder number for power and lighting circuits, and with control wire number as indicated on schematic and interconnection diagrams or equipment manufacturer's shop drawings for control wiring.
- B. All wiring shall be labeled within 2 to 4 inches of terminations. Each end of a wire or cable shall be labeled as soon as it is terminated including wiring used for temporary purposes.

3.4 WIRING DEVICE IDENTIFICATION

- A. Wall switches, receptacles, occupancy sensors, wall dimmers, device plates and box covers, poke-through fittings, access floor boxes, photocells and time clocks shall be identified with circuit numbers and source. In exposed areas, identifications should be made inside of device covers, unless directed otherwise. Use machine-generated labels, or neatly hand-written permanent marker.
- B. Provide identification on receptacle cover plate. Identify with circuit number and source. Labeling shall be permanent and machine generated. Label shall have 1/4" black text on a clear label.

3.5 NAMEPLATE ENGRAVING

- A. Provide nameplates of minimum letter height as scheduled below.
- B. Panelboards, Switchboards and Motor Control Centers: 1 inch; identify equipment designation. 1/2 inch; identify voltage rating, source and room location of the source.
- C. Equipment Enclosures: 1 inch; identify equipment designation. 1/2 inch; identify voltage rating, source and room location of the source where applicable.
- D. Circuit Breakers, Switches, and Motor Starters/VFD's/Soft Starters in Panelboards or Switchboards or Motor Control Centers: 1/2 inch; identify circuit and load served, including location.
- E. Individual Circuit Breakers, Disconnect Switches, Enclosed Switches, Motor Starters, VFD's and Soft Starters: 1/2 inch; identify source and load served.
- F. Junction boxes: 1 inch; identify system source(s) and load(s) served. Junction boxes may be neatly identified using a permanent marker.

3.6 PANELBOARD DIRECTORIES

- A. Typed directories for panels must be covered with clear plastic, have a metal frame. Room number on directories shall be Owner's numbers, not Plan numbers unless Owner so specifies.

3.7 ARC FLASH LABELS

- A. Install ARC FLASH WARNING signs on all switchboards, panelboards, and motor control centers.

3.8 FIRE ALARM DEVICES

- A. Install computer printed labels on all addressable fire alarm devices indicating the device loop and address. Text shall be black on a clear label.
- B. Coordinate label location on devices with the Owner prior to installation.

END OF SECTION 260553

SECTION 260800 - COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide the commissioning of electrical systems indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Commissioning of this project shall meet the current adopted version of the International Energy Conservation Code.

1.2 QUALITY ASSURANCE

- A. Installer and Manufacturer Qualifications
 - 1. Installer shall have an established working relationship with Control System Manufacturer.
 - 2. Installer shall have successfully completed Control System Manufacturer's control system training. Upon request, Installer shall present record of completed training including course outlines.
- B. Commissioning Agent Qualifications
 - 1. The testing commissioning agent will need to have a certification that has been accredited by the American National Standards Institute (ANSI).
- C. Regulatory Requirements
 - 1. Work, materials, and equipment shall comply with the most restrictive of local, state, and federal authorities' codes and ordinances or these plans and specifications.
 - a. Current adopted version of the National Electric Code (NEC)
 - b. Current adopted version of the International Building Code (IBC)
 - c. Current adopted version of the International Mechanical Code (IMC)
 - d. ANSI/ASHRAE 135-2010: Data Communication Protocol for Building Automation and Control Systems (BACNET)
 - e. Current adopted version of the International Energy Conservation Code
 - f. ASHRAE 90.1-2010: Energy Standard for Buildings

1.3 SUMMARY

- A. Section includes commissioning process requirements for electrical systems, assemblies, and equipment.
- B. Related Sections
 - 1. Division 01 Section "General Commissioning Requirements" for general commissioning process requirements.
- C. Start up of equipment and systems such as emergency power and lighting systems, etc. shall be done by or with a trained manufacturer's representative who can check and report on all

items such as installation, operation, and see that the equipment or system starts and operates properly.

- D. Testing shall be performed at the convenience of the Owner and with the Owner's representatives present and the manufacturer's representative of the equipment and/or system present.

1.4 ABBREVIATIONS

- A. The following are common abbreviations used in the Specifications and in the Commissioning Plan. Definitions are found in Section 1.5.

A/E- Architect and Design Engineers	GC- General Contractor
CxA- Commissioning Authority	MC- Mechanical Contractor
TC- Temperature Controls Contractor	OR- Owner's Representative
CM- Construction Manager	PC- Prefunctional Checklist
Cx- Commissioning	PM- Project Manager (of the Owner)
Cx Plan- Commissioning Plan	FPT- Functional Performance Test
EC- Electrical Contractor	TAB- Test and Balance Contractor

1.5 DEFINITIONS

- A. Acceptance Phase: Phase of construction after startup and initial checkout when functional performance tests, O&M documentation review and training occurs.
- B. Approval: Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes in accordance with the contract documents.
- C. Architect/Engineer (A/E): The prime consultant (architect) and sub-consultants who comprise the design team, generally the HVAC mechanical designer/engineer and the electrical designer/engineer.
- D. Basis of Design (BOD): A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- E. Commissioning Authority (CxA): The entity identified by the OR/PM who leads, plans, schedules, and coordinates the commissioning team to implement the commissioning process.
- F. Commissioning Plan: An overall plan that provides the structure, schedule and coordination planning for the commissioning process.
- G. Construction Manager (CM): The manager contracted by the owner or architect. Generally responsible for the overall coordination of the project.
- H. Contractors: The subcontractors to the GC who provide and install building components and systems.
- I. Deferred Functional Tests: Tests that are performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions that disallow the test from being performed.

- J. Deficiency: A condition in the installation or function of a component, piece of equipment or system that is not in compliance with the contract documents (that is, does not perform properly or is not complying with the design intent).
- K. Functional Performance Test (FPT): Test of the dynamic function and operation of equipment and systems using manual or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes. The CxA develops the functional test procedures in written form. The CxA performs or directs, coordinates, oversees, and documents the actual testing. The contractor performs the functional tests when requested by the CxA. FPT's are performed after startup are complete.
- L. General Contractor (GC): The prime contractor for this project. Generally responsible for the overall coordination of the project.
- M. Monitoring: The recording of parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of control systems.
- N. Observation/Issue Log: The log of all commissioning related items that require current or future attention. This form is used to track all action taken on each item listed overtime until the items are resolved.
- O. Owner's Project Requirements (OPR): A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
- P. Phased Commissioning: Commissioning that is completed in phases (by floors, for example) due to the size of the structure or other scheduling issues, in order to minimize the total construction time. Commissioning shall be provided for each phase according to the schedule for that phase. Some repetition and/or remobilization may be required.
- Q. Sampling: Functionally testing only a fraction of the total number of identical or near identical pieces of equipment.
- R. Startup: The initial starting or activating of dynamic equipment.
- S. Trending: Monitoring using the building control system.
- T. Warranty Period: Warranty period for entire project, including equipment components. Warranty begins at substantial completion and extends for at least one year, unless specifically noted otherwise in the contract documents and accepted submittals.

1.6 CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor's commissioning responsibilities are as follows (all references apply to commissioned systems and equipment only):
 - 1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation.
 - 2. Cooperate with the CxA for resolution of issues recorded in the observation/issue log.
 - 3. Attend commissioning team meetings.
 - 4. Include the cost of commissioning assistance in the contract price.

5. Address incomplete work before functional performance testing.
6. Provide skilled technicians to execute startup of equipment. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.
7. Provide skilled technicians to participate and assist under the direction of the CxA for specified equipment. Provide manufacturer's representative as required and as specified in the specification.
8. Submit approved equipment data sheets on systems to be commissioned to the CxA for review.
9. Submit all approved equipment data sheets, approved sequence of operations to the CxA.
10. Provide all training as specified.

1.7 CxA'S RESPONSIBILITIES

- A. The CxA is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CxA may assist with problem-solving, non-conformance or deficiencies, but ultimately that responsibility resides with the GC and the A/E. The primary role of the CxA is to develop and coordinate the execution of a testing, observe and document performance—that systems are functioning in accordance with the documented design intent and contract documents. The contractors will provide all tools or the use of tools to start, check-out and functionally test equipment and systems.
1. Coordinates and directs the commissioning activities using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
 2. Coordinate the commissioning work with the GC/CM to ensure that commissioning activities are being scheduled into the master schedule.
 3. Revise, as necessary, the commissioning plan.
 4. Plan and conduct a commissioning kickoff meeting and other commissioning meetings.
 5. Request and review additional information required to perform commissioning tasks, including O&M materials, contractor start-up and checkout procedures.
 6. Write the functional performance test procedures for equipment and systems.
 7. Analyze any functional performance trend logs and monitoring data to verify performance.
 8. Perform or direct, witness and approve manual functional performance tests. Coordinate retesting as necessary until satisfactory performance is achieved.
 9. Maintain the observation/issue log and distribute to the team.

10. Review the training of the owner's operating personnel when defined in the contract documents.
11. Provide a final commissioning report.
12. Perform or direct, witness and supervise required seasonal or deferred testing and deficiency corrections.

1.8 COMMISSIONING DOCUMENTATION

- A. Provide the following information to the CxA for inclusion in the commissioning plan:
1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
 2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
 3. Process and schedule for completing prefunctional checklists and manufacturer's prestart and startup checklists for electrical systems, assemblies, equipment, and components to be verified and tested.
 4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
 5. Certificate of readiness certifying that electrical systems, subsystems, equipment, and associated controls are ready for testing.
 6. Test and inspection reports and certificates.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 TESTING PREPARATION

- A. Certify that electrical systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- B. Certify that electrical instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
- C. Certify that testing and adjusting procedures have been completed and that testing and adjusting reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified on checklists.

- F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
- G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.2 TESTING VERIFICATION

- A. Prior to performance of testing Work, provide copies of reports, sample forms, checklists, and certificates to the CxA.
- B. Notify the CxA at least 10 days in advance of testing Work, and provide access for the CxA to witness testing Work.
- C. Provide technicians, instrumentation, and tools to verify testing of electrical systems at the direction of the CxA.
 - 1. The CxA will notify testing Contractor 10 days in advance of the date of field verification. Notice will not include data points to be verified.
 - 2. The testing Contractor shall use the same instruments (by model and serial number) that were used when original data were collected.
 - 3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing and adjusting report.
 - 4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.3 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.
- B. Scope of electrical testing shall include all components, equipment, and systems as outlined in outlined later in this section.
- C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response to input signals.
- D. The CxA along with the Electrical Subcontractor shall prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.
- E. Tests will be performed using design conditions whenever possible.
- F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
- G. The CxA may direct that set points be altered when simulating conditions is not practical.

- H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.
- I. If tests cannot be completed because of a deficiency outside the scope of the electrical system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.

3.4 AUTOMATIC TRANSFER SWITCHES

- A. All automatic transfer switches shall be tested by deenergizing and energizing the power feeders in proper sequence to ensure correct operation.

3.5 EMERGENCY POWER SYSTEMS

- A. Emergency power systems shall be tested under load by deenergizing the normal power feeders to verify proper transfer. All of the alarm systems will be tested to verify proper operation. The starting battery will be tested to ensure compliance with the manufacturer's specifications.

3.6 FIRE ALARM SYSTEM

- A. All fire alarm sequences of operation shall be initiated or simulated to verify proper operation.

3.7 LIGHTING DIMMING AND CONTROL SYSTEMS

- A. All dimming systems shall be operated throughout its entire range with all functions operated to verify proper operation.
- B. All occupancy sensors shall be tested for proper operation over the entire intended zone of coverage.

3.8 DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS

- A. Documentation: The CxA shall perform or direct, witness, and document the results of all functional performance tests using the specific procedural forms developed for that purpose. The CxA will include the filled out forms in the final report.
- B. Non-conformance
 - 1. The CxA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and reported to the GC/CM and the contractors in the observation/issue log.
 - 2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA.
 - 3. As testing progresses and deficiencies are identified, the CxA shall discuss such deficiencies with the commissioning team and responsible contractors.
 - a. When there is no dispute on the deficiency and the contractor accepts responsibility to correct the deficiency, the CxA will document it in the observation/issue log and require the responsible contractor to respond to the item

in the log. The contractor shall reschedule the test and the test is repeated by the CxA.

- b. If there is a dispute about a deficiency, specifically whether or not it is a deficiency, the dispute shall be documented in the observation/issue log. Resolutions will be made at the lowest management level possible. Other parties will be brought into the resolution discussions as needed. Final authority is with the A/E. Final acceptance authority is with the OR/PM. The CxA will document the resolution process. Once the resolution has been accepted, the contractor corrects the deficiency, responds in the observation/issue log certifying the equipment is ready to be retested, and sends the log back through the GC/CM to the CxA. The contractor shall reschedule the test and the test is repeated by the CxA until satisfactory performance is achieved.

C. Cost of Retesting

1. The cost for the contractor to retest a functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the GC/CM.

D. Failure Due to Manufacturer Defect: If 10%, or three, whichever is greater, of identical pieces of equipment fail to perform to the contract documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance specification, all identical units may be considered unacceptable by the A/E or CxA. In such case, the contractor shall provide the OR/PM or GC/CM with the following:

1. Within one week of notification from the OR/PM or GC/CM, the contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the OR/PM or GC/CM within two weeks of the original notice.
2. Within two weeks of the original notification, the contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
3. The A/E will determine whether a replacement of all identical units or a repair is acceptable.
4. Two examples of the proposed solution will be installed by the contractor and the A/E will be allowed to test the installations for up to one week, upon which the A/E will decide whether to accept the solution.
5. Upon acceptance, the contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

E. Approval: The CxA notes each satisfactorily demonstrated function on the test form. Final approval of the functional tests is made after review by the CxA and by the OR/PM, following recommendations by the A/E.

END OF SECTION 260800

SECTION 260943 - DIGITAL LIGHTING CONTROLS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all work required to provide and install the lighting control components, conductors, cabling and raceways to form a distributed-type digital lighting control system. The lighting control system shall provide time-based, sensor-based (occupancy and/or daylight) and manual lighting controls, as indicated on plans and schedules.
- B. Section includes:
 - 1. Zone controllers
 - 2. Manual controls
 - 3. Digital occupancy sensors
 - 4. Digital photo sensors
 - 5. Network components
 - 6. Programming tools
 - 7. Accessories
 - 8. Wiring

1.2 REFERENCES

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this Section.
- B. Specification 260923 Lighting Control Devices
- C. Specification 260519 Low-Voltage Electrical Power Conductors and Cables
- D. Specification 260523 Control Cables
- E. Refer to Digital Lighting Controls Schedule, Digital Lighting Controls - Zone Control Schedule and Digital Lighting Controls - Switch Schedule on plans.

1.3 SUBMITTALS

- A. Product data: Provide a detailed cut sheet with model number(s) and included options clearly noted for each system component type, except cabling. Indicate dimensions.
- B. Shop drawings:
 - 1. CAD drawings:

- a. Selected manufacturer shall request CAD floor plans from the Engineer and layout all system devices on the CAD plan, except for cabling. A legend shall be provided on the CAD plan to aid in quick identification of each device and function of that device.
 - b. For occupancy and photo sensors: Selected manufacturer shall review ceiling heights, room obstructions (e.g. ceiling fans) and room finishes shown on the architectural plans. Where a conflict arises between the design on plan and selected manufacturer's recommendations, the manufacturer's recommendation shall dictate the type and quantity of devices used in that space.
 - c. The locations and quantities of occupancy and photo sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with those sensors. The Contractor shall include in their bid the additional occupancy sensors needed to properly and completely cover the respective room.
2. One-line block diagram: Project specific with nomenclature matching plans. Show interconnections between components specified in this section and necessary system interfaces. Indicate required communication cabling types.
 3. Wiring diagrams: Power, signal, and control wiring. Coordinate nomenclature with block diagram.
 4. Custom button labels: Submit a custom button label form for each manual switch requiring custom labels.
- C. Warranties: Submit sample warranty letter meeting requirements specified in this section.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Submit under requirement and format listed in Specification 260500 Common Work Results
- B. Include the following additional documentation:
 1. Copy of on-site system startup reports.
 2. All required submittals for this section, updated to reflect required changes from review comments.
 3. System device addresses and programmed settings (e.g. an occupancy sensor time delay).
 4. Mark locations of zone controllers and interfaces on the as-built drawings.
 5. Warranty letter(s) indicating dates of coverage and warranty claim contact information.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Digital lighting control system components shall be sourced from a single manufacturer.
 1. Exception: Occupancy sensors and emergency relay devices, tested with and approved by the manufacturer of the selected digital lighting control system, may be from different manufacturer. However, all occupancy sensors (digital and analog) must be from the same manufacturer.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6 DEFINITIONS

- A. BAS: Building automation system.
- B. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling and power-limited circuits.
- C. RS-232: A serial network protocol complying with TIA/EIA-232.

1.7 PLAN NOTATION

- A. Luminaire zoning notation on plans:
 - 1. Basic room zoning
 - a. Rooms with Digital Lighting Control Devices ('L' subscript), but without luminaire subscripts indicates that room contains either one zone of dimmed control or two or fewer zones of switched control. The luminaire subscripts have been omitted to maintain drawing clarity.
 - 2. Complex room zoning
 - a. To better define zoning intent in areas containing two or more dimmed lighting zones or three or more switched lighting zones, luminaire subscripts (e.g. 'a1', 'a2', etc) have been shown next to each luminaire on plan.
 - b. Luminaires with matching subscripts shall be controlled together as one lighting control zone. A luminaire with two subscripts (e.g. 'a1,a2') indicates that luminaire belongs to two independent lighting control zones to allow for multi-level or step-dimming control.
- B. Manual controls
 - 1. Basic rooms: Switch breaks and line work shown on plans will identify control within the room.
 - 2. Complex rooms: Each low voltage manual switch (\$_{LV}) is assigned a unique three digit number (e.g. '001') on plan. Refer to the Digital Lighting Control - Switch Schedule on plans for quantity of buttons, control type and zones controlled. Switch breaks have been omitted from the plans for these types of rooms.
- C. Digital occupancy sensors
 - 1. Basic rooms: All the luminaires in the room shall be controlled by the occupancy sensor(s) shown in that room. Subscripts indicating zones controlled have been omitted from the occupancy sensor.
 - 2. Complex rooms: Subscripts of lighting zones controlled by each occupancy sensor will be indicated on plan below the occupancy sensor symbol (e.g. 'a1,a2'). Refer to Digital Lighting Controls – Zone Control Schedule on plan for additional information.

D. Digital photo sensors

1. Basic rooms: When a photo sensor is shown in a room containing luminaires without subscripts, all the luminaires in the room shall be controlled (i.e. switched or dimmed) by the photo sensor shown in that room as a common group. Subscripts indicating zones controlled have been omitted from the occupancy sensor.
2. Complex rooms: Subscripts of lighting zones controlled by each occupancy sensor will be indicated on plan below the photo sensor symbol (e.g. 'a1, a2'). Refer to Digital Lighting Controls – Zone Control Schedule on plan.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site. Store and protect under provisions of Specification 260500 General Work Results.

1.9 WARRANTY

- A. All equipment shall be warranted to be free of defects in materials and workmanship by the manufacturer for the period of five (5) years from the date of successful system startup.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Refer to Digital Lighting Control Schedule on plan.

2.2 ZONE CONTROLLERS

- A. Controls one or more luminaires in one or more independent lighting control zones. Contains one or more 20-amp, 120/277 volt relays in a plenum rated enclosure suitable for mounting to a junction box or luminaire. Also serves as a connection point for system peripheral devices (e.g. digital occupancy sensors, digital photo sensor, manual controls) serving room.
- B. Provide a zone controller with 0-10 VDC dimming when load(s) controlled are dimmable. Zone controllers ARE NOT shown on plans. Selected manufacturer shall provide in quantities as needed to meet zoning requirements shown on plans and schedules.

2.3 MANUAL CONTROLS

- A. Low voltage manual switches
 1. Field-programmable, momentary-contact, plastic push buttons or rocker switches with LED light for each button indicating status. Provide remote interface and remote power supply, if necessary, for proper switch operation.
 2. Multiple switches shall be ganged together, if needed, to provide control indicated on plans at each manual control location.
 3. Non-\$LV switches: Standard "ON", "OFF", "RAISE" or "▲", and "LOWER" or "▼" labels are acceptable. Custom button labels are not required.

4. \$LV switches: Provide custom button labels as indicated on Digital Lighting Control System – Switch Schedule on plan.
5. Device color shall be white with cover plate to match Specification 262726 Wiring Devices

B. Handheld remote

1. Handheld remote with field-programmable buttons and infrared transceiver for manual control of lighting zones within a room. Battery powered.

C. Refer to Digital Lighting Controls – Switch Schedule for button quantity, purpose and lighting zones controlled by each manual control.

2.5 DIGITAL OCCUPANCY SENSORS

- A. Device shall be designed for use with the digital lighting control system.
- B. Sensors to be low voltage devices and shall be powered from a zone controller.
- C. Provide with field-programmable time delay.
- D. Provide with an LED as a visual means that motion is being detected during both testing and normal operation.
- E. Provide mounting hardware suitable for specified mounting location.
- F. Refer to Digital Lighting Controls – Switch Schedule and floor plans for additional information.

2.6 DIGITAL PHOTO SENSORS

- A. Interior photo sensor: Ceiling mounted digital sensor that provides light level readings directly to the zone controller for automatic daylight harvesting. Powered by and connected to the zone controller.
- B. Skylight photo sensor: Photo sensing device specifically design for use in skylight sidewall connected to the network via suitable input module. Powered by and connected to the zone controller.
- C. Exterior photocell: Analog photo sensing device specifically designed for exterior use and connected to the system via a suitable interface module. Photocell to have weatherproof housing with visor for shading and lens protection. Adjustable light level sensitivity.
- D. Refer to Digital Lighting Controls – Switch Schedule and floor plans for additional information.

2.7 NETWORK COMPONENTS

- A. Network Bridges
 1. Allows a zone controller and stand-alone system components to become part of a building-wide lighting control network. Converts communication via universal protocol (e.g. BACnet MS/TP) to system-specific protocol.

2. Provide network bridges to connect all digital lighting control system devices to form a networked digital lighting control system.
3. Network bridges ARE NOT shown on plans. Provide in quantities as needed.

B. Network segment manager:

1. Connects network bridges on the project to form a segment network. Allows for time-of-day and astronomical time clock scheduling of zones, plus monitoring and programming of all devices, including but not limited to digital occupancy sensors, digital daylight sensors and manual wall stations using any computer with internet access and a compatible web browser.
2. Contains a web-browser user interface and connects to building network. Supports third party integration with BAS via BACnet IP.
3. Network segment managers ARE NOT shown on plans.

C. Network devices above ARE NOT shown on plan. Provide components listed above in quantities as needed for a complete and functioning system.

2.8 PROGRAMMING TOOLS

- A. Wireless configuration tool: Handheld device with LCD that allows for configuration of all system devices, one at a time, via device infrared transceivers.
- B. Web-based programming: Provides connection via any internet-connected computer with username/password protection. Allows for multiple users at one time. No local software or user licenses required on the user's computer. Connects to user's local area network (LAN) or via the BAS (BACnet MS/TP protocol). GUI on website allows for programming and monitoring of all networked digital lighting control system components. Requires data connection to LAN with Ethernet static IP address, plus 120 volt receptacle.
- C. Programming tool IS NOT shown on plans. Furnish programming tool above for system programming.

2.9 ACCESSORIES

- A. RS-232 interface: Serial device that allows for control of the digital lighting system by a third-party control system (e.g. A/V system) and integration of motorized shades. Built-in protocol allows for automatic response to message requests from third party devices. RS-232 interfaces ARE shown on plans.
- B. Digital I/O interface: Two (2) input and one (1) 24 VDC, 1 amp isolated SPDT relay with N.O. and N.C. output for integration with third-party devices, such as input from a BAS time clock or output to a piece of HVAC equipment via BAS (e.g. turn up HVAC equipment when occupancy sensor senses occupancy). Digital I/O interfaces ARE shown on plans. Isolated output relay: 24 VDC, 1 amp isolated SPDT relay with N.O. and N.C. output only for control of third-party HVAC equipment. Output relays ARE shown on plans.
- C. Infrared partition sensor: Utilizes infrared technology to detect the presence of a moveable partition. Provide necessary interface device that inputs the partition position signal into the digital lighting control system. Partition sensors ARE shown on plans.

- D. Analog occupancy sensor interface: Allows for third-party and analog occupancy sensors to be connected into the digital lighting control system. Analog interfaces ARE NOT shown on plans.
- E. Emergency lighting control devices: Refer to Specification 265200 Emergency Lighting for requirements.

2.10 WIRING

- A. Line-voltage conductors: Comply with Specification 260519 Low-Voltage Electrical Power Conductors and Cables.
- B. Digital lighting control system cables: Comply with selected digital lighting control manufacturer's recommendations. All low voltage communication cabling shall be plenum rated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Zone controllers

1. Rooms with accessible ceiling (e.g. lay-in grid): Install zone controller for each room above accessible ceiling directly above a manual control location. Mark location of zone controller on as-built drawing.
2. Rooms with open ceilings: Install zone controller in adjacent room with accessible ceiling. Mark location of zone controller on as-built drawing.
 - a. Exception: Zone controllers for back-of-house rooms (e.g. storage room) with open ceilings may be installed exposed on wall near bottom of structure and above manual control location.
3. Rooms with inaccessible (e.g. gypsum) ceilings: Install zone controller in adjacent room with accessible ceiling or adjacent back-of-house room with open ceiling. Mark location of zone controller on as-built drawing.
4. Connect a network bridge to each zone controller, per manufacturer's recommendation, allowing all the downstream devices (e.g. occupancy sensors, photo sensors, manual controls) to become network devices. Install the network bridge adjacent to each zone controller. Connect all network bridges, per manufacturer's recommendations, to form a complete digital lighting control network.

B. Manual Controls

1. Install low voltage wall stations at locations shown on plans. All cabling shall be per manufacturer's recommendation. Connect to zone controller.
2. Program each button function per Digital Lighting Control System – Switch Schedule on plans.
3. Install custom button labels for $\$_{LV}$ wall stations and suitable cover plates for all manual controls.

C. Digital Occupancy Sensors

1. Connect to zone controller per manufacturer's recommendation.
2. It shall be the contractor's responsibility to locate and aim sensors in the correct location required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas per the manufacturer's recommendations. Rooms shall have 90% - 100% coverage (minor motion in office environments).
3. Ceiling sensors shall not be installed within four (4) feet of HVAC air diffusers or heating blowers.
4. Provide a minimum 6' service loop in the cable at the ceiling sensor location to allow for sensor relocation if necessary.

D. Digital Photo Sensors

1. Install the photo sensor at the location recommended by the manufacturer and connect to the system per manufacturer's recommendations utilizing any necessary interface.
2. Daylight harvesting shall begin only after the target foot-candle level(s) in the room has been reached. Light levels for initiating daylight harvesting of each zone shall be field programmed by the factory authorized representative during the start-up process.

E. Network components

1. Install a network bridge near the zone controllers for all zone.
2. Install network segment manager(s) on a wall in MDF or IDF closet. Connect to dedicated, spare 20 amp, 1-pole circuit breaker in nearest 208/120 volt branch panel. Provide one (1) building network data drop to each segment manager meeting requirements of Specification 271500 Communications Horizontal Cabling. Coordinate internet access/IP address with owner's IT staff.

F. Accessories

1. RS-232 interface
 - a. All lighting scene presets programmed by the factory-authorized technician of the digital lighting control system shall be made available to the A/V contractor for easy integration.
2. Infrared partition sensor: Install device at location shown on plans. Partition sensor interface shall be located above nearest accessible ceiling. Digital lighting control system shall automatically reconfigure manual and automatic lighting controls based on partition(s) position.
3. Analog occupancy sensor interface: Install device above accessible ceiling in rooms with analog occupancy sensors. Quantity of interfaces needed determined by selected manufacturer based on lighting control requirements for the room.

4. Emergency lighting control devices: Override all dimming of life safety luminaires shown on plan that are part of the digital lighting control system upon normal power loss using UL924 listed device. Provide devices in quantities as needed.

3.2 WIRING INSTALLATION

- A. Install all low voltage cabling in raceways except where installed above accessible ceilings.
- B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Separate power-limited and non-power-limited conductors according to conductor manufacturer's written instructions. Provide a physical barrier between

3.3 PRE-INSTALLATION MEETING

- A. A factory-authorized technician from the selected system manufacturer shall meet with the electrical contractor on-site prior to installation of the system to step through the installation process, important installation requirements and answer contractor questions. SYSTEM START-UP
- A. Upon completion of the installation by the contractor, the installation of the devices shall be reviewed on-site by the manufacturer's factory authorized technician. This visit may be combined with the occupancy sensor startup and training visit. The owner shall be included in determining the initial programming of time sweeps and similar functions.
- B. The Electrical Contractor shall provide both the manufacturer and the Electrical Engineer with 10 working days written notice of the scheduled start-up date.
- C. Factory-authorized technician shall utilize the wireless configuration tool to program each digital lighting control system device per plans and owner input.
- D. Factory-authorized technician shall setup the web-based software provided with the digital lighting control system to fit the project and then program each system device per plans and owner input.

3.5 OWNER TRAINING

- A. After system start-up, the factory-authorized technician shall train the owner's representatives in the system architecture, components, programming and any necessary maintenance for the system. This training may take place during the system start-up trip. Operations and maintenance manuals shall be delivered to the owner prior to the owner training being scheduled.

3.6 ADJUSTING

- A. When requested within twelve (12) months of date of Substantial Completion, provide on-site assistance in adjusting sensors and to assist Owner's personnel in making program changes to suit actual occupied conditions. Provide one (1) visit to Project during other than normal occupancy hours for this purpose.

END OF SECTION 260943

SECTION 262416 – PANELBOARDS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the main, distribution and branch circuit panelboards indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. Applicable provisions of Division 1 govern work under this Section.

1.3 SUBMITTALS

- A. Include outline and support point dimensions, voltage, main bus ampacity, and integrated short circuit ampere rating.
- B. Circuit breaker enumeration (frame, ATE, poles, I.C.): Indicate if circuit breakers are suitable for the panelboards' Fully Rated Equipment Rating, or where acceptable, are series connected devices that have been test verified and listed with UL (include documentation proving the compatibility of the proposed circuit breaker combinations). Circuit breakers do not have to be listed as series connected devices when all of the circuit breaker interrupting ratings are equal to, or greater than, the short circuit rating of the panelboard.
- C. When indicated on the panelboard schedule, a coordinated selective scheme between the main circuit breaker and branch/feeder circuit breakers so that under fault conditions the branch/feeder circuit breaker clears the fault while the main circuit breaker remains closed.
- D. Accessories.

1.4 OPERATION AND MAINTENANCE DATA

- A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver panelboards in factory-fabricated water-resistant wrapping..
- B. Handle panelboards carefully to avoid damage to material components, enclosure and finish.
- C. Store in a clean, dry space and protected from the weather.

1.6 EXTRA MATERIALS

- A. Keys: Furnish two (2) keys for each panelboard to Owner.

PART 2 - PRODUCTS

2.1 MAIN AND DISTRIBUTION PANELBOARDS

- A. Panelboards: Circuit breaker type.
- B. UL label "SUITABLE FOR USE AS SERVICE EQUIPMENT" where used as service equipment.
- C. Enclosure: NEMA Type 1. Minimum cabinet size: 5-3/4 inches deep; 20 inches wide, with 5" minimum gutter space top and bottom. Constructed of galvanized code gauge steel.
- D. Provide cabinet front with hinged door with flush lock. Front cover shall be hinged to allow access to wiring gutters without removal of panel trim. Hinged trim shall be held in place with screw fasteners. Finish in manufacturer's standard gray enamel.
- E. Provide metal directory holders with clear plastic covers.
- F. Provide panelboards with copper bus (phase buses, bus fingers, etc.), ratings as scheduled on Drawings. Provide ground bars in all panelboards. Neutral and ground bars can be dual rated ALCU9. All spaces shall have bus fully extended and drilled for the future installation of breakers.
- G. Circuit breakers shall be 125 VDC/240 AC rated for nominal 208Y/120V panels and 480Y/277V rated for nominal 480Y/277V panels. Minimum interrupting ratings shall be 10,000 amperes for 120/208V circuits and 14,000 amperes for 277/480V circuits, unless higher rating noted on the Contract Documents.
- H. Molded Case Circuit Breakers: Provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits. Breakers 225 ampere through 400 ampere shall have continuously adjustable magnetic pick-ups of approximately five to ten times trip rating.
- I. Circuit breakers shall be bolt-on type with common trip handle for all poles. No handle ties of any sort will be approved.
- J. Shunt trip breakers shall be provided where indicated.
- K. Ground fault breakers shall be provided where indicated.

2.2 BRANCH CIRCUIT PANELBOARDS

- A. Lighting and Appliance Branch Circuit Panelboards: Circuit breaker type.
- B. Enclosure: Type 1. Minimum cabinet size: 5-3/4 inches deep; 20 inches wide with 5" minimum gutter space top and bottom. Constructed of galvanized code gauge steel.
- C. Provide surface cabinet fronts with concealed trim clamps, concealed hinge and flush cylinder lock all keyed alike. Front cover shall be hinged to allow access to wiring gutters without removal of panel trim. Hinged trim shall be held in place with screw fasteners. Finish in manufacturer's standard gray enamel.
- D. Provide flush cabinet fronts with concealed trim clamps, concealed hinge and flush cylinder lock all keyed alike. Finish in manufacturer's standard gray enamel.

- E. Provide metal directory holders with clear plastic covers.
- F. Provide panelboards with copper bus (phase buses, bus fingers, etc.), ratings as scheduled on Drawings. Provide ground bars in all panelboards. Neutral and ground bars can be dual rated ALCU9. All spaces shall have bus fully extended and drilled for the future installation of breakers.
- G. Minimum System (i.e. individual component) Short Circuit Rating: As shown on the Drawings.
- H. Molded Case Circuit Breakers: Bolt-on type thermal magnetic trip circuit breakers. Provide UL Class A ground fault interrupter circuit breakers where shown on Drawings. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits. Breakers 225 ampere through 400 ampere shall have continuously adjustable magnetic pick-ups of approximately five to ten times trip rating.
- I. Do not use tandem circuit breakers.
- J. Circuit breakers shall be bolt-on type with common trip handle for all poles. No handle ties of any sort will be approved.
- K. Shunt trip breakers shall be provided where indicated.
- L. Ground fault breakers shall be provided where indicated.
- M. All of the panelboards provided under this section shall be by the same manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. See specification section 260529 Hangers and Supports.
- B. Install panelboards plumb with wall finishes.
- C. Height: 6 ft to top.
- D. Install a crimp type stud termination to stranded conductor when terminating on circuit breakers without a captive assembly rated for terminating stranded conductors.
- E. Provide filler plates for unused spaces in panelboards.
- F. See specification section 260553 Identification. Provide typed circuit directory for each branch circuit panelboard. Circuit labels shall indicate actual loads served. Use final room numbers and names of equipment. Do not use panel directories used for construction purposes. Revise directory to reflect circuiting changes required to balance phase loads.
- G. Provide ARC flash identification per NFPA 70E.
- H. Stub five (5) empty 1" conduits to accessible location above ceiling or below floor out of each recessed panelboard. Cap these conduits to prevent material from entering them.
- I. Maintain cabinet interior cleanliness at all times.

- J. Cabinet exteriors shall be maintained free of mud, spray-on insulation, paint spray and all substances not placed on the exterior surface by the panelboard manufacturer.
- K. For panelboards located in areas accessible to the public, paint the exposed surfaces of the trims, doors, and boxes with finishes to match surrounding surfaces after the panelboards have been installed.
- L. Panel cabinets shall not be used as raceways or pull boxes for adjacent equipment. Panel cabinets shall not contain wire splices. Panel wiring shall be installed in a neat and workmanlike manner with wire conforming to the contours of the cabinet. Wire bundles shall be wire tied and installed in a manner to protect wire insulation from cover screws and other sharp edges. All phase conductors shall be labeled with a circuit number, readily visible to the panelboard front without removing the dead front cover. All neutral conductors shall be labeled with the circuit number, which they are associated with, within three inches of their termination point
- M. For circuit breakers being added to existing panelboards, coordinate the breaker type with existing panelboards. Modify the panel directory.
- N. Where new panels are to be installed in existing backboxes, backboxes shall have rust and scale removed from inside. Paint inside of backboxes with rust preventive paint before the new panel interior is installed. Provide new trim and doors for these panels. Covers shall fit tight to the box with no gaps between the cover and the box.

3.2 FIELD QUALITY CONTROL

- A. The Contractor shall circuit the panelboards as shown on the drawings. Measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 10 percent, rearrange circuits in the panelboard to balance the phase loads within 10 percent.
- B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections.

END OF SECTION 262416

SECTION 262702 – EQUIPMENT WIRING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the electrical connections indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment included in this Section may be specified under other Divisions and/or Sections, or furnished by Owner, including, but not limited to:
 - 1. HVAC motors, VFDs, and panels
 - 2. Plumbing motors, VFDs, and panels
 - 3. Elevators
 - 4. Kitchen Equipment
 - 5. Modular Furniture

1.2 REFERENCES

- A. Applicable provisions of Division 1 govern work under this Section.
- B. Section 260533 Raceway and Boxes for Electrical Systems.
- C. Section 260519 Low-Voltage Electrical Power Conductors and Cables.

1.3 COORDINATION

- A. Coordinate all equipment requirements with the various contractors and the Owner. Review the complete set of drawings and specifications to determine the extent of wiring, starters, devices, etc., required.

PART 2 - PRODUCTS

2.1 CORDS AND CAPS

- A. Straight-blade Attachment Plug: NEMA WD 1.
- B. Locking-blade Attachment Plug: NEMA WD 5.
- C. Attachment Plug Configuration: Match receptacle configuration at outlet provided for equipment.
- D. Cord Construction: Oil-resistant thermoset insulated multiconductor flexible cord with identified equipment grounding conductor, suitable for hard usage in damp locations.
- E. Cord Size: Suitable for connected load of equipment and rating of branch circuit overcurrent protection.

2.2 OTHER PRODUCTS

- A. Refer to related sections for other product requirements.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.2 PREPARATION

- A. Review equipment submittals prior to installation and electrical rough-in. Verify location, size, and type of connections. Coordinate details of equipment connections with supplier and installer.

3.3 INSTALLATION

- A. Use wire and cable with insulation suitable for temperatures encountered in heat-producing equipment.
- B. Make conduit connections to equipment using flexible PVC-coated metal conduit.
- C. Install pre-finished cord set where connection with attachment plug is indicated or specified, or use attachment plug with suitable strain-relief clamps.
- D. Provide suitable strain-relief clamps for cord connections to outlet boxes and equipment connection boxes.
- E. Make wiring connections in control panel or in wiring compartment of pre-wired equipment in accordance with manufacturer's instructions. Provide interconnecting wiring where indicated.
- F. Install disconnect switches, controllers, control stations, and control devices such as limit switches and temperature switches as indicated. Connect with conduit and wiring as indicated.
- G. Coolers and Freezers: Cut and seal conduit openings in freezer and cooler walls, floor, and ceilings.

3.4 HVAC AND PLUMBING CONNECTIONS

- A. Provide all power wiring including all circuitry carrying electrical energy from panelboard or other source through starters, variable frequency drives (VFDs), and disconnects to motors or to packaged control panels. Packaged control panels may include disconnects and starters and overcurrent protection. Provide all wiring between packaged control panels and motors.
- B. VFD Installations: Install VFD input wiring and output wiring in separate conduit systems. Do not mix VFD input power and output power, or control wiring in a common raceway.
- C. Provide 120 volts to each temperature control panel. Coordinate requirements with HVAC/DDC contractors.

- D. Unless otherwise specified, all electrical motors and control devices such as aquastats, float and pressure switches, fan powered VAV boxes, switches, electro-pneumatic switches, solenoid valves and damper motors requiring mechanical connections shall be furnished and installed and wired by the Contractor supplying the devices.
- E. Each motor terminal box shall be connected with a minimum 12", maximum 36" piece of flexible PVC-coated metal conduit to a fixed junction box. Conduit must be installed perpendicular to direction of equipment vibration to allow conduit to freely flex.
- F. Check for proper rotation of each motor.

3.5 ELEVATOR CONNECTIONS

- A. Provide fused disconnect switch with auxiliary contacts adjacent to elevator equipment room door. Locate on strike side of door. Provide one (1) for each unit.
- B. Provide all power wiring from source through disconnect to elevator controller to motor.
- C. Provide fused disconnect switch labeled "CAB LIGHTS" adjacent to power disconnect. Extend 120 volt circuit from source through lockable switch to controller. Provide one lockable switch and 120 volt circuit per unit.
- D. Provide 3/4" conduit from controller to nearest telephone wiring closet with CAT-3 (min) four (4) pair cable.
- E. Provide smoke detector in each elevator equipment room or space and at the top of the elevator shaft. Provide an addressable relay in the elevator machine room for connection to the elevator controller.
- F. Provide smoke detector in each elevator lobby. Provide an addressable relay in the elevator machine room for designated floor recall and alternate floor recall for connection to the elevator controller.
- G. Provide vaportight wall mounted fixture (per the luminaire schedule) and duplex receptacle 72" above elevator pit. Provide switch adjacent to access ladder, 36" above door sill. Provide 3-way switches, receptacle, lamp and lampholder on every other floor above lowest level.
- H. All traveling cables, control stations, control station wiring and final control connections at the controller shall be furnished and installed under Division 14 Elevator Work.
- I. Coordinate entire installation with Division 14 Contractor prior to rough-in.

3.6 MODULAR FURNITURE CONNECTIONS

- A. Coordinate delivery of furniture electrical whips with the furniture vendor. Schedule early delivery of whips to allow timely installation prior to furniture delivery.
- B. Coordinate furniture power and voice/data feed points with the furniture vendor prior to rough-in. Furniture vendor to provide dimensioned plans showing wall and floor box locations for furniture feeds. DO NOT dimension floor box locations from electrical plans.
- C. Provide dedicated neutrals for each circuit serving furniture. DO NOT share neutrals. Furniture systems are considered non-linear loads; provide one (1) wire size larger neutrals than phase conductors (i.e. provide #10 AWG neutrals if #12 AWG phase conductors are used).

3.7 EQUIPMENT CONNECTION SCHEDULE

- A. As indicated on the drawings.

END OF SECTION 262702

SECTION 262726 – WIRING DEVICES

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following wiring devices indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment included in this Section
 - 1. Wall switches
 - 2. Receptacles
 - 3. Wall dimmers
 - 4. Device plates and box covers
 - 5. Poke-through service fittings
 - 6. Access floor boxes
 - 7. Photo cells
 - 8. Time clocks

1.2 REFERENCES

- A. Applicable provisions of Division 1 govern work under this Section.

1.3 SUBMITTALS

- A. Provide product data showing model numbers, configurations, finishes, dimensions, and manufacturer's instructions.

1.4 OPERATION AND MAINTENANCE DATA

- A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state, and local requirements, and shall conform to codes and ordinances of authorities having jurisdiction.

- B. Provide factory fabricated wiring devices in the type and electrical rating for the service indicated. Where type and grade are not indicated provide proper selection to correspond with branch circuit wiring and overcurrent protection.
- C. Attachment of wires to devices shall be by screw pressure under the head of binding screws. Arrangements depending on spring pressure or tension are not acceptable. All binding screws shall be brass or bronze.
- D. See Drawings for Device Schedule.

2.2 DEVICE COLOR

- A. White, unless noted otherwise.
- B. Receptacles serving emergency power circuits shall be red.

2.3 WALL SWITCHES

- A. Wall Switches for Lighting Circuits and Motor Loads Under 1/2 HP: Quiet-type single pole through four (4)-way.
- B. Heavy duty use toggle switch, nylon or high impact resistant face and body, rated 20 amperes and 120/277 volts AC.
- C. Switches shall be UL20 Listed and meet Federal Specification WS-896. All switches shall be heavy duty Specification Grade with separate green ground screw.
- D. All switches shall be back and side wired, screw clamp type, suitable for solid or stranded wire up to #10 AWG.

2.4 STRAIGHT-BLADE RECEPTACLES

- A. Nylon or high impact resistant face, NEMA configuration as scheduled on the Drawings.
- B. Receptacles shall be UL498 Listed and meet Federal Specification WC-596.
- C. All receptacles shall be back and side wired, screw clamp type, suitable for solid or stranded wire up to #10 AWG, with a separate green ground screw. Connector-type receptacles are also acceptable.

2.5 TWIST LOCK RECEPTACLES

- A. Nylon or high impact resistant face, NEMA configuration as scheduled on the Drawings.
- B. Receptacles shall be UL498 Listed and meet Federal Specification WC-596.
- C. All receptacles shall be back and side wired, screw clamp type, suitable for solid or stranded wire up to #10 AWG, with a separate green ground screw.

2.6 GROUND FAULT CIRCUIT INTERRUPTER (GFCI) RECEPTACLES

- A. Duplex convenience receptacle, Specification Grade, with integral ground fault current interrupter, auto monitoring (self-test), and line-load reversal function meeting the requirements of UL standard 943 Class A and UL standard 498.
- B. All receptacles installed in outdoor locations, in garages, within six (6) feet of the outside edge of sinks, and in other damp or wet locations shall be GFCI type.

2.7 TAMPER RESISTANT RECEPTACLES

- A. Tamper resistant receptacles shall be similar to standard receptacles except for the addition of a shutter system that blocks access to the phase and neutral plug slots while the device is not in use.

2.8 COMBINATION USB CHARGER RECEPTACLES

- A. Standard AC duplex tamper resistant receptacle with two (2) USB charging ports (Type-A and/or Type-C as noted in the schedule) rated at a minimum of 3.0 A at 5 VDC, UL Listed to UL 498 and UL 1310.
- B. Receptacle shall be UL 498 and UL 1310 Listed and meet Federal Specification WC596.
- C. USB ports shall work with USB 2.0, 3.0, and 3.1 compatible devices.
- D. Device shall have auto grounding feature.
- E. Receptacle shall be back and side wired, screw clamp type, suitable for solid or stranded wire up to #10 AWG, with a separate green ground screw.

2.9 SPECIFIC USE RECEPTACLE

- A. Configuration: As indicated on drawings.

2.10 WALL DIMMERS

- A. Wall Dimmers: Linear slide type or electronic to match the load served. Loads may include the following:
 - 1. Incandescent lighting.
 - 2. Fluorescent lighting.
 - 3. Electronic low-voltage lighting.
 - 4. Magnetic low-voltage lighting.
 - 5. LED lighting
- B. Rating: 600 Watts minimum, larger size to accommodate load shown on Contract Drawings.

2.11 DEVICE PLATES AND BOX COVERS**A. Cover Plate**

1. Finished Spaces: Smooth thermoplastic nylon. Note requirement for red plates on emergency outlets.
2. Unfinished Spaces: Smooth thermoplastic nylon. Note requirement for red plates on emergency outlets.
3. Mechanical and Electrical Rooms: Galvanized Note requirement for red plates on emergency outlets.

B. Weatherproof Cover Plate: Gasketed plastic with hinged cover, wet location listed while in use.

2.12 POKE-THROUGH FITTINGS

A. Description: These poke-thru devices provide the interface between power, communication and audio/visual (A/V) cabling in an above grade concrete floor and the workstation or activation location where power communication and/or A/V device outlets are required.

B. Classification and Use: This poke-thru device shall have been examined and tested by Underwriters Laboratories Inc. to Standard UL514A and/or UL514C and Canadian Standard C22.2, No. 18-98 and bear the U.S. and Canadian UL Listing Mark. This poke-thru device shall also have been tested by Underwriters Laboratories Inc. and classified for fire resistance and bear the U.S. and Canadian UL Classification Mark. Devices shall be classified for use in 1-, 1 1/2-, or 2-hour rated, unprotected reinforced concrete floors and 1-, 1 1/2-, or 2-hour rated, unprotected reinforced concrete floors and 1-, 1 1/2-, or 2-hour rated floors employing unprotected steel floor units and concrete toppings (D900 Series Designs) or concrete floors with suspended ceilings (fire resistive designs with suspended ceilings should have provisions for accessibility in the ceiling below the poke-thru fittings. This device shall also conform to the standards set in the National Electric Code, Section 300-21. These devices meet all UL scrub water requirements, but are not suitable for wet or damp locations, or other areas subject to saturation with water or other liquids such as commercial kitchens. This poke-thru device shall also have been evaluated by UL to meet the applicable U.S. and Canadian safety standards for scrub water exclusion when used on tile, terrazzo, wood, and carpet covered floors. Suitable for use in air handling spaces in accordance with Sec 300-22 (C) of the National Electrical Code.

C. Fire Rating: Three (3) hours or as noted on the plans.

D. Service Fitting: See plans.

E. Type: See plans.

F. Housing: See plans.

G. Device Plate: Stainless steel

H. Configuration: See plans for configuration.

2.13 PHOTO CELLS

- A. The controller shall be rated 2000 watts tungsten at 120, 240 or 277 volts. The cell shall be cadmium sulfide, 1" diameter.
- B. The enclosure shall be die cast zinc, gasketed for maximum weather proofing.
- C. The enclosure shall include the positioning lug on the top of the enclosure.
- D. The unit shall have a delay of up to two (2) minutes to prevent false switching. ON/Off adjustment shall be done by moving a light selector with a range from two (2) to fifty (50) foot-candles.
- E. Mounting shall be for a 1/2" conduit nipple.
- F. The unit shall have a five (5) year warranty.
- G. The contacts shall be SPST normally closed.
- H. The operational temperature range shall be -40 to 140° F.

2.14 TIME CLOCKS

- A. Unit shall be a multi-purpose, seven (7) day, 365 day advance single, and skip a day, combination two (2)-channel electronic time clock with a SPDT switching configuration and astronomic dial.
- B. The contacts shall be rated 10 amp resistive at 120/250 VAC, 7.5 amps inductive at 120/250 VAC, 5 amps inductive at 30 VDC and up to 1/2 hp at 250 VAC. The unit shall be rate for 30 VDC, 120 VAC, 250 VAC and 277 VAC.
- C. The controller shall be capable of programming in the AM/PM or 24 hour format by jumper selection, in one (1) minute resolution, using two (2) buttons only for all basic settings.
- D. Display shall be LED type.
- E. The unit shall have 365 day and or holiday selection capabilities, with sixteen (16) single date and five (5) holiday selection options and user selectable daylight savings/standard time functions.
- F. The unit shall have 72 hour memory backup with rechargeable battery and charger.
- G. The unit shall be capable of manual override, On and OFF to the next scheduled event, using one (1) button for each channel.
- H. The enclosure shall be rated for indoor or outdoor installation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All dimensions noted are centerline dimensions.

- B. Install wall switches 42 inches above floor, OFF position down.
- C. Install wall dimmers 42 inches above floor; de-rate ganged dimmers as instructed by manufacturer; do not use common neutral.
- D. Install convenience receptacles 18 inches above floor, 6 inches above counters or backsplash, grounding pole on bottom. Mount horizontally where indicated.
- E. Install boxes for information outlets 18 inches above finished floor. Install boxes for telephone jack for wall telephones 54 above finished floor.
- F. Install specific-use receptacles at heights shown on Contract Drawings.
- G. Poke-through device installation: Unit shall permit all wiring to be completed at floor level. Use is defined by the UL Fire Resistance Directory as a minimum spacing of “two (2) ft. (610 mm) on center and not more than one (1) device per each 65 sq. ft. (6 m²) of floor area in each span.” Installation shall be completed by pushing unit down into the cored hole. Prior to and during installation, refer to system layout and/or approval drawings. Installer shall comply with detailed manufacturer’s instruction sheet included with each device. The unit shall contain a retainer for securing the device in the slab, as well as the necessary intumescent material to seal the cored hole under fire conditions.
- H. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface-mounted outlets.
- J. Install devices and wall plates flush and level.
- K. Receptacles shall have a bonding conductor from grounding terminal to the metal conduit system. Self-grounding receptacles using mounting screws as bonding means are not approved.

3.2 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

3.3 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.
- B. Mark all conductors with the panel and circuit number serving the device with a machine generated label, at the device, and on the back of the device cover.

END OF SECTION 262726

SECTION 262728 – DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install disconnect switches, fuses and enclosures indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. Applicable provisions of Division 1 govern work under this Section.

1.3 SUBMITTALS

- A. Include outline drawings with dimensions, and equipment ratings for voltage, ampacity, horsepower, and short circuit.

1.4 OPERATION AND MAINTENANCE DATA

- A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

PART 2 - PRODUCTS

2.1 DISCONNECT SWITCHES

- A. Fusible Switch Assemblies (use only when overcurrent protection is required): NEMA Type Heavy Duty; quick-make, quick-break, load interrupter, enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse Clips: designed to accommodate Class R cartridge type fuses.
- B. Nonfusible Switch Assemblies: NEMA Type Heavy Duty; quick-make, quick-break, load interrupter, enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.
- C. Solid neutral bus when neutral conductor is included with circuit.
- D. Provide manufacturer's equipment ground kit in all disconnect switches.
- E. Enclosure: NEMA Type as indicated on Drawings.
- F. Current rating and number of poles as indicated on drawings.

2.2 FUSES

- A. Fuses 600 Amperes and Less: Dual element, time delay, 250 volt, UL Class RK 1. Interrupting Rating: 200,000 rms amperes.

- B. Fuses 601 Amperes and Larger: Time delay, 600 volt, UL Class L. Interrupting Rating: 200,000 rms amperes.
- C. Provide three (3) spares of each size and type fuse. Provide enclosure for spare fuse.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install disconnect switches where indicated on Drawings.
- B. Install switches so that the maximum height above the floor to the center of the operating handle does not exceed 6'-6".
- C. Provide identification as specified in Section 260553.

END OF SECTION 262728

SECTION 262813 – FUSES

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install 250 and 600 volt fuses indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. Applicable provisions of Division 1 govern work under this Section.

1.3 SUBMITTALS

- A. Provide device dimensions, nameplate nomenclature, and electrical ratings.
- B. Submit manufacturer's product data sheets with installation instructions.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 FUSES RATED 600 VOLTS OR LESS

- A. Fuses for Safety Switches (Motor Circuits) and Service Disconnects:
 - 1. Cartridge Type (250 Volts, 600 Amperes or Less): Dual element time-delay, UL Class RK-5, 200,000 amperes R.M.S. symmetrical interrupting capacity.
 - a. Cooper Industries Inc.'s/Bussman Div. Type FRN-R
 - b. Mersen Type TR-R
 - c. Littlefuse Inc.'s Type FLN-R
 - 2. Cartridge Type (600 Volts, 600 Amperes or Less): Dual element time-delay, UL Class RK-5, 200,000 amperes R.M.S. symmetrical interrupting capacity.
 - a. Cooper Industries Inc.'s/Bussmann Div. Type FRS-R
 - b. Mersen Type TRS-R
 - c. Littlefuse Inc.'s Type FLS-R
 - 3. Cartridge Type (600 Volts or Less - Above 600 Amperes): Current limiting, UL Class L, 200,000 amperes R.M.S. symmetrical interrupting capacity.
 - a. Cooper Industries Inc.'s/Bussmann Div. Type KTU
 - b. Mersen Type A4BY
 - c. Littlefuse Inc.'s Type KLP-C

- B. Fuses for Safety Switches (Lighting and Heating Circuits):
1. Cartridge Type (250 Volts): Single element, UL Class RK-1, 200,000 amperes R.M.S. symmetrical interrupting capacity.
 - a. Cooper Industries Inc.'s/Bussmann Div., Type KTN-R
 - b. Mersen Type A2K-R
 - c. Littlefuse Inc.'s Type KLN-R
 2. Cartridge Type (600 Volts): Single element, UL Class RK-1, 200,000 amperes R.M.S. symmetrical interrupting capacity.
 - a. Cooper Industries Inc.'s/Bussmann Div. Type KTS-R
 - b. Mersen Type A6K-R
 - c. Littlefuse Inc.'s Type KLS-R

2.3 FUSES RATED OVER 600 VOLTS

- A. Fuses for Metal Enclosed Interrupter Switchgear:
1. Current Limiting, Silver-Sand Type.
 - a. General Electric Co.'s Type EJ
 - b. Westinghouse Elec. Corp.'s Type CLE
 2. Boric-Acid Type:
 - a. S & C Electric Co.'s Type SM with snuffler
 - b. Westinghouse Elec. Corp.'s Type RBA with condenser
- B. Fuses for 35KV Service Switch and Fuse Assembly: S & C Electric Co.'s Type SM-5.
- C. Fuses for Pad Mounted High Voltage Switch and Fuse Assembly: S & C Electric Co.'s Type SML.
- D. Fuses for Fused Load Break Interrupter Switches:
1. General Electric Co. Type EJ
 2. S & C Electric Co.'s Type SM
 3. Westinghouse Electric Corp.'s Type CLE
- E. Fuses for Distribution Oil Cutouts:
1. General Electric Co.'s Fuse Links 9F57CAA
 2. G & W Electric Co.'s Type FL
- F. Fuses for Primary Cutouts:
1. Cutouts Rated 5.2KV: EEI-NEMA standard Type K (fast) distribution fuse links; Westinghouse Electric Corp.'s Universal Cable Type Fuse Links Series 632AO--A01.

2. Cutouts Rated 14.4KV: EEI-NEMA standard Type K (fast) distribution fuse links; S & C Electric Co.'s 265000 Series, or Westinghouse Electric Corp.'s Universal Cable Type Fuse Links Series 632A0--A01.
3. Cutouts Rated 38KV: EEI-NEMA standard Type K (fast) distribution fuse links, to suit primary cutouts.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fuses shall not be installed until equipment is ready to be energized.
- B. Install fuse with label oriented such that manufacturer, type, and size are easily read.
- C. Install spare fuse storage enclosure in Electrical Room or where indicated on the Drawings.

END OF SECTION 262813

SECTION 263600 – TRANSFER SWITCHES

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the transfer switches (less than 600V) for standby generator systems indicated by the Contract Documents with supplementary items necessary for proper installation. The transfer switch(es) shall start and stop the generator.

1.2 REFERENCES

- A. Applicable provisions of Division 1 govern work under this section
- B. Section 26 32 00 - Generator

1.3 SUBMITTALS

- A. Submit product data showing overall dimensions, electrical connections, electrical ratings, all specified accessories, interlock methods, and environmental requirements.
- B. Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in automatic transfer equipment with five (5) years documented experience.

1.5 OPERATION AND MAINTENANCE DATA

- A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.
- B. In addition to the general content specified under GENERAL REQUIREMENTS supply the following additional documentation:
- C. Instructions for operating equipment under test and emergency conditions.

PART 2 - PRODUCTS

2.1 AUTOMATIC TRANSFER SWITCH

- A. Description: NEMA ICS 2; automatic transfer switch. In applications where the switch serves as the service entrance disconnect, the switch shall be rated as suitable for use as a service disconnecting means.
- B. Configuration: The transfer switch shall be electrically operated and mechanically held. The electrical operation shall be by a solenoid mechanism operating from the same source to which the load is being transferred.

- C. The switch shall be rated for continuous duty and be mechanically interlocked to be in either the normal or the emergency position.
- D. The switch shall be controlled by electronic solid state components with printed circuit control boards, and industrial grade plug in control relays.
- E. The switch shall be designed and built so that it can be manually operated under no-load conditions from behind a barrier partition or with the door closed. The enclosure shall allow for inspection of the internal operation of the switch through a full sequence of the transfer cycle with the door open and the switch de-energized.
- F. Programmed Neutral Switch Position: Switch operator has a programmed neutral position arranged to provide a midpoint between the two (2) working switch positions, with an intentional, time-controlled pause at midpoint during transfer.
- G. Unassigned Auxiliary Contacts: Two (2) normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.

2.2 RATINGS

- A. Ratings: As scheduled on drawings.

2.3 AUTOMATIC SEQUENCE OF OPERATION

- A. Initiate Time Delay to Start Alternate Source Engine Generator: Upon initiation by normal source monitor.
- B. Time Delay to Start Alternate Source Engine Generator: 0 to 10 seconds, adjustable.
- C. Initiate Transfer Load to Alternate Source: Upon initiation by normal source monitor and permission by alternate source monitor.
- D. Time Delay Before Transfer to Alternate Power Source: 0 to 60 seconds, adjustable.
- E. Initiate Re-transfer Load to Normal Source: Upon permission by normal source monitor.
- F. Time Delay Before Transfer to Normal Power: 0 to 30 minutes adjustable.
- G. Time Delay Before Engine Shut Down: 0 to 30 minutes, adjustable, unloaded operation.
- H. Operating transfer time of the switch in either direction shall not be greater than 1/6 of a second.
- I. Engine Exerciser: Digital control, - start engine every 7 to 30 days adjustable; run for 0 to 120 minutes adjustable, before shutting down. Bypass exerciser control if normal source fails during exercising period.

2.4 ACCESSORIES

- A. Manual Operator: Provide manual operator to allow switch to be operated under no-load conditions from behind a barriered partition or with the door closed.
- B. Indicating Lights: LED type. Mount in cover of enclosure to indicate NORMAL SOURCE AVAILABLE, ALTERNATE SOURCE AVAILABLE, SWITCH POSITION.

- C. Test Switch: Mount in cover of enclosure to simulate failure of normal source by interrupting the power signal to the normal source monitor.
- D. Return to Normal Switch: Mount in cover of enclosure to initiate manual transfer from alternate to normal source.
- E. Transfer Switch Auxiliary Contacts: Minimum two (2) normally open; two (2) normally closed.
- F. Normal Source Monitor: Monitor each line of normal source voltage; adjustable set points; initiate transfer when voltage drops below 85 percent.
- G. Alternate Source Monitor: Monitor alternate source voltage and frequency; adjustable set points; inhibit transfer when voltage is below 85 percent or frequency varies more than 3 Hertz from rated nominal voltage.
- H. The switch shall contain an in-phase monitor or adjustable time delay transition to inhibit closing of the switch into high levels of motor residual voltage.
- I. A factory installed equipment ground bar shall be provided in each switch enclosure.
- J. Four-pole transfer switches shall contain an overlapping neutral contact or a fully rated switched neutral pole.
- K. Three-pole transfer switches shall contain a factory installed fully rated solid neutral lug assembly.
- L. Provide digital metering on all transfer switches 200A and larger. Metering shall provide, at a minimum, measurement of voltage, current and kW demand for each phase on the load side of the switch.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Starting contacts for all transfer switches shall be wired in parallel to the generator starting circuit so that any transfer switch that senses a loss of normal power will start the generator. This includes contacts as part of the fire pump controller. This control wiring is not shown on the plans but is required to be provided by the electrical contractor.
- C. Wiring between the elevator control contacts and the elevator controllers is not shown on the plans but is required to be provided by the electrical contractor. Terminations at the elevator controller shall be by the elevator installer.

3.2 FIELD ADJUSTMENTS

- A. The contractor shall field adjust all timing and voltage settings of the transfer switch as necessary for proper operation of the switch, related loads and sources.

3.3 FUNCTIONAL PERFORMANCE TESTING

- A. Provide functional testing in conjunction with testing requirements outlined in Section 263200 – Generators.

3.4 TRAINING

- A. Provide training in conjunction with training provided in Section 263200 – Generators.

END OF SECTION 263600

SECTION 264313 - SURGE PROTECTIVE DEVICES (SPDs)
LV AC SURGE PROTECTION FOR ELECTRICAL DISTRIBUTION SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install surge protection devices (SPD) as indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. SPD units and all components shall be designed, manufactured, and tested in accordance with the latest applicable UL standard (ANSI/UL 1449 3rd Edition).
- B. IEEE C62.41 Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.

1.3 SUBMITTALS

- A. The following information shall be submitted to the Engineer:
1. Product data and manufacturer's installation instructions.
- B. Provide verification that the SPD complies with the required ANSI/UL 1449 3rd Edition listing by Underwriters Laboratories (UL) or other Nationally Recognized Testing Laboratory (NRTL). Compliance may be in the form of a file number that can be verified on UL's website or on any other NRTL's website, as long as the website contains the following information at a minimum:
1. Model number.
 2. SPD Type.
 3. System voltage, phases.
 4. Modes of protection.
 5. Voltage Protection Rating (VPR).
 6. Nominal Discharge Current (In).
- C. For sidemount mounting applications (SPD mounted external to electrical assembly), electrical/mechanical drawings showing unit dimensions, weights, installation instruction details, and wiring configuration.

1.4 QUALITY ASSURANCE

- A. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.
- B. The SPD shall be compliant with the Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC.
- C. The specified system shall be thoroughly factory tested before shipment. Testing of each system shall include but shall not be limited to quality control checks, dielectric voltage withstand tests at twice rated voltage plus 1000 volts per UL requirements, and operational and calibration tests.

1.5 SUMMARY

- A. The Contractor shall furnish and install the Surge Protective Device (SPD) equipment having the electrical characteristics, ratings, and modifications as specified herein and as shown on the contract drawings. To maximize performance and reliability and to obtain the lowest possible let-through voltages, the ac surge protection shall be integrated into electrical distribution equipment such as switchgear, switchboards, panelboards, busway (integrated within bus plug), or motor control centers.

1.6 RELATED WORK

- A. Applicable provisions of Division 1 govern work under this Section.
- B. Section 262416 – Panelboards

1.7 QUALIFICATIONS

- A. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of manufacturer's instructions shall be included with the equipment at time of shipment.

1.9 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance manuals shall be provided with each SPD shipped.

1.10 WARRANTY

- A. The manufacturer shall provide a full five (5) year warranty from date of shipment against any part failure when installed in compliance with manufacturer's written instructions, UL listing

requirements, and any applicable national or local electrical codes. Manufacturer shall make available (local, national) field engineering service support. Where direct factory employed service engineers are not locally available, travel time from the factory or nearest dispatch center shall be stated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Mersen
- B. Erico/Critec
- C. Liebert
- D. Current Technology
- E. Eaton Cutler-Hammer
- F. Square D
- G. Siemens
- H. General Electric

2.2 VOLTAGE SURGE SUPPRESSION – GENERAL

A. Electrical Requirements

1. Unit Operating Voltage – Refer to drawings for operating voltage and unit configuration.
2. Maximum Continuous Operating Voltage (MCOV) – The MCOV shall not be less than 125% of the nominal system operating voltage.
3. Protection Modes – The SPD must protect all modes of the electrical system being utilized. The required protection modes are indicated by bullets in the following table:

Configuration	Protection Modes			
	L-N	L-G	L-L	N-G
Wye	•	•	•	•
Delta	N/A	•	•	N/A
Single Split Phase	•	•	•	•
High Leg Delta	•	•	•	•

4. Nominal Discharge Current (I_n) – All SPDs applied to the distribution system shall have a 20kA I_n rating regardless of their SPD Type (includes Types 1 and 2) or operating voltage. SPDs having an I_n less than 20kA shall be rejected.

5. ANSI/UL 1449 3rd Edition Voltage Protection Rating (VPR) – The maximum ANSI/UL 1449 3rd Edition VPR for the device shall not exceed the following:

Modes	208Y/120
L-N; L-G; N-G	700
L-L	1200

B. SPD Design

1. Maintenance Free Design – The SPD shall be maintenance free and shall not require any user intervention throughout its life. SPDs containing items such as replaceable modules, replaceable fuses, or replaceable batteries shall not be accepted. SPDs requiring any maintenance of any sort such as periodic tightening of connections shall not be accepted. SPDs requiring user intervention to test the unit via a diagnostic test kit or similar device shall not be accepted.
2. Balanced Suppression Platform – The surge current shall be equally distributed to all MOV components to ensure equal stressing and maximum performance. The surge suppression platform must provide equal impedance paths to each matched MOV. Designs incorporating replaceable SPD modules shall not be accepted.
3. Electrical Noise Filter – Each unit shall include a high-performance EMI/RFI noise rejection filter. Noise attenuation for electric line noise shall be up to 50 dB from 10 kHz to 100 MHz using the MIL-STD-220A insertion loss test method. Products unable to meet this specification shall not be accepted.
4. Internal Connections – No plug-in component modules or printed circuit boards shall be used as surge current conductors. All internal components shall be soldered, hardwired with connections utilizing low impedance conductors.
5. Monitoring Diagnostics – Each SPD shall provide the following integral monitoring options:
 - a. Protection Status Indicators - Each unit shall have a green / red solid-state indicator light that reports the status of the protection on each phase.
 - 1) For wye configured units, the indicator lights must report the status of all protection elements and circuitry in the L-N and L-G modes. Wye configured units shall also contain an additional green / red solid-state indicator light that reports the status of the protection elements and circuitry in the N-G mode. SPDs that indicate only the status of the L-N and L-G modes shall not be accepted.
 - 2) For delta configured units, the indicator lights must report the status of all protection elements and circuitry in the L-G and L-L modes.
 - 3) The absence of a green light and the presence of a red light shall indicate that damage has occurred on the respective phase or mode. All protection status indicators must indicate the actual status of the protection on each phase or mode. If power is removed from any one phase, the indicator lights must continue to indicate the status of the protection on all other phases and protection modes. Diagnostics packages that simply indicate whether power is present on a particular phase shall not be accepted.

- b. Remote Status Monitor – The SPD must include Form C dry contacts (one NO and one NC) for remote annunciation of its status. Both the NO and NC contacts shall change state under any fault condition.
 - c. Audible Alarm and Silence Button – The SPD shall contain an audible alarm that will be activated under any fault condition. There shall also be an audible alarm silence button used to silence the audible alarm after it has been activated.
 - d. Surge Counter – The SPD shall be equipped with an LCD display that indicates to the user how many surges have occurred at the location. The surge counter shall trigger each time a surge event with a peak current magnitude of a minimum of 50 ± 20A occurs. A reset pushbutton shall also be standard, allowing the surge counter to be zeroed. The reset button shall contain a mechanism to prevent accidental resetting of the counter via a single, short-duration button press. In order to prevent accidental resetting, the surge counter reset button shall be depressed for a minimum of 2 seconds in order to clear the surge count total.
 - 1) The ongoing surge count shall be stored in non-volatile memory. If power to the SPD is completely interrupted, the ongoing count indicated on the surge counter’s display prior to the interruption shall be stored in non-volatile memory and displayed after power is restored. The surge counter’s memory shall not require a backup battery in order to achieve this functionality.
6. Overcurrent Protection
- a. The unit shall contain thermally protected MOVs. These thermally protected MOVs shall have a thermal protection element packaged together with the MOV in order to achieve overcurrent protection of the MOV. The thermal protection element shall disconnect the MOV(s) from the system in a fail-safe manner should a condition occur that would cause them to enter a thermal runaway condition.
8. Safety Requirements
- a. SPDs designed to interface with the electrical assembly via conductors shall require no user contact with the inside of the unit. Such units shall have any required conductors be factory installed.
 - b. Sidemount SPDs shall be factory sealed in order to prevent access to the inside of the unit. Sidemount SPDs shall have factory installed phase, neutral, ground and remote status contact conductors factory installed and shall have a pigtail of conductors protruding outside of the enclosure for field installation.

2.3 SYSTEM APPLICATION

- A. The SPD applications covered under this section include distribution and branch panel locations, assemblies. All SPDs shall be tested and demonstrate suitability for application within ANSI/IEEE C62.41 Category C, B, and A environments.
- B. Surge Current Capacity – The minimum surge current capacity the device is capable of withstanding shall be as shown in the following table:

Minimum surge current capacity based on ANSI / IEEE C62.41 location category			
Category	Application	Per Phase	Per Mode
C	Service Entrance Locations (Switchboards, Switchgear, MCC, Main Entrance)	250 kA	125 kA

B	High Exposure Roof Top Locations (Distribution Panelboards)	160 kA	80 kA
A	Branch Locations (Panelboards, MCCs, Busway)	120 kA	60 kA

- C. SPD Type – all SPDs installed on the line side of the service entrance disconnect shall be Type 1 SPDs. All SPDs installed on the load side of the service entrance disconnect shall be Type 1 or Type 2 SPDs.

2.4 LIGHTING AND DISTRIBUTION PANEL REQUIREMENTS

- A. The SPD application covered under this section includes lighting and distribution panelboards. The SPD units shall be tested and demonstrate suitability for application within ANSI/IEEE C62.41 Category B environments.

1. The SPD shall not limit the use of through-feed lugs, sub-feed lugs, and sub-feed breaker options.
2. SPDs shall be installed immediately following the load side of the main breaker. SPDs installed in main lug only panelboards shall be installed immediately following the incoming main lugs.
3. The panelboard shall be capable of re-energizing upon removal of the SPD.
4. The SPD shall be interfaced to the panelboard via a direct bus bar connection. Alternately, an SPD connected to a 30A circuit breaker for disconnecting purposes may be installed using short lengths of conductors as long as the conductors originate integrally to the SPD. The SPD shall be located directly adjacent to the 30A circuit breaker.

- B. Sidemount Mounting Applications Installation (SPD mounted external to electrical assembly):

1. Lead length between the breaker and suppressor shall be kept as short as possible to ensure optimum performance. Any excess conductor length shall be trimmed in order to minimize let-through voltage. The installer shall comply with the manufacturer's recommended installation and wiring practices.

2.5 ENCLOSURES

- A. All enclosed equipment shall have NEMA 1 general purpose enclosures, unless otherwise noted. Provide enclosures suitable for locations as indicated on the drawings and as described below:

1. NEMA 1 – Constructed of a polymer (units integrated within electrical assemblies) or steel (sidemount units only), intended for indoor use to provide a degree of protection to personal access to hazardous parts and provide a degree of protection against the ingress of solid foreign objects (falling dirt).

PART 3 - EXECUTION

3.1 FACTORY TESTING

- A. Standard factory tests shall be performed on the equipment under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

3.2 INSTALLATION

- A. The Contractor shall install all equipment per the manufacturer's recommendations and the contract drawings.

END OF SECTION 264313

SECTION 265113 – INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the equipment indicated in the Contract Documents with supplementary items necessary for a proper and functioning installation.
- B. Section Includes:
 - 1. Interior luminaires
 - 2. Exit signs

1.2 REFERENCES

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this Section.
- B. Refer to Division 26 Section “Low Voltage Electrical Power Conductors and Cables” for wiring requirements
- C. Refer to Division 26 Section “Emergency Lighting” for emergency battery ballasts, emergency lighting units, exit signs with battery backup and lighting inverter systems.

1.3 SUBMITTALS

- A. Product data:
 - 1. For each luminaire type, submit a technical cut sheet with complete model number(s) and included options clearly noted, plus luminaire support points, weight, accessory information and photometric performance data indicating total luminaire efficiency. Place luminaire type (e.g. ‘F1’) at the top of each cut sheet page for that luminaire.
 - 2. Submit a technical cut sheet for the associated lamp and ballast proposed for that luminaire. When multiple luminaires use the same lamp and/or ballast, a single cut sheet for the lamp or ballast may be submitted with all luminaires utilizing that lamp or ballast clearly labeled on the cut sheet.
- B. Finish samples: For decorative luminaires, submit paint/finish samples to architect via mail for review and selection.
- C. Warranty: Submit sample warranty letter meeting requirements specified in this section.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Submit under requirements and format listed in Division 26 Section “Common Work Results”.
- B. Include the following documentation
 - 1. All required submittals for this section, updated to reflect required changes from review comments.

2. Warranty letter(s) indicating dates of coverage and warranty claim contact information.

1.5 QUALITY ASSURANCE

- A. Electrical components and accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.
- B. Lamps, including linear fluorescent, compact fluorescent and high intensity discharge, shall be low mercury type and shall pass all federal TCLP (Toxicity Characteristic Leaching Procedure) test requirements at the time of manufacture.
- C. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

1.6 DEFINITIONS

- A. LEED: Leadership in Energy and Environmental Design
- B. CRI: Color rendering index (for lamps)
- C. CCT: Correlated color temperature (for lamps)
- D. BUG: Backlight, Uplight and Glare ratings for luminaires based on IESNA TM-15-07.

1.7 COORDINATION

- A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported from structure, including HVAC equipment, fire-suppression system, and partition assemblies.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver luminaires wrapped in factory-fabricated fiberboard type containers. Parabolic louvers shall be shipped in thermally sealed polyethylene wrapper.
- B. Handle lighting fixtures carefully to prevent breakage, denting and scoring the fixture finish. Do not install damaged lighting fixtures.
- C. Store product in a clean, dry space protected from weather.

1.9 WARRANTY

- A. All equipment shall be warranted to be free of defects in materials and workmanship by the manufacturer for the time period listed below from the date of project substantial completion:
 1. Non-LED Luminaires: One (1) year
 2. LED luminaires (including LED power supply): Five (5) years

1.10 EXTRA MATERIAL

- A. Special Tools - Two (2) tools to remove and install each type and size of fasteners on fixtures

equipped with vandal resistant fasteners.

- B. Deliver replacement stock as directed to Owner's storage space.

PART 2 - PRODUCTS

2.1 INTERIOR LUMINAIRES

- A. Refer to the Luminaire Schedule on the drawings for types of luminaires (e.g. F1, F2, EM1, etc.). The luminaire type listed in the schedule will appear on the lighting plans adjacent to the symbol for each luminaire.
- B. For each luminaire type the manufacturer and model listed first in the schedule, in conjunction with all other luminaire attributes listed on the schedule, shall be considered the basis of design. The remaining acceptable manufacturers shall meet or exceed the performance of the basis of design. When a discrepancy exists between the model number and the other attributes listed for that luminaire, the Contractor shall ask for clarification during the bidding process or include the more expensive option as part of their bid.
- C. The Contractor shall furnish lamps for all luminaires.
- D. Provided luminaire doors with rubber, fiberglass gaskets or equivalent material to prevent light leak. Luminaires shall be provided with proper thermal protection as required for surrounding environment.
- E. Acrylic lenses shall be prismatic and not less than 0.125-inches thick nominal, unless noted otherwise on plans.
- F. All luminaire finishes shall be factory applied unless specifically noted otherwise. Refer to schedule on drawings for finish color.
- G. Provide factory installed integral disconnecting means for fluorescent luminaires with double-ended lamps per 2011 NEC article 410.130(G)(1).

2.2 SOLID STATE LUMINAIRES

- A. Photometric Measurement: Comply with IESNA LM-80-2008.
- B. Lumen Maintenance: Tested in accordance to IESNA LM-79-2008.
- C. Long Term Lumen Maintenance: Comply with IESNA TM-21-2011.
- D. The basis of design for each LED luminaire is listed on the Luminaire Schedule. All other listed acceptable manufacturers shall meet or exceed the delivered lumens of the basis of design using +/- 10% input watts.
- E. CRI and CCT per Luminaire Schedule on plans

2.3 EXIT SIGNS

- A. Mounting type and chevrons shall be as indicated on the Drawings. Lettering and chevron-type directional indicators shall comply with NFPA 101, Life Safety Code, and shall be Listed in accordance with UL 924, Standard for Safety Emergency Lighting and Power Equipment.

- B. Sign housing type shall be as indicated on the Luminaire Schedule.
- C. Mounting canopies will be of identical construction and color to match the exit frame.

2.4 LED POWER SUPPLIES

- A. Acceptable manufacturers: Selected and tested by luminaire manufacturer with specified luminaire for compatibility and performance.
- B. Provide with 0-10 VDC dimming interface when specified on Luminaire Schedule on plans.
- C. LED power supplies shall have temperature and a moisture rating suitable for the environments for which it is to be installed. luminaires installed in low ambient temperature areas shall have power supplies specifically designed for low temperature operation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install luminaires at locations and heights as indicated, in accordance with luminaire manufacturer's written instructions, applicable requirements of NEC, NECA's "Standard of Installation", NEMA Standards and with recognized industry practices to ensure that luminaires fulfill requirements.
- B. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
- C. Check the building electrical system requirements and architectural finishes. Regardless of the catalog number prefixes and suffixes shown, furnish fixtures with the proper trim, frames, supports, hangers, ballasts, voltage rating, and other miscellaneous appurtenances to properly coordinate with Project conditions. Verify with Engineer prior to ordering.
- D. Check the type of ceilings to be installed in each room and verify that the recessed light fixtures are proper for the type of ceiling to be installed before ordering fixtures. Provide a frame compatible with the type of ceiling in which the recessed lighting fixture is installed. Refer to the Architectural Room Finish Schedule for the specified ceiling type.
- E. Install suspended luminaires and exit signs using pendants supported from swivel hangers. Heavy duty jack chain supports may be used where indicated on the fixture schedule. Provide pendant or chain length required to suspend luminaire at indicated height.
- F. Support luminaires larger than 2 x 4 foot size independent of ceiling framing using #12 steel wires anchored to structure.
- G. Locate ceiling luminaires as indicated on the architectural reflected ceiling plan.
- H. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prohibit movement.
- I. Finishing Collar or Combination Finishing Collar/Outlet Box (Surface Mounted Fixture Used With Exposed Raceway):
 - 1. Provide finishing collar where surface mounted fixture is installed on an exposed raceway

outlet box and the fixture base is larger than the outlet box.

2. Provide combination finishing collar/outlet box where surface mounted fixture is not indicated to be installed on an exposed raceway outlet box, but raceway cannot be run directly into fixture body due to fixture design.
 - J. The Contractor shall install fixture supports as required. Fixture installations with fixtures supported only by insecure boxes will be rejected. It shall be the Contractor's responsibility to support all lighting fixtures adequately, providing extra steel work for the support of fixtures if required. Any components necessary for mounting fixtures shall be provided by the Contractor. No plastic, composition or wood type anchors shall be used.
 - K. Exposed Grid Ceilings: Support surface mounted luminaires on grid ceiling directly from building structure. Provide auxiliary members spanning ceiling Ts to support surface mounted luminaires. Fasten surface mounted luminaires to ceiling T using bolts, screws, rivets, or suitable clips. Provide independent support for all fixtures over 50 lbs.
 - L. Install recessed luminaires to permit removal from below.
 - M. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.
 - N. Install wall mounted luminaires at height as scheduled.
 - O. Install accessories furnished with each luminaire.
 - P. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
 - Q. Bond fixtures and metal accessories to branch circuit equipment grounding conductor.
 - R. Install specified lamps in each luminaire.
 - S. Protect installed fixtures from damage during the remainder of the construction period.
- 3.2 ADJUSTING AND CLEANING
- A. Align luminaires and clean lenses and diffusers at completion of Work. Clean paint splatters, dirt, and debris from installed luminaires.
 - B. Aim and adjust luminaires as indicated on Drawings or as directed by the Architect/Engineer.
 - C. Touch up luminaire finish at completion of work.
- 3.3 FIXTURE CONNECTIONS INCLUDING MASTER-SLAVE
- A. Direct box or conduit connections for surface and recessed fixtures. Flexible metal conduit from a J-box for recessed lay-in light fixtures. Flexible metal conduit shall be minimum 3/8" diameter and six foot maximum length. Flexible whip between master and slave fixtures may be supported off of the ceiling grid wires. Conduit length shall allow movement of the fixture for maintenance purposes. Minimum wire size shall be #18 AWG for single fixture or master-slave fixture.

- B. The flexible connectors shall be all steel, galvanized, clamp type with locknut or snap-in connector including those used on the master-slave unit.
- C. Fixture whips shall be supported to prevent them from lying on or being supported by the ceiling grid. Supports shall be listed for raceway support. Tape and other temporary means are not acceptable.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Interface with air handling accessories furnished and installed under Division 23.

3.5 FIELD QUALITY CONTROL

- A. Upon completion of installation of interior lighting fixtures, and after circuitry has been energized, apply electrical energy to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at the Project Site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.
- B. All existing fixtures in work area that are re-used or relocated shall be cleaned inside and out, broken or damaged parts replaced and new lamps installed.

END OF SECTION 265113

SECTION 265200 – EMERGENCY LIGHTING-UNIT EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following emergency lighting-unit equipment indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. Equipment included in this Section
 - 1. Emergency lighting units
 - 2. Exit signs
 - 3. Battery back-up ballasts.

1.2 REFERENCES

- A. Applicable provisions of Division 1 govern work under this Section.

1.3 SUBMITTALS

- A. Include outline drawings, lamp and ballast data, battery/charger information, support points, weights, accessory information and performance data for each luminaire type.
- B. For each luminaire type, submit luminaire information in the following example table format, and submit catalog cuts with highlighted catalog numbers and required accessories.

LUMINAIRE		BALLAST	LAMP	ANSI INPUT WATTS
Type	Manufacturer and Catalog No.	Manufacturer, Quantity per Fixture, and Catalog No.	Manufacturer, Quantity per Fixture, and Catalog No.	

1.4 OPERATION AND MAINTENANCE DATA

- A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver lighting fixtures individually wrapped in factory-fabricated fiberboard type containers.
- B. Handle lighting fixtures carefully to prevent breakage, denting and scoring the fixture finish. Do not install damaged lighting fixtures.
- C. Store product in a clean, dry space protected from weather.

PART 2 - PRODUCTS

2.1 EXIT/EMERGENCY LIGHTING AND ACCESSORIES

- A. See the Luminaire Schedule on the drawings, for type of fixtures and catalog numbers. Catalog numbers are shown on the drawings for quality and performance requirements only. Fixtures manufactured by others are equally acceptable provided they meet or exceed the performance of the indicated fixtures, and meet the intent of the design.
- B. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 EMERGENCY LIGHTING UNITS

- A. Acceptable Manufacturers: As indicated on the Drawings.
- B. Emergency light mounting shall be as indicated on the Drawings.
- C. Housing material shall be as indicated on the Drawings.
- D. Units shall comply with NFPA 101, Life Safety Code, and shall be Listed in accordance with UL 924, Standard for Safety Emergency Lighting and Power Equipment.
- E. Emergency operation shall be provided for a minimum of ninety (90) minutes.
- F. Design will allow universal 120/277VAC, 60 Hz operation.
- G. Lamp type, quantity, and wattage shall be as indicated on the Drawings.
- H. Emergency components shall include a solid-state, constant current type (for nickel-cadmium batteries) battery charger; a maintenance-free, nickel-cadmium battery; an AC-On indicator light; voltmeter; and a test switch.
- I. Standard operating temperature: 68°F to 86°F. Provide emergency light suitable for environmental conditions above or below the standard operation temperature or as noted in the Luminaire Schedule.

2.3 REMOTE LIGHTING HEADS

- A. Acceptable Manufacturers: As indicated on the Drawings.
- B. Remote head mounting shall be as indicated on the Drawings.
- C. Housing material shall be as indicated on the Drawings.
- D. Lamp type, quantity, voltage, and wattage shall be as indicated on the Drawings.
- E. Units shall comply with NFPA 101, Life Safety Code, and shall be Listed in accordance with UL 924, Standard for Safety Emergency Lighting and Power Equipment.

2.4 GENERATOR TRANSFER DEVICE

- A. Acceptable Manufacturers

1. Philips Bodine
 2. Iota Engineering
- B. Generator-supplied (or central inverter system-supplied) egress lighting shall be provided using a standard light fixture equipped with a generator transfer device. The device shall be capable of bypassing the wall switch when the auxiliary generator (or central inverter system) powers the lighting. The device shall consist of relay switching circuitry and fusing combined in a steel case; shall operate at 120 or 277 VAC, 60 Hz; shall have all inputs fused to three (3) amps maximum; and shall comply with the current NEC. The device shall be UL Listed. Warranty for a full five (5) years from the date of purchase.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
- C. Check the building electrical system requirements and architectural finishes. Regardless of the catalog number prefixes and suffixes shown, furnish fixtures with the proper trim, frames, supports, hangers, ballasts, voltage rating, and other miscellaneous appurtenances to properly coordinate with Project conditions. Verify with Engineer prior to ordering.
- D. Check the type of ceilings to be installed in each room and verify that the recessed light fixtures are proper for the type of ceiling to be installed before ordering fixtures. Provide a frame compatible with the type of ceiling in which the recessed lighting fixture is installed. Refer to the Architectural Room Finish Schedule for the specified ceiling type.
- E. Install suspended luminaires using pendants supported from swivel hangers. Chain or cable supports may be used in unfinished spaces or where indicated on the fixture schedule. Provide pendant, chain, or cable length required to suspend luminaire at indicated height.
- F. Fixture whips shall be supported to prevent them from lying on or being supported by the ceiling grid. Supports shall be listed for raceway support. Tape and other temporary means are not acceptable.
- G. Locate exit and emergency luminaires as indicated on the Drawings. Install accessories furnished with each luminaire.
- H. Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Secure to prohibit movement.
- I. Finishing Collar or Combination Finishing Collar/Outlet Box (Surface Mounted Fixture Used With Exposed Raceway):
 1. Provide finishing collar where surface mounted fixture is installed on an exposed raceway outlet box and the fixture base is larger than the outlet box.
 2. Provide combination finishing collar/outlet box where surface mounted fixture is not indicated to be installed on an exposed raceway outlet box, but raceway cannot be run directly into fixture body due to fixture design.

- J. The Contractor shall install fixture supports as required. Fixture installations with fixtures supported only by insecure boxes will be rejected. It shall be the Contractor's responsibility to support all lighting fixtures adequately, providing extra steel work for the support of fixtures if required. Any components necessary for mounting fixtures shall be provided by the Contractor. No plastic, composition or wood type anchors shall be used.
- K. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- L. Bond fixtures and metal accessories to branch circuit equipment grounding conductor.
- M. Protect installed fixtures from damage during the remainder of the construction period.
- N. Insert a copy of the battery warranty in each unit and mark on batteries the date placed in service.
- O. Emergency Lighting Units
 - 1. Units shall be mounted so that they may easily be removed for service.
 - 2. Units shall be permanently connected to a 120/277 volt power source in compliance with the NEC.
 - 3. Remote lamps shall be connected to battery unit using raceway and wire size noted on the Drawings.
- P. Emergency Ballasts and Generator Transfer Device
 - 1. Install in accordance with manufacturer's instructions.
 - 2. Where provided, install remote test/monitoring plate and location indicated on the Drawings.

3.2 ADJUSTING AND CLEANING

- A. Align luminaires and clean lenses and diffusers at completion of Work. Clean paint splatters, dirt, and debris from installed luminaires.
- B. Aim and adjust luminaires as indicated on Drawings or as directed by the Architect/Engineer.
- C. Touch up luminaire finish at completion of work.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of interior lighting fixtures, and after circuitry has been energized, apply electrical energy to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at the Project Site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.

END OF SECTION 265200

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SECTION 270513 – COMMUNICATIONS COMMON WORK RESULTS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the required remote control and signal cabling indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 SUMMARY

- A. Section includes
 - 1. Contractor Responsibility and Qualifications
 - 2. Reference Standards and Codes
 - 3. Required Contractor Training
 - 4. Quality Assurance
 - 5. Submittals
 - 6. Product Assurance
 - 7. Coordination
 - 8. Alternates, Substitution and Change Orders
 - 9. Project Management
 - 10. Delivery and Storage
 - 11. Cleaning
 - 12. Painting

1.3 CONTRACTOR RESPONSIBILITY AND QUALIFICATION

- A. The chosen Communications Contractor (here after referred to as Contractor) shall provide a minimum one (1) year warranty on material, installation and workmanship.
- B. Contractor shall provide all components, materials, services and labor essential for a complete and functional structured cabling system.
- C. The Contractor shall be responsible for complying with all local, state and federal laws and regulations applicable to the work performed, although said law, rule or regulation is not identified herein.
- D. Examination of building and site shall be the responsibility of the Contractor: Contractors shall examine site and building as required prior to installation to determine any conditions affecting

the scope of work. Contact Owner representative for arrangements. All systems and cabling are assumed working and in good condition unless contractor documents exceptions.

- E. Contractor shall call for all inspections required. Final payment of this contract will not be made until final inspections have been completed and all deficient items noted have been corrected.
- F. Contractor will respect and protect the privacy and confidentiality of Owner, its employees, processes, products, and intellectual property to extent necessary, consistent with the legal responsibilities of the State of Iowa and Owner policies.
- G. Use of sub-contractors: The Contractor shall inform in writing to Owner's representative and General Contractor about the intention to use sub-contractors and the scope of work for which they are being hired. Owner's representative prior to the sub-contractor's hiring and start of any work must approve the use of sub-contractors in writing.
- H. Contractor will be required to provide a sufficient number of technicians for this project to stay on schedule.
- I. Contractor shall identify the qualifications of their technician. Vendor shall also identify the type(s) of certifications / testing that its technicians go through before and after being hired on by your company.
- J. Installers: Only technicians certified by equipment manufacturer are approved.

1.4 REFERENCE STANDARDS AND CODES

- A. Supervisors and lead installers shall have a working knowledge and understanding of the following documents and codes are their most recent updates, and shall be familiar with the requirements that pertain to this installation. Installers shall be familiar with and have practical working knowledge of the requirements that pertain to this installation.
- B. Codes: Comply with applicable sections of the most recent editions and addenda of following for interior and exterior installations. Ensure you are using the latest and most up to date standards regulations applicable.
 - 1. International Building Code (IBC)
 - 2. National Electrical Code (NEC/NFPA 70)
 - 3. National Electrical Safety Code (NESC IEEE)
- C. Standards: Comply with applicable sections of the most recent editions and addenda of the following for installations and testing of communications cabling, connectors, and related hardware. Comply with applicable sections of the following for interior and exterior installations.
 - 1. IEEE Std 1100, Recommended Practice for Powering Grounding Sensitive Electronics
 - 2. TIA/EIA TSB-140, Additional Guidelines for Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems.
 - 3. ANSI/TIA/EIA-455-59A, Measurement of Fiber Point Discontinuities Using an OTDR.
 - 4. ANSI/TIA/EIA-455-60A, Measurement of Fiber or Cable Length Using an OTDR.
 - 5. ANSI/TIA/EIA-455-61A, Measurement of Fiber or Cable Attenuation Using an OTDR.

6. TIA/EIA-526-7, Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant – OFSTP-7.
7. TIA/EIA-526-14-A, Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant – OFSTP-14.
8. TIA/EIA-568-B1.1, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements.
9. TIA/EIA-568-B.2-4, Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components
10. TIA/EIA-568-B.3-1, Optical Fiber Cabling Components Standard
11. TIA/EIA-569-A-7, Commercial Building Standard for Telecommunications Pathways and Spaces.
12. ANSI/CEA S83-596, Fiber Optic Premises Distribution Cable
13. ANSI/TIA/EIA-526-7, Optical Power Loss Measurements of Installed Single Mode Fiber Cable Plant-OFSTP-7
14. ANSI/TIA/EIA-526-14-A, Optical Power Loss Measurements of Installed Multi Mode Fiber Cable Plant-OFSTP-14A
15. ANSI/TIA/EIA-569-A, Commercial Building Standards for Telecommunications Pathways and Spaces.
16. TIA/EIA-598-B, Optical Fiber Cable Color Coding
17. TIA-604-5-C, Intermateability Standard (FOCIS), Type MPO, FOCIS-5
18. TIA/EIA-606-A, Administration Standard for Commercial Telecommunications Infrastructure.
19. J-STD-607, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
20. TIA/EIA 758, Customer-Outside Plant Telecommunications Cabling Standard

1.5 ELECTRONIC DOCUMENT RELEASE

- A. Electronic versions of the bid documents will be made available to the contractors for use during the bidding process and to help generate fabrication drawings for various systems. A summary of the requirements for the various document types is listed below:

1. PDF
 - a. Contact the Construction Manager or Architect to obtain a PDF version of the Bid Documents. No Document Release Form is required.

2. REVIT

- a. The REVIT drawings will be converted to AutoCAD and then transferred to the contractor.
- b. Bluestone Engineering can provide an AutoCAD version of the bid documents for the contractor to use for generating shop drawings and fabrication drawings. This will include plan drawings with the architectural background. The contractor is responsible for incorporating any modifications that occur during bidding by all disciplines. Details and schedules will not be included.
- c. A document release form (see attached) will be required to be completed by the contractor to determine the version of AutoCAD and drawings required.
- d. Submittal of the document release form will be required prior to the AutoCAD files being transmitted.

1.6 SUBSTITUTION

- A. All manufacturers listed as Acceptable Manufacturers in each specification section are considered equal to the basis of design. The basis of design is preferred and will take precedence. Any products from an alternate approved manufacturer need to meet the requirements and performance specified and shall be equal to the basis of design.
- B. The Contractor may request permission for a substitution of any item (equipment or material), subject to the following conditions:
 1. Submit substitution requests in writing to the Engineer, on a form supplied by the Engineer. A sample copy of this form is included at the end of this section. An electronic copy can also be provided to the Contractor by the Engineer.
 2. Where equipment or accessories are used which differ in arrangement, configuration, dimensions, ratings, or engineering parameters from those indicated on the contractor documents, the Contractor is responsible for all costs involved in integrating the equipment or accessories into the system and the assigned space and for obtaining the performance from the system into which these items are placed as well as any re-design costs incurred by the Architect or Engineer. The Contractor is also responsible for coordinating changes required by other trades.
 3. Any requests for alternate manufacturers must be submitted to the Architect/Engineer at least ten (10) days prior to bid day. Incomplete substitution requests will not be considered.
- C. Approval
 1. No work involving requests for substitution shall commence without written approval on the provided form by the Engineer.
 2. Any work started or material ordered/installed by the Contractor without written approval shall be removed/repared at the sole expense of the Contractor. The Contractor will also be responsible for any costs incurred by the Owner for such rework.

1.7 REQUIRED CONTRACTOR TRAINING

- A. The Contractor shall be fully conversant and capable in the cabling of low voltage applications such as, but not limited to data, voice and imaging network systems. The Contractor shall at a minimum possess the following qualifications:

1. Personnel trained and certified in the design of the Structured Cabling System.
2. Personnel trained and certified to install the Structured Cabling System.
3. The Designer and Installer shall show proof of current “Certified Installer” of the Structured Cabling System via an updated certificate given after attending the appropriate training course or an on-line re-certification class.
4. Provide references for the type of installation provided in this specification.
5. Personnel trained and certified in fiber optic cabling, splicing, termination and testing techniques. Personnel must have experience using an optical light source and OTDR.
6. Personnel trained in the installation of pathways and support for housing horizontal and backbone cabling.

1.8 QUALITY ASSURANCE

- A. Perform work in accordance with contract documents and governing codes and standards.
- B. All personnel performing the work of this Section shall be thoroughly familiar with the cabling methods set forth in the latest release of the BICSI TDMM (Building Industry Consulting Services International Telecommunications Distribution Methods Manuals).
- C. The installed cabling systems shall not generate nor be susceptible to any harmful electromagnetic emission, radiation, or induction that degrades cabling systems.
- D. Expansion Capability: Unless otherwise indicated, provide spare positions in wall fields, cross connects, and terminal strips, and space in cable pathways to accommodate twenty (20) percent future growth in campus distribution and riser.
- E. Backward Compatibility: The provided solution shall be backward compatible with lower category ratings such that if higher category components are used with lower category components, the permanent link and channel measures shall meet or exceed the lower channel’s specified parameters.
- F. Component Compliance: The provided solution’s components shall each meet the minimum transmission specifications listed herein such that no individual component will be less than specifications for permanent and channel, regardless of the fact that tests for permanent and channel ultimately meet required specifications.
- G. Pre-installation Inspection: Visually inspect all cables, cable reels, and shipping cartons to detect possible cable damage incurred during shipping and transport.
 1. Test optical fiber cable while on reels. Use an optical time domain reflectometer (OTDR) to verify the cable length and locate cable defects, splices and connector, including the loss value of each.
 2. Test each pair of UTP cable for open and short circuits. Test results to be submitted to Owner.
- H. Visibly damaged goods are to be returned to the supplier and replaced at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 SUBMITTALS

A. General

- 1. Bill of materials, noting any long lead time items in business days. Mark general catalog sheets and drawings to indicate specific items being submitted and proper identification of equipment by name and/or number as indicated in the Contract Documents.
 - 2. Proposed test forms for fiber backbone, copper backbone and horizontal UTP cable.
 - 3. Project schedule including all major work components that materially affect any other work on the project.
 - 4. Basis of Design Certification of Structure Cabling System
 - 5. Submit door rough-in wiring details.
 - 6. System Drawings: Project specific system drawing noting systems components and interconnection between components. The interconnection of components shall clearly indicate all wiring required in the system.
- B. Two (2) indexed sets of manufacturer's technical data for each product including product description, specifications including labeling or listing by an agency acceptable to the Owner, and storage requirements.
 - C. Firestop design basis documentation that shall include each type of communication penetration, type of building construction being penetrated including the hourly resistance rating of floor, wall, or other partition of building construction into which firestop design will be installed, and firestop device or system proposed for use.
 - D. Installation Procedures and Material Safety Data Sheets shall be included with products delivered to the job site.
 - E. Informational Submittals
 - 1. Manufacturer's Installation, Start-Up and Adjustment Instructions.
 - 2. Certificates:
 - a. Certify that field tests have been performed and that work meets or exceeds specified requirements.
 - b. Certify that factory tests have been performed and that work meets or exceeds specified requirements. Certificates may be based on recent or previous test results, provided material or products tested are identical to those proposed for this Project.
 - c. Calibration report of test equipment for fiber and copper. Last calibration date should not be older than one (1) year from the 1st day of testing.

3. Field Test Results: Submit sample cable test results showing report format and parameter test.
4. Operation and Maintenance Data

2.3 PRODUCT ASSURANCE

- A. All materials shall be UL and/or ETL approved and labeled in accordance with NEC for all products where labeling service normally applies.
- B. Materials and equipment requiring UL 94, 149, or 1863 listing shall be so labeled. A modification of products that nullifies UL labels is not permitted.
- C. All materials and equipment provided shall be the standard Commercial-Off-The-Shelf (COTS) products of a manufacturer engaged in the manufacture of such products. All materials shall be typical commercial designs that comply with the requirements specified. All materials and equipment shall be readily available through manufacturers and/or distributors. All equipment shall be supplied complete with any optional items required for proper installation.
- D. Materials or Manufacturers not listed in this Division 27 but are required materials to provide a complete and functioning cable infrastructure system shall have cut sheets and product data included in the material and procedures submittal package.
- E. Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance and backward compatibility.
- F. Contractor shall test all fiber cable while on the reel prior to installation of the cable. The Contractor shall assume liability for replacement of cable should it be found defective at this time or a later date prior to customer acceptance.

PART 3 - EXECUTION

3.1 COORDINATION

- A. Coordinate arrangement, mounting, and support of communications equipment with Architect or Owner.
 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 3. To allow connecting pathways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for communications items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section “Penetration Firestopping.”
- E. Contractor shall be responsible for coordination with all trades, to include required scheduling of materials and/or equipment with Owner and/or General Contractor for delivery, storage and protection of equipment as required.

3.2 FIELD QUALITY CONTROL

- A. The Contractor shall perform the following field inspections during installation and commissioning:
 - 1. Visually inspect UTP and optical fiber jacket materials for NRTL certification markings.
 - 2. Visually inspect cabling placements, pathways and terminations in communications equipment rooms, telecommunications rooms and work area’s for compliance with standards and codes.
 - 3. Visually inspect grounding and bonding for compliance with standards and codes.
 - 4. Visually inspect all installed cable trays, cable pathways and wall penetrations for compliance with standards and codes.

3.3 ALTERNATES, SUBSTITUTIONS AND CHANGE ORDERS

- A. If a proposed alternate material is equal to or exceeds specified requirements, Contractor shall provide manufacturer’s specifications in writing for written approval prior to purchase and installation of proposed materials. The proposed material substitution shall not void or change manufacturer’s warranty.
- B. Contractor shall provide a complete cabling infrastructure according to these written specifications and drawings. If the Owner changes the scope of work to be performed by the Contractor, it shall be in writing. Contractor shall response to these changes with a complete material list, labor, and taxes in writing presented to the Owner for approval. Contractor shall not proceed with additional scope of work without a signed approval by the Owner.
- C. Additional work performed by the Contractor will not be paid by Owner without signed approval of these changes prior to implementing changes. Submit a copy of signed change order upon billing.

3.4 PROJECT MANAGEMENT

- A. Contractor shall designate a project manager to act as the single point of contact. Project manager shall oversee all work performed to ensure a quality installation compliant with specifications as outlined in documents (which includes all specifications and drawings). The General Contractor to review a copy of resume of the on-site Project Manager and each on-site teams.
- B. The Contractor project manager/supervisor shall attend meetings arranged by Owner’s representatives, and/or other parties affected by work of this Division 27.
- C. Contractor shall provide written progress reports to Owner’s representative and other parties affected by work of this Division 27. This progress report must include:

1. Update time schedule with estimate time of completion. This must be in MS Project format or equal to software, also showing the time baseline.
2. Work performed last week.
3. Work planned for the upcoming week.
4. Percentage complete of work performed.
5. Identify potential risks that can impact scope and/or the time schedule.

3.5 DELIVERY AND STORAGE

- A. The Contractor shall assume custody and responsibility for the items upon delivery and determining that the contents are complete and in satisfactory condition for installation.
- B. Delivery, loss, storage and protection: All materials and equipment delivered and placed in storage shall be stored with protection from the weather, humidity, and temperature variation, dirt, and dust, or other contaminants.
- C. Coordinate deliveries and submittals with the General Contractor/Owner to ensure a timely schedule installation.
- D. Contractor shall be responsible for all handling and control of cabling equipment. Contractor is liable for any material loss due to delivery and storage problems.
- E. Coordinate with General Contractor/Owner on location of storage materials.

3.6 AS-BUILTS

- A. Record copy and as-built drawings:
 1. Provide record copy drawings periodically throughout the project as requested by the General Contractor or Owner and at end of the project on CD-ROM. Record copy drawings at the end of the project shall be in CAD format and include notations reflecting the as built conditions of any additions to or variation from the drawings provided such as, but not limited to cable paths and termination points. CAD drawings are to incorporate test data imported from the test instruments.

3.7 CLEANING

- A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, dust, and construction debris and repair damaged finish, including chips, scratches, and abrasions. This includes touching up paint removed for grounding.
- B. Contractor shall provide a clean work environment, free from trash/rubbish accumulated during and after cabling installation.
- C. Maintain construction materials and refuse within the area of work. Clean the work area at the end of each day.
- D. Contractor shall keep all liquids (drinks, sodas, etc.) off finished floors, carpets, tiles racks and equipment. If any liquid damage to above finishes or equipment, Contractor shall provide

professional services to clean or repair scratched/soiled finishes or damaged equipment at own expense.

3.8 PAINTING

- A. Touch up marred and bared surfaces of primed, galvanized, and finish painted equipment, materials, and accessories installed.
- B. Restore patched surfaces as close to the original condition and finish as reasonably possible. Where patching occurs in smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received two coats of primer and two coats of finished paint.

3.9 PROJECT CLOSEOUT REQUIREMENTS

- A. Final project closeout tasks
 - 1. Deliver all spare parts listed in each specification section. Deliver to Owner chosen location.
 - 2. All equipment labeled per specifications.
 - 3. All equipment cleaned and ready for use.
- B. Contractor Requirements
 - 1. Marked up drawings and specifications provided to Engineer for incorporation of as-built drawings or to serve as the as-built drawings depending on the project requirements. As-built drawings shall be clean and legible.
 - 2. Operation and Maintenance (O&M) Manuals shall include the following:
 - a. Contractor contact for warranty work.
 - b. Approved shop drawings, incorporating all review comments.
 - c. Warranty copies
 - d. Operation and maintenance instructions
 - e. Proposed test forms for fiber/copper backbone and horizontal UTP cables.
- C. Two (2) final approved O&M Manuals shall be delivered to Owner. Each manual shall be an appropriately sized 3-ring binder with a vinyl cover and printed spine and cover labels. Each section shall have a printed divider tab. Each section shall be listed in a table of contents at the beginning of the manual.

END OF SECTION 270513

(ELECTRONIC DOCUMENT RELEASE & SUBSTITUTION REQUEST FORMS ATTACHED)



Document Release Form

Information Requested:

Project Name:
Drawings Requested:

Media Type: (Check all that are applicable)

- AutoCAD DWG Files (Version _____)
- Adobe PDF Files
- REVIT Files (Version _____)
- Other

Requesting Party:

Name: _____ Address 1: _____
 Company: _____ Address 2: _____
 Signature: _____ Email Address: _____
 Date: _____ Phone #: _____

Bluestone Use:

Form Sent By: _____ Date: _____
 Bluestone Project #: _____

Data contained on these electronic files are part of our instruments of service and shall not be used by you or anyone else receiving these data through or from you for any purpose other than as a convenience in the preparation of shop drawings for the referenced project. Any other use or reuse by you or by others will be at your sole risk and without liability or legal exposure to us. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against us, our officers, directors, employees, agents or sub consultants that may arise out of or in connection with your use of the electronic files. Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold us harmless against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs, arising out of or resulting from your use of these electronic files. These electronic files are not construction documents. Differences may exist between these electronic files and corresponding hard-copy construction documents. We make no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the signed or sealed hard-copy construction documents prepared by us and the electronic files, the signed or sealed hard-copy construction documents shall govern. You are responsible for determining if any conflict exists. By your use of these electronic files, you are not relieved of your duty to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project. Because information presented on the electronic files can be modified, unintentionally or otherwise, we reserve the right to remove all indicia of ownership and/or involvement from each electronic display.

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- Substitution Approved As Noted
- Substitution Rejected
- Substitution Request Received Too Late

Signed by:

_____ Date

Supporting Data Attached:

- Drawings
- Product Data
- Samples
- Tests
- Reports
- Other _____

SUBSTITUTION REQUEST FORM (AFTER BIDDING)

We submit for your consideration the following product instead of the specified item for the following project:

PROJECT: _____

SPEC. SECTION	SPEC. TITLE	PARAGRAPH	SPECIFIED ITEM
_____	_____	_____	_____

Proposed Substitution: _____

MANUFACTURER	TRADE NAME	MODEL NO.
_____	_____	_____

INSTALLER	PHONE NO.
_____	_____

History: New Product 2-5 years old 5-10 years old More than 10 years old

Differences between proposed substitution and specified product: _____

Proposed substitution affects other parts of Work: No Yes; explain _____

Proposed substitution changes Contract Time: No Yes [Add] [Deduct] _____ days

Savings to Owner for accepting substitution: \$ _____

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including Architectural and Engineering design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by:

Signature

Firm

Telephone

Email

Date

Engineer's Review and Action

- Substitution Approved
- Substitution Approved As Noted
- Substitution Rejected
- Substitution Request Received Too Late

Signed by:

Date

Supporting Data Attached:

- Drawings
- Product Data
- Samples
- Tests
- Reports
- Other _____

SECTION 270526 – GROUNDING/EARTHING AND BONDING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following Grounding/Earthing and Bonding for Communications Systems.
- B. This section includes minimum requirements for the following:
 - 1. Grounding/Earthing System
 - 2. Telecommunications Grounding Busbar (TGB)
 - 3. Telecommunications Main Ground Busbar (TMGB)
 - 4. Rack Grounding/Earthing and Bonding
 - 5. Cabinet Grounding/Earthing and Bonding
 - 6. Shield Grounding/Earthing and Bonding
- C. All cables and related terminations, support and grounding/earthing hardware shall be furnished, installed, wired, tested, labeled, and documented by the telecommunications contractor as detailed in this document.
- D. Product specifications, general design considerations, and installation guidelines are provided in this document. Quantities grounding/earthing products, typical installation details and cable routing will be provided as an attachment to this document. If the bid documents are in conflict, this specification shall take precedence. The successful vendor shall meet or exceed all requirements for the cable system described in this document.

1.2 REFERENCES

- A. The following industry standards are the basis for the grounding/earthing and bonding system described in this document
 - 1. NFPA: NFPA-70 National Electric Code (NEC)
 - 2. IEEE: Std 1100 IEEE Recommend Practice for Powering and Grounding Electronic Equipment (IEEE Emerald Book)
 - 3. TIA/EIA:
 - a. TIA-942 Telecommunications Infrastructure Standard for Data Centers
 - b. J-STD-607-A Commercial Building Grounding/Bonding Requirements
 - c. TIA/EIA-606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
 - 4. International Standard: BS EN 50310:2000 Application of equipotential bonding and earthing in Buildings with information technology equipment.

- B. The most recent versions of all documents apply to this project. If there is a conflict between applicable documents, the order above shall dictate the order of precedence in resolving the issue unless an enforceable local or national code is in effect.

1.3 APPROVED PRODUCTS

- A. Approved grounding/earthing system manufacturer: Panduit
- B. Approved telecommunications grounding busbar manufacturer: Panduit
- C. Approved rack grounding kit manufacturer: Panduit
- D. Approved retrofit rack grounding kit manufacturer: Panduit
- E. Approved cabinet grounding kit manufacturer: Panduit
- F. Approved retrofit cabinet grounding kit manufacturer: Panduit
- G. Approved shielded cabling grounding kit manufacturer: Panduit

1.4 QUALITY ASSURANCE

- A. See the Panduit Electrical Product Warranty on [www. Panduit.com/warranty](http://www.Panduit.com/warranty)

1.5 DEFINITIONS

- A. Bonding – The permanent joining of metallic parts to form an electrically conductive path that will assure electrical continuity and the capacity to conduct safely any current likely to be imposed.
- B. Mesh Common Bonding Network (MCBN) – The mesh CBN (MCBN) can be readily utilized for efficient direct bonding of equipment and other apparatus to the grounding system. Such an arrangement provides efficient grounding and inter/intra-unit bonding of metal cabinets, racks and miscellaneous metal objects (especially when they are not powered). Additionally, the MCBN ensures grounding reliability of the equipment in the event the equipment grounding conductor of the serving power circuit is comprised or disconnected during maintenance. Electrostatic charge buildup and dissipation is also greatly aided by the multiple grounding paths of the CBN. See Figure 1.
- C. Ground/Earth (Earth)/Earthing is an international term equivalent to grounding) – A conducting connection, whether intentional or incidental, by which an electric circuit or equipment is connected to earth, or to some conducting body relatively large extent that serves in place of the earth.
- D. Retrofit Rack Grounding/Earthing – The application of grounding/earthing products and technology where equipment is already deployed and functioning within the equipment rack.
- E. Retrofit Cabinet Grounding/Earthing – The application of grounding/earthing products and technology where equipment is already deployed and functioning within the equipment cabinet.

1.6 OVERVIEW

- A. A primary purpose of the grounding/earthing and bonding system is to create an adequate capacity path for electrical surges and transient voltages to return to their source (which may include the earth).
- B. Lightning, fault currents, circuit switching (motors turning on and off), activation of surge protective devices (SPDs) and electrostatic discharge are common causes of these electrical surges and transient voltages. An effective grounding/earthing and bonding system minimizes the detrimental effects of these electrical surges and transient voltages, which include degraded network performance and reliability and increased safety risks.
- C. A properly constructed protection system includes a number of subsystems including:
 - 1. Grounding electrode system
 - 2. Lightning protection system
 - 3. Surge suppression
 - 4. AC/DC power systems grounding
 - 5. Telecommunications supplemental grounding and bonding
- D. While each subsystem is designed with a specific intent in mind, the systems interact and enhance the overall capability of the entire protection system. This specification focuses primarily on the telecommunications supplemental grounding and bonding subsystem, hereafter referred to as the grounding, bonding, or grounding/earthing system.
- E. The grounding/earthing system must be intentional, visually verifiable, adequately sized to handle expected currents safely, and directs these potentially damaging currents away from sensitive network equipment. As such, grounding/earthing must be purposeful in its design and installation. Four issues require special consideration:
 - 1. Although AC powered equipment typically has a power cord that contains a ground/earth wire, the integrity of this path cannot be easily verified. Thus, many equipment manufacturers require grounding/earthing above and beyond that which is specified by local electrical codes, such as the National Electrical Code, etc. Always follow the grounding/earthing recommendations of the manufacturer when installing equipment.
 - 2. While the building steel and metallic water piping must be bonded to the grounding/earthing system for safety reasons, neither may be substituted for the telecommunications bonding backbone (TBB).
 - 3. Electrical continuity throughout each rack or cabinet is required to minimize safety risks. Hardware typically supplied with bolt-together racks is not designed for grounding/earthing purposes. Additionally, most racks and cabinets are deliberately bonded, continuity between members is incidental, and in many cases, unlikely.
 - 4. Any metallic component that is part of the data center, including equipment, racks, cabinets, ladder racks, enclosures, cable trays, etc., must be bonded to the grounding/earthing system.
- F. The ground/earth system must be designed for high reliability. Therefore, the grounding/earthing system shall meet the following criteria:

- G. Local electrical codes shall be adhered to.
- H. The grounding/earthing system shall comply with ANSI/TIA-942, J-STD-607-A, IEEE Std 1100™ (IEEE Emerald Book), and in international regions BS EN 50310:2000.
- I. All grounding/earthing conductors shall be copper.
- J. Lugs, HTAPs, grounding strips, and busbars shall be UL Listed and made of premium quality tin-plated electrolytic copper that provides low electrical resistance while inhibiting corrosion. Antioxidant shall be used when making bonding connections in the field.
- K. Wherever possible, two-hole lugs shall be used because they resist loosening when twisted (bumped) or exposed to vibration. All lugs shall be irreversible compression and meet NEBS Level 3 as tested by Telcordia. Lugs with inspection windows shall be used in all non-corrosive environments so that connections may be inspected for full conductor insertion (battery rooms are an exception where windowless lugs may be used).
- L. Die index numbers shall be embossed on all compression connections to allow crimp inspection.
- M. Cable assemblies shall be UL Listed and CSA Certified. Cable shall be a distinctive green or green/yellow in color, and all jackets shall be UL, VW-1 flame rated.

PART 2 - PRODUCTS

2.1 EQUIVALENT PRODUCTS

- A. Panduit shall manufacture all products, including but not limited to grounding/earthing and bonding for communications systems. There will be no substitutions allowed.

2.2 GROUNDING/EARTHING AND BONDING

- A. A telecommunications Main Grounding Busbar (TMGB) shall be located at the service entrance. A Telecommunications Grounding Busbar (TGB) shall be located in each telecommunications space. The TGB will be grounded/earthed to the Telecommunications Main Grounding Busbar (TMGB).
- B. The TMGB shall be bonded to building steel and grounded/earthed to the electrical service ground according to J-STD-607-A guidelines. Each TGB shall be bonded to building steel and the electrical panel serving equipment in the telecommunications space. See Figure 1 below.



Figure 1 – Service Entrance Grounding

The gauge of the connecting ground/earth cable, known as the Telecommunications Bonding Backbone (TBB) will follow J-STD-607-A guidelines, as is shown in the table below.

1. Sizing of the TBB	
TBB Length in Linear meters (feet)	TBB Size AWG
Less than 4 (13)	6 (16mm ²)
4-6 (14-20)	4 (25mm ²)
6-8 (21-26)	3 (25mm ²)
8-10 (27-33)	2 (35mm ²)
10-13 (34-41)	1 (35mm ²)
13-16 (42-52)	1/0 (50mm ²)
16-20 (53-66)	2/0 (70mm ²)
Greater than 20 (66)	3/0 (95mm ²)

- C. Route the TBB to each TGB in as straight a path as possible. The TBB should be installed as a continuous conductor, avoiding splices where possible. Use Panduit part number series HTWC to tap into the TBB where necessary. When more than one TBB is used, bond them together using the TGBs on the top floor and every third floor in between with a conductor known as a grounding equalizer (GE). Use the J-STD-607-A guidelines for sizing of the TBB when sizing the GE (shown in the table above).

2.3 COMPONENTS, KITS AND HARDWARE

- A. Panduit® StructuredGround™ Grounding System (StructuredEarth™ Earthing System) kits, components, and hardware shall be used to construct the grounding/earthing system.
- B. Use Panduit GB4 series BICSI/J-STD-607-A telecommunications grounding busbars for the TMGB, which is ideally located at the AC service entrance. Use a Panduit GB2 series busbar for the TGB in each of the other telecommunications/equipment spaces throughout the building. Use Panduit LCC-W series lugs when connecting conductors to the TMGB and TGB.

2.4 CONSTRUCTION OF THE GROUNDING/EARTHING SYSTEM

- A. Avoid routing grounding/earthing conductors in metal conduits. If the grounding/earthing conductor must be routed through a metal conduit, bond each end of the conduit to the grounding/earthing conductor. Use Panduit GPL series grounding clamps to bond to the conduit, a Panduit HTWC HTAP with clear cover to bond to the grounding/earthing conductor, and a #6 AWG copper conductor to connect the GPL grounding clamp to the HTWC HTAP.
- B. In telecommunications spaces with a small number of racks or cabinets, it may be most convenient to bond the grounding/earthing jumper cable directly to the TGB. Larger spaces require a mesh Common Bonding Network, as described below.

Cable Sizes for Other Grounding/Earthing Applications Not Specifically Described Elsewhere in This Document	
Purpose	Copper Code Cable Size
Aisle ground (overhead) of the common bonding network	Minimum #2 AWG (35mm ²)
Aisle ground (under floor) of the mesh common bonding network	Minimum # 6 AWG (16mm ²)
Bonding conductor to each PDU or panel board serving the room.	Size per NEC 250.122 & manufacturer recommendations
Bonding conductor to HVAC equipment	#6 AWG (16mm ²)
Building columns	#4 AWG (25mm ²)
2. Cable ladders and trays	#6 AWG (16mm ²)
Conduit, water pipe, duct	#6 AWG (16mm ²)

C. Wire Basket Bonding

1. Wire baskets shall be bonded per the manufacturer’s installation instructions. Bond shall be made in accordance with Figure 2 above to the mesh Common Bonding Network.
2. Attached a #6 AWG (16mm²) jumper to the Wire Basket with a split bolt, Panduit part series SBCT. Then use a HTCT HTAP to attach the other end of the jumper to the mesh CBN.
3. Overhead Common Bonding Network and Ladder Rack Bonding
4. The overhead common bonding network shall be constructed of a minimum of a #2 AWG (35mm²) or larger gauge wire. The CBN shall be bonded to the TGB using a 2-hole copper compression connector, *PANDUIT* part series LCC-W or metric equivalent.
5. Ladder racks shall be bonded per the manufacturer’s installation instructions. The bond shall be made in accordance with Figure 3 below to the mesh Common Bonding Network.

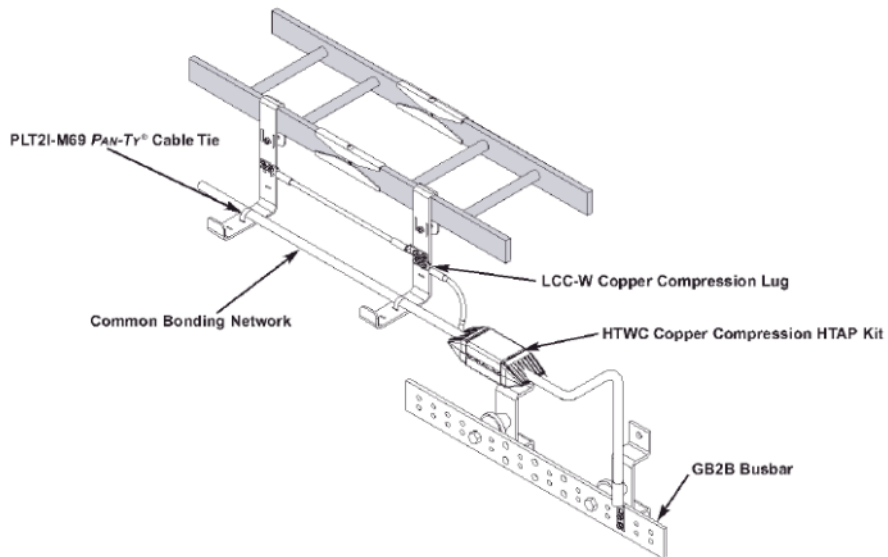


Figure 3 – Overhead Common Bonding Network and Ladder Rack Bonding

6. To provide electrical continuity between ladder rack segments use Panduit® StructuredGround™ Auxiliary Cable Bracket, Panduit part number GACB-1. When installed, the paint piercing teeth on the bracket remove paint from the ladder rack sections providing an electrical bond. There shall also be a grounding jumper, Panduit part number GACBJ618U, that connects to the auxiliary cable brackets to bond the sections of the ladder rack together.

2.5 RACK GROUNDING/EARTHING

- A. Equipment and racks shall be bonded in accordance with the methods prescribed in ANSI/TIA-942, as is shown in Figure 4 below.

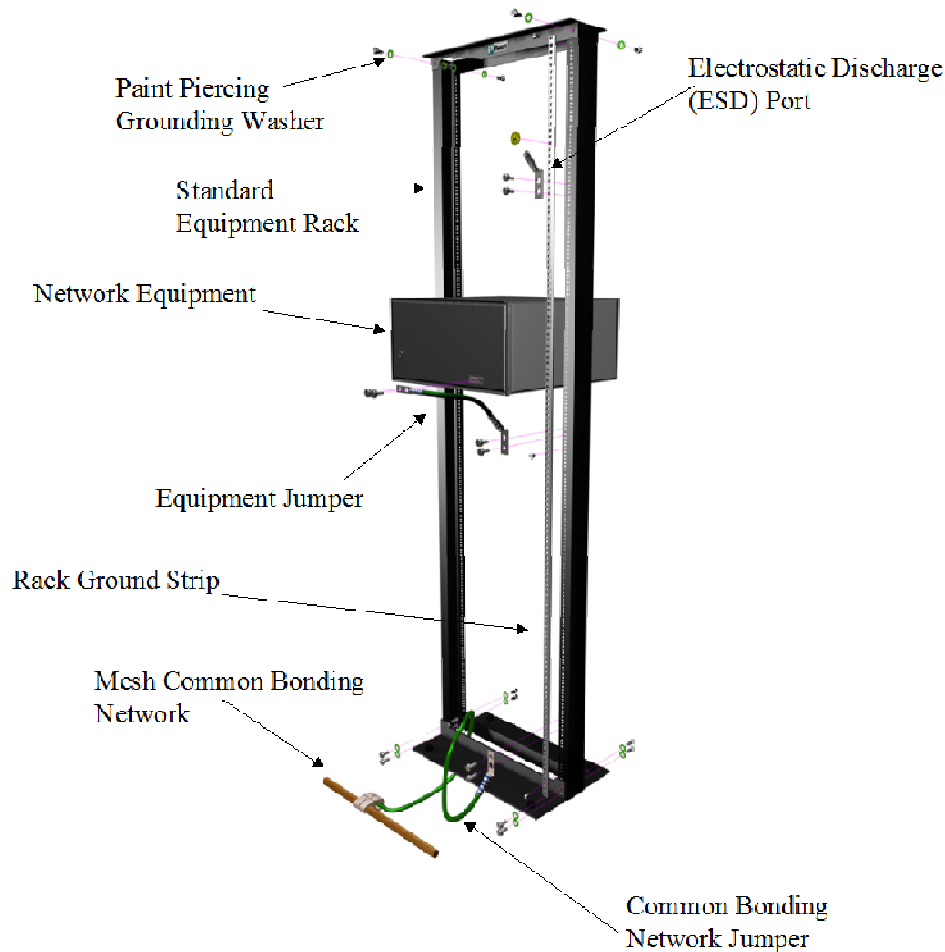


Figure 4 - Properly Grounded/Earthed Rack (Back of Rack Shown)

- B. To provide electrical continuity between rack elements, *PANDUIT* paint piercing grounding washers, series RGW, shall be used where rack sections bolt together, on both sides, under the head of the bolt and between the nut and rack.

- C. All racks shall utilize a full-length rack ground strip, PANDUIT series RGS, attached to the rear of the side rail with the thread-forming screws provided to ensure metal-to-metal contact.
- D. Mount an electrostatic discharge (ESD) port kit, PANDUIT series RGEDS, directly to the rack grounding strip on the back of the rack at approximately 48 inches (122cm) from the floor. Mount a second RGEDS directly to the vertical mounting rail of the rack in the front at approximately the same height. Use the thread-forming screws provided to form a bond to the rack. Place the ESD protection identification stickers directly above the ESD ports.
- E. When the equipment manufacturer provides a location for mounting a grounding connection, that connection shall be utilized. Use the appropriate PANDUIT RG series jumper for the equipment being installed and the thread-forming screws provided in the kit.
- F. Use PANDUIT part number series RGCBNJ (Common Bonding Network Jumper) to attach the rack ground strip to the mesh CBN. This kit includes the #6 AWG cable with one factory installed two-hole lug and hardware to connect to the busbar and one HTCT HTAP to connect to the mesh CBN. In addition, all components can be utilized if your mesh common bonding network is below or overhead. Do not bond racks or cabinets serially. Use the HTCT HTAP that comes with the kit to bond the conductor directly to the mesh common bonding network.
- G. Patch panels will be bonded to racks using the appropriate PANDUIT bonding screws, series RGTS. Mounting rails may utilize cage nuts, threaded holes or thru hole mounting fasteners to secure patch panels to the rails.
- H. RGW paint piercing grounding washers are not used in this scenario. Thus, the grounding busbar provides continuity through the vertical channels of the rack, but not the top and bottom of the rack. Thus, wherever practical, the solution using the RGS rack grounding strip and the RGW paint piercing washers shall be used instead of the retrofit rack grounding kits.
- I. All other grounding/earthing requirements apply to retrofit installations without exception.
 - 1. A key element of a shielded copper cabling system is proper grounding. Panduit TX6™ 10Gig™ Shielded Copper Cabling System shall be bonded as shown in Figure 8 below.

PART 3 - EXECUTION

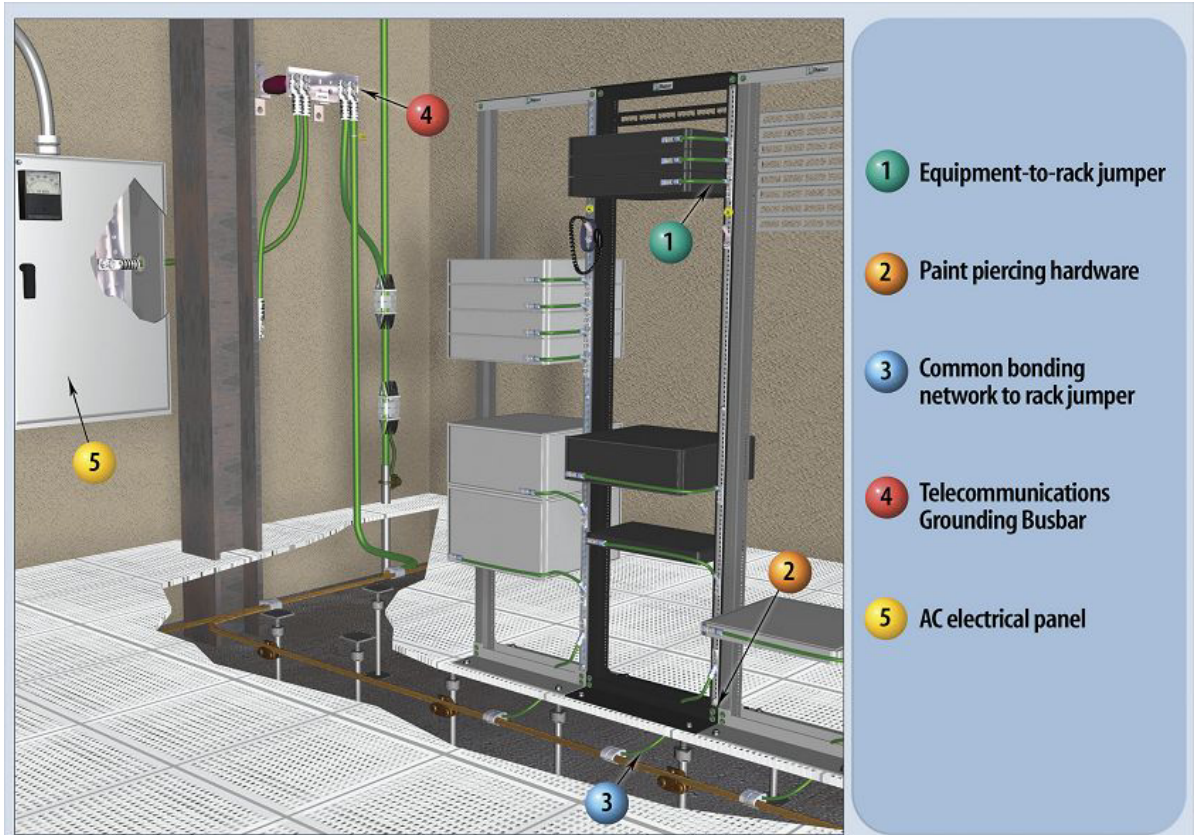
3.1 GROUNDING SYSTEM

- A. The communications grounding system shall be designed and/or approved by a qualified PE, licensed in the state that the work is to be performed. The communications grounding system shall adhere to the recommendations of the ANSI/TIA-942 and J-STD-607-A standards, and shall be installed in accordance with best industry practice. International regions shall adhere to the recommendations of the BS EN 50310:2000 standard.
- B. A licensed electrical contractor shall perform installation and termination of the main bonding conductor to the building service entrance ground.

3.2 INSPECTION OF THE GROUNDING SYSTEM

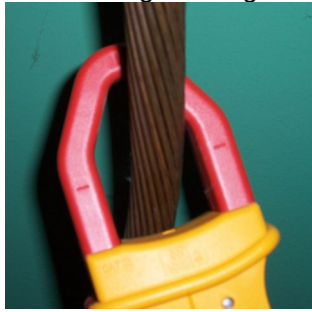
- A. The following describes the process of properly inspecting information technology telecommunications supplemental grounding and bonding systems.

- B. An answer of “yes” for each question on the inspection list indicates that the components of the grounding and bonding system have been installed to commonly referenced industry standards.
- C. Use the room/rack/cabinet number space on each sheet to provide each measurement set with a unique identification number so that issues found during the inspection can be addressed later.

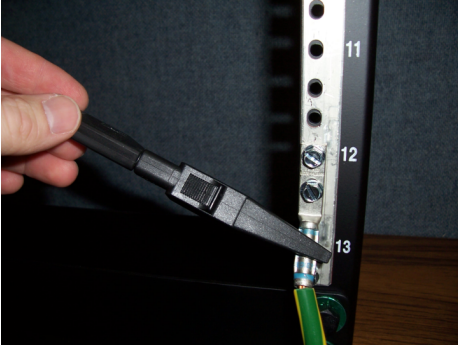
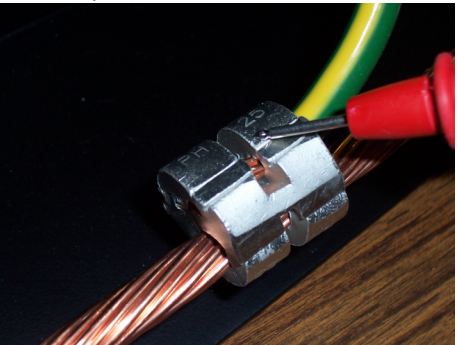


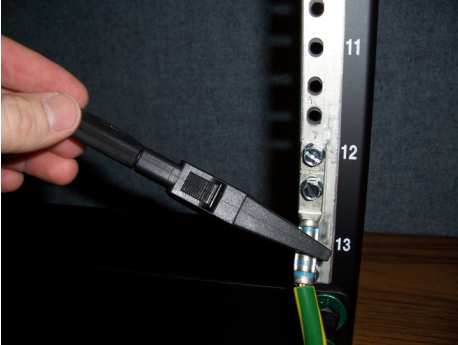

Is a Telecommunications Grounding Busbar (TGB) present?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Have the following bonds been made to the TGB?	
The AC electrical panel	<input type="checkbox"/> Yes <input type="checkbox"/> No
Accessible building steel	<input type="checkbox"/> Yes <input type="checkbox"/> No
The Mesh Common Bonding Network ¹	<input type="checkbox"/> Yes <input type="checkbox"/> No
The Telecommunications Bonding Backbone ²	<input type="checkbox"/> Yes <input type="checkbox"/> No

1. The Mesh Common Bonding Network (MCBN) is the conductor or group of conductors that extend from the TGB to each bay in the room. The MCBN can be installed above the bays or under the access floor.
2. The Telecommunications Bonding Backbone (TBB) is the conductor that bonds every TGB in the bonding network together. The TBB may not be present in every installation.

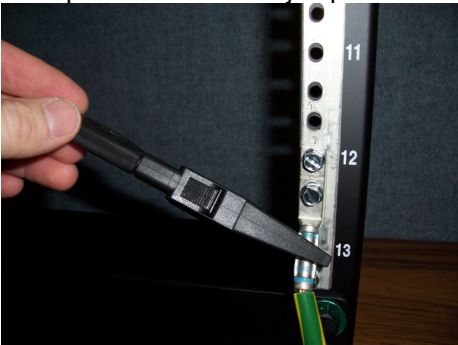
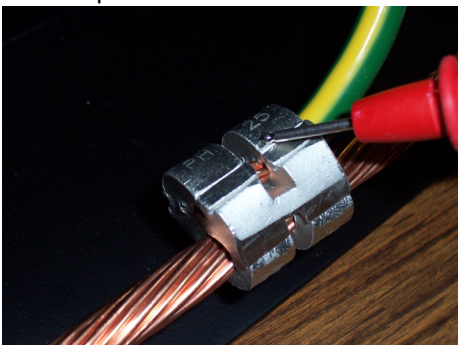
<p>Using a clamp-on amp meter, check for AC and DC current on each of the bonds listed above. A reading of zero amps AC and DC may be indicative of an open connection. A reading of greater than one amp may be indicative of fault conditions somewhere in the power system.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Clamp the meter around the grounding conductor in question</p>	
	
<p>Are the AC and DC currents at acceptable levels?</p>	
<p>Are the bend radii of all these conductors greater than twelve inches?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Are all the bonds to the TGB made with two-hole compression lugs?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Is each conductor bonded to the TGB labeled or tagged "Do not disconnect"?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No

D. Bonding inspections for each rack: Rack Number

<p>Are electrostatic discharge (ESD) wrist strap ports available on the front and back of each rack?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Are two-hole compression lugs compression HTAPs used wherever possible?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Using a two-point resistance meter, measure the DC resistance between the common bonding network (CBN) to rack jumper and the HTAP connecting the jumper to the mesh common bonding network as shown below.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>One probe on the CBN jumper:  One probe on the HTAP: </p>	
<p>Is the DC resistance $\leq 0.1\Omega$?</p>	

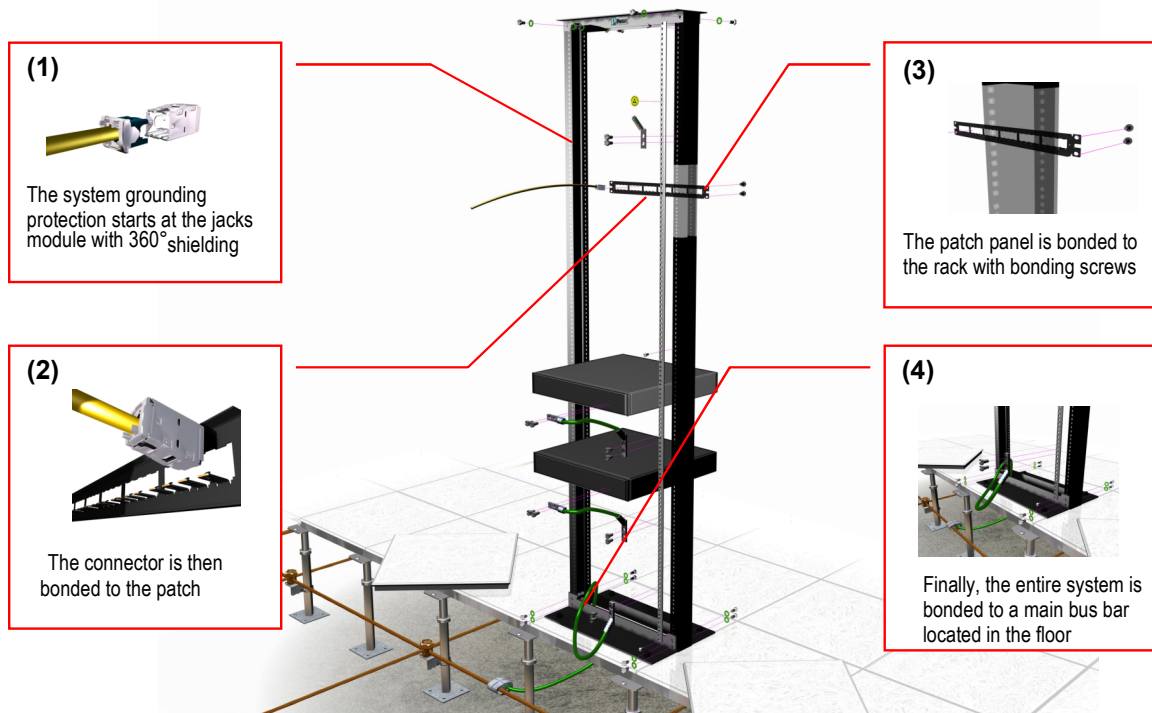
<p>Using a two-point resistance meter, measure the DC resistance between each section of the rack and the common bonding network to rack jumper as shown below.</p> <p>One probe on the CBN jumper:  One probe on the washer: </p> <p>Is the DC resistance $\leq 0.1\Omega$ for each section of rack?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p>Using a two-point resistance meter, measure the DC resistance between the mounting flange of each piece of powered equipment and the common bonding network to rack jumper.</p> <p>Is the DC resistance $\leq 0.1\Omega$ for each piece of equipment?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>

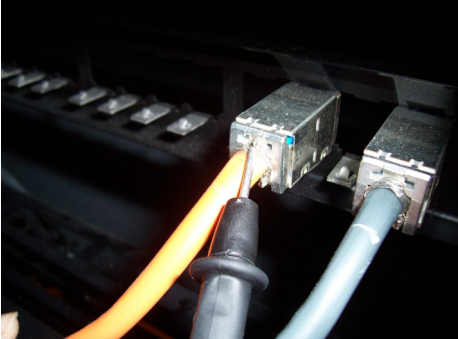
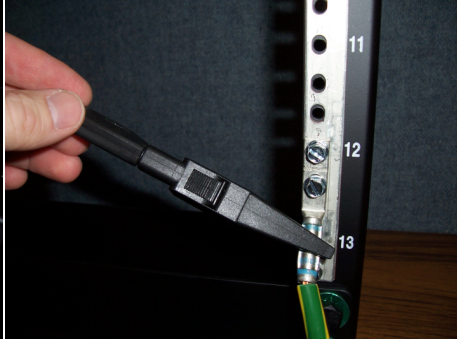
E. Bonding inspections for each cabinet: Cabinet Number

<p>Are electrostatic discharge (ESD) wrist strap ports available on the front and back of each cabinet?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p>Are two-hole compression lugs compression HTAPs used wherever possible?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p>Using a two-point resistance meter, measure the DC resistance between the common bonding network (CBN) to rack jumper and the HTAP connecting the jumper to the mesh common bonding network as shown below.</p> <p>One probe on the CBN jumper:  One probe on the HTAP: </p> <p>Is the DC resistance $\leq 0.1\Omega$?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p>Using a two-point resistance meter, measure the DC resistance between equipment mounting rails and the common bonding network jumper.</p> <p>Is the DC resistance $\leq 0.1\Omega$ for each equipment mounting rail?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>

<p>Using a two-point resistance meter, measure the DC resistance between the mounting flange of each piece of powered equipment and the common bonding network to rack jumper.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Is the DC resistance $\leq 0.1\Omega$ for each piece of equipment?</p>	

F. Bonding inspections for shielded cables: Rack/Cabinet Number



<p>Has the bay passed all the rack or cabinet bonding inspections?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Using a two-point resistance meter, measure the DC resistance between each cable shield and the common bonding network (CBN) to rack jumper as shown below.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>One probe on the shield:</p>  </div> <div style="text-align: center;"> <p>One probe on the CBN jumper:</p>  </div> </div>	
<p>Is the DC resistance $\leq 0.1\Omega$ between each module and the CBN rack jumper?</p>	

END OF SECTION 270526

SECTION 270528 – PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 SUMMARY

- A. This section includes the minimum requirements for communications cable pathway installations.
 - 1. Intrabuilding Cable Routing
 - 2. Horizontal Cable Routing
 - 3. Products
 - 4. Common Requirement for Communications Installations
 - 5. Separation from EMI Sources
 - 6. Wire Mesh Cable Tray
 - 7. Sleeve Installation for Communications Penetrations
 - 8. Penetration of Building Surfaces
 - 9. Cutting and Patching
 - 10. Retrofit-Cutover

1.3 REFERENCE STANDARDS AND CODES

- A. See Section 270513.

1.4 INTRABUILDING CABLE ROUTING

- A. Adequate riser sleeve/slot space shall be available with the ability to ingress the area at a later date in all telecommunications rooms, such that no drilling of additional sleeves/slots are necessary.
- B. The backbone cables shall be installed in a star topology, emanating from the main cross-connect to each telecommunications room. An intermediate cross-connect may be present between the main cross-connect and the horizontal cross-connect.

- C. Backbone pathways shall be installed or selected such that the minimum bend radius and pulling tension of backbone cables is kept within cable manufacturer specifications both during and after installation.

1.5 INTERBUILDING CABLE ROUTING

- A. The backbone subsystem shall include cable installed between buildings via underground, tunnel, direct-buried, aerial or any combination of these from the main cross-connect to an intermediate cross-connect in a multi-building campus.
- B. In an underground system, adequate underground conduit space shall be available and accessible at each building via the Entrance Facility or the Maintenance holes. The conduits shall not exceed a fill factor of 40%.
- C. All underground systems shall be designed to prevent water runoff from entering the building.
- D. The backbone cables shall be installed in a star topology, emanating from the main cross-connect to each satellite building telecommunications room.
- E. Backbone pathways shall be installed or selected such that the minimum bend radius and pulling tension of backbone cables is kept within cable manufacturer specifications both during and after installation.

1.6 HORIZONTAL CABLE ROUTING

- A. All horizontal cables shall not exceed 90 m from the telecommunications outlets in the work area to the horizontal cross connect.
- B. Consolidation points shall not be used.
- C. Horizontal pathways shall be installed or selected such that the minimum bend radius of horizontal cables is kept within manufacturer specifications both during and after installation.
- D. In open ceiling cabling, cable supports shall be provided by means that is structurally independent of the suspended ceiling, its framework, or supports. These supports shall be spaced no more than 1.5 m apart. NOTE: Cable tie-downs should maintain a minimum distance of 0.6 m apart when within 5 m of the termination point. Contact Owner to get project specific requirements on use of "J-hooks" and/or "Bridle Rings".
- E. For voice or data applications, 4-pair copper balanced twisted-pair cables shall be run using a star topology from the telecommunications room serving that floor to every individual information outlet. The Owner prior to installation of the cabling shall approve all cable routes.
- F. The Contractor shall observe the bend radius and pulling strength requirements of the 4 pair copper balanced twisted-pair optic cable during handling and installation.
- G. Each run of 4-pair copper twisted-pair cable between horizontal portions of the cross-connect in the telecommunication closet and the information outlet shall not contain splices.
- H. In a false ceiling environment, a minimum of 75 mm shall be observed between the cable supports and the false ceiling.
- I. Continuous conduit runs installed by the contractor should not exceed 30.5 m or contain more than two (2) 90 degree bends without utilizing appropriately sized pull boxes.

- J. All horizontal pathways shall be designed, installed and grounded to meet applicable local and national building and electrical codes.
- K. The number of horizontal cables placed in a cable support or pathway shall be limited to a number of cables that will not cause a geometric shape of the cables to be altered. Under no circumstances should cables in the horizontal pathway be bundled. This is to minimize “alien” cross talk.
- L. Maximum conduit pathway capacity shall not exceed a 40% fill. However, perimeter and furniture fill ratio is limited to 60% fill for moves, adds and changes.
- M. Horizontal distribution cables shall not be exposed in the work area or other locations with public access.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 SUBMITTALS

- A. See Section 270513.

2.3 CABLE PATHWAYS

- A. Cable Support: NRTL labeled and designed to prevent degradation of cable performance and pinch points that could damage cable. Also to be installed independently of “Other Trades” support system.
 - 1. Wire Mesh Cable Tray
 - 2. Support brackets with cable tie slots for fastening cable ties to brackets.
 - 3. Lacing bars, spools, J-hooks, and D-rings.
 - 4. Straps and other devices.
- B. Approved manufacturers:
 - 1. Snake Tray
 - 2. Cooper B-Line
 - 3. Chatsworth Products, Inc. (CPI)
 - 4. Cope
 - 5. Similar products, after approval by Owner

2.4 SLEEVES FOR PATHWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends, with plastic bushings.
- B. Sleeves for Rectangular Openings: Galvanized sheet steel.
 - 1. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.5 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FIRESTOPPING

- A. Subject to compliance with requirements, provide products of one of the following manufacturers
 - 1. Hilti Firestop Systems
 - 2. 3M, Electrical Products Division, St. Paul, Minnesota
 - 3. Metacaulk; Rectorseal Corp., Houston, Texas
 - 4. Specified Technologies Inc., Somerville, New Jersey
 - 5. United States Gypsum Company
- B. Provide materials classified by UL to provide fire barrier equal to time rating of construction being penetrated.
- C. Provide asbestos free materials that comply with applicable Codes and have been tested in accordance with UL 1479 or ASTM E 814.
- D. Fire Rated Cable Pathways: Device modules comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill, the following products are acceptable
 - 1. Specified Technologies Inc. (STI) EZ-PATH™ Fire Rated Pathway
 - 2. Or equivalent product from different manufacturer, after approval by Owner.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR COMMUNICATIONS INSTALLATION

- A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
- B. All installation shall be in accordance with manufacturer's published recommendations.
- C. Install to facilitate service, maintenance, and repair or replacement of components of both communications equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- D. Right of Way: Give to piping systems installed at a required slope.

3.2 SEPARATION FROM EMI SOURCES

- A. Comply with TIA/EIA-569-A recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
- B. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - 1. Electrical Equipment Rating Less than 2 kVA: A minimum of 5 inches
 - 2. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
 - 3. Electrical Equipment Rating More than 5 kVA: A minimum of 24 inches
- C. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - 1. Electrical Equipment Rating Less than 2 kVA: A minimum of 2-1/2 inches
 - 2. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
 - 3. Electrical Equipment Rating More than 5 kVA: A minimum of 12 inches
- D. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - 1. Electrical Equipment Rating Less than 2 kVA: No requirement
 - 2. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
 - 3. Electrical Equipment Rating More than 5 kVA: A minimum of 6 inches
- E. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or higher: A minimum of 48 inches.

- F. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.3 WIRE MESH CABLE TRAY

- A. Provide all components of the tray system (tray, supports, splices, fasteners and accessories) from a single manufacturer.
- B. Supports will be sized at minimum to match the width of the wire mesh cable tray that is supported. The support may be wider than wire mesh cable tray.
- C. Wire mesh cable tray shall be secured independently to the structural ceiling, building truss system, wall or floor using manufacturer's recommended supports and appropriate hardware as defined by local code or the authority having jurisdiction (AHJ).
- D. When the pathway is overhead, wire mesh cable tray shall be installed with a minimum clearance of 12" above the tray. Leave 12" in between the tray and ceiling/building truss structure. Multiple tiers of wire mesh cable tray shall be installed with a minimum clearance of 12" in between the trays. When located above an acoustical drop ceiling, wire mesh cable tray shall be installed a minimum of 3" above the drop ceiling tiles.
- E. When installed under a raised floor, wire mesh cable tray shall be installed with a minimum $\frac{3}{4}$ " clearance between the top of the tray and the bottom of the floor tiles or floor system stringers, whichever are lower in elevation. Maintain a 3" clearance between trays wherever trays cross over.
- F. Wire mesh cable tray shall be supported by manufacturer's specifications. Support wire mesh cable tray on both sides of every change in elevation.
- G. Wire mesh cable tray shall be labeled with a sign along its side (6 inches by 12 inches) that states the Telecommunications Room that it serves and shall point to the direction of the nearest telecommunications room that it serves, spaced at intervals of every 25 feet with footage markers showing the total footage in reference to the Telecommunications Room that it serves.
- H. Secure wire mesh cable tray to each support with a minimum of one (1) fastener. Follow the manufacturer's recommended assembly, splice and intersection-forming practices.
- I. Use installation tools recommended by the manufacturer to field fabricate wire mesh cable tray intersections and changes in elevation. Use shear cutters to cut wire mesh cable tray. Use a bending tool to form the ends of cut sections downward at 90° to allow easy drop-in installation with approved supports.
- J. Wire mesh cable tray shall be bonded to the Telecommunications Grounding Busbar (TGB) using an approved ground lug on the wire basket tray and a minimum #6 grounding wire or as recommended by the AHJ. Verify bonds at splices and intersections between individual cable tray sections and supports. Cable pathway should be electrically continuous through bonding and attached to the TGB.
- K. The quantity of cables within the tray will not exceed a whole number value equal to 50% of the interior area of the tray divided by the cross-sectional area of the cable. Cable fill will not exceed the depth of the cable tray's side rail (2", 4" or 6").
- L. The combined weight of cables within the tray will not exceed stated load capacity in manufacturer's specifications.

- M. Separate different media type within the tray. Treat each type of media separately when determining cable fill limits.
- N. When pathways for other utilities or building services are within 2' of the wire mesh cable tray, cover the tray after cables are installed.

3.4 SLEEVE INSTALLATION FOR COMMUNICATION PENETRATIONS

- A. Communications penetrations occur when pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Each pipe sleeve, horizontal or vertical, shall have a plastic type "end-bushing" on both ends to protect cables from abrasion when pulled through sleeves. The "end-bushing" shall be installed prior to install cables through sleeve.
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both surfaces of walls with respect to plastic "end-bushings". The plastic "end-bushing" shall be plenum rated if applied in plenum space.
- G. Extend sleeves installed in floors 2 inches above finished floor level with respect to plastic "end-bushings". The plastic "end-bushing" shall be plenum rated if applied in plenum space.
- H. Size pipe sleeves to provide 1/4" annular clear space between sleeve and pathway or cable, unless indicated otherwise.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint.
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pathway and cable penetrations. Install sleeves and seal pathway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."
- L. Roof-Penetration Sleeves: Weather seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

3.5 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve

seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

- C. Provide sleeves for new conduit and cable penetrations of building construction.
 - 1. Openings to accept sleeves in new building construction will be formed in building construction by the Contractor for General Construction work. Openings to accept sleeves in existing building construction shall be provided under this division of the Specifications. Refer to Article, CUTTING AND PATCHING in this Section.
 - 2. Use galvanized rigid conduit sleeves for penetrations through exterior masonry/concrete walls and foundations, concrete floor slabs on grade and above grade, and concrete-filled decks.
 - 3. Use only fire-rated listed assemblies for the type of sleeve being installed through CMU walls or gypsum walls for communications penetrations. Sleeve type shall be galvanized rigid conduit.
- D. Where conduits are installed before building construction being penetrated, install sleeves loose around conduits. Split, fit, and weld steel sleeves over existing conduits, with respect to anything flammable in the surrounding environment.
- E. Secure sleeves firmly in place using filling and patching materials (grout) that match with surrounding construction.
- F. In floor penetrations, extend sleeve 4" above finished floor unless noted otherwise. In wall penetrations, cut sleeves flush with wall surface and use metal escutcheon plates in finished interior areas.
- G. Seal voids between sleeves and building construction with joint sealants. Make allowances for and coordinate the Work with installation of firestopping, conduit insulation, and waterproofing as applicable.
- H. The Contractor shall be fully responsible for final and correct location of sleeves. Sleeves which are omitted or incorrectly located in existing building construction, shall be corrected and provided by the Communications Contractor, at no additional costs to the Owner.

3.6 PENETRATION OF BUILDING SERVICES

- A. Above Grade Level or Non-waterproof Areas
 - 1. Seal each annular space between conduits or cable and building surfaces. Pack space with Oakum, other rope packing, or backer rod materials and cover with fire-resistant sealant or other protection materials.
 - 2. Provide sleeves as specified in Article, SLEEVE-SEAL INSTALLATION in this Section for conduit and cable penetrations. Seal each space between conduit or cable and sleeve. Sealing shall be as specified in above paragraph.
- B. Waterproof Areas (Above and Below Grade)
 - 1. In new and existing construction for penetration through concrete below grade, ground water level, or in other waterproof areas, provide through-wall and floor seals having galvanized fittings, sealing assemblies, and sleeves as specified.

2. In existing construction when core bore drilled openings are used for conduit penetrations below grade, ground water level, or in other waterproof areas, provide sealing.

C. Fire-resistant Areas

1. Provide through-penetration firestop systems for penetrations through fire-rated walls, floors, and other partitions of building construction. Comply with requirements in Division 07 Section "Penetration Firestopping."
2. In walls or partitions with 2-hour or less fire ratings, provide only metallic outlet or device boxes installed per UL Fire Resistance Director, NEC, and other national building code requirements.

3.7 CUTTING AND PATCHING

- A. Provide openings, cutting, coring, and patching of openings in existing building construction as required. Patching includes openings and voids left in existing construction as a result of demolition.
- B. The Work shall include necessary assemblies and materials to maintain required fire ratings.
- C. Perform cutting as to not impair structural stability of building construction and system. Do not drill holes or weld attachments to beams and other structural members without prior written approval from the Owner's Representative. Contact the Engineer-of-Record for guidance.
- D. The Work shall be done by a craftsperson skilled in the particular trades affected.
- E. Patching materials shall match existing materials in type and quality. Patching shall be done in a manner to match appearance of adjacent surfaces.

3.8 RETROFIT-CUTOVER

- A. Furnish equipment, materials, labor and services, and perform operations required to retrofit/cutover existing cabling systems. Removals shown are general indications and may not indicate full extent of removals which may be required to complete Work.
- B. Furnish equipment, materials, labor and services, and performing operations required to enable continued functioning of existing system until cutover to new system.
- C. Remove wiring, punch blocks, cabinets, outlets, raceways, and equipment not required for new system.
 1. Abandon flush mounted device and junction boxes and cover with blank plate to match the current room décor.
 2. Remove surface telecommunications outlets and pathways unless said removal will damage the existing finish on surfaces, or physically damage the structure.
 3. Remove wiring from abandoned conduits and raceways from the work area outlet back to the corresponding termination point in the Telecommunication Room. Place a trailer string in vacated conduits and raceways.
 4. Remove labeling at both ends for abandoned cables/wiring.

5. The collected abandoned cables/wiring shall be collected and removed from site by Contractor.
- D. Perform the work in neat and workmanlike manner in accordance with the applicable codes, standards and AHJ.
- E. Removal and replacement of existing ceilings:
 1. Carefully remove existing ceilings as required to perform the work. Store removed tiles in an area designated by the Owner. Modify and augment existing suspension systems as necessary. Restore ceiling systems to their original finish.
 2. Repair any damage to ceilings due to modifications, removal, and replacement of same. Replace damaged ceiling tiles, including tiles with holes or openings left as a result of demolition, with materials of like kind.
- F. Existing equipment or material shall not be reused without specific approval of the Owner's Representative except as noted below:
 1. Existing cable terminal housings may be reused if in good condition.
- G. Equipment and materials to be removed and not desired by the Owner shall be removed from site promptly.
- H. Equipment and material to be removed and that is desired by the Owner shall be moved to an on-site storage location as directed by the Owner.

3.9 FIRESTOPPING

- A. Performance Requirements
 1. Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur.
 2. Where non-mechanical products are utilized, provide products that upon curing do not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during or after construction.
 3. Where it is not practical to use a mechanical device, openings within floors and walls designed to accommodate telecommunications and data cabling shall be provided with re-enterable products that do not cure or dry.
 4. Openings for cable trays shall be sealed using re-enterable firestopping pillows.
- B. Quality Assurance
 1. Product/Systems: Provide firestopping systems that comply with the following requirements:
 - a. Firestopping tests are performed by a qualified, testing and inspection agency. A qualified testing and inspection agency is UL, or another agency performing testing and follow-up inspection services for firestop system acceptable to authorities having jurisdiction.

- b. Firestopping products bear the classification marking of qualified testing and inspection agency.
- c. Installer Qualifications: Experience in performing work of this section who is qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products in accordance with specified requirements.

C. Project Conditions

- 1. Do not install firestopping products when ambient or substrate temperatures are outside limitations recommended by manufacturer.
- 2. Do not install firestopping products when substrates are wet due to rain, frost, condensation, or other causes.
- 3. Maintain minimum temperature before, during and for a minimum three (3) days after installation of materials.
- 4. Do not use materials that contain flammable solvents.
- 5. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- 6. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- 7. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

END OF SECTION 270528

SECTION 270553 – IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following systems identification indicated by the Contract Documents with supplementary items necessary for proper installation.
- B. The contractor shall develop and submit for approval a labeling system for the structure cabling installation. The Owner will negotiate an appropriate labeling scheme with the successful contractor. At a minimum, the labeling system shall clearly identify all components of the structured cabling system: racks, cables, panels and outlets. The labeling system shall designate the cables origin and destination and a unique identifier for the cable within the system. Racks and patch panels shall be labeled to identify the location within the structured cable system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme.

1.2 REFERENCES

- A. Several industry standards define the identification of the network physical infrastructure. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
 - 1. TIA-942 Telecommunications Infrastructure Standard for Data Centers
 - 2. TIA/EIA-606B Administration Standard for Telecommunication Infrastructure
 - 3. NFPA 70E-2004 Standard for Electrical Safety in the Workplace
- B. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:

1.3 SUBMITTALS

- A. Product Data: The Contractor shall submit catalog cut-sheets that include manufacturer, trade name, and complete model number for each product specified. Model number shall be handwritten and/or highlighted to indicate exact selection. Identify applicable specification section reference for each product.
- B. Qualification Data: For firms and person specified in “Quality Assurance” Article.

1.4 QUALITY ASSURANCE

- A. Provided products shall meet the following requirements: Items of the same classification shall be identical. This requirement includes equipment, assemblies, parts and components.
- B. Assure that the “as installed” system is correctly and completely documented including engineered drawings, manuals, and operational procedures in such a manner as to support maintenance and future expansion of the system.

- C. Materials and equipment: Equipment shall be rated for continuous operation under the ambient environmental temperature, humidity, and vibration conditions encountered at the installed location. The equipment shall meet the following requirements:
1. Interior controlled environment: 60 to 100 degrees F dry bulb and 20 to 90 percent relative humidity, non-condensing.
 2. Interior uncontrolled environment: 0 to 130 degrees F dry bulb and 10 to 95 percent relative humidity, non-condensing.
 3. Exterior environments: Minus 30 degrees to 130 degrees F dry bulb, and 10 to 100 percent relative humidity, condensing.
 4. Hazardous environment: All system components located in areas where fire or explosion hazards may exist because of flammable gas or vapors, flammable liquids, combustible dust, or ignitable fibers or flyings, shall be rated and installed according to Chapter 5 of the NEC and as shown.
 5. Listing and Labeling: Provide products specified in this Section that are listed and labeled, as defined in the NEC Article 100.

PART 2 - PRODUCTS

2.1 EQUIPMENT TYPE

- A. All label printing will be machine generated by Panduit Easy-Mark labeling software and Panduit desktop and hand-held printers using indelible thermal transfer ribbons or cartridges. Panduit self-laminating labels or Turn-Tell™ labels will be used on cable jackets, appropriately sized to the OD of the cable, and placed within view at the termination point on each end. Outlet, patch panel and wiring block labels shall be installed on, or in, the space provided on the device.
1. Computer Printable Labels
 - a. Machine generated labels provide clear communication. Labels are designed for specific data center infrastructure applications insuring a proper fit and long life.
 - b. Data cables shall be identified with self-laminated cable markers that can be rotated for visibility from any angle, and allow repositioning on the cable to align legends for improved aesthetics (Turn-Tell Labels).
 - c. Cabinets and equipment shall be identified with thermal transfer printed, die-cut, microcellular foam with a polyester printable surface and high-tack adhesive (Raised Panel Labels).
 - d. Fiber Optic cables shall be identified with non-adhesive, thermal transfer printable, flag style markers that permit the repositioning of the marker for greater visibility and improved aesthetics (Flag Labels).
 - e. Cable bundle shall be identified with non-adhesive thermal transfer printable marker plates attached with nylon cable ties or hook and loop ties. Marker plates shall offer crisp, clear legends and shall meet requirements for MIL-STD-202G, Notice 12 Method 215J (Thermal Transfer Printable Marker Plates).
 2. Easy-Mark Labeling Software
 - a. The Labeling Software insures that data center infrastructure identifiers conform to applicable Standards.

- b. Labels and identifiers shall be produced with labeling software that guides the user through the process of creating labels used throughout the data center providing faster and more reliable infrastructure identification (Easy-Mark Labeling Software).
 - c. Labels and identifiers shall be produced with labeling software that facilitates quick and easy extraction of identifiers from CAD drawings saving time and reducing errors caused by manual entry of data into labeling software (CAD-Connect Labeling Software)
3. LS8EQ Portable Printing System
- a. The LS8EQ printer produces durable, clear identification labels on site.
 - b. Labels and identifiers shall be printed on hand-held thermal transfer printer increasing labeling productivity. Printer labels shall be contained in fast loading label cassette containing an integrated memory device for automatic formatting, recall of last legend and number of labels remaining on the cassette. The printer shall provide a partial cut feature to allow the flexibility of tear-apart strips of labels for quicker installation.
 - c. Labels and identifiers shall be printed on a compact and rugged portable thermal transfer printer that fits in one hand. The printer shall have a large, backlit display, QWERTY keyboard, USB interface for importing data and printing labels from a wireless laptop or desktop computer. Printer shall simplify the creation of labels for network components through built-in data center labeling tools. Printer labels shall be contained in fast loading label cassette containing an integrated memory device for automatic formatting, recall of last legend and number of labels remaining on the cassette. The printer shall provide a partial cut feature to allow the flexibility of tear-apart strips of labels for quicker installation (LS8EQ).
4. Physical Network Security Devices
- a. Physical Network Security devices insure that network connection points are protected from unauthorized or unintended access or disconnection.
 - b. RJ45 Plug Lock In Device
 - c. RJ45 Plug Block-out Device
 - d. SC Connector Block-out Device
 - e. LC Connector Lock In Device
 - f. LC Connector Block-out Device
5. Facility Safety Signs
- a. Provide clear, concise communication of facility hazards and infrastructure mechanical systems.
 - b. Snap-on Pipe Markers
6. Electrical Safety Signs
- a. Clearly define electrical hazards and power paths.
 - b. Arc Flash Warning Signs

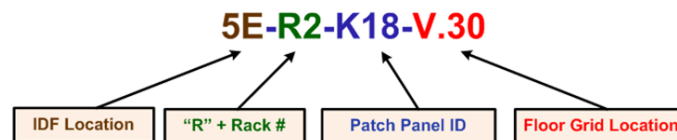
2.2 ACCEPTABLE MANUFACTURERS

- A. Panduit (Basis of Design)

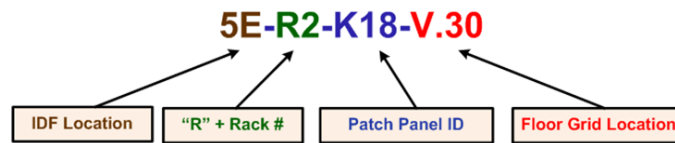
PART 3 - EXECUTION

3.1 INSTALLATION

- A. TIA/EIA-606-B: Four (4) classes of administration are specified in the standard, to accommodate diverse degrees of complexity present in the telecommunications infrastructure. The specifications for each class include requirements for identifiers, records, and labeling.
1. Class 2: Administration provides for telecommunications infrastructure administration needs of a single building or tenant that is served by a single or multiple TS's within a single building. Class 2 administration includes all elements of Class 1 administration, plus identifiers for cabling subsystem 2 and 3 or backbone cabling, cabling subsystem 2 and 3 ports, and firestopping locations.
- B. Telecommunication Space Labeling
1. Each TS should be identified with a scheme that defines the location of the space. The location should be defined with the floor and room number or other room designation. A typical telecommunication space would have the following scheme: 1DC2. This identifier would be defined that this is DATA CENTER 2 LOCATED ON THE FIRST FLOOR OF THE BUILDING.
- C. Component Locations in the Telecommunications Space
1. Locations for components in the TS can be determined either by using the grid coordinates for the space or assigning unique numbers to the various cabinet and wall segments in the space.
- D. Workstation Labeling
1. The labeling of the data outlets should correspond with the label on the patch panel in the IDF/MDF room. The label format should follow this structure:
 2. Every jack module must be labeled according to this standard. The letters "I" and "O" are skipped to avoid confusion with the numbers "1" and "0" respectively.



- E. Labeling
1. The labeling of the horizontal cabling should correspond with the label on the outlet and the patch panel. This horizontal link identifier, unique within the building, shall be used for every horizontal cable. Follow the below labeling format:

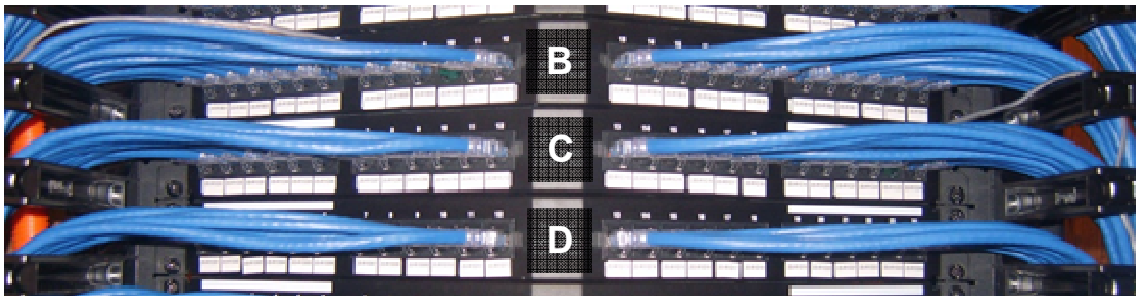


Note: The letters "I" and "O" are skipped to avoid confusion with the numbers "1" and "0" respectively.

F. Patch Panel Type and Labeling

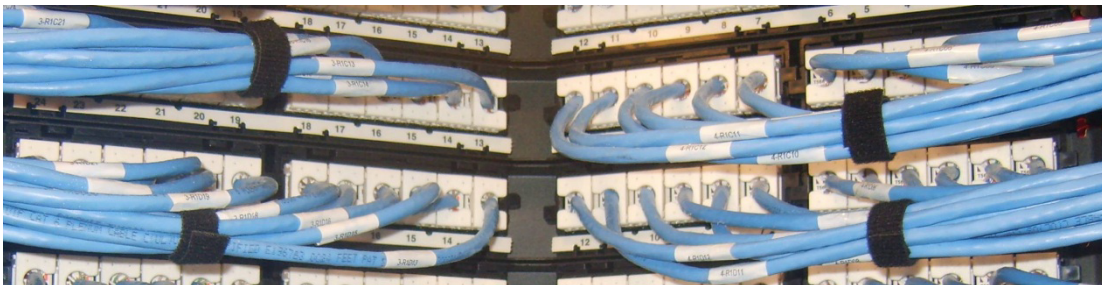
1. Nationwide requires the use of 24-port angled modular patch panels as specified in Appendix C. The patch panels should be labeled from top to bottom with the letters: A, B, C, D, E, F, G, H, J, K, L, M, N, P, Q, R (notice: the letters "I" and "O" are skipped to avoid confusion with the numbers "1" and "0" respectively).
2. The label on each patch panel port should match the label on telecommunications outlet.
3. There should not be any spaces in the rack between the patch panels.
4. The label underneath each patch panel port should include floor identifier and the workstation grid coordinates. Above each port is the manufacturer's pre-printed port number which matches the cable label on the back of the port as well as the label at the cube location (section 2.4).

Patch Panel Front View



The horizontal cables should be labeled on the backside of the patch panel so that the label on the cable matches the label on the front of the patch panel.

Patch Panel Rear View



Patch Panel Rear View (Close Up)



G. Cabinet/Rack Labeling

1. The floor tile designations are used to identify each cabinet or rack in the data center. The cabinet/rack location is based on which floor tile the right front corner of the cabinet/rack rests upon. Cabinets and racks should have location labels applied to the top and bottom of both the front and rear of the device. These labels should be visible whether or not doors are closed or opened on the cabinets.
2. A typical cabinet/rack label would have the following scheme: AB04. This identifier would define that the cabinet/rack is located with its RIGHT FRONT CORNER AT THE INTERSECTION OF ROW AB AND COLUMN 04.
3. Cable/Rack Label Recommendation:

Printer Type	Laser/Inkjet	LS8E	Desktop Thermal
Label Area	2.00 x 1.00	2.00 x 1.00	2.00 x 1.00
Label P/N	C200X100YJJ	C200X100YPC	C200X100YPT C200X100APT C200X100AMT

H. Panel Labeling

1. Once the cabinet/rack identifiers are established then the various panels in the cabinet/rack should be identified. The designation for the panel positions in a cabinet/rack can be either an alphabetic designation or a two-digit number that represent the rack unit number (RU) where the top-left mounting screw lands in the cabinet/rack. Using the RU method provides the data center manager with greater flexibility since it allows for panels and equipment to be added or removed later and not disrupt the designation of panel identifiers.



2. A typical panel label would have the following scheme: AB04-24. This identifier would define that the top left mounting screw of the panel is located at the 24th rack unit position in the cabinet/rack located grid AB04 in the data center.

3. Panel Label Recommendation:

Printer Type	Laser/Inkjet	LS8E	Desktop Thermal
Label P/N	C100X050YJJ	C100X050YPC	C100X050APT C100X050A0T

I. Port Labeling

1. Port identifiers are very important in that they will define the connectivity of cabling within the data center infrastructure. Many patch panels come from the factory with numbers already screen-printed above the ports. If this is the case then there is no need to re-label those patch panels. If the patch panels are not pre-printed with port numbers then labels will need to be created to identify the port numbers. The numbering sequence should proceed from left to right and top to bottom for all ports on a patch panel. The number of digits used for all numbers on a patch panel should be consistent with the total number of ports on that patch panel. For example a 48-port patch panel should be labeled 01 through 48 and a 144-port patch panel should be labeled 001 through 144.



2. A typical port label would have the following scheme: AB04-24:12. This identifier can be decoded to define that this port 12 located on panel 24 in cabinet/rack AB04. This is

somewhat redundant information given that the cabinet/rack and panel are clearly identified and are not usually required information on the port label since the cabinet/rack and panel are apparent to the viewer who is standing at the location of the port. Therefore, a typical port label would have the following scheme: 12. This identifier defines that this is port 12.

3. Port Label Recommendations:

Printer Type	Laser/Inkjet				
Cable Type	Copper	Copper	Copper	Copper	Fiber
Label Style	Adhesive	Adhesive	Non-Adhesive	Non-Adhesive	Adhesive
Number of Ports	4	6	4	6	n/a
Label P/N	C261X030FJJ	C379X030FJJ	C261X035Y1J	C390X030Y1J	C350X100YJJ

Printer Type	LS8E				
Cable Type	Copper	Copper	Copper	Copper	Fiber
Label Style	Adhesive	Adhesive	Non-Adhesive	Non-Adhesive	Adhesive
Number of Ports	4	6	4	6	n/a
Label P/N	C252X030FJC	C379X030FJC	C261X035Y1C	C390X030Y1C	T100X000YPC-BK

Printer Type	Desktop Thermal		
Cable Type	Copper	Copper	Fiber
Label Style	Adhesive	Adhesive	Adhesive
Label P/N	C252X030YPT C252X030APT	C379X030YPT C379X030APT	C350X100YJT

J. Cable Labeling and Patch Cord Labeling

1. Cabling on the back and front of the cabinet/rack must be identified. Labeling of cables on the back of the panel is considered cable labeling and the labeling of cables connected to the front of the patch is considered patch cord/equipment cord labeling.
2. Cable labels are identified with information that defines the connection between the near end panel connection and the far end panel connection. A near end connection identifier would consist of the cabinet/rack location, panel location, and port location. The far end connection identifier would consist of the cabinet/rack location, panel location and port location.



- a. A typical cable label would have information in the following scheme: AB04-24:01/AB07-36:13. This identifier would be decoded to define the cable connects between cabinet AB04 panel 24 port 01 going to cabinet AB07 panel 36 port 13. The far end of the cable would have a label that would have the same but with the information reversed.
- b. Recommended Cable Labels:

Printer Type	Laser/Inkjet	Laser/Inkjet	Laser/Inkjet	Laser/Inkjet	Laser/Inkjet
Cable Type	Copper	Copper	Fiber	Fiber	Fiber
Cable Diameter	Cat5/5e/6	10G UTP/STP	2mm/3mm	Duplex 3mm	Dia (0.24" to 0.48")
Marker Type	Self-Laminating	Self-Laminating	Flag	Flag	Self-Laminating
Label P/N	S100X150YAJ	S100X225YAJ	F102X220FJJ	F102X220FJJ	S100X225YAJ

Printer Type	LS8	LS8	LS8	LS8	LS8
Cable Type	Copper	Copper	Fiber	Fiber	Fiber
Cable Diameter	Cat5/5e/6	10G UTP/STP	2mm/3mm	Duplex 3mm	Dia (0.24" to 0.48")
Marker Type	Self-Laminating	Self-Laminating	Self-Laminating for Label-Core	Self-Laminating for Label-Core	Self-Laminating
Label P/N	S100X150VAC R100X150V1C	S100X225VAC R100X150V1C	S100X160VAC	S100X220VAC	S100X225VAC

Printer Type	Desktop Thermal	Desktop Thermal	Desktop Thermal
Cable Type	Copper	Copper	Fiber
Cable Diameter	Cat5/5e/6	10G UTP/STP	Dia (0.24" to 0.48")
Marker Type	Self-Laminating	Self-Laminating	Self-Laminating
Label P/N	S100X150VAT R100X150V1T	S100X225VAT R100X225V1T	S100X225VAT R100X225V1T

- 3. Patch Cord/Equipment Cord Labels are identified with information that defines the connection between the near end patch panel front connections and the far end patch panel front connections or equipment connections. A near end connection identifier

would consist of the cabinet/rack location, panel location, and port location. The far end connection identifier would consist of the cabinet/rack location, panel location, and port location.



- a. A typical patch cord label would have information in the following scheme: AB04-24:12\AB04-36:24. This identifier would be decoded to define the patch cord connection between cabinet AB04 panel 24 port 12 going to the same cabinet panel 36 port 24. The far end of the cable would have a label that would have the same but with the information reversed.
- b. A typical equipment cord label would have information in the following scheme: AB04-24:01\AB04-Tinley2:A. This identifier would be decoded to define the equipment cord connection between cabinet AB 04 panel 24 port 01 going to the same cabinet port A on equipment named Tinley2. Rack unit location could be substituted for equipment name if necessary.
- c. Recommended Patch/Equipment Cord Labels:

Printer Type	Laser/Inkjet	Laser/Inkjet	Laser/Inkjet	Laser/Inkjet	Laser/Inkjet
Cable Type	Copper	Copper	Fiber	Fiber	Fiber
Cable Diameter	Cat5/5e/6	10G UTP/STP	2mm/3mm	Duplex 3mm	Dia (0.24" to 0.48")
Marker Type	Self-Laminating	Self-Laminating	Flag	Flag	Self-Laminating
Label P/N	S100X150YAJ	S100X225YAJ	F102X220FJJ	F102X220FJJ	S100X225YAJ

Printer Type	LS8	LS8	LS8	LS8	LS8
Cable Type	Copper	Copper	Fiber	Fiber	Fiber
Cable Diameter	Cat5/5e/6	10G UTP/STP	2mm/3mm	Duplex 3mm	Dia (0.24" to 0.48")
Marker Type	Self-Laminating	Self-Laminating	Self-Laminating for Label-Core	Self-Laminating for Label-Core	Self-Laminating
Label P/N	S100X150VAC R100X150V1C	S100X225VAC R100X150V1C	S100X160VAC	S100X220VAC	S100X225VAC

Printer Type	Desktop Thermal	Desktop Thermal	Desktop Thermal
Cable Type	Copper	Copper	Copper
Cable Diameter	Cat5/5e/6	10G UTP/STP	Dia (0.24" to 0.48")
Marker Type	Self-Laminating	Self-Laminating	Self-Laminating

Label P/N	S100X150VAT R100X150V1T	S100X225VAT R100X225V1T	S100X225VAT R100X225V1T
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4. Patch Panel Connectivity defines the connections between the near-end ports and the far-end ports. This labeling can define the connection of a range of ports on a panel or just define the connection for two (2) individual ports.



- a. A typical patch panel connectivity label would have the following scheme: AB04-24: ports 01-12/AB04-36: ports 12-24. This identifier would describe that ports 01 through 12 on panel 24 of cabinet AB04 connect to ports 12 through 24 on panel 36 of cabinet AB04.
- b. Recommended Patch Panel Connectivity Labels:

Printer Type	Laser/Inkjet		
Media	Copper	Copper	Fiber
Ports	4 or less	More than 4	n/a
Label P/N	C252X030FJJ	C379X030FJJ	C350X100YJJ

Printer Type	LS8		
Media	Copper	Copper	Fiber
Ports	4 or less	More than 4	n/a
Label P/N	C252X030FJC	C379X030FJC	T100X000VJC-BK

Printer Type	Desktop Thermal		
Media	Copper	Copper	Fiber
Ports	4 or less	More than 4	n/a
Label P/N	C252X030YPT	C379X030YPT	C350X100YJT

K. Labeling for Other Systems

1. In addition to the data connections there are many other systems in a data center that require labeling.

3.2 GROUNDING AND BONDING

- A. Labeling of the grounding and bonding system involves the identification of the main grounding busbar, grounding busbars, conductors connecting busbars, conductors connecting devices to busbars, and equalizing conductors.

1. The typical scheme for the main grounding busbar would be: 1-B301-TMGB. This identifier can be decoded to define that this is the main telecommunications grounding busbar located on Floor 1 in Space B301.

- 2. The typical scheme for a grounding busbar would be: 2-R201-TGB. This identifier can be decoded to define that this is the telecommunications grounding busbar on Floor 2 in Space R201.

- a. Recommended Telecommunications Grounding Busbar Labels

Printer Type	Laser/Inkjet	LS8	Desktop Thermal
Label P/N	C400X200YJJ	C200X100YPC	C400X200YPT

- 3. The typical scheme for the busbar connections would be: 1-B301-TMGB/2-R201-TGB. This identifier can be decoded to define that this is the conductor that connects the main telecommunications grounding busbar located on Floor 1 in Space B301 to the telecommunications grounding busbar on Floor 2 in Space R201.

- a. Recommended Busbar Connections Labels

Printer Type	Laser/Inkjet				
Cable Diameter	18-14 AWG	12-10 AWG	8-4 AWG	2-1 AWG	1/0-250 MCM
Marker Type	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating
Label P/N	S100X075YAJ	S100X125YAJ	S100X225YAJ	S100X400YAJ	S100X650YAJ

Printer Type	LS8				
Cable Diameter	18-14 AWG	12-10 AWG	8-4 AWG	2-1 AWG	1/0-250 MCM
Marker Type	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating
Label P/N	S100X075VAC	S100X125VAC	S100X225VAC	S100X400VAC	S100X650VAC

Printer Type	Desktop Thermal				
Cable Diameter	18-14 AWG	12-10 AWG	8-4 AWG	2-1 AWG	1/0-250 MCM
Marker Type	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating
Label P/N	S100X075VAT	S100X125VAT	S100X225VAT	S100X400VAT	S100X650VAT

END OF SECTION 270553

SECTION 270800 – WARRANTY OF STRUCTURED CABLING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the Structured Cabling indicated by the Contract Documents with supplementary items necessary for proper installation and guarantee of warranty.

1.2 SUBMITTALS

- A. Product Data

1.3 QUALITY ASSURANCE

- A. Manufacturer's Warranty and Application Assurance

1. The Structured Connectivity Solutions Extended Manufacturer's Warranty and Application Assurance
 - a. The extended manufacturer's warranty, for a minimum of 20 years from the date of occupancy, shall include providing replacement or repair of defective product(s) and labor for the replacement or repair of such defective product(s) for the period indicated above.
 - b. Minimum twenty (20) year application assurance: The application assurance shall cover the failure of the wiring system to support the application which it has designed to support, as well as additional application(s) introduced in the future for a minimum twenty (20) year period.
 - c. System certification: Upon successful completion of the installation and subsequent inspection, the Owner shall be provided with a numbered certificate, from the manufacturer(s), registering the installation.
2. Application Assurance
 - a. The Application Assurance covers the Registered Manufacturer SCS compliant to support operations of the application(s) that the system was designed to support, as well as additional application(s) that the system was designed to support, as well as additional application(s) defined below. Manufacturer Solutions warrants that the Registered Manufacturer SCS will be free from defects that prevent operation of the specific application(s) for which the Registered Manufacturer SCS was initially designed as long as the design is in compliance with the Manufacturer SCS Performance Specifications for said applications and is in compliance with all other terms and conditions of this warranty.
 - b. The Application Assurance also covers the following additional applications:
 - 1) Those as specified in the current (at the time of installation) Manufacturer SCS Performance Specifications and Addendums; and
 - 2) In accordance with application standards specifications, any application introduced in the future by recognized standards or user forums that use the relevant TIA 568-C series or ISO/IEC 11801 components and link/channel specifications for cabling, to the extent that such applications are defined to operate over the guaranteed channel performance and/or the installed channel topologies.

- 3. Term of Warranty
 - a. The warranty period will be for a minimum of Twenty (20) years from the date of occupancy.
 - b. Moves, additions or changes are covered by the original registration certificate if performed by a Manufacturer Business Partner in compliance with the Manufacturer SCS design, installation and registration requirements.
 - c. Administration of Manufacturer SCS cords by the end user is covered by the original registration certificate.

- 4. Person / Entity Covered
 - a. This warranty is for the sole benefit of the person or entity to whom the Manufacturer Solution’s registration certificate is issued and any successor in interest to the site in which such Registered Manufacturer SCS was originally installed.

B. Testing and Inspection of Communications Equipment

- 1. Provide tests specified below, when applicable, and as indicated under individual items of material, equipment, and work specified in this Specification.
 - a. Furnish all test equipment and instruments required for the tests.
 - b. Responsible, qualified employees of the contractor in the presence of the Owner or an authorized representative shall perform the cable testing.
 - c. All individuals involved in the testing phase of the project shall not have been involved in the installation phase nor shall have immediate knowledge of the installation task.
- 2. End to end performance of all parts and channels will be tested.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 270800

SECTION 270810 – ACCEPTANCE OF COMMUNICATIONS FIBER CABLING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the required remote control and signal cabling indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
- C. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- D. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.
- E. See Section 270513.

1.3 SUBMITTALS

- A. See Section 270513.
- B. A schedule of all optical fibers to be tested.
- C. Sample test reports.
- D. Copy of latest calibration report of used test equipment.

1.4 QUALITY ASSURANCE

- A. Trained technicians who have successfully attended an appropriate training program, which includes testing with an OTDR and have obtained a certificate as proof thereof shall execute the tests. These certificates may have been issued by any of the following organizations or an equivalent organization:
 - 1. Manufacturer of the fiber optic cable and/or the fiber optic connectors.
 - 2. Manufacturer of the test equipment used for the field certification.
 - 3. Training organizations (e.g., BICSI, A Telecommunications Associations headquarters in Tampa, Florida; ACP [Association of Cabling Professionals™] Cabling Business Institute located in Dallas, Texas)
- B. The Owner or the Owner's representative shall be invited to witness and/or review field testing.

- C. The Owner or the Owner's representative shall be notified of the start date of the testing phase five (5) business days before testing commences.
- D. The Owner or the Owner's representative will select a random sample of 10% of the installed links. The Owner or the Owner's representative shall test these randomly selected links and the results are to be stored in accordance with Part 3 of this document. The results obtained shall be compared to the data provided by the installation Contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation Contractor under supervision of the representative shall repeat 100% testing at no cost to the Owner.

PART 2 - PRODUCTS

2.1 OPTICAL FIBER CERTIFICATION TESTERS

- A. The field-test instrument shall be within the calibration period recommended by the manufacturer.
- B. Acceptable manufacturer:
 - 1. Fluke Networks
 - 2. Or approved equal

2.2 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 GENERAL

- A. All tests performed on optical fiber cabling that use a laser or LED in a test set shall be carried out with safety precautions in accordance with ANSI Z136.2.
- B. All outlets, cables, patch panels and associated components shall be fully assembled and labeled prior to field-testing. Any testing performed on incomplete systems shall be redone on completion of the work.

3.2 OPTICAL FIBER CABLE TESTING

- A. Field-test instruments shall have the latest software and firmware installed.
- B. Link test results from the OTDR shall be recorded in the test instrument upon completion of each test for subsequent uploading to a PC in which the administrative documentation (reports) may be generated.
- C. Fiber endfaces shall be inspected at 200X or 400X magnification. 200X magnification is suitable for inspecting multi-mode and single-mode fibers. 400X magnification may be used for detailed

examination of single-mode fibers. Scratched, pitted or dirty connectors shall be diagnosed and corrected.

- D. Testing shall be performed on each cabling segment (connector to connector).
- E. Testing of the cabling shall be performed using high-quality test cords of the same fiber type as the cabling under test. The test cords for OTDR testing shall be approximately 100 m for the launch cable.
 - 1. Optical loss testing
 - 2. Multi-mode backbone links shall be tested at 850 nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A, Method B, One Reference Jumper or the equivalent method.
 - 3. Single-mode backbone links shall be tested at 1310 nm and 1550 nm in accordance with ANSI/TIA/EIA-526-7, Method A.1, One Reference Jumper or the equivalent method.
 - 4. Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.
 - 5. Each fiber link shall be tested bi-directional.
 - 6. A launch cable shall be installed between the OTDR and the first link connection.
 - 7. A receive cable shall be installed after the last link connection.

3.3 FIBER / CABLE TECHNOLOGY

- A. The maximum length or reach of a channel link is determined by the channel configuration, component performance, fiber bandwidth/attenuation and optical transceiver characteristics.
- B. The IEEE 802.3ae standard for 10Gb Ethernet and the ANSI T11 Fibre Channel standard specify the minimum transceiver performance characteristics (e.g., Jitter, RIN, and receiver sensitivity) and based on the characteristics the minimum reach for a given fiber solution (based on attenuation and bandwidth). If the transceiver exceeds the minimum specified output power and/or the receiver has a higher sensitivity the link will have a larger power budget. However, one cannot assume the additional power budget can be equated to longer reach by considering fiber attenuation alone. Longer fiber links will introduce more modal dispersion and increased effects of other power penalties; primarily Intersymbol Interference (ISI).
- C. Also, additional connectors and particularly, individual connectors that have high individual connector loss can introduce significant Modal Noise (MN) into the channel.
- D. The IEEE 802.3ae 10Gb Ethernet standard only supports a minimum reach of 300m (based on OM3 and the ANSI T11 8Gb standard supports a minimum reach of 150m or 190m (based on OM3 and OM4 respectively), and as such all claims for a longer reach are only supported by the optical fiber manufacturer for the given channel configuration.
- E. The minimum reach for higher bandwidth fibers such as enhanced OM4 (fiber with greater than 4700 MHz .km) strongly depends on the transceiver characteristics and is not supported by the application specified, IEEE (but is supported by ANSI T11 under the designation M5F).
- F. The minimum requirements for fiber media deployed in cabling systems described in the document are covered below:

Fiber Type	OFL Bandwidth 850nm (MHz km)	OFL Bandwidth 1300nm (MHz km)	Laser Bandwidth 850nm* (MHz km)	Laser Bandwidth 1300nm (MHz km)
50/125µm OM3	1500	500	2000	500
50/125µm OM4	3500	500	4700	500

3.4 ACCEPTANCE OF FIBER TEST RESULTS

A. Unless otherwise specified by the Owner or the Owners representative, each cabling link shall be in compliance with the following test limits:

1. Backbone (multi-mode and single-mode) link. The link attenuation shall be calculated by the following formulas:
 - a. Link Attenuation (dB) = Cable_Attn (dB) + Connector_Attn (dB) + Splice_Attn (dB)
 - b. Cable_Attn (dB) = Attenuation_Coefficient (dB/km) * Length (Km)
 - c. Connector_Attn (dB) = number_of_connector_pairs * connector_loss (dB)
 - d. Maximum allowable connector_loss = 0.50 dB
 - e. Splice_Attn (dB) = number_of_splices * splice_loss (dB)
 - f. Maximum allowable splice_loss = 0.3 dB
 - g. The values for the Attenuation_Coefficient (dB/km) are listed in the table below:

Type of Optical Fiber	Wavelength (nm)	Attenuation coefficient (dB/km)	Wavelength (nm)	Attenuation coefficient (dB/km)
Multi-mode 62.5/125 µm	850	3.5	1300	1.5
Multi-mode 50/125 µm	850	3.5	1300	1.5
Single-mode (Inside plant)	1310	1.0	1550	1.0
Single-mode (Outside plant)	1310	0.5	1550	0.5

2. Reflective events (connections) shall not exceed 0.5 dB.
3. Non-reflective events (splices) shall not exceed 0.3 dB.
4. Magnified endface inspection
5. Fiber connections shall be visually inspected for endface quality.
6. Scratched, pitted or dirty connectors shall be diagnosed and corrected.

Minimum Fiber Cable Bandwidth

* - Effective Modal Bandwidth, per TIA/EIA-492AAAC (OM3), TIA/EIA-492AAAD (OM4) and IEC 60793-2-10, ensured by EMBc or DMD performance specifications for sources meeting launch conditions specified in 10 Gb Ethernet (IEEE 802.3ae), and ANSI Fibre Channel.

Fiber Type	Attenuation 850nm (db/km)	Attenuation 1300nm (db/km)
50/125µm OM3	3.5	1.0
50/125µm OM4	3.0	1.0

Maximum Fiber Cable Attenuation

Application	50/125µm OM3	50/125µm OM4
10GBASE-SR	300	550*
10BASE-LX4	300	300
10BASE-LRM	220	220
400-M5E-SN-I	380	--
400-M5F-SN-I	--	400
800-M5E-SN-I	150	--
800-M5F-SN-I	--	190

Ethernet and Fibre Channel Supported Distances (in meters)

*-550 meter reach assuming 3.5 dB/KM maximum cabled attenuation at 850 nm plus 1.0 dB of total connection and splice loss, or 3.0 dB maximum cabled attenuation at 850 nm and 1.3 dB total connection and splice loss.

Additionally, the fiber media must exceed the requirements of TIA and IEC bandwidth requirements and must adhere to more stringent (and discriminating) Differential Mode Delay (DMD) mask methods for verifying the ultimate integrity of the Effective Modal Bandwidth (EMB) metric.

The fiber shall be manufactured with a Modified Inside Chemical Vapor Deposition (MICVD) or Plasma assisted Inside Chemical Vapor Deposition (PCVD) process and meet at least one (1) of the following DMD templates, each of which consists of both an inner and outer mask specification, and the sliding mask specifications shown below.

OM3 Media

Template Number	850 nm DMD-Inner Mask (ps/m) (Radius 0-18 µm)	850 nm DMD-Outer Mask (ps/m) (Radius 0-23 µm)
1	≤ 0.23	≤ 0.70
2	≤ 0.24	≤ 0.60
3	≤ 0.25	≤ 0.50
4	≤ 0.26	≤ 0.40
5	≤ 0.27	≤ 0.35
6	≤ 0.33	≤ 0.33

Sliding Interval Masks: ≤ 0.25 ps/m

OM4 Media

Template Number	850 nm DMD-Inner Mask (ps/m) (Radius 0-18 μm)	850 nm DMD-Outer Mask (ps/m) (Radius 0-23 μm)
1	≤ 0.10	≤ 0.30
2	≤ 0.11	≤ 0.17
3	≤ 0.14	≤ 0.14

Sliding Interval Masks: ≤ 0.11 ps/m

- B. All installed cabling links shall be field-tested and pass the test requirements. Any link that fails these requirements shall be diagnosed and corrected. Any corrective action that must take place shall be documented and followed with a new test to prove that the corrected link meets performance requirements. The final and passing result of the tests for all links shall be provided in the final test results documentation, which shall be reviewed, approved and signed by the Contractors RCDD.
- C. Acceptance of the test results shall be given in writing after the project is fully completed and tested in accordance with the Contract Documents and to the satisfaction of the Owner.
- D. Magnified Endface Inspection: Fibers shall be inspected at 250X or 400X magnification. 250X magnification is suitable for inspection multi-mode and single-mode fibers. 400X magnification may be used for detailed examination of single-mode fibers.
- E. Length Measurement
 - 1. The length of each fiber shall be recorded.
 - 2. It is preferable that the optical length be measured using an OTDR.

3.5 ADMINISTRATION

- A. Test results documentation
 - 1. Test results saved within the field-test instrument shall be transferred into a FLW file so it can be uploaded to Fluke Networks LinkWare software that allows for the maintenance, inspection and archiving of the test records. These test records shall be uploaded to the PC unaltered, i.e., "as saved in the field-test instrument."
 - 2. The test results documentation shall be available for inspection by the Owner or the Owner's representative during the installation period and shall be passed to the Owner's representative within 5 working days of completion of tests on cabling served by a telecommunications room or of backbone cabling. The Contractor shall retain a copy to aid preparation of as-built information.
 - 3. The database for the complete project shall be stored and delivered on CD-ROM prior to Owner acceptance of the building. This CD-ROM shall include the software tools required to view, inspect, and print any selection of the test reports.
 - 4. Circuit IDs reported by the test instrument should match the specified label ID.

5. The detailed test results documentation data is to be provided in an electronic database for each tested optical fiber and shall contain the following information.
 - a. The identification of the customer site as specified by the Owner.
 - b. The name of the test limit selected to execute the stored test results.
 - c. The name of the personnel performing the test.
 - d. The date and time the test results were saved in the memory of the tester.
 - e. The manufacturer, model and serial number of the field-test instrument.
 - f. The version of the test software and the version of the test limit database held within the test instrument.
 - g. The fiber identification number.
 - h. Test results to include OTDR link traces and event tables at the appropriate wavelength(s).
 - i. The length for each optical fiber as calculated by the OTDR.
 - j. The overall Pass/Fail evaluation of the link-under-test for OTDR measurements.

3.6 ADDITIONAL SUPPORT

A. Panduit Certification Plus System Warranty

1. A Certification Plus System Warranty shall provide a complete system warranty to guarantee end-to-end high performance cabling systems that meet application requirements. The guarantee shall include cable and connectivity components and have one (1) point of contact for all cabling system issues. The system shall be warranted for a period of 25 years.

B. Panduit PCI Contractor Agreement

1. A factory registered Panduit PCI contractor shall complete network installation. The contractor shall have completed standards based product and installation training. A copy of the PCI Contractor Registration shall be submitted in the proposal.

C. Product Guarantee

1. All Panduit Pan-Net non-consumable products have a 25-year guarantee. When installed per TIA or ISO/IEC standards, the Panduit Pan-Net Network Cabling System will operate the application(s) for which the system was designed to support. Applications may include, but are not limited to those listed in Section 1.1 of this document.
2. In order to qualify for the guarantee, the structured cabling system must be installed per the following:
 - a. Meet all TIA/EIA (or ISO/IEC) commercial building wiring standards
 - b. Panduit Products must be installed per Panduit instruction sheets.
3. Note: All Networks shall be installed per applicable standards and manufacturer's guidelines.
4. If any Panduit Pan-Net product fails to perform as stated above, Panduit will provide new components at no charge. THIS GUARANTEE IS MADE IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE ARE SPECIFICALLY EXCLUDED. Neither seller nor manufacturer shall be liable for any other injury, loss or damage, whether direct or consequential.

END OF SECTION 270810

SECTION 270820 – ACCEPTANCE OF COMMUNICATIONS COPPER CABLING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the required remote control and signal cabling indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references.
- C. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- D. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them. See Section 207513.

1.3 SUBMITTALS

- A. See Section 270513
- B. A schedule (list) of all copper cables to be tested.
- C. Sample test reports
- D. Copy of latest calibration report of used test equipment.

1.4 QUALITY ASSURANCE

- A. Trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof shall execute the tests. Appropriate training programs include but are not limited to installation certification programs provided by BICSI or the ACP (Association of Cabling Professionals). These certificates may have been issued by any of the following organizations or an equivalent organizations:
 - 1. Manufacturer of the copper cable and/or copper connectors.
 - 2. Manufacturer of the test equipment used for the field certification.
 - 3. Training organizations (e.g., BICSI, A Telecommunications Association headquarters in Tampa, Florida; ACP [Association of Cabling Professionals™] Cabling Business Institute located in Dallas, Texas)

- B. The test equipment shall be within the calibration period recommended by the manufacturer in order to achieve the manufacturer-specified measurement accuracy.
- C. The Owner or the Owner's representative shall be invited to witness and/or review field-testing.
- D. The Owner or the Owner's representative shall be notified of the start date of the testing phase five (5) business days before testing commences.
- E. The Owner or the Owner's representative will select a random sample of 10% of the installed links. The Owner or the Owner's representative shall test these randomly selected links and the results are to be stored in accordance with Part 3 of this document. The results obtained shall be compared to the data provided by the installation Contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation Contractor under supervision of the representative shall repeat 100% testing at no cost to the Owner.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 COPPER CERTIFICATION TESTERS

- A. The field-test instrument shall be within the calibration period recommended by the manufacturer.
- B. Test equipment (tester) for:
 - 1. Category 6: Test equipment shall comply with the accuracy requirements for level III field testers as defined in the TIA Cat 6 Standard.
- C. Acceptable Manufacturer
 - 1. Fluke Networks
 - 2. Or approved equal

PART 3 - EXECUTION

3.1 GENERAL

- A. Every cabling link in the installation shall be tested for
 - 1. Wire map
 - 2. Length
 - 3. Insertion Loss

- 4. NEXT Loss
- 5. PS NEXT Loss
- 6. ACR-F Loss
- 7. PS ACR-F Loss
- 8. Return Loss
- 9. Propagation Delay
- 10. Delay Skew

B. End-to-end cabling will be considered defective if it does not pass tests and inspections, based on Category 6 performance specifications chart below.

Category 6 Performance Specifications Chart	
Parameter	Category 6
Specified Frequency Range	250 MHz
Attenuation	19.8
NEXT	44.3 dB
Power-Sum NEXT	37.1 dB
ACR	18.6 dB
Power-Sum ACR	20.3 dB
ELFEXT	27 dB
Power-Sum ELFEXT	24.8 dB
Return Loss	20.1 dB
Propagation Delay	548 nsec
Delay Skew	50 nsec
Network 5 Supported	1000 Base-TX

- C. Alien Crosstalk testing is not required. Please get confirmation hereof from the Owner before testing.
- D. The installed twisted-pair horizontal links shall be tested from the Telecommunications Room to the wall outlet in the work area.
- E. The test plug shall fall within the values specified in the applicable standard (CAT6) for NEXT Loss, FEXT Loss and Return Loss.
- F. The tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. In order to deliver

optimum accuracy, preference is given to a permanent link interface adapter for the tester than can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. The Contractor shall provide proof that the interface has been calibrated within the period recommended by the vendor. To ensure that normal handling on the job does not cause measurable Return Loss change, the adapter cord cable shall not be of twisted-pair construction.

- G. A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter. The test result of a parameter shall be marked with an asterisk (*). When the result is closer to the test limit than the accuracy of the field tester. The field tester manufacturer must provide documentation as an aid to interpret results marked with asterisks. To which extent '*' results shall determine approval or disapproval of the element under test shall be defined in the relevant detail specification, or agreed on as a part of a contractual specification.

3.2 CERTIFYING COPPER CABLE

A. Category 6

1. All tests should be in accordance with the field test specifications defined in ANSI/TIA/EIA-568-B.2-1. "Addendum 1 – Transmission Performance Specifications for 4-pair 100 Ω Category 6 Cabling." This document will be referred to as the "Category 6 Standard."
2. The test parameters are defined in the Category 6 Standard. The test of each link shall contain all of the following parameters as detailed below. In order to pass the test, all measurements (at each frequency in the range from 1 MHz through 250 MHz) must meet or exceed the limit value determined in the above-mentioned standard.

3.3 ACCEPTANCE OF COPPER TEST RESULTS

- A. One hundred percent of the installed cabling links must pass the requirements of the applicable standards. Any failing link must be diagnosed and corrected. The corrective action shall be followed with a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links shall be provided in the final test results documentation, which shall be reviewed, approved and signed by the Contractors RCDD.
- B. Acceptance of the test results shall be given in writing after the project is fully completed and tested in accordance with Contract Documents and to the satisfaction of the Owner.

3.4 ADMINISTRATION

A. Test results documentation

1. Test results saved within the field-test instrument shall be transferred into a FLW file so it can be uploaded to Fluke Networks LinkWare software that allows for the maintenance, inspection and archiving of the test records. These test records shall be uploaded to the PC unaltered, i.e., "as saved in the field-test instrument."
2. The test results documentation shall be available for inspection by the Owner or the Owner's representative during the installation period and shall be passed to the Owner's representative within five (5) working days of completion of tests on cabling served by a

telecommunications room or of backbone cabling. The installer shall retain a copy to aid preparation of as-built information.

3. The database for the complete project shall be stored and delivered on CD-ROM prior to Owner acceptance of the building. This CD-ROM shall include the software tools required to view, inspect, and print any selection of the test reports.
4. Circuit IDs reported by the test instrument should match the specified label ID.
5. The detailed test results documentation data is to be provided in an electronic database for each tested copper cable and shall contain the following information.
 - a. The identification of the customer site as specified by the Owner.
 - b. The name of the test limit selected to execute the stored test results.
 - c. The name of the personnel performing the test.
 - d. The date and time the test results were saved in the memory of the tester.
 - e. The manufacturer, model and serial number of the field-test instrument.
 - f. The version of the test software and the version of the test limit database held within the test instrument.
 - g. The copper identification number.
 - h. The length for each copper cable.
 - i. The overall Pass/Fail evaluation of the copper link-under-test.

END OF SECTION 270820

SECTION 271100 – COMMUNICATIONS EQUIPMENT ROOM FITTINGS

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the required remote control and signal cabling indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references.
- C. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- D. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them. See Sections 270513.

1.3 SUBMITTALS

- A. See Section 270513.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 - 1. Layout Responsibility: Preparation of Shop Drawings will be under the direct supervision of a RCDD.
 - 2. Installation Supervision: Installation will be under the direct supervision of a Registered Technician who will be present at all times when Work of this Section is performed at Project site.
 - 3. Field Inspector: Currently registered by BICSI as RCDD to perform the on-site inspection.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.
- D. Grounding: Comply with ANSI-J-STD-607-A.
- E. Hole spacing and mechanical dimensions: Comply with EIA-310.

1.5 TELECOMMUNICATION ROOMS

- A. The Telecommunications Room is generally considered to be a floor serving facility. The horizontal cross-connect links the horizontal subsystem and the backbone subsystem together.
- B. The Telecommunications Rooms shall have a minimum dimension of 10' x 10' square.
- C. L-shaped or other shaped dimensions are not acceptable.
- D. Concrete columns in this area are not acceptable.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 GENERAL

- A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
- B. All installation shall be in accordance with manufacturer's published recommendations.
- C. Environmental Limitations: Do not deliver or install equipment frames and cable trays until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and work above ceilings is complete.

3.2 CABLE TRAYS

- A. Ladder Racks: Inside the Equipment room and Telecommunications rooms, ladder rack is to be used for horizontal wire management. This tray is designated for cabling to remain within these rooms. Any implementation of this ladder rack equipment will include spill brackets at all inside corners.
- B. Cable Tray
 - 1. The cable tray will be installed parallel to the furred out wall 6 to 12 inches inside the Telecommunications/Equipment rooms. The cable tray will continue into far enough to deliver the riser, station, horizontal, and fiber to the end destination. Cascade transitions (waterfalls) shall be used if height variations occur between the cable tray equipment and the ladder rack equipment.
 - 2. All cable trays inside the Telecommunications/Equipment rooms must be a prefabricated structure consisting of two (2) side rails connected by individual transverse members.

Wire mesh type or Mono Mount wire cable tray systems will not be used. The horizontal cable tray system shall be able to support a minimum of 100 lbs of cable per linear foot.

- C. Drop-off support for the copper cable going into the frames/racks shall be used.

3.3 OUTLET BOXES

- A. Outlet boxes shall be assembled as follows

1. Depth: 3.26 inches
2. Height: 4.16 inches
3. Width: 3.51 inches

3.4 VERTICAL WIRE MANAGERS COPPER/FIBER

- A. A standard vertical wire manager between equipment frames is 6 inches. If the vertical wire manager is at the end of a row or against a wall, 6 inch wire manager shall be used.
- B. The vertical wire manager shall have separate slack managers for fiber and copper.
- C. Proper drop-off support into the vertical wire manger shall be used. Bars in the ladder rack must be cut and replaced by 'movable cross member' if needed, to establish proper drop-off.

3.5 HORIZONTAL FIBER MANAGEMENT

- A. In Telecommunication Rooms only: a 2 inch x 2 inch fiber management system shall be installed above all frames and/or racks and between all rows.
- B. Proper drop-off support into the frames/racks shall be used.

3.6 EQUIPMENT RACKS – FLOOR MOUNTED – 2 POST

- A. Floor mounted equipment racks shall be aluminum relay racks with uprights to mount equipment 19 inches wide. Uprights shall be a 3 inch deep channel 1-1/4-inches wide, drilled and tapped 12-24 in a 1/2 inch pattern. Racks shall be provided with a standard top cross member, and predrilled base plate to allow floor fastening. Open frame equipment racks shall be 7-feet in height, 45 rack units. Rack units to be 1-3/4" spacing. Equipment racks shall be provided with ground bar and a #6 AWG ground lug. Each rack shall have not less that 40% available space for use by Owner at completion of cable installation.
- B. Furnish a minimum of two (2) single sided 15-inch deep component shelves per rack.
- C. 19" Power strip – horizontal 20 AMP, 120v AC with twelve (12) outlets and 15' long power cord. Size - Uses one (1) rack unit.

3.7 CABLE MANAGEMENT – VERTICAL AND HORIZONTAL

- A. Equipment racks - Cable guides shall be specifically manufactured for the purpose of routing cables, wires and patch cords horizontally and vertically on 19-inch equipment racks. Cable guides shall consist of ring or bracket-like devices mounted on rack panels for horizontal use or

individually mounted for vertical use. Cable guides shall mount to racks by screws and/or nuts and lock washers. Provide sufficient quantity of cable guides to fill rack (for both active and spare sections of rack). The cable guides shall control cable bend radius and provide cable strain relief. Vertical cable management to have doors – front and back.

- B. Horizontal cable managers shall be capable of front and rear cable management, and have capacity for cables in front of rack area. They shall be designed to be installed on a standard EIA 19" x 7' telecommunications rack. Horizontal cable managers shall have front door.
- C. Equipment cabinets - Cabinets shall be equipped with vertical and horizontal cable management hardware, in either guides or form of rings, to assist in neatly routing of copper jumpers and/or optical fiber from the 110-type termination blocks or modular patch panel to the owner provided network electronics. Horizontal cable management shall be 3.5 inches in height with minimum of five (5) jumper distribution rings.
- D. 110 Type Termination Blocks - Plastic horizontal troughs shall be provided by the contractor to assist in neatly routing of jumpers. They shall be mounted at the top of each column of 110-type termination blocks and between each 100 pair-type termination block. Metal vertical distribution rings shall be provided for vertical routing of cross-connect wires and jumpers.

3.8 DEMARCATION REQUIREMENTS

- A. Contractor shall coordinate with owner's selected service provider all requirements for the demarcation point.
- B. In the event that the service provider's requirements differ from the work shown on the documents, the contractor shall not proceed on the installation without a document from the engineer.

3.9 COMMUNICATION SYSTEM GROUNDING

- A. Refer to Specification Section 260526.

3.10 TELECOMMUNICATIONS ROOM

- A. The telecommunication room shall house racks, voice termination fields and required cable routing hardware. Racks shall be placed in a manner that will allow a minimum of three (3) feet of clearance from the front and rear mounting surfaces and on one side on racks. If one mounting rail of the rack is placed against a wall, the mounting rail shall be no closer than 6" to the wall to allow room for vertical management. Where there is more than one (1) rack, the racks shall be ganged with vertical management hardware. Ganged rack frames will be placed in a manner that will allow a minimum of three (3) feet of clearance from the front and rear mounting surfaces and on one side of the ganged assembly. Open frame equipment racks shall be bolted to the floor by means of the manufacturer's recommended fasteners. Cable guides shall be bolted or screwed to racks. Racks shall be installed level. Ganged racks shall be bolted together. Ganged rack cabinets shall have adjacent side panels removed.
- B. System components and appurtenances shall be installed in accordance with NFPA 70, manufacturer's instructions and as shown. Necessary interconnections, services, and adjustments required for a complete and operable signal distribution system shall be provided. Components shall be labeled in accordance with TIA/EIA 606. Penetrations in fire-rated construction shall be firestopped. Conduits, outlets and raceways shall be installed in accordance with Division 26. Wiring shall be installed in accordance with EIA/TIA 569A. Wiring,

and terminal blocks and outlets shall be marked in accordance with TIA/EIA 606. Cables shall not be installed in the same cable tray, utility pole compartment, or floor trench compartment with ac power cables. Cables not installed in conduit or wireways shall be properly secured and neat in appearance and, if installed in plenums or other spaces used for environmental air, shall comply with NFPA 70 requirements for this type of installation.

END OF SECTION 271100

SECTION 271300 – COMMUNICATIONS BACKBONE CABLING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the required remote control and signal cabling indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references.
- C. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- D. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them. See Sections 270513.

1.3 SUBMITTALS

- A. See Sections 270513.

1.4 BACKBONE CABLING DESCRIPTION

- A. Backbone cabling system shall provide interconnections between communications equipment rooms, telecommunicating rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.
- B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities.
- C. Bridged taps and splitters shall not be used as part of backbone cabling.
- D. Color designations for type fiber cable
 - 1. Single Mode fiber > Yellow
 - 2. Multi Mode fiber 62.5 micron > Orange
 - 3. Multi Mode fiber 50 micron 1GB > Orange
 - 4. Multi Mode fiber 50 micron 10GB > Aqua

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 MANUFACTURERS

- A. The system must be a manufacturer certified system.
- B. Acceptable manufacturers:
 - 1. Panduit (basis of design)
 - 2. Commscope
 - 3. Belden-Belden
 - 4. Corning
 - 5. Approved equal to

2.3 UTP CABLE

- A. 24 AWG CAT 3 (or higher rated) plenum riser cable (minimum of 25 pair). Substituted if required by local fire codes.

2.4 UTP CABLE HARDWARE

- A. Riser cable shall not be terminated on Cat3 or higher rated patch panels. Horizontal wire management shall be mounted horizontally between patch panels.
- B. Cables will be terminated in numerical order starting with the smallest number.

2.5 OPTICAL FIBER CABLE (INDOOR RATED)

- A. Backbone Fiber Cable. Single mode 6, 12 strand fiber optic backbone cable shall be used indoor. Cable shall be 9/125 micrometer single-mode graded index optical fiber cable. Cable construction shall be tight buffered type. Individual fibers shall be color coded for identification. Cable shall be imprinted with fiber count and aggregate length at regular intervals. Cable shall be yellow and plenum rated OFNP per NFPA 70.
- B. Backbone Fiber Cable. Multimode 6, 12, or 24 strands fiber optic backbone cable shall be used indoors. Cable shall be 62.5/125 50/125 10 Gig micrometer multimode graded index optical fiber cable. Cable construction shall be tight buffered type. Individual fibers shall be color coded for identification. Cable shall be imprinted with fiber count and aggregate length at regular intervals. Cable shall be plenum rated OFNP per NFPA 70.
- C. The optical fiber cable must be Optical Fiber Conductive Plenum rated and armored type.

- D. The optical fiber must be FDDI and ATM compliant and conform to all relevant ANSI and EIA/TIA standards.
- E. Fiber Patch Cords: Patch cords shall be the cross-connect between the backbone fiber distribution cabinet and the Owners network (switch/hub). Simplex and duplex cable connectors.
1. Fiber Patch cords: Factory-made, dual-fiber cables.
 2. All fiber patch cords shall be supplied one (1) each for terminated fiber connection plus 20% spares.
 3. Contractor to coordinate based on room layout and with owner prior to ordering/installing fiber patch cords.
- F. Work Area Fiber Patch Cords: Simplex and duplex cable connectors.
1. Work Area Fiber Patch Cords: Factory-made, dual-fiber cables in 6' lengths.
 2. All fiber patch cords shall be supplied one (1) each for terminated fiber connection plus 20% spares.
 3. Contractor to coordinate with the owner prior to ordering and installation of patch cords.
 4. Wall outlet plates for fiber shall come equipped with M81 Series modular fiber optic adapter with mounting module. The SC, LC, ST coupling / adapter snaps into the regular opening of the M81 type mounting module. The integrated fiber management tool is equipped with slack management to maintain proper bend radius behind the wall.
- G. Cable Connecting Hardware
1. Comply with the Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604.12. Comply with TIA/EIA-568-B.3.
 2. Quick-connect, simplex and duplex, Type SC connectors. Insertion loss not more than 0.75 dB.
 3. Mixing and matching of fiber SCS components from different vendors is not permitted.
 4. Throughout all data centers the preferred multimode fiber types used are:
 - a. OM3 Multimode Laser Optimized 50/125µm
 - b. OM4 Multimode Laser Optimized 50/125µm
 5. Such multimode solutions will support an OF-300 (300m) channel throughout the installation when configured using any LC Duplex OM3 patch cords (including LC to gender change cords) necessary to connect the active equipment.
 6. For multimode Laser Optimized 50/125µm (OM3/OM4) products the fiber used in the production of cords, cables and pigtailed must be from the same source of manufacture (ex. – mixing of Bend Tolerant and Non-Bend intolerant fibers is not permitted).
 7. For all new installations, the preferred fiber shall be OM3 or OM4 Laser Optimized 50/125µm, capable of supporting 10GB Ethernet @ 850nm for a minimum distance of 300m and 8GB Fibre Channel for a minimum distance of 150m, including the multiple

connectors in the channel (given that the total connector insertion loss is below that allowed in the applicable standard).

8. The preferred connector type for presentation on the cabling infrastructure is the LC (TIA FOCIS compliant) duplex connector. All connectors shall be supplied as factory assembled and pre-terminated, using the same fiber type, performance and manufacturer source for the fiber in the connectorized components (patch cords, harnesses and cassettes) as that of the fiber optic cable backbones (trunk assemblies and ribbon interconnect cordage).
9. Test results from the manufacturer shall be provided for all components supplied. Also, factory data to validate return loss will be collected and be available upon request. This data shall include the following key and critical parameters:
10. Connector end face finish and geometry is critical for high speed application support and repeatability of mated loss performance between connectors
11. Paragraph 52.14.2.2 from IEEE 802.3ae states that “the maximum discrete reflectance from an individual connector for 10GBASE-SR shall be less than -20dB”; also, Paragraph 8.2.5 from ANSI T11 FC-PI-5 states that “connectors and splices shall each have a return loss greater than 20dB”. These are equivalent statements and generally require that all connectors must have physically contacting fiber ends.
12. In order to meet these application requirements, every terminated connector in the channel must be inspected using interferometer evaluation tools to qualify the geometry against standards that guarantee such physical contact. In general the cabling contractors do not have the time or skill set to undertake this task as part of their normal process. For this reason the use of direct field terminated (hand polished) connectors is not permitted.
13. Care must be taken to accurately measure the cable lengths as there will be little to no spare capacity in the containment to host loops of excess cable.
14. Only approved fiber optic components and products may be used throughout the installation.
 - a. Bend radius should be maintained at 10x cable outside diameter, no less.
 - b. Avoid excessive slack in the frames and cable tray, and abrupt bends
 - c. Tie wraps are not permitted, Panduit Tak-Ty® recommended
 - d. Waterfalls should be installed in every location where cables are dropped down into a frame or a rack out from the overhead cabling.
 - e. Where fiber backbone must be placed in the same cable routing solution as copper backbone, great care must be taken to segregate them in the containment.
 - f. Fiber backbone should be the top most cable in all cable routing solutions. Fiber should never be buried under any other cables.
 - g. Alternate routing of fiber cables from the left side and right side, every other panel within a given rack for ease of cable management. This applies for distribution frames and cabinets.
 - h. As per the requirements from any local or national governing code or standard; plenum rated cables must be used in plenum rated spaces.
 - i. For ease of access to the fiber ports and for cable management generally fiber patch panels located in cabinets should be installed facing the hot aisle.
 - j. Dust plugs will be provided and should be maintained on all fiber outlets and patch panel ports to protect the connection from contamination when not in use.
 - k. Mechanical splices and giber adapter products shall not be used for joining fibers mid-span of any fiber link.

H. MPO/MTP Fiber Cabling System

1. Customer shall deploy optical fiber circuits consisting of trunk cables, cassettes, harnesses/hydras, patch cords and optical fiber patch panels as a standard configuration. A typical end-to-end data circuit will begin at the end equipment, and be constructed using standard components that includes a patch cord, a cassette, trunk cable, another cassette, and another patch cord, which terminates in the end equipment at the far end.
2. Channels may be deployed that include multiple cassettes, harnesses and trunks that produce worst case channel loss above the standards depending on physical channel length (such as cross-connected systems). Such “engineered links” must be individually validated against the IEEE reference model to assure performance.
3. Multimode circuits shall contain only 50/125µm OM3 or OM4 fiber, cables, cassettes, and patch cords. The trunk cables shall be comprised of optical fiber cable terminated with the appropriate number of 12- fiber multi-fiber push-on (MPO/MTP) connectors.
4. The cassettes shall be comprised of optical fibers terminated in one (1) or two (2) MPO/MTP-style connectors on one end and SC duplex or LC connectors on the other end and patch cords shall be of the same connector type, (LC or SC). The optical fibers and connectors shall be fully contained in a protective metal and/or plastic modular housing.
5. Patch cords shall be duplex (two-fiber) cable assemblies with SC duplex or LC connectors on each end. Hybrid patch cords (patch cords with different connectors on each end) may be used between the electronics and the first cassette if necessary to match the end equipment interface.

I. Manufacturers: subject to compliance with requirements, provide products by one of the following manufacturers:

1. Basis of Design: Panduit
2. General Cable Technologies Corporation
3. Superior Essex, Inc.
4. CommScope
5. Belden
6. Or approved equal to

J. Backbone OSP Foam Skin Filled Copper Cable: Permits extension of telecommunication services in a multi-building environment, extending from the main cross-connect to the intermediate cross-connect in each building being served.

1. Conductors: No. 24 AWG, 100-ohm, solid annealed copper; 100 200 300 Pair
2. Insulation: dual insulated conductors with inner layer of foamed polyolefin covered by an outer solid, colored polyolefin skin. Color coded in accordance with telephone industry standards.
3. Core Assembly: Cables 25 pairs and less assemble pairs in a single group. Cables larger than 25 pairs arrange pairs in 25 pair units with color-coded unit binders.

4. Filling Compound: Entire core assembly completed filled with ETPR compound, completely filling interstices between the pairs and under the core wrap.
 5. Core Wrap: Non-hygroscopic dielectric tape applied longitudinally.
 6. Shielding: Corrugated, copolymer coated 8-mil aluminum tape applied longitudinally with an overlap. Shield interfaces to be flooded.
 7. Jacket: Black, linear low-density polyethylene
 8. Jacket Markings: Include manufacturer's identification, pair count, AWG, product identification at 2-ft interval along cable jacket.
 9. Comply with ANSI/ICEA S-84-608-2002 and RUS 7 CFR 1755.890 (PE-89)
- K. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:
1. Basis of Design: Panduit
 2. General Cable Technologies Corporation
 3. Superior Essex, Inc.
 4. CommScope
 5. Belden
 6. Or approved equal to

2.6 OPTICAL FIBER CABLE HARDWARE

- A. Connectors shall be duplex SC, LC, ST type. Connectors shall be field installable. Connectors shall utilize adhesive for fiber attachment to ferrule. Connectors shall terminate fiber sizes as required for the service.
- B. Fiber Enclosures. Fiber optic adapters shall be provided to align and join the fiber optic connectors allowing a means to cross connect or interconnect premises equipment to the optical fiber cabling. Adapters shall be housed in rack mounted panels and shall have sliding drawers to store fiber loops and tinted removable durable door covers to protect the fiber connectors. Enclosure shall incorporate cable support and or strain relief mechanisms to secure the horizontal cables at the termination block and to ensure that all manufacturers minimum bend radius specifications are adhered to. Quantity of fiber patchcords and adapters shall be sufficient to accommodate the installed cable plant plus 20% spare.

2.7 PATCH (EQUIPMENT) CORDS

- A. Panduit® Opti-Core® 10Gig™ Standard OM3/OM4 and Optimized OM3/OM4 Patch Cords work in conjunction with Panduit's 10Gig™ Fiber Optic High Speed Data Transport System to deliver the next progression in high performance optical connectivity and media with seamless integration of 10Gb/s Ethernet and 8 Gb /s Fiber Channel network capability.
- B. This scalable solution is designed to deploy long channels and/or cascaded connectivity (cross-connects) with ample headroom. These high performance 10Gig™ OM3/OM4 Patch Cords and

Pigtails are the optimum solution for demanding high-density fiber optic data center applications with minimal physical infrastructure risk.

- C. Panduit OM3/OM4 Patch Cords and Pigtails minimize the cost of ownership and provide a future-proof network migration path. Opti-Core® 10Gig™ OM3/OM4 Patch Cords are available with LC and SC connector combinations. Patch cord fiber options include 1.6mm and 3mm duplex jacketed cable and simplex pigtail 900 micron tight-buffered fiber in 1-10, 15, 20, 25 and 30 meter lengths.
- D. Insertion loss for standard OM3/OM4 patch cords <0.25dB/mated pair. Insertion loss for “optimized” OM3/OM4 patch cords <0.15dB/mated pair.

2.8 MODULAR QUICKNET PATCH PANEL SYSTEM

- A. Modular fiber adapter panels contain TIA/EIA-604 FOCIS compliant or compatible simplex or duplex fiber optic adapters and meet or exceed TIA/EIA-568-B.3 requirements. Fiber adapter panels include 4, 6, 8 LC, and SC, or 4/6 or 8 MTP fiber optic adapters. LC and SC fiber optic adapters include zirconia ceramic split sleeves to satisfy higher speed network requirements. LC and SC adapter housing colors follow the TIA/EIA-568-C.3 suggested color identification scheme. Multimedia modular panels allow customization of installation for applications requiring integration of fiber optic and copper cables. Blank fiber adapter panels reserve fiber adapter panel space for future use. All fiber adapter panels snap quickly into the front of fiber optic patch panels and enclosures for easy network deployment or moves, adds and changes.

2.9 CROSS CONNECT/MAIN DISTRIBUTION AREA CONNECTIVITY

- A. MDA cross connect shall contain a logical plug & play based patching system that “port maps” HD LAN/San switch ports to equivalent LC patchfield in the main distribution area. This area will consist of the following logical building blocks to cross connect switch ports efficiently to host EDAs:
 - 1. Port Mapping ‘Jumbo’ 1RU cassettes
 - 2. QuickNet™ MTP* Trunk Cable Assemblies
 - 3. QuickNet™ SFQ Series MTP* Fiber Optic Cassettes
 - 4. Patch (equipment) cords
 - 5. QuickNet™ Cassette Rear Cable Manager
- B. Port Mapping ‘Jumbo’ 1RU Cassettes
 - 1. Pre-terminated HDQ series high density fiber optic cassette shall comply with IEEE 802.3ae 10 GbE and ANSI T11.2 Fibre Channel requirements. Fiber optic cassettes shall support network data rates up to 10 Gb/s for link lengths up to 300 meters using laser optimized OM3 fiber, and up to 550 meters using laser optimized OM4 fiber. Optimized cassettes shall provide insertion loss no greater than 0.5dB, and standard cassettes shall provide insertion loss no greater than 0.75dB to meet IEEE 802.3ae max. Channel loss specification of <2.6dB. Cassettes shall employ high performance MTP* connectors on the rear of the units routed to 6 or 4 duplex LC adapters on the patch field side. Adapter housing colors shall follow TIA/EIA-568-C.3 suggested identification scheme. Cassettes shall interconnect with high-density SFF MTP* ribbon interconnect cable assemblies. High density cassettes shall mount into 19” wide telecommunications racks, allowing 96

fiber connections to be deployed in one (1) rack unit (1 RU) without additional support infrastructure.

C. QuickNet™ MTP* Trunk Cable Assemblies

1. QuickNet™ MTP Trunk Assemblies allow for rapid deployment of single fiber cassette breakout cassettes for patch field connectivity in high-density Storage Area Network (SAN) and Data Center LAN cross connect MDAs. Fiber optic trunks shall support network data rates up to 10 Gb/s for link lengths up to 300 meters using laser optimized OM3 fiber, and up to 550 meters using laser optimized OM4 fiber. Optimized trunks shall provide insertion loss no greater than 0.35dB, and standard trunks shall provide insertion loss no greater than 0.5dB to meet IEEE 802.3ae max channel loss specification of <2.6dB. Trunks shall employ high performance MTP* connectors on each end. Cassettes shall interconnect with high-density such SFF MTP* ribbon interconnect cable assemblies. High density cassettes shall mount into 19" wide telecommunications racks, allowing 96 fiber connections to be deployed in one (1) rack unit (1 RU) without additional support infrastructure.
2. Trunks are offered in ruggedized distribution style form factor with fiber counts of up to 144 (12 MTPs per end) for deployment in basket trays and in ribbon interconnect form-factor (single 12 fiber MTP on each end) for deployment in protected pathways such as FiberRunner.
3. Insertion loss for standard OM3/OM4 Trunk/Interconnect <0.5dB/MTP mated pair. Insertion loss for "optimized" OM3/OM4 Trunk/Interconnect <0.35dB/MTP mated pair. Insertion loss for "super optimized" OM3/OM4 Trunk/Interconnect <0.25dB/MTP pair.

2.10 GENERAL

- A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
- B. All installation shall be in accordance with manufacturer's published recommendations.
- C. Copper cables shall be terminated with connecting hardware of same category or higher.
- D. Install plenum cable in environmental air spaces, including plenum ceilings.

2.11 INSTALLATION OF CABLES

- A. General Requirements for Cabling:
 1. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
 2. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than six (6) inches from cabinets, boxes, fittings, outlets, racks, frames and terminals.
 3. Install lacing bars to restrain cables consistently, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
 4. Bundle, lace and train conductors to terminal points without exceeding manufacturer's limitations on bending radii.

5. Use Velcro tie wraps.
 6. Do not install bruised, kinked, scored, deformed, or abraded cable. Remove and discard cable if damaged during installation and replace it with new cable.
 7. Cold-Weather Installation: Follow manufacturer specifications for installation and storage temperatures. Heat lamps shall not be used for heating.
 8. In the communications equipment room, install a 10-foot service loop for backbone cabling on each end of cable.
 9. Pulling Cable: Do not exceed manufacturer recommended maximum cable pull tensions.
- B. UTP Cable Installation
1. Do not untwist UTP cables more than ½ inch from the point of termination to maintain cable geometry.
- C. Optical Fiber Cable Installation:
1. Exterior cable: All exterior cables shall be installed in PVC duct. All cables shall be dressed along the side of handholes and secured to cable rack. Contractor shall test cables after installation in accordance with industry standards and provide written results back to the owner. All cables shall be labeled at each end of each handhole/manhole.
 2. Fiber Backbone Cable: Fiber optic cables shall be installed in 1-inch orange plenum rated inner duct or an approved equal to armored plenum fiber optic cable can be substituted. Vertical cable support intervals shall be in accordance with manufacturer's recommendations. Cable bend radius shall not be less than ten (10) times the outside diameter of the cable during installation and once installed. Maximum tensile strength rating of the cable shall not be exceeded. Cable shall not be spliced. All strands of the fiber optic cable shall be terminated.
 3. The metal armor of the optical fiber cable must be grounded.
- D. Open-Cable Installation
1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
 2. Suspend UTP cable independently from "Other Trades" and not in a wireway or pathway, a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.
 3. Cable shall not be run through or supported from structural members or in contact with pipes, ducts, or other potentially damaging items.
- E. Group connecting hardware for cables into separate logical fields.

END OF SECTION 271300

SECTION 271500 – COMMUNICATIONS HORIZONTAL CABLING

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the required remote control and signal cabling indicated by the Contract Documents with supplementary items necessary for proper installation.

1.2 REFERENCES

- A. See Section 270513.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- C. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.
- D. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- E. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:

1.3 HORIZONTAL CABLING DESCRIPTION

- A. Horizontal cable and its connecting hardware provide the means of transporting signals between the telecommunications outlet/connector and the horizontal cross-connect located in the Telecommunication Room or Equipment Room.
 - 1. Horizontal cabling shall contain no transition point or consolidation point between the horizontal cross-connect and the telecommunications outlet/connector.
 - 2. Bridged taps and splices shall not be installed in the horizontal cabling.
- B. The maximum allowable horizontal cable length is 295 feet. This maximum allowable length does not include an allowance for the length of 16 feet to the workstation equipment. The maximum allowable length does not include an allowance for the length of 16 feet in the horizontal cross-connect.
- C. Color and cable type designations UTP cable:
 - 1. Data and Voice: UTP CAT5E/6/6A, Blue
 - 2. WAPs and Kronos Clocks: UTP CAT5E/6/6A, Orange
 - 3. Security Cameras: UTP CAT5E/6/6A, Yellow

PART 2 - PRODUCTS

2.1 MANUFACTURER HORIZONTAL CABLING

- A. Manufacturers: Subject to compliance with requirements, provide telecommunication systems of one (1) of the following: System warranty shall be written through the connectivity manufacturer.

CAT 6 - END TO END SOLUTIONS

1. Panduit TX 6500 Enhanced System
2. Commscope Systemax Gigaspeed 71 Series System
3. Belden-Belden

2.2 UTP CABLE

- A. Horizontal UTP Cable. Cable shall be label-verified. Cable jacket shall be factory marked at regular intervals indicating verifying organization and performance level. Cable shall be blue. Conductors shall be four (4)-pair solid untinned copper 23AWG. Cable shall be plenum rated CMP per NFPA 70.

2.3 UTP CABLE HARDWARE

- A. Data Outlets. Wall outlet plates shall include modular eight (8)-position jacks, quantity as indicated on the Drawings. Modular jacks shall be non-keyed eight (8)-position jacks and the color orange. A color-coded bezel or icon may be used to identify the modular jack. Modular jack pin/pair configuration shall be T568B. (Verify pin/pair configuration with Owner prior to installation.) Modular jacks shall be unkeyed. Faceplates shall be labeled face plates with recessed labeling field included to accept label card and clear plastic cover. Faceplate material and finish shall match faceplates for other wiring devices in the same room or space (See Division 26 Specification Section Wiring Devices for material and finish). Blank cover plates shall be added for unused openings on face plate.
1. Wall phone to be mounted at 42" A.F.F. Faceplate to consist of two (2) mounting post and stainless steel material.
- B. Rack mounted patch panels shall consist of non-keyed eight (8)-position modular jacks, modular connection system with modular jacks, arranged in rows or columns on 19-inch rack mounted panels. Patch panel shall be fully populated. Jack pin/pair configuration shall be T568B. (Verify pin/pair configuration with Owner prior to installation.) Jacks shall be unkeyed. Panels shall be provided with labeling space. Patch panels shall be 48 port. Modular patch panels shall incorporate cable support and or strain relief mechanisms to secure the horizontal cables at the termination block and to ensure that all manufacturers minimum bend radius specifications are adhered to. Provide quantity of patch panels required to accommodate the installed cable plant plus 20% spares.
- C. Copper Patch Cords: Factory-made, four (4)-pair RJ-45 connectors on end of cables. These cables shall be used to cross-connect between the network electronics and the horizontal RJ-45 modular patch panel. Provide 100% for all assigned ports on the modular patch panel. Of these cords, provide 40% at 7' and 60% at 10' lengths; terminated with eight (8)-position modular RJ-45 connector at each end. Patch cords shall not be made-up in the field.

1. Patch cord shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.
 2. Patch cords shall have color-coded boots for circuit identification.
 3. Color and quantity: Color yellow for data and color blue for voice, one (1) for each modular jack in faceplate for project plus 20% spare.
 4. Contractor to coordinate based on room layout and with Owner prior to ordering/installing patch cords.
- D. Work Area Patch Cords: Factory-made, four (4)-pair cables in 10' lengths; terminated with eight (8)-position modular RJ-45 connector at each end. Patch cords shall not be made-up in the field.
1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.
 2. Patch cords shall have color-coded boots for circuit identification.
 3. Contractor to provide patch cords based on the total quantity of modular patch panel ports.
 4. Color and quantity: Gray color, one (1) for each modular jack in faceplate for project plus 20% spares.
 5. Contractor to coordinate specific patchcord requirements with owner prior to ordering and installing patch cords.

2.4 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
- B. Cables shall be terminated with connecting hardware of same category or higher.

PART 3 - EXECUTION

3.1 GENERAL

- A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
- B. All installation shall be in accordance with manufacturer's published recommendations.
- C. Horizontal UTP cable must be terminated using 8-conductor, 8-position connectors. The pin/pair assignment will be T568B. Use color matching icon.
- D. Install plenum cable in environmental air spaces, including plenum ceilings.

- E. Cables and conductors shall sweep into termination areas; cables and conductors shall not bend at right angles. Manufacturer's minimum bending radius shall not be exceeded. When there are multiple system type drops to individual workstations, relative position for each system shall be maintained on each system termination block or patch panel.
- F. Provide service loops above the ceilings at the workstation location and in the telecommunication closet. At the workstation provide a minimum cable slack of 12-inches for UTP, cables and 40-inches for optical fiber cables. In the telecommunication closets provide a minimum cable slack of 10-feet for both UTP and optical fiber cables. Cable slack shall be neatly installed and supported by ladder rack and ladder rack drop outs above the vertical wire managers in the equipment racks.
- G. Unshielded Twisted Pair Cable: Each pair shall be terminated on appropriate outlets, terminal blocks or patch panels. Pairs shall remain twisted together to within the proper distance from the termination. Conductors shall not be damaged when removing insulation. Wire insulation shall not be damaged when removing outer jacket. The pulling tension on a four (4)-pair UTP cables shall not exceed 25 lbs. for a single or bundle of cables.

3.2 COORDINATION

- A. Coordinate telecommunications outlet/connector locations with location of power receptacles at each work area with General Contractor/Owner. The telecommunications outlet/connector shall be in close proximity to the power receptacles in each work area.

3.3 INSTALLATION OF CABLES

A. General Requirements for Cabling

1. MUTOA shall not be used.
2. Horizontal Distribution Cable. All cables shall be installed in a continuous raceway from each data outlet box to accessible space above ceiling, Outlet box shall be 4"x 4" x 2-1/8" deep box with single gang plaster ring. Provide a continuous raceway to telecommunication closet in areas without accessible ceilings. Conduit size shall be 1-inch minimum. Horizontal cabling installed in/out of cable tray shall be bundled at not less than 4' intervals with hook and loop tie wraps. The use of plastic cable ties is strictly prohibited. Provide insulated bushing at each end of conduit prior to installation of cable. The rated cable pulling tension shall not be exceeded. Cable shall not be stressed such that twisting, stretching or kinking occurs. Cable shall not be spliced. Copper cable not in a wire raceway, shall be suspended a minimum of 8-inches above ceilings by cable supports no greater than 48-inches apart. Cable shall not be run through structural members or in contact with pipes, ducts or other potentially damaging items. Placement of cable parallel to power conductors shall be avoided, if possible; a minimum separation of 12-inches shall be maintained when such placement cannot be avoided. Cables shall be terminated; no cable shall contain unterminated elements. Minimum bending radius shall not be exceeded during installation or once installed. Service loops shall have a 3 feet per cable located at the ceiling at the last support (ex. J-hook, etc.) before entering cable into conduit, wall, and surface raceway. Service loops for modular furniture/movable walls shall have an additional fifteen (15) feet per cable for horizontal cable runs of under 250 feet in length for future office layout change without recabling. Horizontal cabling fed from poke-thru device to furniture raceway shall be managed in flexible spiral wrap and neatly concealed to furniture raceway.

Cedar Falls City Hall Remodel

SECTION 271500 – COMMUNICATIONS
HORIZONTAL CABLING

3. Cold-Weather Installation: Follow manufacturer specifications for installation and storage temperatures. Heat lamps shall not be used for heating.

END OF SECTION 271500

SECTION 274133 - TELEVISION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. These specifications include the furnishing of all labor and materials necessary for the installation of complete and operating system.

PART 2 - PRODUCTS

2.1 EQUIPMENT FURNISHED

- A. Service Provider shall provide service cabling to Electrical Room EC102 in Energy Center.
- B. All trunk cable shall be plenum-rated, 100% dual shielded, 14 gauge, RG-11 cable listed for CATV use. Approved Manufacturers: Commscope 2287 K Plenum.
- C. All branch antenna cable shall be plenum rated, 100% dual shielded, 18-gauge, RG-6 cable listed for CATV use. Approved Manufacturer: Commscope 2227V Plenum.
- D. Owner shall be responsible to coordinate with TV service provider.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. This installation must be done in accordance with the requirements of the cable TV service provider and the general specifications herewith. Contractor shall verify all material and installation requirements prior to submitting Shop Drawings.
- B. Provide service conduit per Cable TV providers requirements and/or as shown on drawings.
- C. Provide raceway to telecommunication closet with hook and loop tie wraps. The use of plastic cable ties is strictly prohibited. Cable shall not be stressed or twisted. Cable shall be supported a minimum of 6" above ceiling by supports and no greater than 48 inches apart. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

END OF SECTION 274133

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SECTION 283100 – FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.1 SCOPE

- A. Perform all Work required to provide and install the following fire detection and alarm indicated by the Contract Documents with supplementary items necessary for proper installation. The Work under this section includes the furnishing of all labor, materials, transportation, tools and appliances required in the performance of all operations required for the installation of a complete and working fire detection and alarm system.
- B. Base bid is to replace devices within the remodel space and maintain the existing fire alarm control panel. Alternate bid is to replace the entire fire alarm system for the building including a new fire alarm control panel.

1.2 REFERENCES

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections
 - 1. Division 01 General Requirements
 - 2. Division 07 Thermal and Moisture Protection, Section 078413 Penetration Firestopping
 - 3. Division 08 Openings, Section 087100 Door Hardware
 - 4. Division 21 Fire Suppression
 - 5. Division 23 Heating Ventilating and Air Conditioning Monitoring & Control (HVAC)
 - 6. Division 26 Electrical, Section 260500 Common Work Results for Electrical

1.3 SUBMITTAL

- A. Title page with an accurate legend of symbols for all fire alarm devices being installed. The legend must include the quantity and model number for each device.
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories. Complete manufacturer's catalog data including supervisory power usage, alarm power usage, physical dimensions, and finish and mounting requirements.
- C. Battery capacity calculations: Battery size shall be a minimum of 125% of the calculated requirement. Provide the following supporting information:
 - 1. Supervisory power requirements for all equipment.
 - 2. Alarm power requirements for all equipment.

3. Power supply rating justification showing power requirements for each of the system power supplies. Power supplies shall be sized to furnish the total connected load in a worst-case condition plus 25% spare capacity. This shall include anticipated devices in tenant areas where the base design is a building shell. Coordinate anticipated device layout with Engineer.
4. Voltage drop calculations for wiring runs demonstrating worst-case condition.
5. NAC circuit design shall incorporate a 15% spare capacity for future expansion.
6. The voice communications system shall be designed to meet the intelligibility standard.
7. When visual notification devices are added to existing systems the submittal shall include a power availability analysis showing the intended source of power, the notification circuit capacity and standby power availability.
8. When audible notification devices are added to existing systems the submittal shall include a power availability analysis showing the intended source of audio, the amplifier used, the notification circuit capacity and standby power availability. All manufacturers' data pertaining to audible circuits such as noise suppression and wiring limitations shall be included in the submittal.

D. Drawings

1. Prepare drawings using AutoCAD software and include all Contractors' information. The Contractor shall be responsible for verifying all critical dimensions shown on the drawings provided by the Architect.
2. Floor plans: Provide locations for all devices, new and existing (with device number at each addressable device corresponding to control unit programming), appliances, panels, power boosters, equipment, junction / terminal cabinets, risers, electrical power connections individual circuit and raceway routing, number size and type of raceways, and conductors in each raceway. Conduit fill calculations with cross section area percent fill for each type of conductor and raceway. Show all interfaces for all fire safety functions. Identify all fire rated walls within the Project area. Coordinate with Construction Documents
3. Riser diagrams: Provide, for the entire system, the number, size and type of riser raceways and conductors in each riser raceway and number of each type of device per floor and zone. Show door holder interface, elevator control interface, HVAC shutdown interface, fire extinguishing system interface, and all other fire safety interfaces. Show wire styles on the riser diagram for all circuits. The riser schematic shall show locations of all control panels, transponder cabinets, terminal cabinets, NAC power supplies. Locations shown shall be identified by room number.
4. A wire list showing the wire type, gauge, and conductor count for all wires and cables.
5. Complete system point-to-point wiring diagrams with appropriate terminal designations and schematics for all components provided and for interfaces to equipment and cabling supplied under other Divisions or by the Owner.
6. Detailed wiring diagrams: Provide for control panels, modules, power supplies, electrical power connections, auxiliary relays, and annunciators showing termination identifications, size and type conductors, circuit boards, led lamps, indicators, adjustable controls, jumpers, switches, connectors, harnesses terminal strips and connectors. Diagrams shall

be drawn to a scale sufficient to show the spatial relationships between components, enclosures and equipment configuration.

7. Duct air velocity where each duct smoke detector employing the use of sampling tubes is installed. Coordinate with Mechanical Contractor and Construction Documents.
8. Provide a fire alarm system function matrix as referenced by 2010 NFPA 72, Figure A.14.6.2.4(9). Matrix shall illustrate alarm input/out events in association with initiation devices. Matrix summary shall include system supervisory and trouble output functions. Include any and all departures, exceptions, variances or substitutions from these specifications and/or drawings at time of bid.

E. Sequence of Operation

1. Submittal shall include a complete written sequence of operations of all functions of the system.
2. In addition to the written sequence of operations, all sequence functions shall be depicted using a sequence of operations matrix chart of all functions showing how the system will react to the activation of each type of device, as recommended by 2010 NFPA 72, Figure A.14.6.2.4(9).
3. Submittal shall include details of all interfaced functions. Details shall include all fire alarm system functions and interconnections applicable to each interface.

F. Operation and Maintenance Data: For all fire alarm equipment, to include in operation and maintenance manuals.

G. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Each and all items of the fire alarm system shall be listed as a product of a single fire alarm system manufacturer under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label. All control equipment shall be listed under both UL category UOJZ Control Units System as a single unit and under UL category APOU Proprietary Alarm Units. Service under APOU shall be Grade A. Partial listings, or multiple listings for various major sections of the control, shall not be acceptable.
- B. The complete installation is to conform to the applicable sections of NFPA 72, NFPA 90A, NFPA 99, NFPA 101, State and Local Code Requirements, NFPA 70 the National Electrical Code with particular attention to Article 760.
- C. Additionally, the entire installed system and all integrated system operations shall be within the guidelines of the International Building Code, 2015, the Americans with Disabilities Act, Public Law 101-336, and the FM Global (Factory Mutual (FM)): FM Approval Guide.
- D. All control equipment shall have transient protection devices to comply with UL864 requirements.
- E. The system controls shall be UL listed for Power Limited Applications per NEC 760. All circuits shall be marked in accordance with NEC 760-23.

F. Supplier Qualifications

1. The document submittal preparation and supervision of installation and testing shall be provided by a technician that is certified NICET level III or a registered fire protection engineer. The NICET certified technician shall be on site for the supervision and testing of the system. Factory engineers from the equipment manufacturer, thoroughly familiar and knowledgeable with all equipment utilized, shall provide additional technical support at the site as required by the Owner or his authorized representative.
2. Provide the services of a factory trained and certified representative or technician, experienced in the installation and operation of the type of system provided. The representative shall be licensed in the State if required by law.
3. The technician shall supervise installation, software documentation, adjustment, preliminary testing, final testing and certification of the system. The technician shall provide the required instruction to the owner's personnel in the system operation and maintenance.
4. The supplies shall furnish evidence they have an experienced service organization, which carries a stock of spare and repair parts for the system being furnished.
5. The equipment supplier shall be authorized and trained by the manufacturer to calculate, design, install, test, and maintain the air sampling system and shall be able to produce a certificate stating such upon request.

G. Installer Qualifications

1. Installers shall have a minimum of five (5) years' experience installing fire alarm systems.
2. Contractors unable to comply with the provisions of Qualification of Installers shall present proof of engaging the services of a subcontractor qualified to furnish the required services.

1.5 SUMMARY

- A. This Specification describes a fire detection and alarm system. The features and capacities described in this Specification are required as a minimum for this project and shall be furnished by the successful contractor.
- B. The system shall be in full compliance with national and local codes.
- C. The system shall include all required hardware, conduit and fittings, raceways and wiring, firmware, and software to accomplish the requirements of this specification and the contract drawings, whether or not specifically itemized herein.
- D. The Contractor shall perform all Work in accordance with the Drawings and Specifications, and subject to the terms and conditions of the Contract. Work shall include, but not be limited to, the following:
 1. Fire alarm panel.
 2. Remote annunciator(s).
 3. Automatic smoke and heat detection.

4. Manual alarm initiation.
 5. Air handling unit (AHU) controls to integrate AHU into the fire alarm system operation (where applicable).
 6. Monitoring of sprinkler water flow and supervisory alarm switches.
 7. Alarm annunciation.
 8. Elevator recall.
 9. Elevator machine room pre-action sprinkler system and equipment shutdown (Shunt Trip).
 10. Smoke damper control (where applicable).
 11. Monitoring of suppression system activation and supervisory alarm switches.
- E. All equipment furnished shall be new and the latest state of the art products of a single manufacturer, engaged in the manufacturing and sale of fire alarm systems for over five (5) years.
- F. The system as specified shall be supplied, installed, tested and approved by the local authority having jurisdiction, and turned over to the Owner in an operational condition.
- G. In the interest of job coordination and responsibilities the installing contractor shall contract with a single supplier for fire detection and alarm equipment, engineering, installation, programming, and inspection and tests.
- H. All existing fire alarm equipment, wiring, devices and sub-systems that are not shown to be reused shall be removed. All existing fire alarm conduit not reused shall be removed.
- I. Existing fire alarm horns, strobes, bells, chimes, door holders, valve tamper switches and waterflow/pressure switches may be reused only as specifically indicated on the Drawings and provided the equipment:
1. Meets this specification section.
 2. Is UL listed or FM approved.
 3. Is compatible with new equipment being installed.
 4. Is verified as operable through contractor testing and inspection.
 5. Is warranted as new by the contractor.
- 1.6 TEMPORARY PROTECTION
- A. Where modifications to existing fire alarm devices or equipment cause Interim Life Safety Measures to remain in place for a period of time exceeding 48 hours, temporary protection shall be provided to the affected area.
- B. Existing conduit or raceways not shown to be reused shall not be used to serve the temporary protection devices.

- C. Temporary protection devices shall be installed in mounting boxes and secured to building structure.
- D. Temporary protection installations shall be fully tested and certified by the installing contractor.
- E. Proposed temporary protection installations shall be presented to the Owner for acceptance before demolition or shutdown of the existing fire alarm system or devices.
- F. Temporary protection shall be left in place until the new fire alarm equipment has been tested and certified compliant and operational by the installing contractor.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, and shelf life if applicable.
- B. Store materials inside, under cover, above ground, and kept dry and protected from physical damage until ready for use. Remove from site and discard wet or damaged materials.

1.8 PROJECT CONDITIONS

- A. Installed products or materials shall be free from any damage including, but not limited to, physical insult, dirt and debris, moisture, and mold damage.
- B. Environmental Limitations: Do not deliver or install products or materials until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.9 WARRANTY

- A. Contractor shall warrant the completed fire alarm system wiring and equipment to be free from inherent defects for a period of one (1) year after system acceptance. The Owner shall determine the date of acceptance. The acceptance date shall not come before substantial completion of the system. The acceptance date shall not come before the system has been completely tested and certified.
- B. The Owner reserves the right to make changes to the fire alarm system during the Warranty Period. Such changes do not constitute a waiver of warranty. Contractor shall warrant parts and installation work regardless of any such changes made by Owner, unless the Contractor provides clear and convincing evidence that a specific problem is the result of such changes to the fire alarm system.
- C. Contractor shall have readily available all replacement components necessary for emergency warranty repairs. Contractor shall provide a site specific list of service repair part numbers for system components. Standard manufacturer's service repair parts list is not acceptable. The exact parts used on site shall be listed with the correct service repair part numbers.
- D. Contractor shall provide written documentation of all warranty service to the Owner. Documentation shall include a description of repairs, any component replaced and the cause of any component failure.

- E. Contractor shall maintain a record of warranty repairs on Site. The specific location shall be the monitoring services location.
- F. In the last month of the Warranty Period, all System software and firmware, software, drivers, etc. will be upgraded to the latest release (version) in effect at the end of the Warranty Period. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.
- G. At any time during the Warranty Period that Contractor is on Site for maintenance, emergency, or normal service, Contractor shall notify the Owner. Contractor shall notify the Owner of all work anticipated being involved for the service work. In addition, no work affecting system operation shall commence until express permission is granted. After the work is completed a work order ticket describing in detail all work performed (i.e. hardware replaced or serviced, software or firmware modifications made, etc.), hours worked, follow-up work required, etc., must be signed by the Owner. Service tickets shall include an explanation of the cause of any component failure.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Base Bid: Simplex 4010
- B. Alternate #3 Bid:
 - 1. Simplex 4100ES
 - 2. Siemens Building Technologies
 - 3. Notifier
 - 4. Gamewell-FCI
 - 5. Edwards System Technologies
 - 6. Silent Knight

2.2 SYSTEM CONTROL PANEL

- A. Base bid: utilize existing control panel
- B. Alternate #3 bid: Provide a Fire Alarm System panel with the following:
 - 1. Enclosure: The system enclosure shall be sized to carry all the modules required to meet the specification requirements. Enclosure color shall be beige.
 - 2. Power Supply: The power supply shall be adequate to provide power for the system needs with a minimum rated output of four (4) amps.
 - 3. Battery/Charger: The battery charger shall be capable of charging up to 25 Ah sealed lead-acid batteries. Batteries shall be mounted within the fire alarm cabinet. Notify

Engineer if required battery capacity exceeds cabinet mounting capacity and an external charger/cabinet assembly is required.

4. Signal Line Circuit(s): Communications for up to two hundred and fifty (250) addressable devices.
 5. Notification Appliance Circuits: Four (4) NAC circuits in Class B wiring configuration.
 6. Auxiliary Output Circuits:
 - a. Two (2) Form "C" dry contacts, each rated 2A at 24 VDC.
 7. Remote annunciator/control panel outputs.
- C. Programming
1. Fully field programmable from the local display or by a PC configuration tool, with Windows-based software for ease of configuration.
 2. Auto configuration, allowing initiating devices to be supervised and send alarm signals to the control panel.
 3. Capable of being programmed for cross-zone initiating device operation.
- D. Display: Backlit LCD (minimum 80 characters) or color touch-screen display.
- E. Function Switches:
1. Provide the following switches in addition to any other switches required for the system (switches may be either a mechanical or electrical device/button):
 - a. Remote Alarm Transmission By-pass Switch: Shall prevent transmission of all signals to the main fire alarm control unit when in the "off" position. A system trouble signal shall be energized when switch is in the off position.
 - b. Alarm Silence Switch: Shall disconnect power to alarm notification circuits on the local building alarm system. A system trouble signal shall be activated when switch is in the off position.
 - c. Alarm Acknowledge Switch: Shall silence the alarm signal whenever the trouble acknowledge switch is operated. This switch shall not reset the alarm signal.
 - d. Supervisory Acknowledge Switch: Shall silence the alarm signal whenever the supervisory acknowledge switch is operated. This switch shall not reset the supervisory signal.
 - e. Trouble Acknowledge Switch: Shall silence the trouble signal whenever the trouble acknowledge switch is operated. This switch shall not reset the trouble signal.
 - f. Reset Switch: Shall reset the system after an alarm, provided the initiating device has been reset. The system shall lock in alarm until reset.
 - g. Lamp Test Switch: A test switch or other approved convenient means shall be provided to test the indicator lamps.
 - h. Drill Switch: Shall activate all notification devices without tripping the remote alarm transmitter. This switch is required only for general evacuation systems specified herein.
 - i. Door Holder By-Pass Switch: Shall prevent doors from releasing during fire alarm tests. A system trouble alarm shall be energized when switch is in the abnormal position.

- j. Elevator recall By-Pass Switch: Shall prevent the elevators from recalling upon operation of any of the devices installed to perform that function. A system trouble alarm shall be energized when the switch is in the abnormal position.
- k. HVAC/Smoke Damper By-Pass: Provide a means to disable HVAC fans from shutting down and/or smoke dampers from closing upon operation of an initiating device designed to interconnect with these devices.

F. Remote Dialers

- 1. An automatic telephone communicator shall be provided to facilitate remote reporting. The communicator shall be a Silent Knight Model 5104B, or equal, fire control communicator. The dialer shall be installed adjacent to the fire alarm panel. The dialer shall be programmed to report to a monitoring service designated by the Owner.
- 2. Three (3) relays shall be provided at the dialer location, one (1) to activate upon alarm, one (1) to activate upon a system trouble condition and one (1) to activate upon a supervisory condition. The relays shall be permanently labeled as to their function. The relays shall be controlled from the fire alarm control panel and connected to the panel via supervised signaling circuits. Wherever relays are used the relay shall include an LED indicator which indicates the activated state of the relay. The LED indicator shall allow for visual verification of relay activation without disassembly of the relay or the relay enclosure.
- 3. The dialer shall be connected to the public switched telephone network upstream of any private telephone system at the protected premises. Two (2) telephone lines, a primary line and a secondary line, shall be provided for the dialer. The telephone lines shall be terminated at the dialer location using RJ31X style jacks.

G. Testing

- 1. Walk test by a single individual in either a silent or audible mode.
- 2. Maintenance and Technician access levels with password protection.

H. Interfacing

- 1. A history log with a minimum of 2000 stored events shall be provided.
- 2. An interface for a printer or computer shall be provided to allow for down loading of the history log or system configuration download/upload.

I. Approvals: The system shall be UL and ULC listed, FM approved.

J. Response Time: The system response time from alarm to output shall not exceed four (4) seconds.

2.3 REMOTE ANNUNCIATOR

- A. Provide and install LCD annunciators as indicated on the Drawings.
- B. Shall be a supervised, LCD display containing a minimum of two lines of 40 characters for alarm annunciation in clear English text.

- C. Message shall identify building number, floor, zone, etc on the first line and device description and status (pull station, smoke detector, waterflow alarm or trouble condition) on the second line.
- D. The initial alarm received shall be indicated as such.
- E. A selector switch shall be provided for viewing subsequent alarm messages.
- F. The display shall be UL listed for fire alarm application.
- G. Coordinate exact locations for LCD annunciators with Owner and the Fire Department.

2.4 INTELLIGENT INITIATING DEVICES

- A. The detector shall have an LED indicating detector status and alarm.
 - 1. Where required, there shall be available a programmable remote lamp configurable to remotely duplicate the on-board LED status of another system device with the same software address.
- B. Combination Detector:
 - 1. The intelligent combination fire detector shall be comprised of four sensing elements, including a photoelectric (light-scattering) particulate sensor, an electrochemical carbon monoxide (CO) sensor, a daylight-filtered infrared sensor and solid state thermal sensor(s) rated at 135°F (57.2°C). The device shall be able to indicate distinct smoke and heat alarms. The intelligent multi-criteria detection device shall include the ability to combine the signal of the photoelectric signal with other sensing elements in an effort to react quickly in the event of a fire situation.
 - 2. The detector communications shall allow the detector to provide alarm input to the system and alarm output from the system within five (5) seconds. So as to minimize the effort required by the installing and maintenance technician to appropriately configure the detector to ensure optimal system design, the detectors shall be programmable as application specific. Application settings shall be selected in software for a minimum of eleven environmental fire profiles unique to the devices installed location.
 - 3. The detector shall be designed to reduce the possibility of false indications caused by dust, moisture, RFI/EMI, chemical fumes and air movement while factoring in conditions of ambient temperature rise, obscuration rate changes and hot/cold smoke phenomenon into the alarm decision to give the earliest possible real alarm condition report.
 - 4. The detector shall support the use of a relay, or LED remote indicator without requiring an additional software address. Detector wiring shall not require any special shielded cable.
- C. Optical Smoke Detector
 - 1. The optical smoke detector shall be an intelligent digital photoelectric detector. Detectors shall be listed for use as open area protective coverage, in duct installation and sampling assembly installation and shall be insensitive to air velocity changes.
 - 2. The detector communications shall allow the detector to provide alarm input to the system and alarm output from the system within four (4) seconds.

3. The detector shall be designed to reduce the possibility of false indications caused by dust, moisture, RFI/EMI, chemical fumes and air movement while factoring in conditions of ambient temperature rise, obscuration rate changes and hot/cold smoke phenomenon into the alarm decision to give the earliest possible real alarm condition report.
4. The detector shall support the use of a relay, or LED remote indicator without requiring an additional software address. Detector wiring shall not require any special shielded cable.

D. Thermal Detectors

1. Thermal Detectors shall be rated at 135° F fixed temperature and 15° F per minute rate of rise. Detectors shall be constructed to compensate for the thermal lag inherent in conventional type detectors due to the thermal mass, and alarm at the set point of 135°F.
2. The choice of alarm reporting as a fixed temperature detector or a combination of fixed and rate of rise shall be made in system software and be changeable at any time without the necessity of hardware replacement.
3. The detectors furnished shall have a listed spacing for coverage up to 2,500 square feet and shall be installed according to the requirements of NFPA 72 for open area coverage.

E. Duct Detectors

1. For duct detector applications, the smoke detector shall be an intelligent digital photoelectric detector with a programmable heat detector or a digital photoelectric detector.
2. Detectors shall be listed for use as open area protective coverage, in duct installation and sampling assembly installation and shall be insensitive to air velocity changes.
3. The detector communications shall allow the detector to provide alarm input to the system and alarm output from the system within four (4) seconds.
4. The detector shall be mounted in a duct detector housing listed for that purpose. The duct detector shall support the use of a remote test switch, relay or LED remote indicator. The duct detector shall be supplied with the appropriate sampling tubes to fit the installation. Where duct detectors are exposed to the weather, a weatherproof enclosure shall be available. The duct housing cover shall include a test port for functional testing of the detector without cover removal. The duct housing shall include a cover removal switch capable of indicating cover removal status to the fire alarm control panel.
5. Where required there shall be available a duct housing with an on-board relay. Also where required, there shall be a standalone housing available with it's own power supply and test/reset switch that does not require connection to a fire alarm control panel.

F. Detector bases shall be low profile twist lock type with screw clamp terminals and self-wiping contacts. Bases shall be installed on an industry standard, 4" square or octagonal electrical outlet box.

1. Where selective localized control of electrical devices is required for system operation, furnish and install detector base with software programmed addressable relay integral to the base. The relay shall switch electrical loads within relay ratings, as indicated on the drawings. Operation of the addressable control circuit shall be independent of the number

of detectors and relays on the circuit or the number in an alarm state. Relay bases shall be rated for resistive or inductive load (120VAC or 30VDC) 3 amps.

2. Where indicated on the drawings, furnish detector base with integral approved audible evacuation alarm signal having an output of 85db @ 10'. The audible signal shall be individually addressable and software programmed for operation.
- G. Provide addressable manual stations where shown on the drawings, to be flush or surface mounted as required. Manual stations shall contain the intelligence for reporting address, identity, alarm and trouble to the fire alarm control panel. The manual station communications shall allow the station to provide alarm input to the system and alarm output from the system within less than four (4) seconds. The manual station shall be equipped with terminal strip and pressure style screw terminals for the connection of field wiring. Surface mounted stations where indicated on the drawings shall be mounted using a manufacturer's prescribed matching red enamel outlet box.
1. Where required, there shall also be available pull stations with break glass, capable of explosion proof installation, capable of weatherproof installation, two (2) stage operation, reset key operation, and metal housings.
- H. Addressable Monitor Modules shall be provided to monitor contacts for such items as water-flow, tamper, and PIV switches connected to the fire alarm system. These modules shall be able to monitor a single or dual contact. An address will be provided for each contact. Where remote supervised relay is required the interface shall be equipped with a SPDT relay rated for 4 amps resistive and 3.5 amps inductive.
- I. Where needed, a Conventional Zone Module shall connect to the Signal Line Circuit, which will allow the use of conventional initiation devices. This module shall have the ability to support up to 15 convention smoke detectors and an unlimited number of contact devices. This module shall also be capable of monitoring beam detectors and conventional flame detectors. Where required, there shall be an intrinsically safe detection solution for NEMA defined intrinsically safe installations compatible with the conventional zone module.

2.5 NOTIFICATION APPLIANCES

A. AC Horn

1. Models shall be UL 464 Listed for Fire Protective Service, and shall include a die-cast metal housing to protect the horn mechanism.
2. Sound output shall be 95 dBA minimum at 10 feet.
3. Mounting options shall include surface mounting for indoor or outdoor applications and semi-flush for indoor applications.
4. The finish shall be textured enamel.
5. All notification appliances shall be listed for "Special Applications".

B. Mini Horn Appliances

1. Notification appliance shall be electronic, and shall have field-selectable settings for Temporal (Code 3) or continuous horn and support coded-systems operation.

2. The anechoic sound pressure measurement on Temporal (Code 3) and Continuous Horn settings shall each be 87 dBA minimum at 24VDC.
3. All models shall have provision for standard reverse polarity-type supervision and IN / OUT wiring terminals.
4. The appliances shall be mounted indoors, and mount on standard, single-gang electrical back boxes requiring no additional trim plates or adapters.
5. All notification appliances shall be listed for “Special Applications”.

C. Horn and Horn Strobe Appliances

1. Horn strobe and standalone horn appliances shall meet and be listed for:
 - a. UL Standard 1971 (Emergency Devices for the Hearing-Impaired for Indoor Fire Protection Service).
 - b. Standard 464 (Fire Protective Signaling).
 - c. Horn strobe shall be listed for indoor use and shall meet the requirement of FCC Part 15 - Class B.
2. All inputs shall be compatible with standard reverse polarity supervision of circuit wiring by the Fire Alarm Control Panel (FACP).
3. Horns shall be of low-current design.
4. Housing shall be red with white lettering except where white is used to match existing devices.
5. Strobe portion of the appliance shall produce a flash rate of one (1) flash per second over the regulated input voltage range, and shall incorporate a Xenon flashtube or LED source enclosed in a rugged Lexan® lens.
6. Strobe intensity, where multi-candela appliances are specified, shall have field-selectable settings, and shall be rated per UL Standard 1971 for:
 - a. 15/30/75/110cd.
 - b. 135/185cd.
7. The selector switch for selecting the candela setting shall be tamper resistant and not accessible from the front of the appliance.
8. All notification appliances shall listed for Special Applications.

D. Strobes

1. Strobes shall meet and be listed for UL Standard 1971 (Emergency Devices for the Hearing-Impaired) for Indoor Fire Protection Service.
2. Strobe shall be listed for indoor use, and shall meet the requirements of FCC Part 15 Class B.
3. Strobe appliances shall produce a flash rate of one (1) flash per second over the regulated voltage range, and shall incorporate a Xenon flashtube or LED source enclosed in a rugged Lexan® lens.

4. All inputs shall be compatible with standard, reverse polarity supervision of circuit wiring by a Fire-Alarm Control Panel (FACP).
5. Strobes shall be of low-current design.
6. Housing shall be red with white lettering except where white is used to match existing devices.
7. Where multi-candela strobes are specified, the strobe intensity shall have field-selectable settings and shall be rated per UL Standard 1971 at:
 - a. 15/30/75/110cd for wall mount
 - b. 15/30/75/95cd or 115/177cd for ceiling mount
 - c. The selector switch for selecting the candela shall be tamper resistant and not accessible from the front of the appliance.
8. The strobes shall be designed for indoor surface of flush mounting

E. Strobe Multi-tone Electronic Appliances

1. Notification appliance shall be electronic and use solid state components. Electromechanical alternatives are not approved.
2. Each electronic appliance shall provide eight (8) field selectable alarm tones. The tones shall consist of: HORN, BELL, MARCH TIME HORN, CODE-3 HORN, CODE-3 TONE, SLOW WHOOP, SIREN and HI/LO. Tone selection shall be by durable dip switch assembly and not clips or jumpers.
3. The Multi-tone Audible appliance shall be UL Listed under Standard 464 for Audible Signal Appliances.
4. The audible and the strobe shall be able to operate from a single NAC circuit while producing any of these tones. The appliance shall provide two (2) output sound levels: STANDARD and HIGH dBA. The HIGH dBA setting shall provide a minimum 5 dBA increase in sound output at nominal voltage. The HIGH anechoic dBA measurement at 10 feet at the alarm HORN SETTING shall be 99 dBA minimum. All models shall have provisions for standard reverse polarity type supervision and IN/OUT wiring terminals.
5. Combination audible/visual appliances shall incorporate a Xenon flashtube or LED source enclosed in a rugged Lexan® lens or equivalent with solid state circuitry. Strobe shall produce a flash rate of one (1) flash per second minimum over regulated input voltage range. The strobe intensity shall be rated per UL and Listed under Standard 1971 for Signaling Devices for the Hearing Impaired for field selectable 15/30/75/110 candela settings.
6. The combination audible/visual appliances shall be installed indoors and may be surface or flush mounted. They shall mount to standard electrical hardware requiring no additional trim plate or adapter. The aesthetic appearance shall not have any mounting holes or screw heads visible when the installation is completed.
7. Housing shall be red with white lettering except where white is used to match existing devices.
8. All notification appliances shall be listed for “Special Applications”.

F. Sprinkler Horn/Strobe

1. Locate this device directly above the fire department sprinkler connection on the exterior of the building.
2. Sprinkler horn/strobe circuits shall be home run to the FACP for power.
3. Sprinkler horn/strobe control module should be located inside the building near the penetration. Do not use FACP signal output.

G. Synchronization

1. Where multiple strobes are installed in a common space, the strobes shall be synchronized.
2. The strobes shall not drift out of synchronization at any time during operation.
3. Audibles and strobes shall be able to synchronize on a two (2)-wire circuit with the capability to silence the audible, if required.
4. Strobes shall revert to a non-synchronized flash-rate, if the sync module or power supply should fail to operate (i.e. – contacts remain closed).

2.6 INSTRUCTION CHART

- A. Provide typewritten instruction card mounted behind a Lexan plastic or glass cover in a stainless steel or aluminum frame with a backplate. Install the frame adjacent to the control unit and where operations are performed. The card shall show those steps to be taken by an operator when a signal is received under all conditions, normal, alarm, supervisory, and trouble. Provide an additional copy with the binder for the input output matrix for the sequence of operation. The instructions shall be approved by the Owner before being posted.

PART 3 - EXECUTION

3.1 GENERAL

- A. Installation shall be in accordance with NFPA 70, 72, 90A, and 101 as shown on the drawings, and as recommended by the major equipment manufacturer.
- B. Existing devices that are reused shall be properly mounted and installed. Where devices are installed on existing shallow backboxes, extension rings of the same material, color and texture of the new fire alarm devices shall be used.
- C. All fire detection and alarm system devices, control units and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.
- D. Location of all controls, alarm actuating devices and audible alarm signaling devices shall generally be as shown on the Drawings. In areas where there are no ceilings, install detectors against the building structure in accordance with manufacturer recommendations. In finished areas, devices shall be located in a symmetrical pattern relating to ceiling and/or wall features and, where applicable, ceiling mounted devices shall be located symmetrically with the ceiling grid centered in two directions. Vertically align pull stations and audible/visual alarm signaling

devices where possible. Where audio/visual, audio only or visual only devices are surface mounted to surface mounted junction boxes, install the manufacturer's skirt, which is designed to enhance aesthetics.

- E. Strobes shall be flush wall mounted 80 inches above the floor or 6 inches below ceiling, whichever is lower. Locate and mount to maintain a minimum 36 inches clearance from side obstructions
- F. Manual pull stations shall be installed not less than 42 inches or more than 48 inches from finished floor to bottom of device and within 60 inches of a stairway or an exit door.
- G. The fire alarm panel shall be programmed with a specific description for each device, including device type, room name, and room number using the Owner's final room numbering scheme, which may differ from the architectural plans. For expansion and/or revisions to existing systems, coordinate final programming and descriptions with the Owner.

3.2 BOXES AND ENCLOSURES

- A. Boxes shall be installed plumb and firmly in position.
- B. Wherever splices are made in J-boxes, wires shall be labeled with the system circuit number and area served. Wire tags shall be affixed to identify the wires. Writing on wires with a marking pen shall not be an acceptable means of wire identification.
- C. J-box covers shall be painted red and clearly marked "Fire Alarm".

3.3 CONDUCTORS

- A. All wiring shall be installed in conduit where concealed behind walls and inaccessible ceilings. Wiring above accessible ceilings may be run exposed.
- B. Where a building's fire alarm system is being added to or modified, the wiring method shall match the building's predominant existing wiring method
- C. Each conductor shall be identified as shown on the shop drawings with wire markers at terminal points. Attach permanent wire markers within 2 inches of wire termination. Marker legends shall be visible.
- D. All wiring shall be supplied and installed in compliance with the requirements of the National Electric Code, NFPA 70, Article 760, and that of the manufacturer.
- E. Where fire alarm system wiring is installed exposed, the wiring shall be installed in such a way that maximum protection from physical damage is provided.
- F. Provide bushings, connectors, strain relief devices, boxes and covers specifically designed for structured cabling use.
- G. Bushings and throats shall be installed for fittings, raceways, boxes or other enclosures prior to installing cables and wiring systems.
- H. Wiring for notification appliance circuits shall be a minimum 14 AWG. Wiring for signaling line circuits shall be a minimum 18 AWG.

- I. All splices shall be made using solderless connectors. All connectors shall be installed in conformance with manufacturer recommendations.
- J. Crimp-on type spade lugs shall be used for terminations of stranded conductors to binder screw or stud type terminals. Spade lugs shall have upset legs and insulation sleeves sized for the conductors.
- K. A consistent color code shall be used for conductors throughout the installation. The installation contractor shall submit for approval, prior to installation of wire, a proposed color code for system conductors to allow rapid identification of circuit types.

3.4 FIRE PROTECTION SYSTEM CONNECTIONS

- A. Each sprinkler system water supply control valve, riser valve or zone control valve, and each standpipe system riser control valve shall be equipped with a supervisory switch. Standpipe hose valves, and test and drain valves shall not be equipped with supervisory switches.
- B. Where possible, locate water flow and pressure switches a minimum of 12 inches from a fitting that changes the direction of the flow and a minimum of 36 inches from a valve.
- C. Mount valve tamper switches so as not to interfere with the normal operation of the valve and adjust to operate within 2 revolutions toward the closed position of the valve control, or when the stem has moved no more than 1/5 of the distance from its normal position.
- D. Valve supervisory switches, furnished and installed under Division 23, shall be connected to the fire alarm system by way of addressable monitor module. Provide one (1) module for a group of tamper switches in a common room unless specified otherwise on the Drawings.
- E. Wet pipe water flow switches and dry pipe alarm pressure switches for sprinkler systems shall be connected to the fire alarm system by way of an addressable monitor module. Provide one module for each flow and pressure switch.
- F. Where dry-pipe sprinkler systems are installed, high and low air pressure switches shall be provided and monitored by way of addressable monitor modules. Provide one module for each sensor/alarm.
- G. Fire pump running, power failure and phase reversal supervisory alarms shall be provided and monitored by way of addressable monitor modules for the fire pump located at the fire pump controller.

3.5 SYSTEM OPERATION

- A. Refer to the fire alarm operation matrix on the Drawings. Additional information is noted below.
- B. Activation of any manual pull station, water flow or pressure switch, heat detector, kitchen hood suppression system, gaseous suppression system, or smoke detector shall cause the following operations to occur:
 - 1. For sprinkler protected buildings, flash strobes continuously only in the zone of alarm. For buildings without sprinkler protection throughout, flash strobes continuously only on the floor of alarm.
 - 2. Continuously sound a temporal pattern general alarm and flash all strobes in the building until reset at the fire alarm control panel.

3. Release only the magnetic door holders in the smoke zone after the alert signal.
 4. Transmit a separate alarm signal, via the main fire alarm control unit to the fire department.
 5. Unlock the electrically locked exit doors within the zone of alarm.
- C. Heat detectors in elevator machine rooms shall, in addition to the above functions, disconnect all power to all elevators served by that machine room after a time delay. The time delay shall be programmed within the fire alarm system programming and be equal to the time it takes for the car to travel from the highest to the lowest level, plus 10 seconds.
- D. Smoke detectors in the primary elevator lobbies shall, in addition to the above functions, return all elevators in the bank to the secondary floor.
- E. Smoke detectors in the remaining elevator lobbies, elevator machine room, or top of hoistway shall, in addition to the above functions, return all elevators in the bank to the primary floor.
- F. Operation of a smoke detector at a corridor door used for automatic closing shall release all only the magnetic door holders in that smoke zone.
- G. Operation of a smoke detector at a smoke shutter used for automatic closing shall release only the shutters in that smoke zone.
- H. Operation of duct smoke detectors shall cause a system supervisory condition and shut down the ventilation system and close the associated smoke dampers as appropriate.
- I. Operation of any sprinkler or standpipe system valve supervisory switch, high/low air pressure switch, or fire pump alarm switch shall cause a system supervisory condition.
- J. Manual Voice Paging Sequence:
1. The System shall be configured to allow selective voice paging.
 2. If any speaker manual control switches are activated, the control panel operator shall be able to make announcements via the push-to-talk paging microphone over the pre-selected speakers. When manually selecting speakers for voice paging, evacuation or supervisory tones shall not be delivered to the selected speakers.
 3. Facility for total building evacuation and paging shall be provided to allow for activation of speakers. This shall be accomplished by means of an "All Circuit" switch.
 4. Each voice control panel will be equipped with custom firmware containing custom voice messages for all clear, drill and testing announcements. Voice messages shall be activated via switch controls. Custom messages shall be developed in conjunction with the Owner and Engineer.
 5. Emergency voice/alarm communications shall reproduce prerecorded, synthesized or live messages WITH VOICE INTELLIGIBILITY in the occupied area, this being achieved when the quantity lav-s exceeds a Common Intelligibility Scale (CIS) score of 0.70 or better, as specified in B3 of IEC 60849, Sound Systems for Emergency Purposes, second edition. Preliminary test reports shall include documentation of voice intelligibility

3.6 FIELD QUALITY CONTROL

- A. All installation and acceptance inspections shall be performed by a licensed fire alarm technician or planner and be documented on the inspection form.
- B. It is the Contractor's responsibility to coordinate all testing between trades to ensure all necessary personnel are present and prepared at scheduled tests.
- C. The Contractor shall perform all tests required by NFPA, State, and Local codes.
- D. The Contractor shall verify that all fire alarm device descriptions programmed into the system use the FINAL room names and numbers as developed by the Owner which may be different that the names and numbers used on the Construction Documents.
- E. The Owner and Engineer shall be notified before the start of the required tests. All items found at variance with the applicable Codes, Drawings, or Specifications during testing or inspection by a representative of the Authority Having Jurisdiction shall be corrected by Contractor at no charge or expense to the Owner.
- F. When the systems have been completed and prior to the scheduling of the final inspection, furnish testing equipment and perform the following tests. When any defects are detected, make repairs or install replacement components, and repeat the tests until such time that the complete fire alarm system meets all contract requirements. After the system has passed the initial test the contractor may request a final inspection.
 - 1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
 - 2. Test the insulation on all installed cable and wiring by standard methods as recommended by the equipment manufacturer.
 - 3. Run water through all flow switches. Check time delay on water flow switches. Submit a report listing all water flow switch operations and their retard time in seconds.
 - 4. Open each alarm initiating and notification circuit to see if trouble signal actuates.
 - 5. Ground each alarm initiation and notification circuit and verify response of trouble signals.
- G. Test reports shall be delivered to the General Contractor as completed.

3.7 TESTING

- A. General
 - 1. A written acceptance test procedure (ATP) for testing the fire detection and control components and installation shall be prepared by the installer and approved by the Engineer in accordance with NFPA 72 and this specification. The contractor shall be responsible for the performance of the ATP, demonstrating the function of the system and verifying the correct operation of all system components, circuits, and programming.
 - 2. A program matrix shall be prepared by the installing contractor referencing each alarm input to every output function affected as a result of an alarm condition on that input.
 - 3. The Owner and Engineer shall be notified 10 days before the start of the required tests. All items found at variance with the applicable Codes, Drawings, or Specifications during

testing or inspection by a representative of the Authority Having Jurisdiction shall be corrected by the Contractor at no charge or expense to the Owner.

4. Prior to the acceptance test, the installing contractor shall prepare a complete listing of all device labels for alphanumeric annunciator display.

B. Preliminary Testing

1. Preliminary testing shall include all testing necessary to certify the correct operation of the entire fire alarm system. The certification of the fire alarm system is required prior to presenting the system for acceptance testing. Preliminary testing shall include as a minimum a pre-functional test, functional performance test and an integrated system test. It is the contractor's responsibility to schedule, perform and document these tests. A representative from the Owner and Engineer may monitor the preliminary tests but the presence of a representative is not required. No part of the fire alarm system is considered to be accepted at any point prior to the final acceptance test.
2. All intelligent devices shall be tested and logged for correct address and sensitivity using test equipment specifically designed for that purpose.
3. Each notification device shall be individually tested and shall be logged by location. The test report shall include the device type, model number, circuit number, candela or wattage setting, individual device location and test results. For each device a passing note shall indicate the device meets all codes, specifications and manufacturer's recommendations regarding placement, performance and workmanship
4. Wiring runs shall be tested for continuity, short circuits and grounds before system is energized. Resistance, current and voltage readings shall be made as work progresses.
5. Preliminary testing as required by code and state laws shall be performed and properly documented at the appropriate times during the installation process.
6. On larger projects, multiple preliminary tests shall be performed as each portion of work completed dictates. All preliminary tests shall be completed prior to presenting the fire alarm system for acceptance testing.
7. Documentation of the preliminary testing shall be retained by the certifying company and presented at the acceptance test as part of the project documentation package.

C. Acceptance Testing

1. The acceptance inspector shall use the system record drawings in combination with the documents specified in this Specification during the testing procedure to verify operation as programmed. In conducting the acceptance test, the acceptance inspector shall request demonstration of any or all input and output functions. The items tested shall include but not be limited to the following:
 - a. A systematic inspection of all system equipment and components to ensure compliance with these specifications.
 - b. A comprehensive test of all peripheral devices.
 - c. Testing of all network annunciators to ensure correct display of points.
 - d. Manual pull stations shall be tested by pulling the handle and reset with key. The break rod shall be installed at the time the manual pull station has passed the acceptance test. The keys for each manual pull station shall be delivered to the Owner's representative at the time of the acceptance test.

- e. Smoke detectors shall be tested using smoke detector test smoke approved for that purpose.
 - f. Each visual notification device shall be checked for correct candela settings. Correct operation and jumper settings of each notification devices shall be verified and listed individually in the inspection report.
 - g. Contractor shall perform Audio Intelligibility testing and sound level testing, providing test results in an acceptance testing report.
 - h. The system shall be tested in full general alarm mode for a minimum of 10 minutes.
 - i. A complete test of all system functions and controls.
2. In addition to the basic system functions, acceptance testing shall include but not be limited to the following systems as appropriate.
- a. Elevator recall.
 - b. Elevator shunt trip.
 - c. AHU shutdown.
 - d. Sprinkler system monitoring modules.
 - e. Smoke damper operation.
 - f. Fire/smoke shutter operation.
3. Secondary power capabilities shall be demonstrated as follows:
- a. System primary power shall be disconnected for a period of seven (7) hours. At the end of that period, an alarm condition shall be created and the system shall perform as specified for a period of five (5) minutes.
 - b. System primary power shall be restored for 48 hours and system- charging current shall be normal trickle charge for a fully charged battery pack.
 - c. System battery voltages and charging currents shall be checked at the fire alarm control panel using the test codes and displayed on the LCD display.
4. Fireman's HVAC override system functions shall be demonstrated as follows:
- a. On/off control of each controlled element and test for interaction of other automatic and manual control functions while in the override mode.
 - b. Correct status display of monitored elements.
 - c. Correct logging of activity to printer and historical memory as programmed.
 - d. Contractor shall provide skilled technicians to execute testing. Ensure that they are available and present during the agreed-upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem solving.
5. Correct message display, building, room number, and icon location for each alarm input at the control panel, each remote annunciator display and at the voice control panel.
6. System wiring shall be tested to demonstrate correct system response and correct subsequent system operation in the event of:
- a. Open, shorted and grounded signal line circuits.
 - b. Open, shorted and grounded notification and releasing circuits.
 - c. Primary power or battery disconnected.

3.8 DOCUMENTATION

- A. System documentation shall be furnished to the Owner and shall include but not be limited to the following:

1. System record drawings with wiring details including one set of reproducible masters and drawings on a CD ROM in a DXF format suitable for use in a CAD drafting program.
2. Electronic copy of the system operation, installation and maintenance manual.
3. System matrix showing interaction of all input signals with output commands.
4. Documentation of system voltage, current and resistance readings taken during the installation and testing phases of the system installation.
5. System program showing system functions, controls and labeling of equipment and devices.

3.9 TRAINING

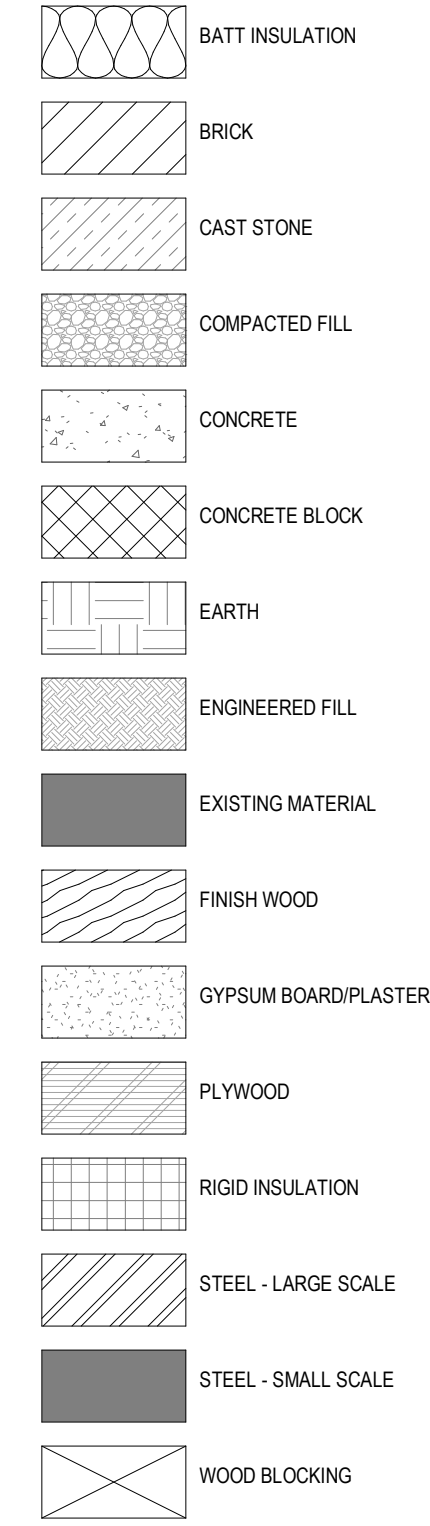
- A. Formal training for the operation and maintenance of all fire alarm equipment and the systems specified herein shall be given by factory trained and certified personnel.
- B. The training shall not take place until all system devices, annunciators and controls have been installed and certified operational by the licensed fire alarm technician. The certifying technician shall be present throughout the training sessions.
- C. The Contractor and/or the Systems Manufacturer's representative shall provide a typewritten "Sequence of Operation" including a trouble shooting guide of the entire system. The sequence of operation will be shown for each input in the system in a matrix format and provided in a loose leaf binder. When reading the sequence of operation, the reader will be able to quickly and easily determine what output will occur upon activation of any input in the system. The INPUT/OUTPUT matrix format shall be as shown in Appendix A to NFPA 72.
- D. The installation contractor shall furnish training as follows for a minimum of four employees of the system user:
 1. Training in the receipt, handling and acknowledgment of alarms.
 2. Training in the system operation including manual control of output functions from the system control panel.
 3. Training in the testing of the system including logging of detector sensitivity, field test of devices and response to common troubles.
 4. The total training requirement shall be a minimum of two (2) hours, but shall be sufficient to cover all items specified.

END OF SECTION 283100

CEDAR FALLS CITY HALL REMODEL

IN CEDAR FALLS, IOWA

MATERIAL LEGEND



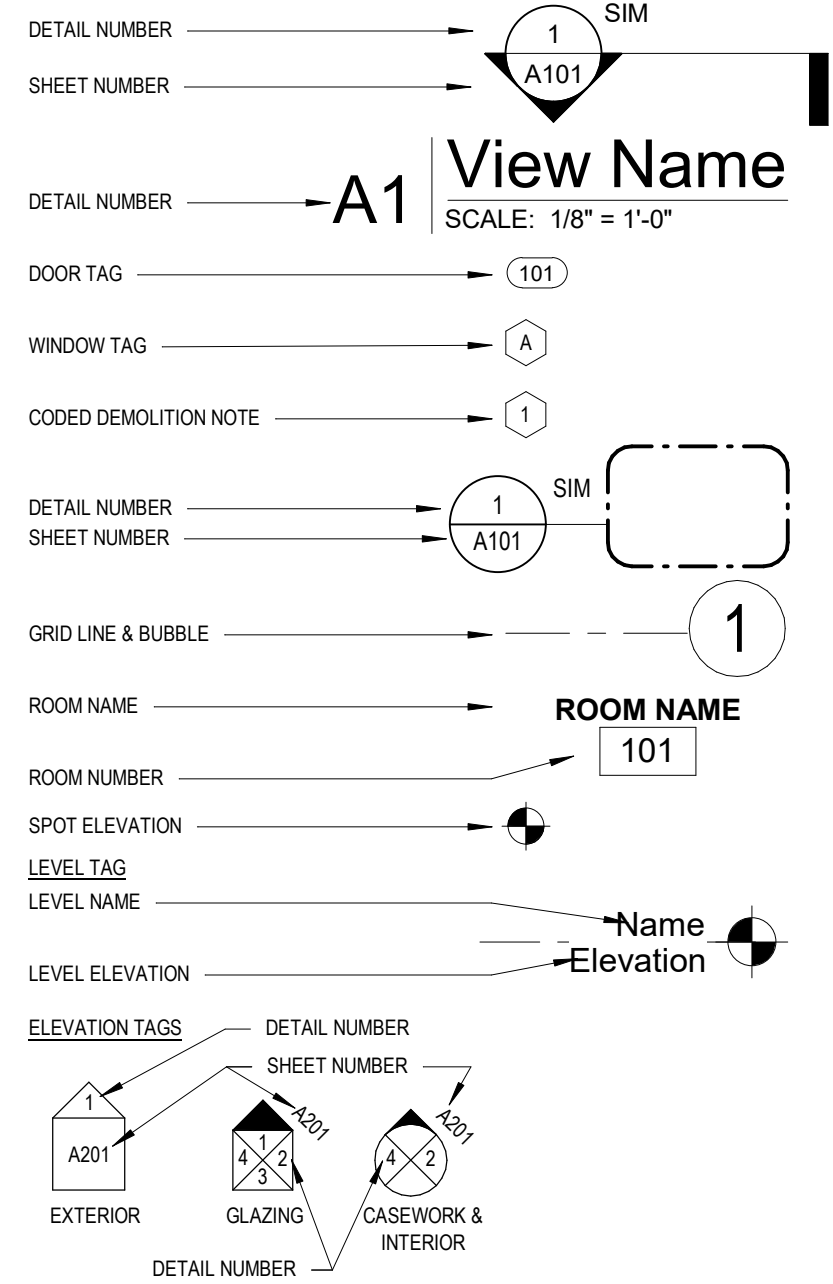
ABBREVIATIONS

ABBREVIATION	TEXT
@	AT
A.F.F.	ABOVE FINISHED FLOOR
ACQST.	ACOUSTICAL
ADJ.	ADJUSTABLE
ALT.	ALTERNATE
ALUM.	ALUMINUM
APPROX.	APPROXIMATELY
ARCH.	ARCHITECT
B.U.R.	BUILT UP ROOF
BD.	BOARD
BLDG.	BUILDING
BLK.	BLOCK
BOT.	BOTTOM
BRG.	BEARING
BRK.	BRICK
C.I.	CAST IRON
C.L.	CENTER LINE
C.M.U.	CONCRETE MASONRY UNIT
C.O.	CLEAN OUT
CAB.	CABINET
CER. T.	CERAMIC TILE
C.G.	CEILING
COL.	COLUMN
COMP.	COMPACTED
CONC.	CONCRETE
CONT.	CONTINUOUS
CONTR.	CONTRACTOR
CRS.	COURSES
D.	DEEP OR DEPTH
D.S.	DOWNSPOUT
DET.	DETAIL
DIA.	DIAMETER
DMEN.	DIMENSION
DR.	DOOR
DRS.	DOORS
E.C.	ELECTRICAL CONTRACTOR
E.J.F.	EXPANSION JOINT FILLER
E.P.D.M.	ETHYLENE PROPYLENE DIENE MONOMER
EA.	EACH
ELEC.	ELECTRICAL
ELEV.	ELEVATION
EQ.	EQUAL
EXST.	EXISTING
EXP.	EXPANSION OR EXPOSED
EXT.	EXTERIOR
F.D.	FLOOR DRAIN
F.D.N.	FOUNDATION
F.E.	FIRE EXTINGUISHER
F.E.C.	FIRE EXTINGUISHER & CABINET
F.E.J.	FLOOR EXPANSION JOINT
F.L.M.	FULL LENGTH MIRROR
F.O.	FINGER OPENING
F.S.	FLOOR SINK
F.S.C.	FOOD SERVICE CONTRACTOR
FIN.	FINISH
FLR.	FLOOR
FRM.	FRAME
G.B.	GRAB BAR
G.B.	GYP-SUM BOARD
G.E.V.	GRAB BAR W/ VERTICAL
G.C.	GENERAL CONTRACTOR
GA.	GAUGE
GA.LV.	GALVANIZED
GL.	GLASS
GR.	GRADE
H.	HIGH
H.M.	HOLLOW METAL
HORIZ.	HORIZONTAL
HT.	HEIGHT
I.D.	INSIDE DIAMETER
INSUL.	INSULATION
JST.	JOIST
JT.	JOINT
K.W.	KEY WALL
L.	LONG OR LENGTH
L.L.H.	LONG LEG HORIZONTAL
L.L.V.	LONG LEG VERTICAL
L.W.	LIGHT WEIGHT
LAM.	LAMINATE
LT.	LIGHT
M.B.	MARKER BOARD
M.C.	MECHANICAL CONTRACTOR
M.O.	MASONRY OPENING
M.O.L.	MIRROR OVER LAVATORY
M.V.	MOVEMENT WALL JOINT
MAS.	MASONRY
MAX.	MAXIMUM
MECH.	MECHANICAL
MEMB.	MEMBRANE
MIN.	MINIMUM
MTL.	METAL
N.I.C.	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
NO.	NUMBER
O.C.	ON CENTER
O.O.	OPENING ONLY
OPG.	OPENING
OPP.	OPPOSITE
P.C.	PLUMBING CONTRACTOR
P.T.	PORCELAN TILE PRESSURE TREATED
P.V.	PLUMBING VENT
P.V.C.	POLYVINYLCHLORIDE
PRFB.	PREFORMED
PL.	PLATE
PLAS.	PLASTIC
PLY.W.	PLYWOOD
PR.	PAIR
PWR.	POWER
Q.T.	QUARRY TILE
R.	RISER OR RADIUS
R.D.	ROOF DRAIN
R.E.J.	ROOF EXPANSION JOINT
R.O.	ROUGH OPENING
REFL.	REFLECTED
REFR.	REFRIGERATOR
RENF.	REINFORCING
REQ.	REQUIRED
RK.	ROOM
S.D.	SOAP DISPENSER
S.F.	SQUARE FOOT
S.L.	SIDE LIGHT
S.N.D.	SANITARY NAPKIN DISPENSER
S.S.	STAINLESS STEEL
ST.	STORM
SAN.	SANITARY
SECT.	SECTION
SHT.	SHEET
SIM.	SIMILAR
SPECS.	SPECIFICATIONS
STD.	STANDARD
STL.	STEEL
SUSP.	SUSPENDED
T.	TREAD
T.B.	TACK BOARD
T.E.	TECHNICAL ENCLOSURE
T.O.B.	TOP OF BEAM
T.O.F.	TOP OF FOOTING
T.O.M.	TOP OF MASONRY
T.O.S.	TOP OF STEEL
T.P.H.	TOILET PAPER HOLDER
T.V.	TELEVISION
T.W.F.	THRU WALL FLASHING
THK.	THICK OR THICKNESS
TYP.	TYPICAL
V.B.	VINYL BASE
V.I.F.	VERIFY IN FIELD
V.T.	VINYL TILE
V.T.B.	VINYL TACK BOARD
V.T.R.	VENT THROUGH ROOF
V.W.C.	VINYL WALL COVERING
VERT.	VERTICAL
W.	WIDTH
W.C.	WATER COOLER
W.H.	WATER HEATER
W.P.	WATERPROOFING OR WORK POINT
W.W.F.	WELDED WIRE FABRIC
W.	WITH
WD.	WOOD
WDW.	WINDOW
XMR.	TRANSFORMER

SHEET INDEX

GENERAL	
G001	COVER SHEET
G002	CODE PLAN
G003	PHASING PLAN
ARCHITECTURAL	
AD101	DEMOLITION PLAN
AD102	DEMOLITION PLAN
A101	LOWER FLOOR PLAN
A102	UPPER FLOOR PLAN
A110	ROOF PLAN
A111	REFLECTED CEILING PLANS
A112	REFLECTED CEILING PLANS
A301	SECTIONS AND DETAILS
A302	SECTIONS AND DETAILS
A421	CASEWORK/INTERIOR ELEVATIONS
A422	CASEWORK DETAILS
A423	CASEWORK DETAILS
AF101	FINISH PLANS
AF102	FINISH PLANS
MECHANICAL	
M000	MECHANICAL GENERAL NOTES & SYMBOLS
MD101	LOWER LEVEL MECHANICAL DEMO PLAN
MD102	UPPER LEVEL MECHANICAL DEMO PLAN
MD103	ROOF MECHANICAL DEMO PLAN
MPD100	LOWER LEVEL MECHANICAL PIPING DEMO PLAN
MPD101	UPPER LEVEL MECHANICAL PIPING DEMO PLAN
M101	LOWER LEVEL MECHANICAL PLAN
M102	UPPER LEVEL MECHANICAL PLAN
M103	ROOF MECHANICAL PLAN
MP100	LOWER LEVEL MECHANICAL PIPING PLAN
MP101	UPPER LEVEL MECHANICAL PIPING PLAN
M501	MECHANICAL DETAILS
M502	MECHANICAL DETAILS
M601	MECHANICAL SCHEDULES
M602	MECHANICAL SCHEDULES
M603	MECHANICAL SCHEDULES
MT011	MECHANICAL CONTROLS
M702	MECHANICAL CONTROLS
PLUMBING	
PD001	LOWER LEVEL UNDERFLOOR PLUMBING DEMO PLAN
PD100	LOWER LEVEL PLUMBING DEMO PLAN
PD101	UPPER LEVEL PLUMBING DEMO PLAN
P100	LOWER LEVEL UNDERFLOOR PLUMBING PLAN
P101	UPPER LEVEL PLUMBING PLAN
P501	PLUMBING DETAILS
P601	PLUMBING SCHEDULES
FIRE PROTECTION	
FP100	LOWER LEVEL FIRE PROTECTION PLAN
FP501	FIRE PROTECTION SCHEDULES & DETAILS
ELECTRICAL	
ED100	LOWER LEVEL ELECTRICAL DEMO
ED101	UPPER LEVEL ELECTRICAL DEMO
EL100	LOWER LEVEL LIGHTING PLAN
EL101	UPPER LEVEL LIGHTING PLAN
EP100	LOWER LEVEL POWER PLAN
EP101	UPPER LEVEL POWER PLAN
EP201	ELECTRICAL ROOF PLAN
ES100	LOWER LEVEL SYSTEMS PLAN
ES101	UPPER LEVEL SYSTEMS PLAN
E500	ELECTRICAL DETAILS
E600	ELECTRICAL SCHEDULES
E601	ELECTRICAL SCHEDULES
E602	ELECTRICAL SCHEDULES
TECHNOLOGY	
T101	LOWER FLOOR TECHNOLOGY PLAN
T102	UPPER FLOOR TECHNOLOGY PLAN
T500	TECHNOLOGY DETAILS
T600	TECHNOLOGY SCHEDULES

SYMBOLS LEGEND



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Cedar Falls, Iowa 50613

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Emergent Architecture

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phone: 319.883.6309

Engineer

Bluestone Engineering

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Johnston, Iowa 50131

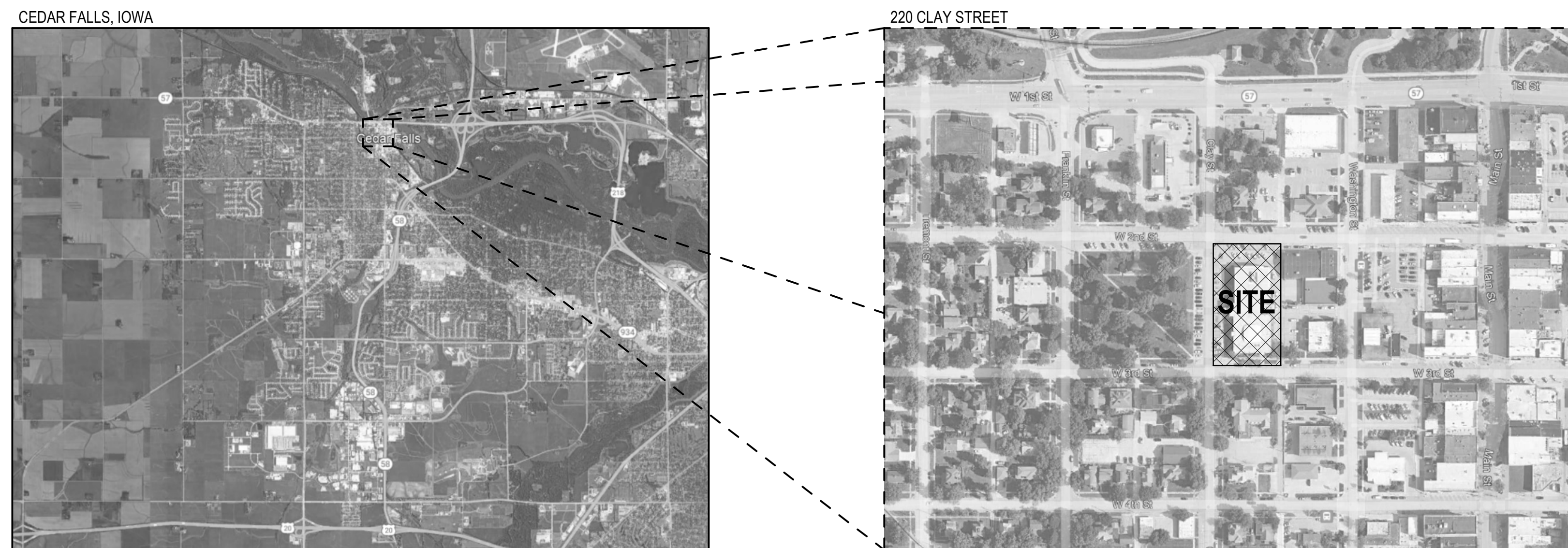
Joe Weeks (Mechanical Engineer)
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PROJECT LOCATION



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ARCHITECTURE

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CEDAR FALLS, IA 50613

BLUESTONE ENGINEERING
5518 NW 88TH STREET
JOHNSTON, IA 50131
515.727.0700

CEDAR FALLS CITY HALL REMODEL


CEDAR FALLS, IOWA

No.	Description	Date
	95% OWNER REVIEW SET	9-24-2021
	ISSUED FOR BID	10-5-2021

COVER SHEET

Project Number: 21004
Date: OCTOBER 5, 2021

G001



I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge. I am a duly Licensed Architect under the laws of the State of Iowa.

JOHN J. LIZER

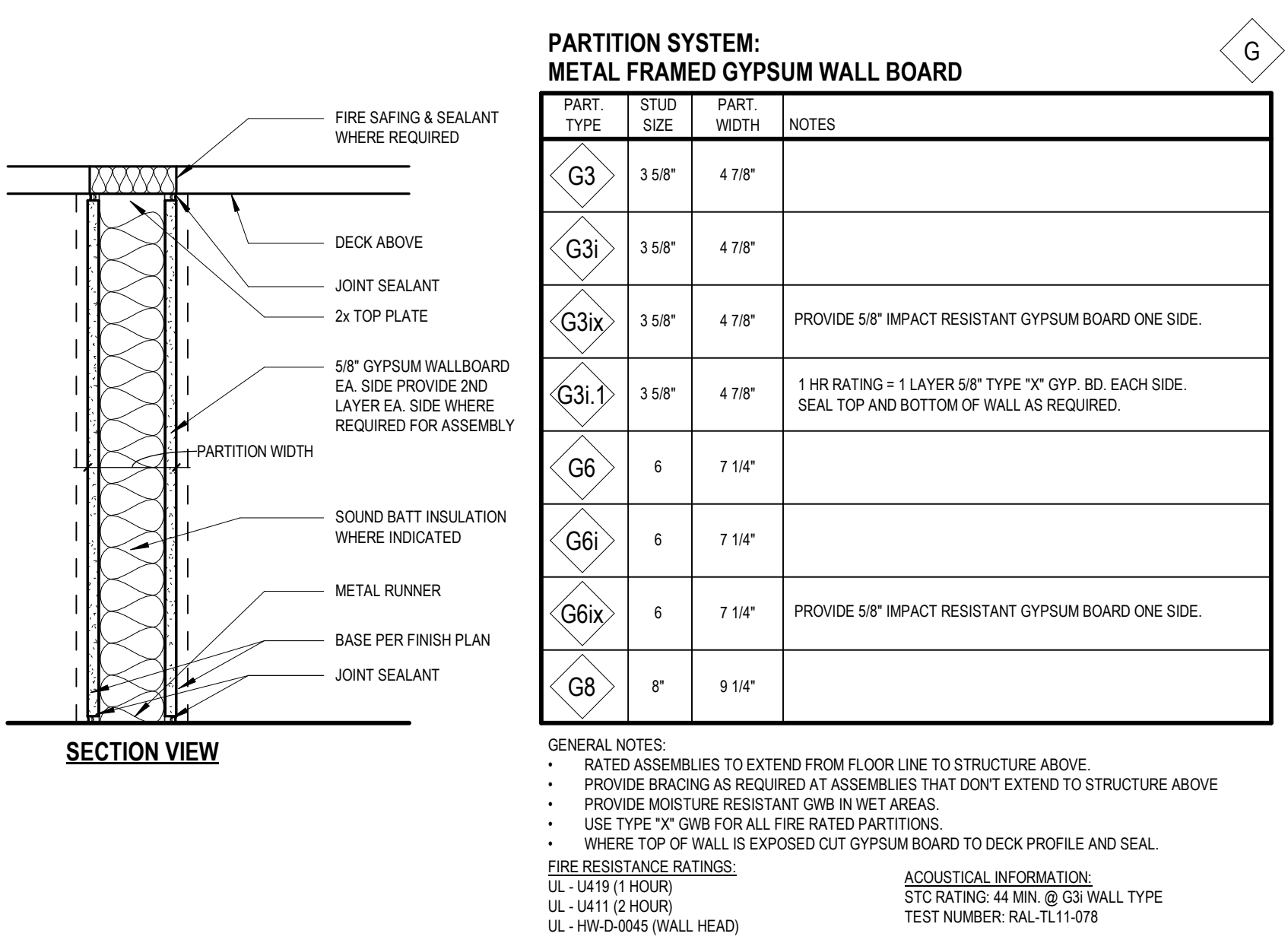
SIGNATURE _____

LICENSE NO.: 06948

LICENSE RENEWAL DATE: JUNE 30, 2023

PAGES OR SHEETS COVERED BY THIS SEAL: _____

ALL 'G' AND 'X' SHEETS _____



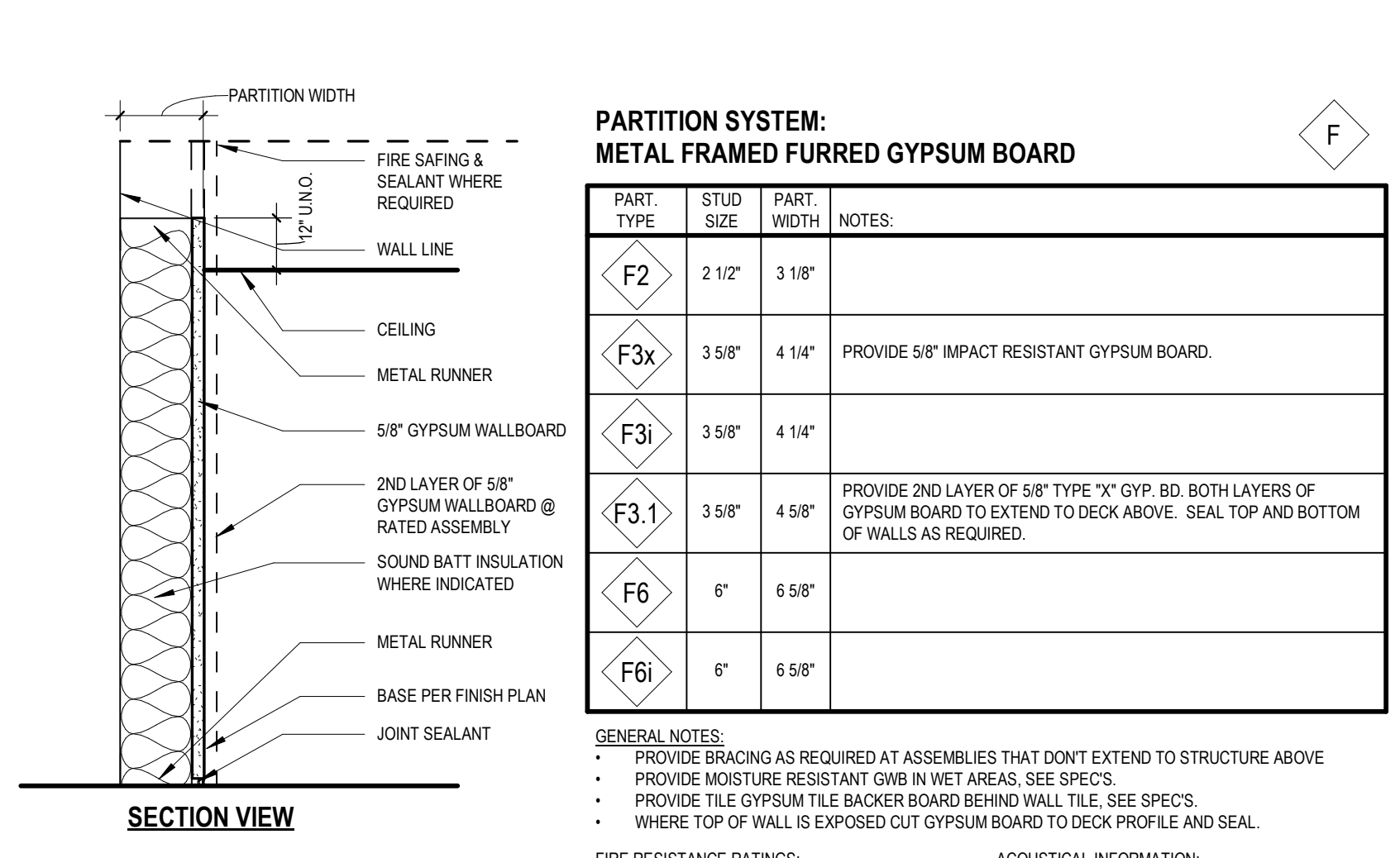
PART. TYPE	STUD SIZE	PART. WIDTH	NOTES
G3	3 5/8"	4 7/8"	
G3i	3 5/8"	4 7/8"	
G3ix	3 5/8"	4 7/8"	PROVIDE 5/8\"/>
G3i1	3 5/8"	4 7/8"	1 HR RATING = 1 LAYER 5/8\"/>
G6	6	7 1/4"	
G6i	6	7 1/4"	
G6ix	6	7 1/4"	PROVIDE 5/8\"/>
G8	8"	9 1/4"	

GENERAL NOTES:

- RATED ASSEMBLIES TO EXTEND FROM FLOOR LINE TO STRUCTURE ABOVE.
- PROVIDE BRACING AS REQUIRED AT ASSEMBLIES THAT DON'T EXTEND TO STRUCTURE ABOVE.
- PROVIDE MOISTURE RESISTANT GMB IN WET AREAS.
- USE TYPE "X" GMB FOR ALL FIRE RATED PARTITIONS.
- WHERE TOP OF WALL IS EXPOSED CUT GYPSUM BOARD TO DECK PROFILE AND SEAL.

FIRE RESISTANCE RATINGS:
UL - 1419 (1 HOUR)
UL - 1411 (1 HOUR)
UL - HW-D-045 (WALL HEAD)

ACOUSTICAL INFORMATION:
STC RATING: 44 MIN. @ G3 WALL TYPE
TEST NUMBER: RAL-TL11-078



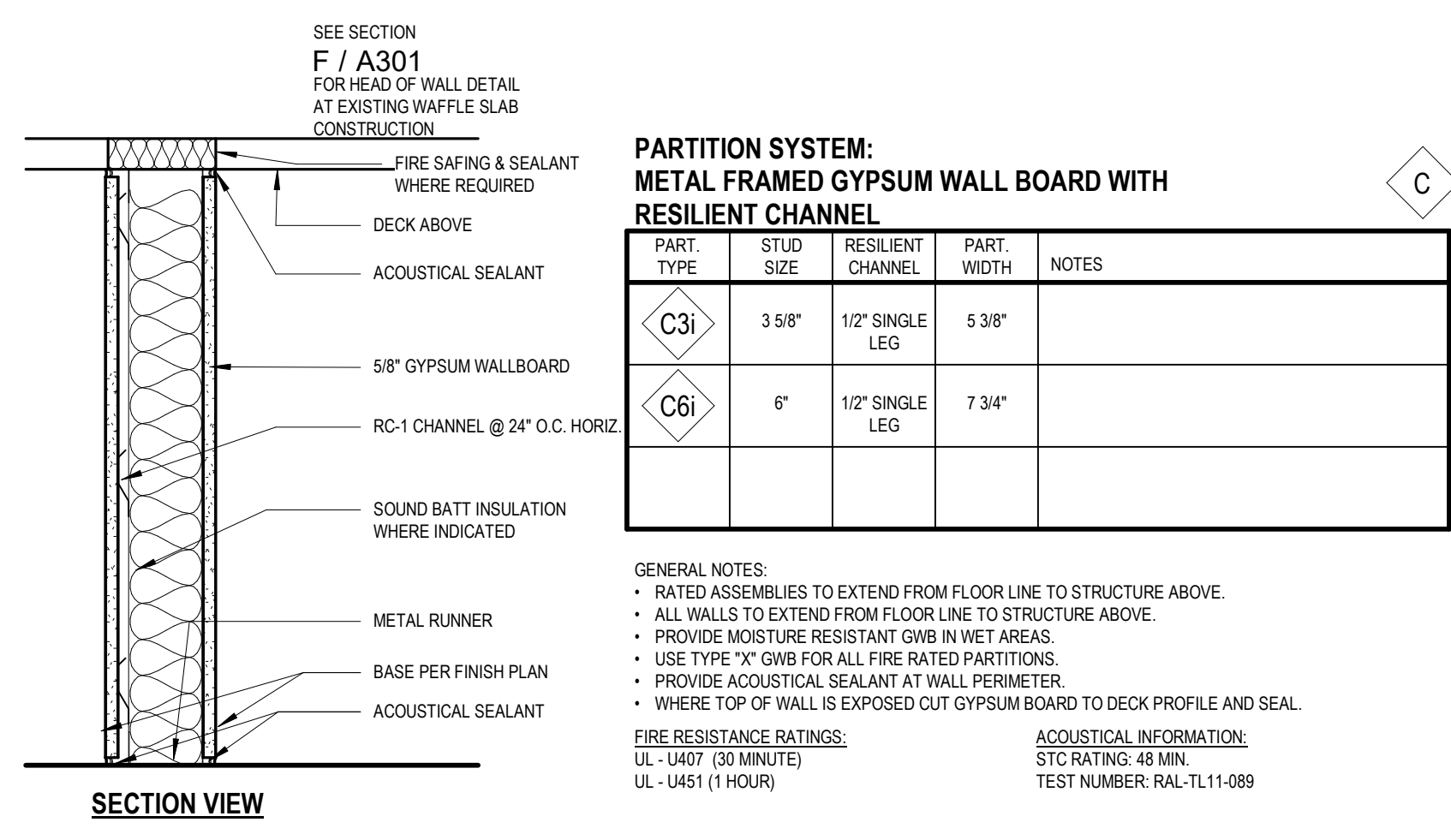
PART. TYPE	STUD SIZE	PART. WIDTH	NOTES
F2	2 1/2"	3 1/8"	
F3x	3 5/8"	4 1/4"	PROVIDE 5/8\"/>
F3i	3 5/8"	4 1/4"	
F3i1	3 5/8"	4 5/8"	PROVIDE 2ND LAYER OF 5/8\"/>
F6	6"	6 5/8"	
F6i	6"	6 5/8"	

GENERAL NOTES:

- PROVIDE BRACING AS REQUIRED AT ASSEMBLIES THAT DON'T EXTEND TO STRUCTURE ABOVE.
- PROVIDE MOISTURE RESISTANT GMB IN WET AREAS. SEE SPECS.
- PROVIDE TILE GYPSUM TILE BACKER BOARD BEHIND WALL T.I.E. SEE SPECS.
- WHERE TOP OF WALL IS EXPOSED CUT GYPSUM BOARD TO DECK PROFILE AND SEAL.

FIRE RESISTANCE RATINGS:
UL - 1491 (1 HOUR)

ACOUSTICAL INFORMATION:
STC RATING: N/A
TEST NUMBER: N/A



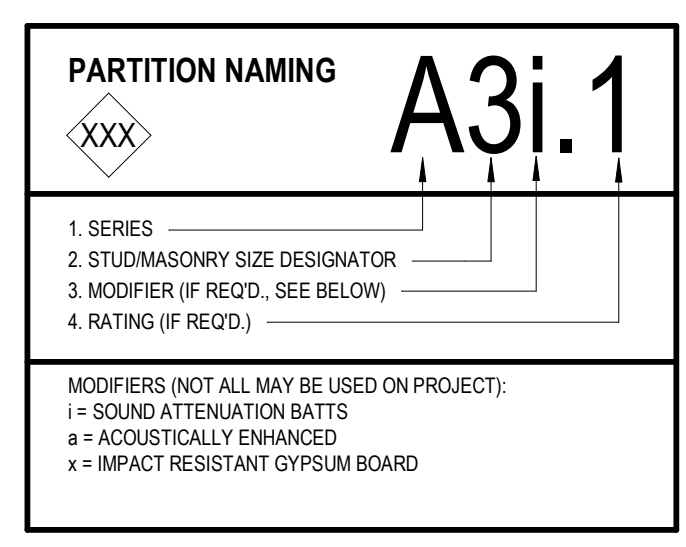
PART. TYPE	STUD SIZE	RESILIENT CHANNEL	PART. WIDTH	NOTES
C3i	3 5/8"	1/2" SINGLE LEG	5 3/8"	
C6i	6"	1/2" SINGLE LEG	7 3/4"	

GENERAL NOTES:

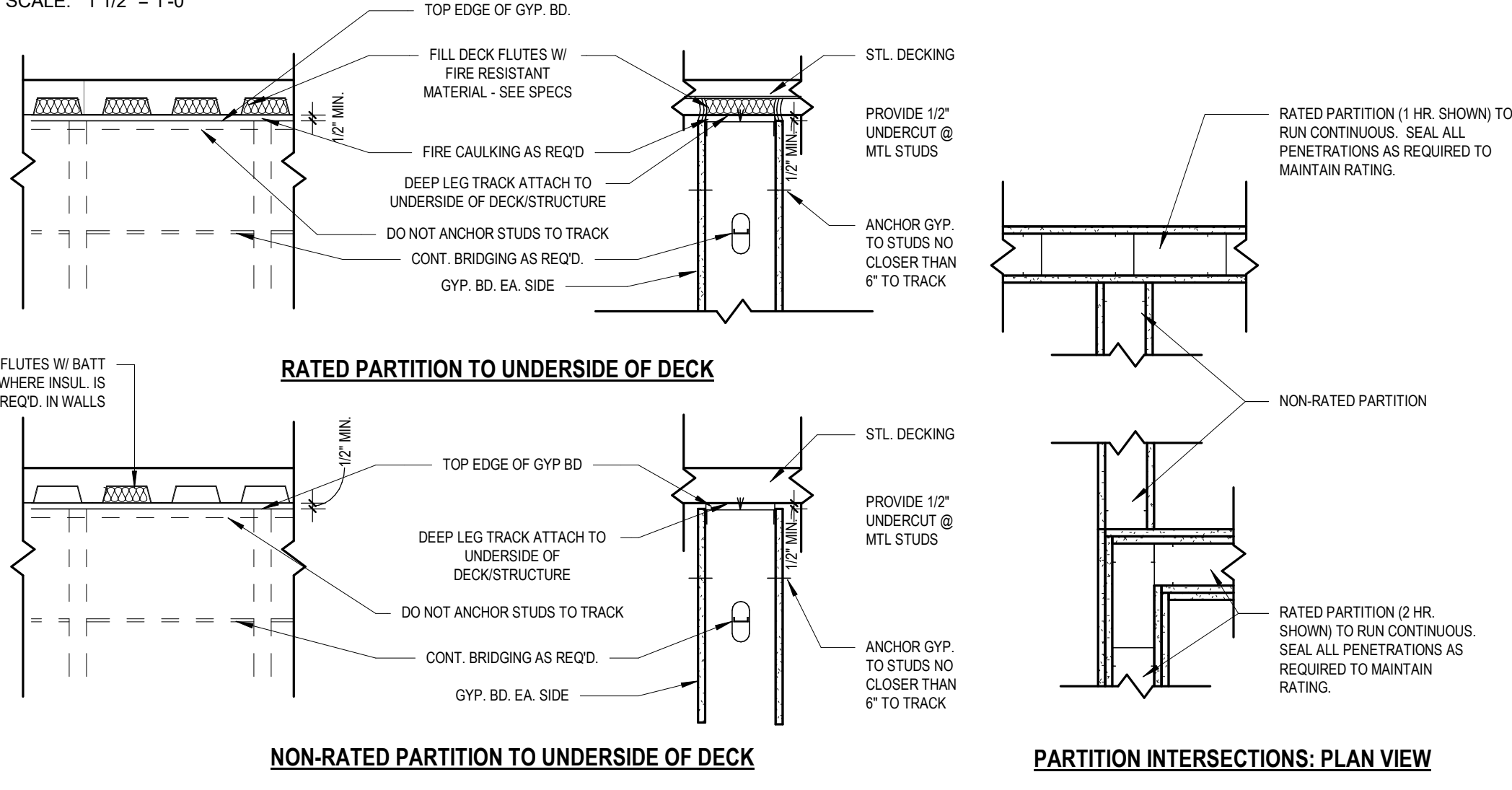
- RATED ASSEMBLIES TO EXTEND FROM FLOOR LINE TO STRUCTURE ABOVE.
- ALL WALLS TO EXTEND FROM FLOOR LINE TO STRUCTURE ABOVE.
- PROVIDE MOISTURE RESISTANT GMB IN WET AREAS.
- USE TYPE "X" GMB FOR ALL FIRE RATED PARTITIONS.
- PROVIDE ACOUSTICAL SEALANT AT WALL PENETRATOR.
- WHERE TOP OF WALL IS EXPOSED CUT GYPSUM BOARD TO DECK PROFILE AND SEAL.

FIRE RESISTANCE RATINGS:
UL - 1407 (30 MINUTE)
UL - 1401 (1 HOUR)

ACOUSTICAL INFORMATION:
STC RATING: 46 MIN
TEST NUMBER: RAL-TL11-089



INTERIOR PARTITIONS



GENERAL ARCHITECTURAL DRAWING NOTES:

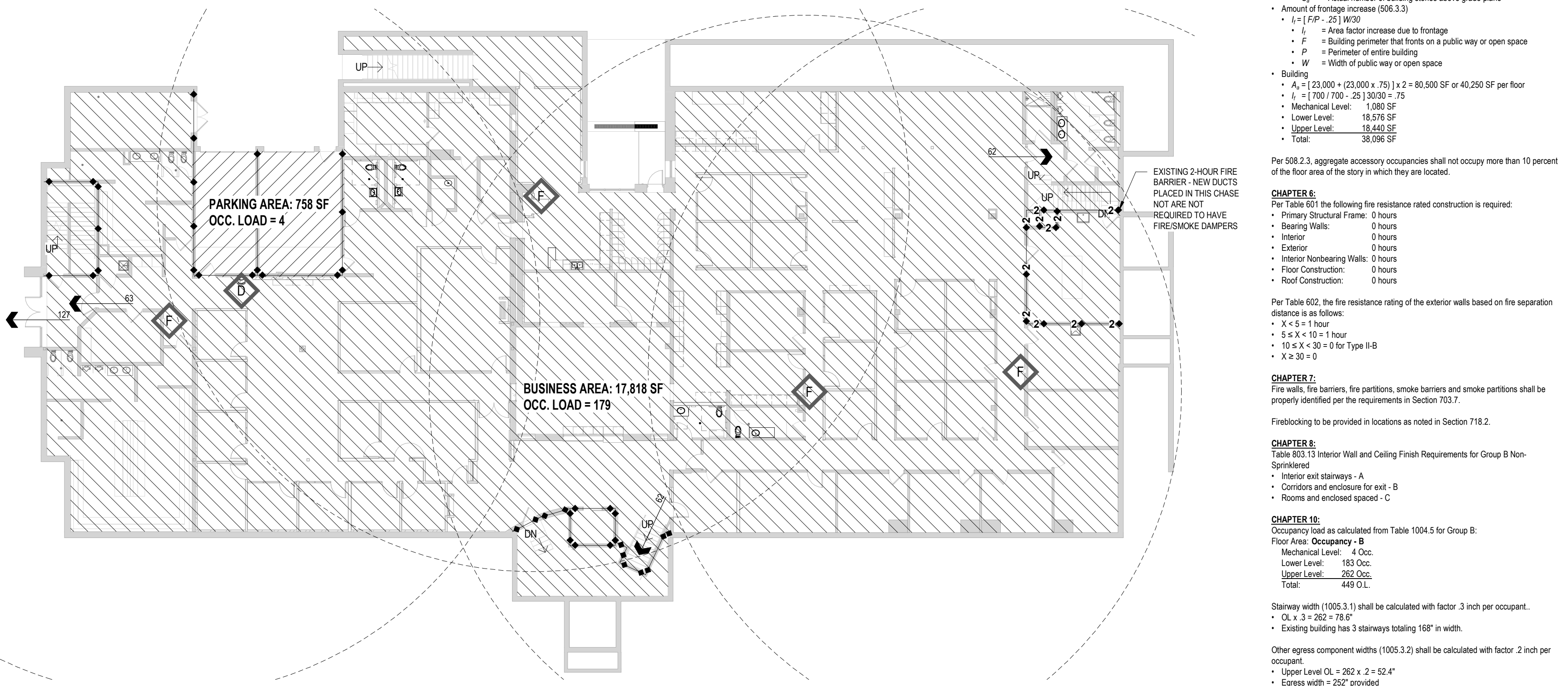
DIMENSIONS

- VERIFY EXISTING CONDITIONS AND DIMENSIONS BEFORE START OF WORK. REPORT DISCREPANCIES TO THE ARCHITECT PRIOR TO PROCEEDING WITH ANY AFFECTED WORK.
- DIMENSIONS NOTED AS "FIELD VERIFY" - "V.F." - "V.F." SHALL BE CHECKED AT THE SITE BY THE CONTRACTOR AND REVIEWED WITH THE ARCHITECT BEFORE INCORPORATING INTO THE WORK.
- BUILDING FLOOR PLAN DIMENSIONS ARE REFERENCED FROM STRUCTURAL GRID FACE OF CONCRETE, FACE OF MASONRY OR FINISH FLOOR SURFACE, UNLESS NOTED OTHERWISE.
- CEILING PLAN DIMENSIONS ARE NOTED FROM FINISHED SURFACES UNLESS NOTED OTHERWISE. CEILING HEIGHTS ARE NOTED FROM FLOOR TO FINISHED CEILING HEIGHT.
- CASINGWORK, TOILET PARTITIONS, AND OTHER FITURES AND EQUIPMENT ARE DIMENSIONED FROM FINISHED SURFACES UNLESS NOTED OTHERWISE.
- DIMENSIONS NOTED AS "CLEAR" ARE TO BE CLEAR BETWEEN FINISH SURFACES. COORDINATE BETWEEN ALL TRADES TO MAINTAIN DIMENSIONS.
- NOTES OR DIMENSIONS LABELED "TYPICAL" OR "TYP." SHALL APPLY TO SITUATIONS THAT ARE THE SAME OR SIMILAR.
- DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS TAKE PRECEDENCE. IF CLARIFICATION IS REQUIRED, CONTACT THE ARCHITECT.

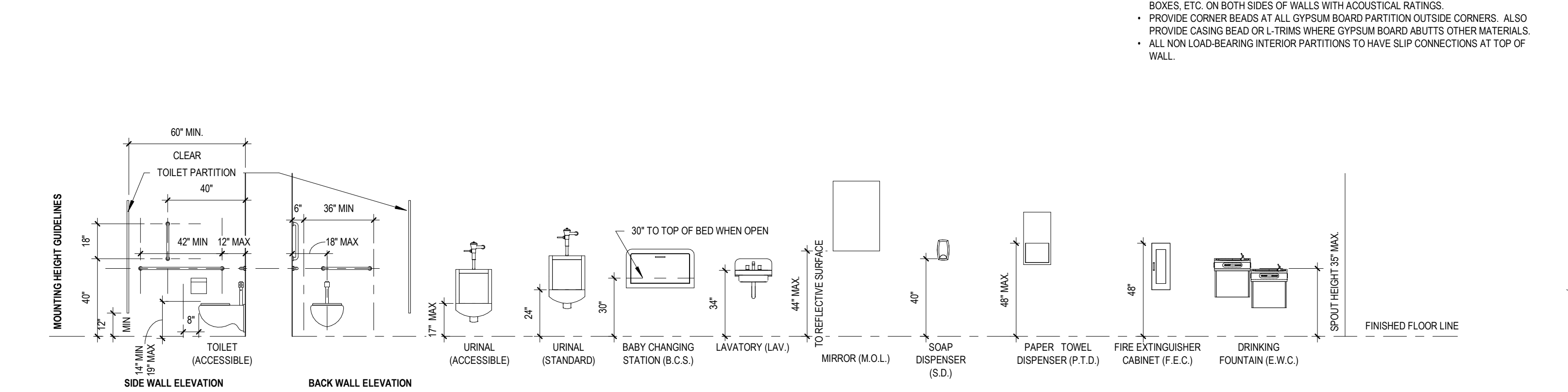
PARTITION NOTES

- SEE CODE PLANS FOR RATED PARTITION LOCATIONS.
- WALL TYPES NOTED ON PLANS SHALL RUN FROM CORNER TO CORNER UNLESS OTHERWISE NOTED.
- FIRE RESISTANCE RATED PARTITIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REFERENCED ASSEMBLY DESCRIPTION.
- WHERE DIFFERENT PARTITION TYPES INTERSECT, THE PARTITION TYPE WITH THE GREATER FIRE RESISTANCE RATING SHALL CONTINUE WITHOUT INTERRUPTION.
- PENETRATIONS OF FIRE RESISTANCE RATED ASSEMBLIES SHALL BE PROVIDED WITH FIRE RATED PENETRATION PROTECTION IN ACCORDANCE WITH AN APPROVED UNDERWRITERS LABORATORY SYSTEM.
- FIRE DAMPERS ON FIRE DUCTS SHALL BE PROVIDED WHERE AIR DUCTS OR DRAININGS PENETRATE FIRE RATED PARTITIONS.
- AT ALL WET AREAS AND LOCATIONS TO RECEIVE TILE, COORDINATE THE SUBSTRATE MATERIAL WITH SPECIFICATIONS, EXTENDING THE SUBSTRATE A MINIMUM OF 4" BEYOND THE WET AREA.
- ACOUSTICAL SEALANT SHALL BE USED AROUND ALL PIPES, DUCTS, CONDUIT, JUNCTION BOXES, ETC. ON BOTH SIDES OF WALLS WITH ACOUSTICAL RATINGS.
- PROVIDE CORNER BEADS AT ALL GYPSUM BOARD PARTITION OUTSIDE CORNERS. ALSO PROVIDE CASING HEAD OR TRIMS WHERE GYPSUM BOARD ADJUTS OTHER MATERIALS.
- ALL NON LOAD BEARING INTERIOR PARTITIONS TO HAVE SLIP CONNECTIONS AT TOP OF WALL.

00 - SOUTH MECHANICAL - CODE PLAN



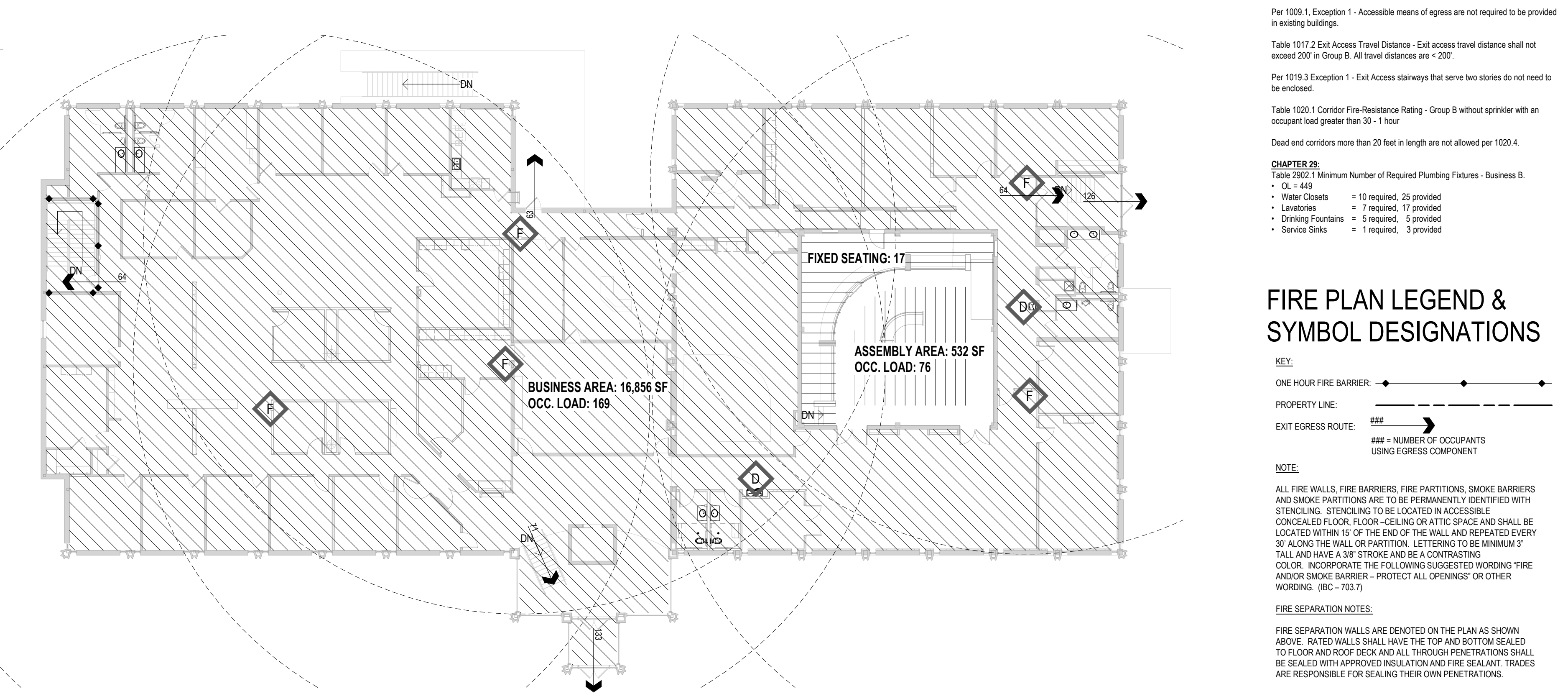
PARTITION INTERSECTIONS



TYP. MOUNTING HEIGHTS

SCALE: 1/4" = 1'-0"

01 - LOWER LEVEL - CODE PLAN



02 - UPPER LEVEL - CODE PLAN

SCALE: 1/16" = 1'-0"

CODE REVIEW

APPLICABLE CODES:

- 2015 International Building Code
- 2015 International Fire Code
- 2017 National Electric Code
- 2015 Uniform Plumbing Code
- 2015 International Mechanical Code
- 2012 International Energy Conservation Code
- 2010 ADA

CHAPTER 3:
Occupancy Classification: Group B (304.1)

CHAPTER 4:
Existing grille openings are smaller than 1,000 of and are separated by 1-hour fire barriers and 1-hour horizontal assemblies. (406.1.1)

CHAPTER 5:
Table 504.3 Allowable Building Height
Group B, Type I-B, Non-Sprinklered - 55'
Actual Building Height (Exceeds): 38'

Table 504.4 Allowable Number of Stories above Grade
Group B, Type I-B, Non-Sprinklered - 3
Total Number of Stories - 2

Allowable Building Area
Table 502.2 Allowable Area Factor
Group B, Type I-B, Non-Sprinklered - 23,000 sq ft
Single-occupancy, multi-story buildings (506.2.3)
A₁ = [A - (1 + L) S]
A = Allowable Area
A₁ = Tabular allowable area factor
AS = Tabular allowable area factor for nonsprinklered building
L = Area factor increase due to frontage (percent) as calculated in 506.3
S = Actual number of building stories above grade plane
Amount of frontage increase (506.3.3)
L = [L (SP) - 25] (W) / W
L = Area factor increase due to frontage
F = Building perimeter that fronts on a public way or open space
P = Perimeter of entire building
W = Width of public way or open space

Building
A₁ = (23,000 + (23,000 x .75)) / 2 = 80,500 SF or 40,250 SF per floor
A₁ = 1,700 / 700 = .25 (300) = 75
Mechanical Level = 1,000 SF
Lower Level = 18,576 SF
Upper Level = 18,576 SF
Total = 38,000 SF

Per 508.2.3, aggregate accessory occupancies shall not occupy more than 10 percent of the floor area of the story in which they are located.

CHAPTER 6:
Per Table 601 the following fire resistance rated construction is required:
Primary Structural Frame: 0 hours
Bearing Walls: 0 hours
Exterior: 0 hours
Interior Nonbearing Walls: 0 hours
Floor Construction: 0 hours
Roof Construction: 0 hours

Per Table 602, the fire resistance rating of the exterior walls based on fire separation distance is as follows:
A x 5 + 1 hour
5 x 5 + 10 + 1 hour
10 x 5 + 30 + 0 or 1-hour Type I-B
X x 30 = 0

CHAPTER 7:
Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions shall be properly identified per the requirements in Section 703.7.

Fireblocking to be provided in locations as noted in Section 718.2.

CHAPTER 8:
Table 803.1.3 Interior Wall and Ceiling Finish Requirements for Group B Non-Sprinklered
Interior exit stairways - A
Corridors and enclosure for exit - B
Rooms and enclosed space - C

CHAPTER 10:
Occupancy load as calculated from Table 1004.5 for Group B:
Floor Area - Occupancy - B
Mechanical Level: 4 Occ.
Lower Level: 183 Occ.
Upper Level: 262 Occ.
Total: 449 O.C.L.

Stairway width (1005.2.1) shall be calculated with factor 3 inch per occupant.
O₁ x 3 = 262 = 786'
Existing building has 3 stairways totaling 186' in width.

Other egress component widths (1005.3.2) shall be calculated with factor 2 inch per occupant.
Upper Level O₁ = 262 x 2 = 524'
Egress width = 252' provided

Table 1006.3.2 Minimum Number of Exits or Access to Exits per Story: 1-500 + 2

Two exits or exit access doorways (1007.1.1) shall be not less than one-half of the maximum overall diagonal dimension of the area served.

Per 1009.1, Exception 1 - Accessible means of egress are not required to be provided in existing buildings.

Table 1017.2 Exit Access Travel Distance - Exit access travel distance shall not exceed 200 ft Group B. All travel distances are < 200'

Per 1019.3 Exception 1 - Exit Access stairways that serve two stories do not need to be enclosed.

Table 1020.1 Corridor Fire-Resistance Rating - Group B without sprinkler with an occupant load greater than 30 - 1 hour

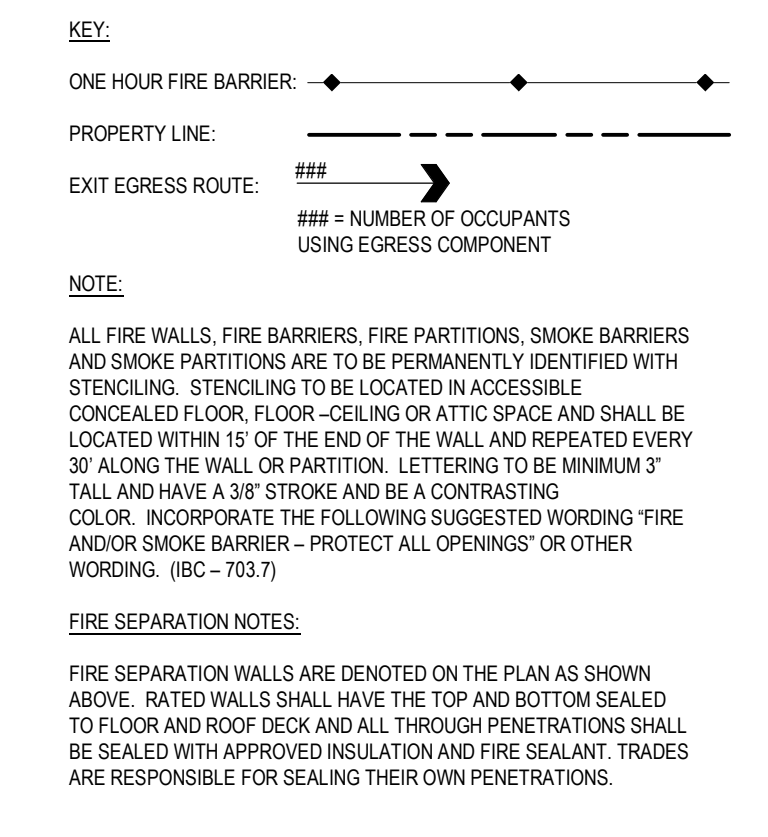
Dead end corridors more than 20 feet in length are not allowed per 1020.4.

CHAPTER 26:
Table 2602.1 Minimum Number of Required Plumbing Fixtures - Business B.
O₁ = 449
Water Closets = 10 required, 25 provided
Lavatories = 7 required, 17 provided
Drinking Fountains = 1 required, 3 provided
Service Sinks = 1 required, 3 provided

NOTE:
ALL FIRE WALLS, FIRE BARRIERS, FIRE PARTITIONS, SMOKE BARRIERS AND SMOKE PARTITIONS ARE TO BE PERMANENTLY IDENTIFIED WITH STENCILING. STENCILING TO BE LOCATED IN ACCESSIBLE CONCEALED FLOOR, FLOOR-CEILING OR ATTIC SPACE AND SHALL BE LOCATED WITHIN 5' OF THE END OF THE WALL AND REPEATED EVERY 30' ALONG THE WALL OR PARTITION. LETTERING TO BE MINIMUM 3" TALL AND HAVE A 3/8" STROKE AND BE A CONTRASTING COLOR. INCORPORATE THE FOLLOWING SUGGESTED WORDING "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS" OR OTHER WORDING. (IBC - 703.7)

FIRE SEPARATION NOTES:
FIRE SEPARATION WALLS ARE DENOTED ON THE PLAN AS SHOWN ABOVE. RATED WALLS SHALL HAVE THE TOP AND BOTTOM SEALED TO FLOOR AND ROOF DECK AND ALL THROUGH PENETRATIONS SHALL BE SEALED WITH APPROVED INSULATION AND FIRE SEALANT. TRADES ARE RESPONSIBLE FOR SEALING THEIR OWN PENETRATIONS.

FIRE PLAN LEGEND & SYMBOL DESIGNATIONS



No.	Description	Date
	95% OWNER REVIEW SET ISSUED FOR BID	9-24-2021 10-5-2021

CODE PLAN

Project Number: 21004
Date: OCTOBER 5, 2021

G002

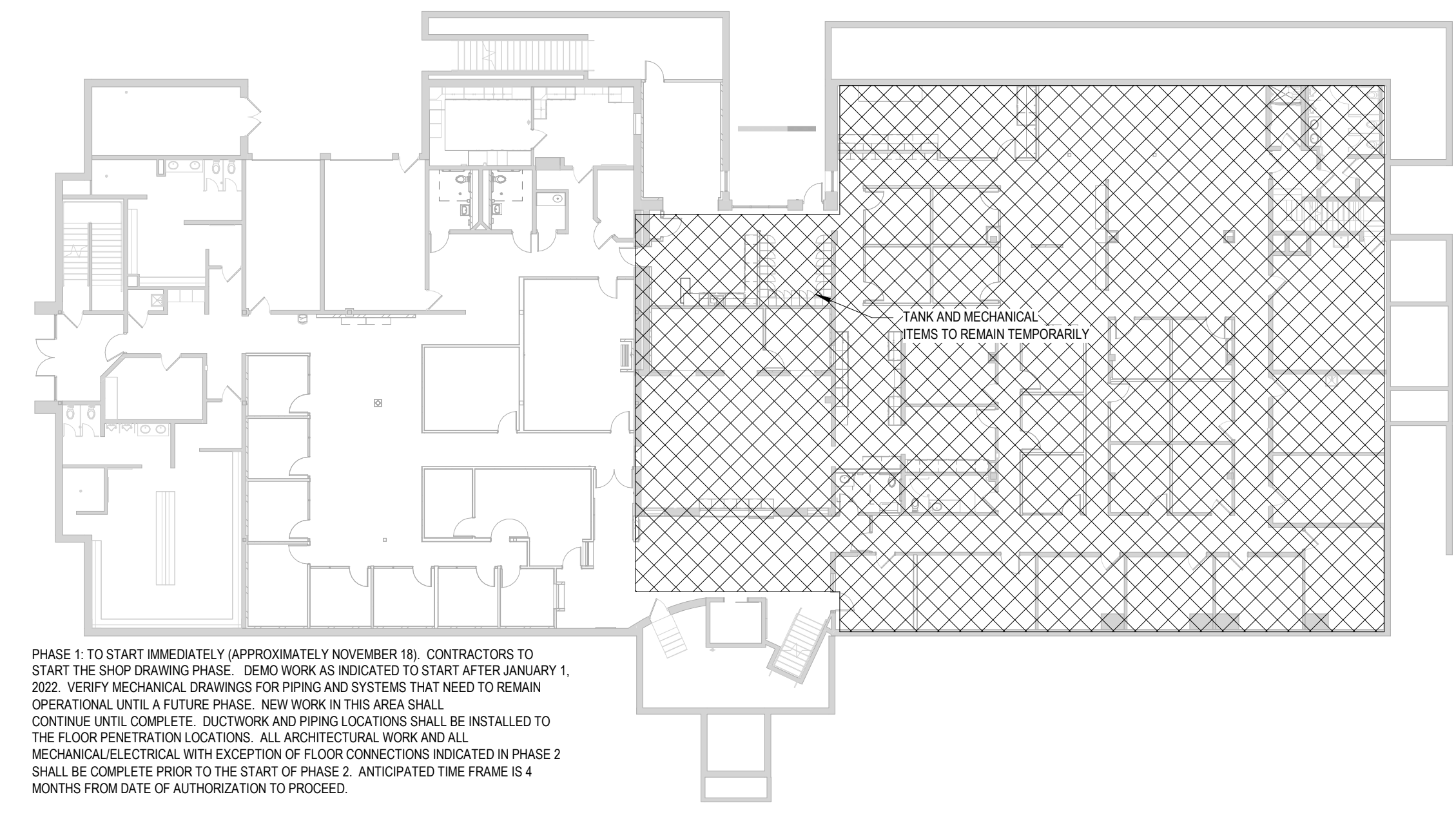
**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

No.	Description	Date
	95% OWNER REVIEW SET	9-24-2021
	ISSUED FOR BID	10-5-2021

PHASING PLAN

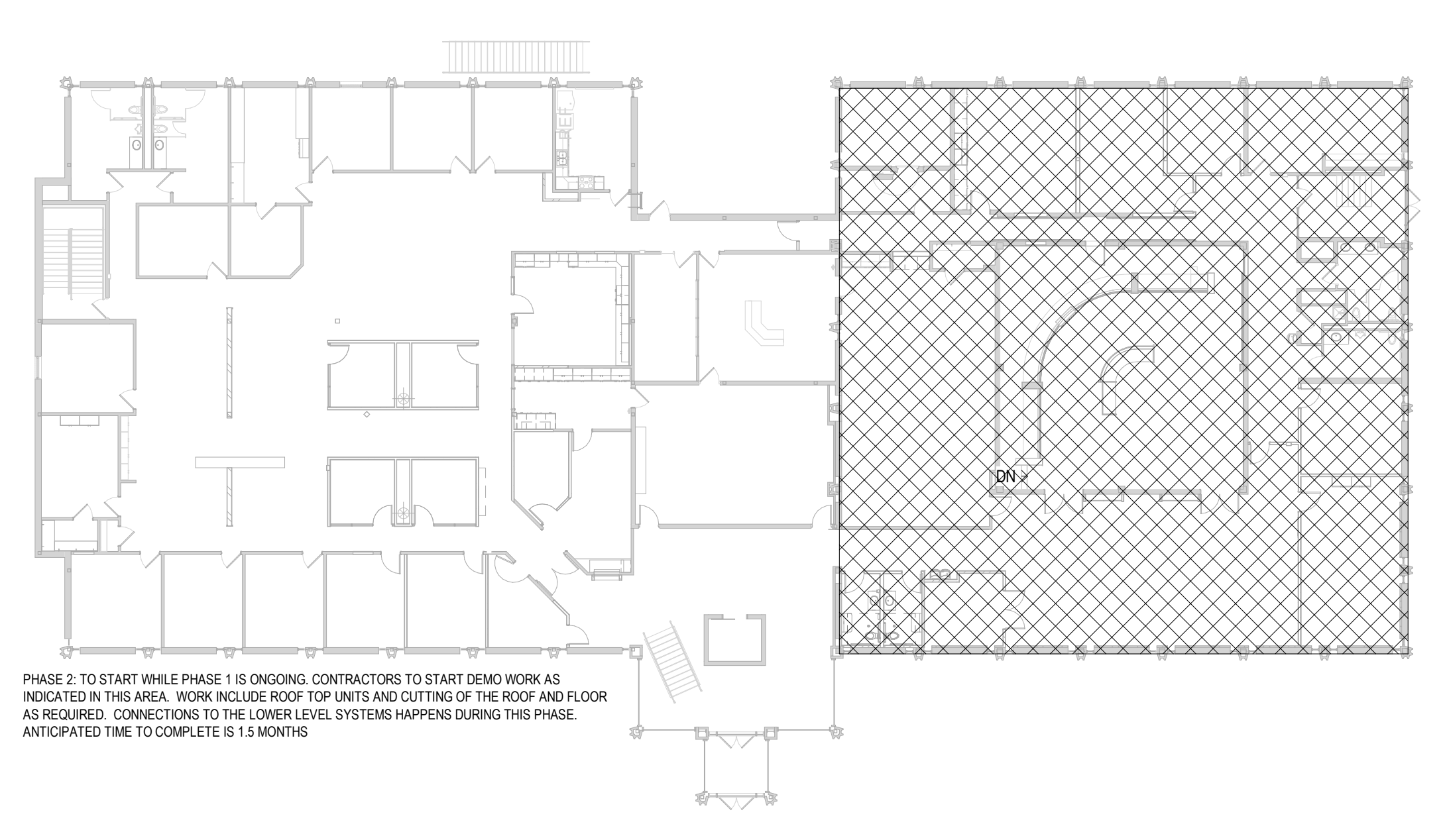
Project Number: 21004
Date: OCTOBER 5, 2021

G003



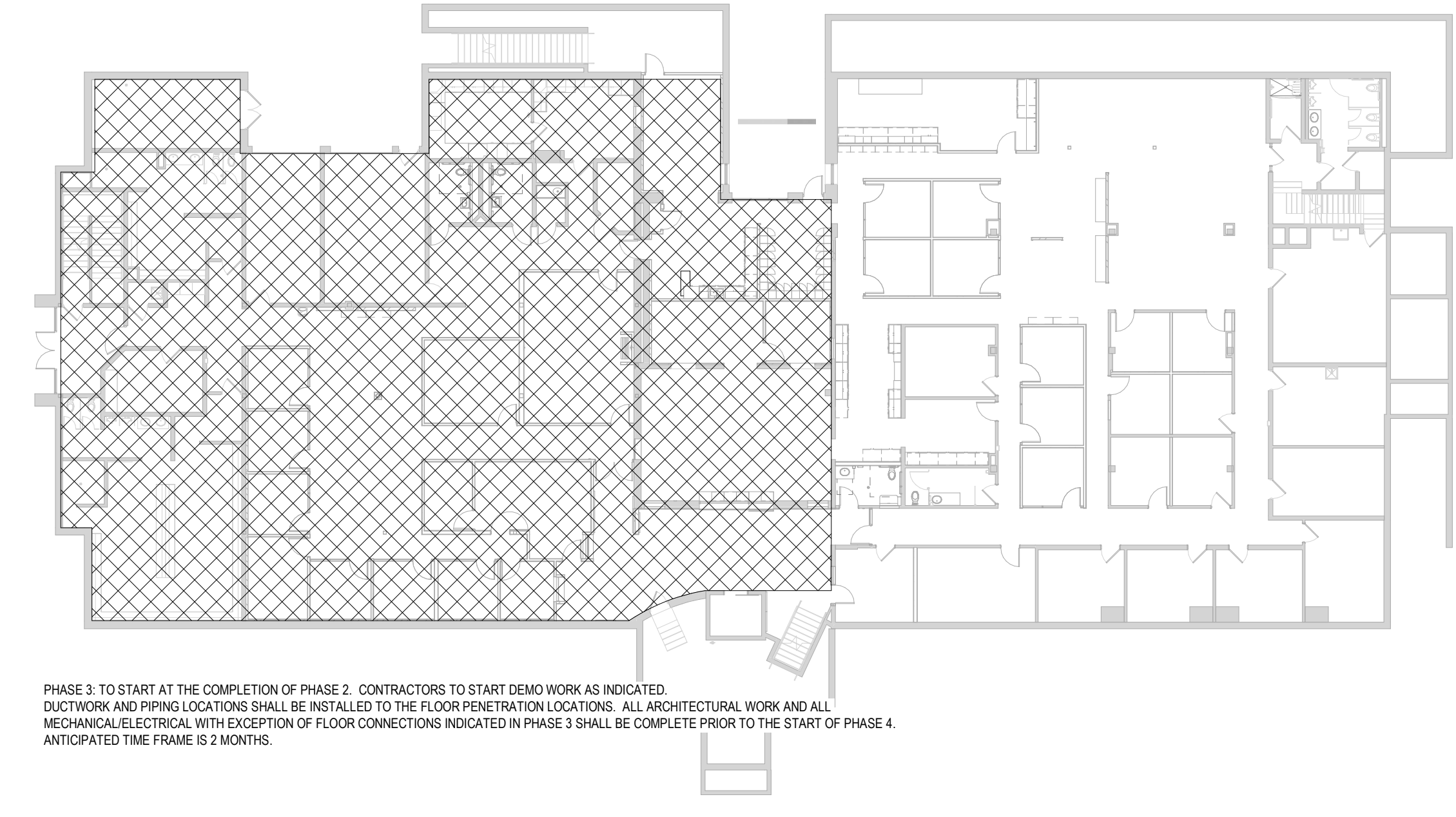
PHASE 1: TO START IMMEDIATELY (APPROXIMATELY NOVEMBER 18). CONTRACTORS TO START THE SHOP DRAWING PHASE. DEMO WORK AS INDICATED TO START AFTER JANUARY 1, 2022. VERIFY MECHANICAL DRAWINGS FOR PIPING AND SYSTEMS THAT NEED TO REMAIN OPERATIONAL UNTIL A FUTURE PHASE. NEW WORK IN THIS AREA SHALL CONTINUE UNTIL COMPLETE. DUCTWORK AND PIPING LOCATIONS SHALL BE INSTALLED TO THE FLOOR PENETRATION LOCATIONS. ALL ARCHITECTURAL WORK AND ALL MECHANICAL/ELECTRICAL WITH EXCEPTION OF FLOOR CONNECTIONS INDICATED IN PHASE 2 SHALL BE COMPLETE PRIOR TO THE START OF PHASE 2. ANTICIPATED TIME FRAME IS 4 MONTHS FROM DATE OF AUTHORIZATION TO PROCEED.

1 01 - LOWER LEVEL - PHASE 1- START LATE NOVEMBER 2021
SCALE: 1" = 20'-0"



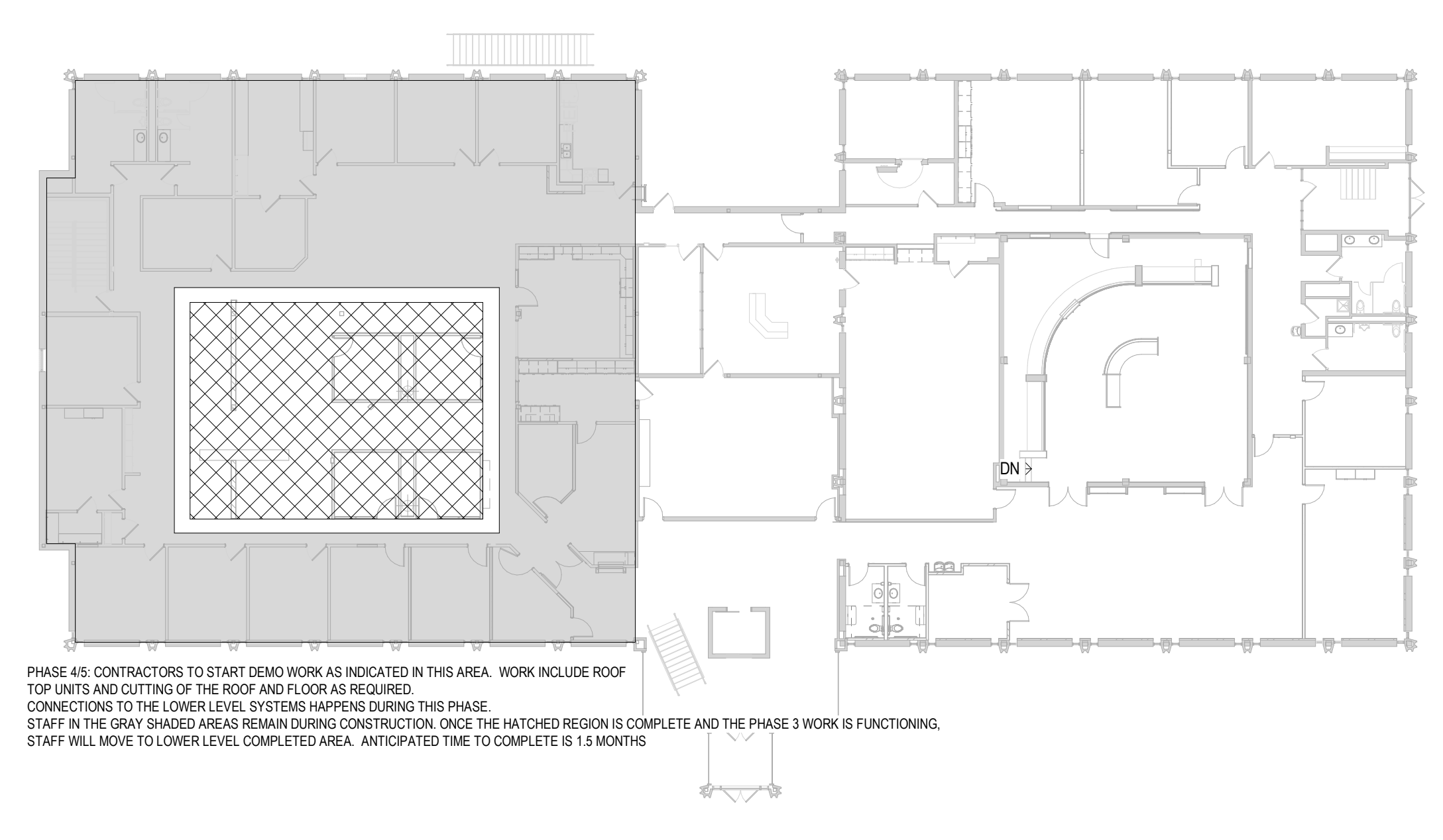
PHASE 2: TO START WHILE PHASE 1 IS ONGOING. CONTRACTORS TO START DEMO WORK AS INDICATED IN THIS AREA. WORK INCLUDE ROOF TOP UNITS AND CUTTING OF THE ROOF AND FLOOR AS REQUIRED. CONNECTIONS TO THE LOWER LEVEL SYSTEMS HAPPENS DURING THIS PHASE. ANTICIPATED TIME TO COMPLETE IS 1.5 MONTHS.

2 02 - UPPER LEVEL - PHASE 2- START FEBRUARY 2022
SCALE: 1" = 20'-0"



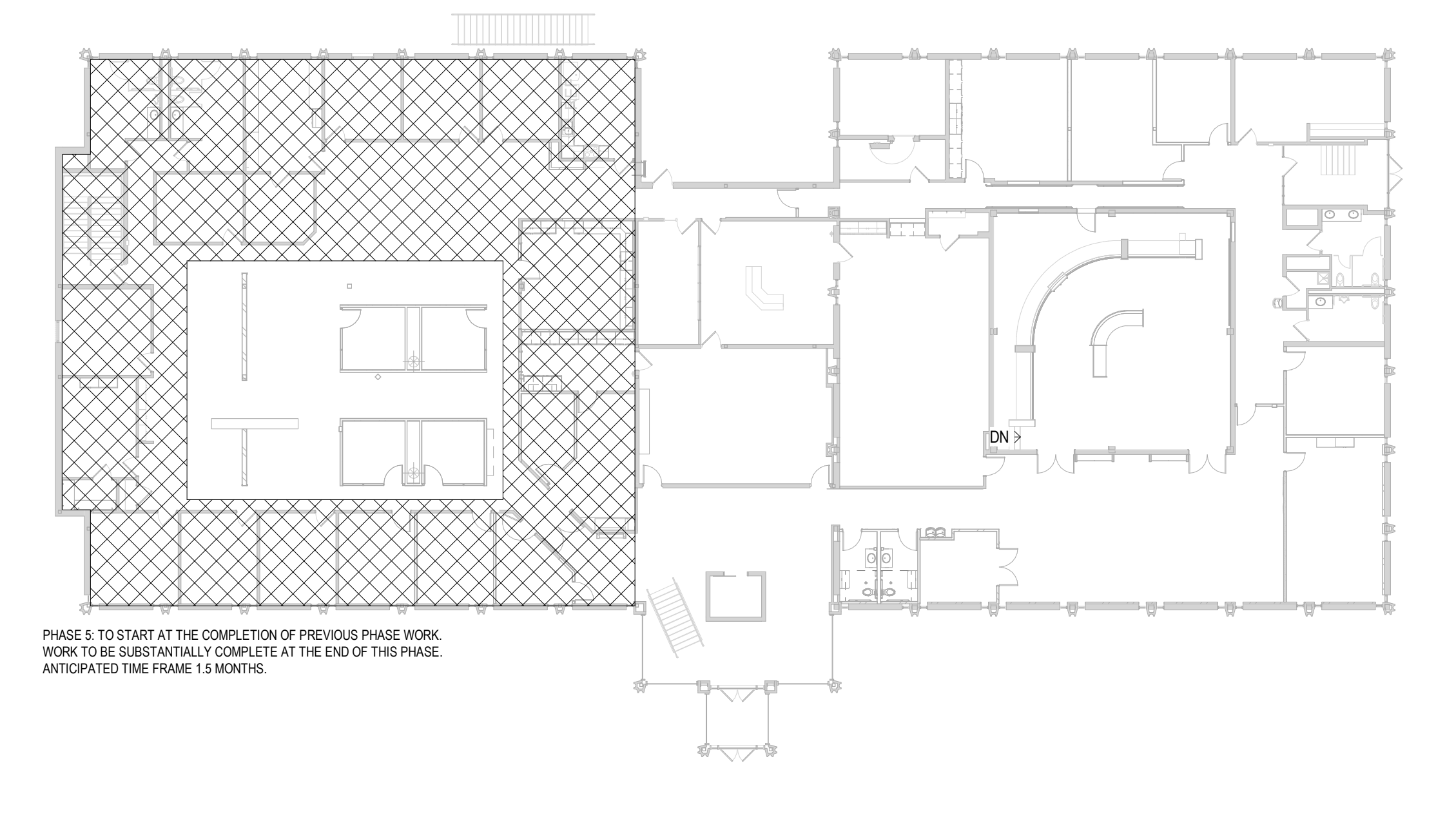
PHASE 3: TO START AT THE COMPLETION OF PHASE 2. CONTRACTORS TO START DEMO WORK AS INDICATED. DUCTWORK AND PIPING LOCATIONS SHALL BE INSTALLED TO THE FLOOR PENETRATION LOCATIONS. ALL ARCHITECTURAL WORK AND ALL MECHANICAL/ELECTRICAL WITH EXCEPTION OF FLOOR CONNECTIONS INDICATED IN PHASE 3 SHALL BE COMPLETE PRIOR TO THE START OF PHASE 4. ANTICIPATED TIME FRAME IS 2 MONTHS.

3 01 - LOWER LEVEL - PHASE 3- START APRIL 15
SCALE: 1" = 20'-0"



PHASE 4S: CONTRACTORS TO START DEMO WORK AS INDICATED IN THIS AREA. WORK INCLUDE ROOF TOP UNITS AND CUTTING OF THE ROOF AND FLOOR AS REQUIRED. CONNECTIONS TO THE LOWER LEVEL SYSTEMS HAPPENS DURING THIS PHASE. STAFF IN THE GRAY SHADED AREAS REMAIN DURING CONSTRUCTION. ONCE THE HATCHED REGION IS COMPLETE AND THE PHASE 3 WORK IS FUNCTIONING, STAFF WILL MOVE TO LOWER LEVEL COMPLETED AREA. ANTICIPATED TIME TO COMPLETE IS 1.5 MONTHS.

4 02 - UPPER LEVEL - PHASE 4- START JULY 1
SCALE: 1" = 20'-0"



PHASE 5: TO START AT THE COMPLETION OF PREVIOUS PHASE WORK. WORK TO BE SUBSTANTIALLY COMPLETE AT THE END OF THIS PHASE. ANTICIPATED TIME FRAME: 1.5 MONTHS.

5 02 - UPPER LEVEL - PHASE 5- START AUGUST 15- OCTOBER 1, 2022
SCALE: 1" = 20'-0"

No.	Description	Date
	95% OWNER REVIEW SET	9-24-2021
	ISSUED FOR BID	10-5-2021

DEMOLITION PLAN

Project Number 21004
Date OCTOBER 5, 2021

AD101

GENERAL DEMOLITION NOTES: (APPLIES TO ALL DEMOLITION PLANS)

A. THIS DEMOLITION PLAN OUTLINES THE SCOPE OF THE WORK INVOLVED FOR THE DEMOLITION PHASE OF THIS PROJECT. CONTRACTOR SHALL ALSO REFER TO THE DRAWINGS FOR THE NEW CONSTRUCTION FOR ADDITIONAL INFORMATION. THESE DEMOLITION DRAWINGS ARE NOT INTENDED TO BE ALL INCLUSIVE OF DEMOLITION REQUIRED FOR PROJECT.

B. EXISTING CONDITIONS INFORMATION WAS OBTAINED FROM DOCUMENTS AND INFORMATION SUPPLIED TO THE ARCHITECT ALONG WITH CASUAL FIELD OBSERVATIONS. THE CONTRACTOR IS TO VERIFY EXACT LOCATIONS, SIZES, ELEVATIONS, ETC. AND REPORT ANY DISCREPANCIES TO THE ARCHITECT.

C. REMOVE EXISTING CONSTRUCTION TO THE EXTENT INDICATED ON THE DRAWINGS. SHOULD ANY DAMAGE OCCUR TO ANY EXISTING CONSTRUCTION TO REMAIN ON SITE, THE CONTRACTOR SHALL REPAIR THE DAMAGE.

D. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION OF TEMPORARY DUST AND NOISE PROOF PARTITION BETWEEN CONSTRUCTION AREA AND ADJACENT PROPERTIES AS NECESSARY.

E. THE CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.

F. MAINTAIN THE INTEGRITY OF ALL EXISTING RATED WALLS, FIRE SEAL ANY PENETRATIONS WITH U.L. APPROVED ASSEMBLY.

G. CONTRACTOR IS TO VERIFY THE EXACT LOCATION OF ALL EXISTING UTILITIES PRIOR TO DEMOLITION ACTIVITIES.

H. CONTRACTOR TO PATCH/REPAIR ALL HOLES IN WALLS, FLOORS, & OR CEILINGS, AS REQUIRED. AT THE RATED ASSEMBLY PATCH WITH APPROPRIATE U.L. RATED PRODUCTS.

I. REFER TO M.E.P. DRAWINGS FOR DEMOLITION OF M.E.P. SYSTEMS.

J. REFER TO DEMOLITION PLUMBING PLANS FOR FULL EXTENT OF CONCRETE SLAB TO BE REMOVED AND REPLACED FOR UNDER FLOOR PIPING INSTALLATION.

K. EXISTING WALLS (OR PORTIONS OF WALLS) TO BE REMOVED SHALL BE CUT FLUSH WHERE INTERSECTING WITH WALLS TO REMAIN. REMAINING WALLS TO BE PATCHED AND FINISHED SMOOTH.

L. NEW OPENINGS IN EXISTING MASONRY WALLS SHALL BE SAW CUT AND TOOTHED WITH NEW JAMB BLOCKS AT LOCATIONS INDICATED AND TO THE HEIGHT AND WIDTH INDICATED. NEW INTELS SHALL BE INSTALLED TO SUPPORT EXISTING WALL CONSTRUCTION ABOVE AS INDICATED ON THE DRAWINGS.

M. PATCH FLOORS, WALLS, CEILINGS WHICH REMAIN AT LOCATIONS WHERE PIPES, CONDUITS, ETC. ARE REMOVED AS REQUIRED TO MATCH EXISTING CONDITIONS OR FOR NEW FINISHES.

N. WHERE EXISTING FINISH FLOOR IS REMOVED, PREPARE SURFACE TO RECEIVE NEW FLOORING.

O. REFER TO MECHANICAL DRAWINGS FOR NEW DUCT AND PIPING PENETRATIONS THROUGH EXISTING FLOOR SLABS.

P. PROTECT ADJACENT EXISTING FLOOR FINISHES TO REMAIN FROM CONSTRUCTION DIRT AND DEBRIS.

Q. ALL EXISTING WINDOW BLINDS AND SHADES ARE TO REMAIN. SALVAGE AND REINSTALL AS REQUIRED.

R. THE FOLLOWING ITEMS THAT ARE TO BE REMOVED SHALL BE SALVAGED AND TURNED OVER TO THE OWNER:

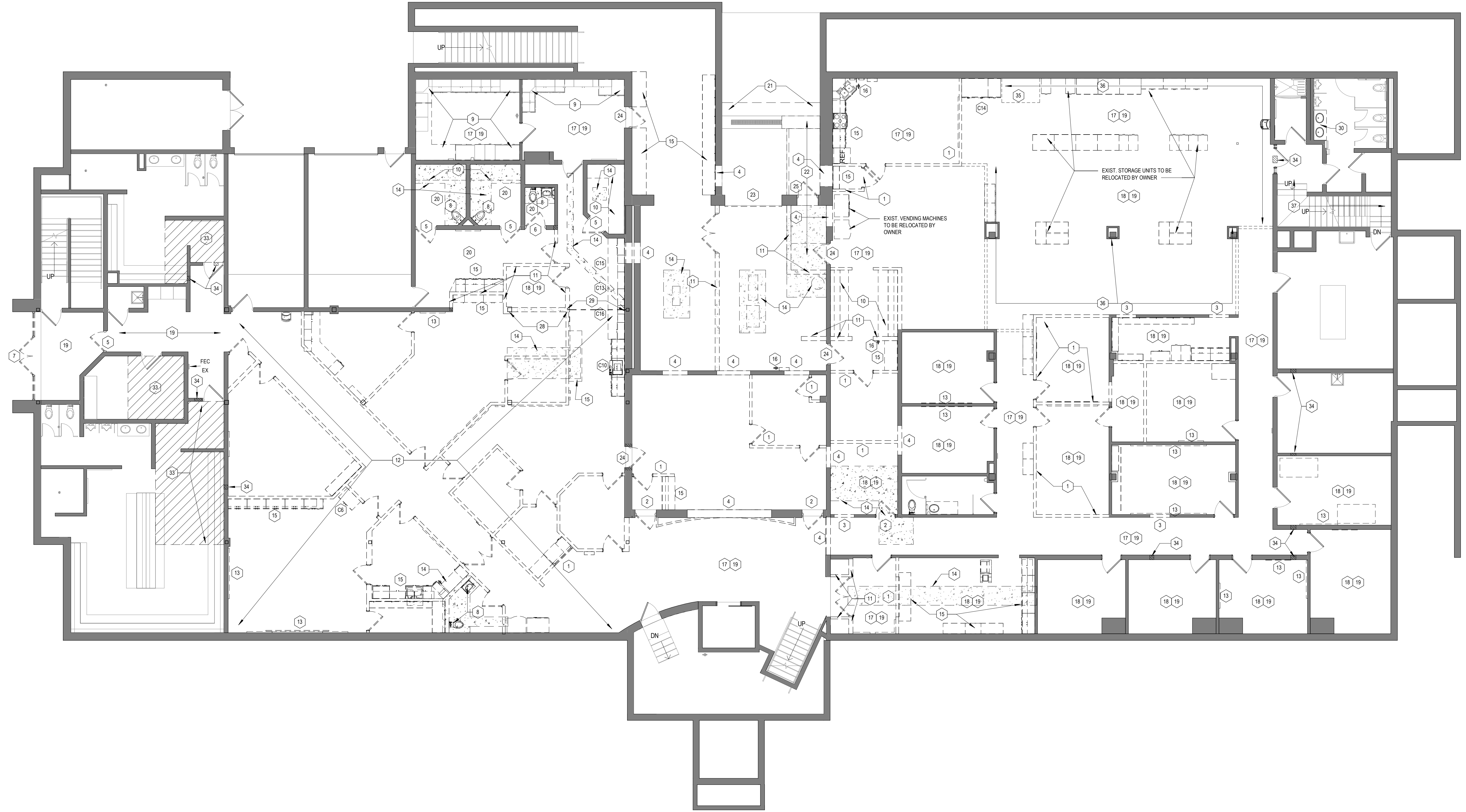
- ALL EXISTING DOORS AND WINDOWS
- ALL UNUSED HARDWARE FROM THE DOOR ACCESS SYSTEM (DOOR/SITE CONTROLLERS, ELECTRONIC LOCKS OR STRIKES)
- ANY WATER FOUNTAINS
- SLOAN TOILET VALVES
- SUN LOCKERS
- LOCKERS IN ENGINEERING AREA
- TV MOUNTS
- COILING DOORS AT THE SERVICE WINDOWS
- EXISTING OFFICE AND CONFERENCE ROOM SIGNAGE

SALVAGED CASEWORK NOTES SEE SHEET A421 FOR RELOCATION

NOTE	COMMENT
C1	REMOVE AND RELOCATE EXISTING CASEWORK (1)
C2	REMOVE AND RELOCATE EXISTING CASEWORK (2)
C3	REMOVE AND RELOCATE EXISTING CASEWORK (3)
C4	REMOVE AND RELOCATE EXISTING CASEWORK (4)
C5	REMOVE AND RELOCATE EXISTING CASEWORK (5)
C6	REMOVE AND RELOCATE EXISTING CASEWORK (6)
C7	REMOVE AND RELOCATE EXISTING CASEWORK (7)
C8	REMOVE AND RELOCATE EXISTING CASEWORK (8)
C9	REMOVE AND RELOCATE EXISTING CASEWORK (9)
C10	REMOVE AND RELOCATE EXISTING CASEWORK (10)
C11	REMOVE AND RELOCATE EXISTING CASEWORK (11)
C12	REMOVE AND RELOCATE EXISTING CASEWORK (12)
C13	REMOVE AND RELOCATE EXISTING CASEWORK (13)
C14	REMOVE AND RELOCATE EXISTING CASEWORK (14)
C15	REMOVE AND RELOCATE EXISTING CASEWORK (15)
C16	REMOVE AND RELOCATE EXISTING CASEWORK (16)
C17	REMOVE AND RELOCATE EXISTING CASEWORK (17)

CODED DEMOLITION NOTES

NOTE	COMMENT
1	EXISTING FRAME WALL TO BE REMOVED INCLUDING ANY DOORS, WINDOWS AND SURFACE MOUNTED ITEMS. PATCH ADJACENT FLOOR/WALL/CEILING SURFACES BACK TO MATCH EXISTING.
2	EXISTING DOOR/WINDOW AND FRAME ASSEMBLY TO BE REMOVED. PATCH JAMBS AS REQ'D. AND PREPARE OPENING FOR NEW DOOR AND FRAME.
3	PROVIDE NEW OPENING IN EXISTING FRAME WALL. PATCH ADJACENT REMAINING WALL SURFACES BACK TO MATCH EXISTING.
4	SAW CUT EXISTING MASONRY/CONCRETE WALL FOR NEW OPENING. SEE DOOR SCHEDULE FOR SIZE AND LINTEL. PATCH DAMAGE TO ADJACENT SURFACES TO MATCH.
5	EXISTING DOOR PANEL TO BE REMOVED. PREPARE FRAME TO RECEIVE NEW DOOR PANEL AND HARDWARE. PATCH ANY UNUSED HOLES.
6	EXISTING DOOR AND FRAME MASONRY WALL TO BE REMOVED. PATCH JAMBS AS REQ'D. AND PREPARE OPENING FOR NEW DOOR AND FRAME.
7	EXISTING ALUM. STOREFRONT SYSTEM TO BE REMOVED AND REPLACED WITH NEW IN SAME LOCATION. PATCH ADJACENT SURFACES BACK TO MATCH EXISTING.
8	EXISTING PLUMBING FIXTURE TO BE REMOVED. PATCH REMAINING SURFACES BACK TO MATCH EXISTING. SEE MECHANICAL PLANS.
9	EXISTING COUNTER TOP TO BE REMOVED AND REPLACED WITH NEW. PATCH WALL SURFACES BACK TO MATCH EXISTING.
10	EXISTING CONC. BECH AND MASONRY SUPPORT WALL BELOW TO BE REMOVED. PATCH REMAINING SURFACES BACK TO MATCH EXISTING.
11	EXISTING MASONRY WALL TO BE REMOVED. PATCH REMAINING ADJACENT FLOOR SURFACES BACK TO MATCH EXISTING. PROVIDE CONT. WATERSTOP RX AT PERIMETER OF CONCRETE FLOOR PATCH.
12	ALL EXISTING FLOORING FRAME WALLS, CEILING TILE & GRID TO BE REMOVED IN THIS AREA. PATCH ANY REMAINING ADJACENT SURFACES BACK TO MATCH EXISTING. SEE M.E.P.T. PLANS.
13	EXISTING WALL MOUNTED M.B.T. OR AV SCREEN TO BE REMOVED. PATCH WALL SURFACE BACK TO MATCH EXISTING.
14	SAW CUT AND PATCH EXIST. CONC. FLOOR AS REQUIRED FOR BELOW FLOOR M.E.P.T. WORK. SEE M.E.P.T. PLANS. PROVIDE CONT. WATERSTOP RX AT PERIMETER OF OPENING.
15	EXISTING CASEWORK TO BE REMOVED. PATCH REMAINING WALL/FLOOR SURFACES BACK TO MATCH EXISTING.
16	SALVAGE EXISTING FIRE EXTINGUISHER FOR REUSE.
17	EXISTING V.C.T. FLOORING AND BASE MATERIAL TO BE REMOVED. PREPARE FLOORING SURFACE TO RECEIVE NEW FINISHES PER FINISH PLAN.
18	EXISTING CARPET TILE AND BASE TO BE REMOVED. PREPARE FLOOR SURFACE TO RECEIVE NEW FINISH PER FINISH PLANS.
19	EXISTING SUSPENDED ACoustICAL CEILING TILE AND GRID TO BE REMOVED. PATCH REMAINING WALL SURFACES BACK TO MATCH EXISTING. SEE M.E.P.T. PLANS FOR CEILING MOUNTED ITEMS TO BE REMOVED.
20	EXISTING GYP. BD. CEILING AND FRAMING TO BE REMOVED. PATCH REMAINING SURFACES AS REQUIRED TO MATCH EXISTING.
21	EXISTING CONCRETE PAVING TO BE REMOVED AND REPLACED.
22	EXISTING CONCRETE RAMP TO BE REMOVED.
23	EXISTING OVERHEAD DOOR, FRAME AND SUPPORT STRUCTURE TO BE REMOVED. PREPARE OPENING AS REQUIRED FOR NEW WINDOW FRAMING.
24	EXISTING DOOR AND HOLLOW METAL FRAME TO BE REMOVED. INFILL OPENING AS REQUIRED TO MATCH ADJACENT SURFACES. SEE FLOOR PLAN.
25	EXISTING HOLLOW METAL DOOR FRAME AND CONCRETE FLOOR INFILL TO BE REMOVED. PREPARE OPENING FOR NEW DOOR AND FRAME.
26	EXISTING MASONRY & PLASTER VAULT WALLS & DOOR TO BE REMOVED. PATCH ADJACENT WALL AND FLOOR SURFACES BACK TO MATCH EXISTING.
27	EXISTING ALUM. WINDOW TO BE REMOVED AND REPLACED WITH NEW IN SAME LOCATION. PATCH ADJACENT WALL SURFACES BACK TO MATCH EXISTING.
28	EXISTING MASONRY BEARING WALL TO BE REMOVED. SHORE EXISTING FLOOR STRUCTURE UNTIL NEW BEAM CAN BE INSTALLED. SHORING DESIGN BY G.C.
29	EXISTING STEEL BEAM TO BE REMOVED TO MAKE WAY FOR NEW STEEL BEAM IN SAME LOCATION. SHORE EXISTING FLOOR AS REQUIRED. SHORING DESIGN BY G.C.
30	EXISTING COUNTER WITH SINK TO BE REMOVED AND REPLACED WITH NEW. PATCH WALLS BACK TO MATCH EXISTING.
31	CUT & PATCH EXISTING MASONRY WALL TO ALLOW FOR WALL HYDRANT INSTALLATION. PATCH BACK TO MATCH EXISTING SEE MECH. PLANS.
32	EXISTING PRECAST CONCRETE OR WALLS SLAB TO BE CORE DRILLED FOR NEW PLUMBING, SEE MECH. PLANS.
33	REMOVE, SALVAGE AND REINSTALL EXISTING CEILING TILE AND GRID AS REQUIRED FOR ABOVE CEILING WORK. COORDINATE EXTENTS WITH MECHANICAL/ELECTRICAL.
34	CUT & PATCH EXISTING MASONRY WALL AS REQUIRED FOR NEW MECH. CEILING DUCTWORK. PROVIDE NEW LINTEL PER SCHEDULE.
35	EXISTING HOOD TO BE REMOVED. PATCH ADJ. WALL SURFACES BACK TO MATCH EXISTING.
36	PATCH EXISTING GYP. BD. BULKHEAD WALL AS REQUIRED FOR NEW CEILING HEIGHT.
37	EXISTING HANDRAILS TO BE REMOVED. MODIFY EXISTING HORIZONTAL GUARDRAIL BRACKETS AS REQ'D. FOR NEW. SEE DETAILS.
38	EXISTING UNIT VENTILATOR TO BE REMOVED. SEE MECH. PATCH WALL OPENING WITH METAL FRAMING, GATT INSUL. AND GYP. BD. TO MEET EXISTING WALL SURFACE FLUSH.
39	CUT & PATCH EXISTING MASONRY WALL AS REQUIRED FOR NEW MECHANICAL WORK. SEE MECHANICAL PLANS. PATCH WALL SURFACE BACK TO MATCH EXISTING ADJACENT SURFACES.
40	MODIFY EXISTING FRAME WALL TO ADD NEW BLOCKING FOR WALL MOUNTED CABINETRY. PATCH WALL BACK TO MATCH EXISTING.
41	EXISTING WOOD FRAMED STAIRS & PLATFORMS TO BE REMOVED. PATCH REMAINING WALL SURFACES BACK TO MATCH EXISTING.
42	EXISTING WALL MOUNTED WOOD DISPLAY & PICTURES TO BE SALVAGED AND TURNED OVER TO OWNER.
43	EXISTING DOOR AND FRAME TO BE REMOVED. PREP OPENING TO RECEIVE NEW DOOR AND FRAME. INFILL ABOVE NEW DOOR AND FRAME TO MATCH ADJACENT WALL SURFACES.
44	SAW CUT NEW OPENING IN EXISTING CORE SLAB FLOOR. SEE MECHANICAL PLANS.
45	NEW OPENING IN EXISTING CORE SLAB FLOOR UNDER ALTERNATE #1.
46	EXISTING DOOR PANEL TO BE REPLACED. SALVAGE ALL HARDWARE FOR REUSE.
47	ALL CASEWORK NOT BEING REUSED TO BE DEMOLISHED.
48	EXISTING WOOD ACCENTRION DOORS & TRACK TO BE REMOVED. PATCH REMAINING SURFACES BACK TO MATCH EXISTING.
49	EXISTING ACoustICAL WALL CARET TO BE REMOVED APPROX. 10" H. PREP WALL AS REQUIRED FOR NEW ACoustICAL WALL COVERING.
50	EXISTING DESK TO REMAIN. PROVIDE NEW FINISHES AS INDICATED ON PLANS & ELEVATIONS.
51	EXISTING ACoustICAL WALL PANELS TO BE REMOVED AND REPLACED WITH NEW AT WALLS & BULKHEAD ABOVE. SEE INTERIOR ELEVATIONS.
52	EXISTING WOOD CHAIR WALL TO BE REMOVED. PATCH WALL AS REQUIRED TO MATCH EXISTING.
53	EXISTING VINYL WALL COVERING TO BE REMOVED. SKIM COAT REMAINING WALL SURFACE TO RECEIVE NEW FINISHES.



1 01 - LOWER LEVEL DEMOLITION PLAN
SCALE: 1/8" = 1'-0"

No.	Description	Date
	95% OWNER REVIEW SET	9-24-2021
	ISSUED FOR BID	10-5-2021

DEMOLITION PLAN	21004
Project Number	OCTOBER 5, 2021
Date	

GENERAL DEMOLITION NOTES: (APPLIES TO ALL DEMOLITION PLANS)

A. THIS DEMOLITION PLAN OUTLINES THE SCOPE OF THE WORK INVOLVED FOR THE DEMOLITION PHASE OF THIS PROJECT. CONTRACTOR SHALL ALSO REFER TO THE DRAWINGS FOR THE NEW CONSTRUCTION FOR ADDITIONAL INFORMATION. THESE DEMOLITION DRAWINGS ARE NOT INTENDED TO BE ALL INCLUSIVE OF DEMOLITION REQUIRED FOR PROJECT.

B. EXISTING CONDITIONS INFORMATION WAS OBTAINED FROM DOCUMENTS AND INFORMATION SUPPLIED TO THE ARCHITECT ALONG WITH CASUAL FIELD OBSERVATIONS. THE CONTRACTORS TO VERIFY EXACT LOCATIONS, SIZES, ELEVATIONS, ETC. AND REPORT ANY DISCREPANCIES TO THE ARCHITECT.

C. REMOVE EXISTING CONSTRUCTION TO THE EXTENT INDICATED ON THE DRAWINGS. SHOULD ANY DAMAGE OCCUR TO ANY EXISTING CONSTRUCTION TO REMAIN ON SITE, THE CONTRACTOR SHALL REPAIR THE DAMAGE.

D. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION OF TEMPORARY DUST AND NOISE PROOF PARTITION BETWEEN CONSTRUCTION AREA AND ADJACENT PROPERTIES AS NECESSARY.

E. THE CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.

F. MAINTAIN THE INTEGRITY OF ALL EXISTING RATED WALLS. FIRE SEAL ANY PENETRATIONS WITH U.L. APPROVED ASSEMBLY.

G. CONTRACTOR IS TO VERIFY THE EXACT LOCATION OF ALL EXISTING UTILITIES PRIOR TO DEMOLITION ACTIVITIES.

H. CONTRACTOR TO PATCH/REPAIR ALL HOLES IN WALLS, FLOORS, &/ OR CEILINGS, AS REQUIRED. AT FIRE RATED ASSEMBLIES PATCH WITH APPROPRIATE U.L. RATED PRODUCTS.

I. REFER TO M.E.P. DRAWINGS FOR DEMOLITION OF M.E.P. SYSTEMS.

J. REFER TO DEMOLITION PLUMBING PLANS FOR FULL EXTENT OF CONCRETE SLAB TO BE REMOVED AND REPLACED FOR UNDER FLOOR PIPING INSTALLATION.

K. EXISTING WALLS (OR PORTIONS OF WALLS) TO BE REMOVED SHALL BE CUT FLUSH WHERE INTERSECTING WITH WALLS TO REMAIN. REMAINING WALLS TO BE PATCHED AND FINISHED SMOOTH.

L. NEW OPENINGS IN EXISTING MASONRY WALLS SHALL BE SAW-CUT AND TOOTHED IN WITH NEW JAMB BLOCKS AT LOCATIONS INDICATED AND TO THE HEIGHT AND WIDTH INDICATED. NEW UNTELS SHALL BE INSTALLED TO SUPPORT EXISTING WALL CONSTRUCTION ABOVE AS INDICATED ON THE DRAWINGS.

M. PATCH FLOORS, WALLS, CEILINGS WHICH REMAIN AT LOCATIONS WHERE PIPES, CONDUITS, ETC. ARE REMOVED AS REQUIRED TO MATCH EXISTING CONDITIONS OR FOR NEW FINISHES.

N. WHERE EXISTING FINISH FLOOR IS REMOVED, PREPARE SURFACE TO RECEIVE NEW FLOORING.

O. REFER TO MECHANICAL DRAWINGS FOR NEW DUCT AND PIPING PENETRATIONS THROUGH EXISTING FLOOR SLABS.

P. PROTECT ADJACENT EXISTING FLOOR FINISHES TO REMAIN FROM CONSTRUCTION DIRT AND DEBRIS.

Q. ALL EXISTING WINDOW BLINDS AND SHADES ARE TO REMAIN. SALVAGE AND REINSTALL AS REQUIRED.

R. THE FOLLOWING ITEMS THAT ARE TO BE REMOVED SHALL BE SALVAGED AND TURNED OVER TO THE OWNER:

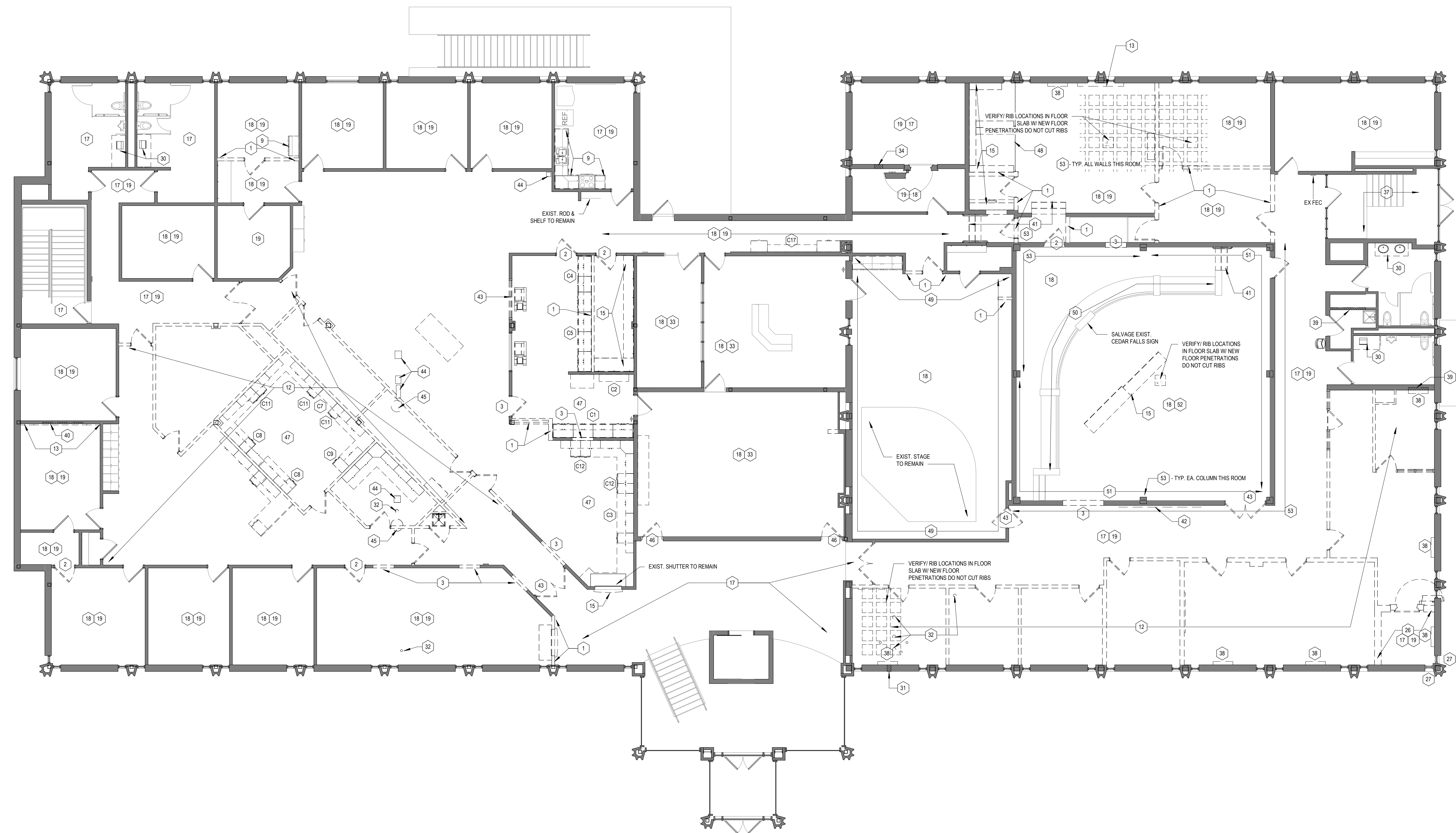
- ALL EXISTING DOORS AND WINDOWS
- ALL UNUSED HARDWARE FROM THE DOOR ACCESS SYSTEM (DOORSITE CONTROLLERS, ELECTRONIC LOCKS OR STRIKES)
- ANY WATER FOUNTAINS
- SLOAN TOILET VALVES
- SUN LOANERS
- LOCKERS IN ENGINEERING AREA
- TV MOUNTS
- COILING DOORS AT THE SERVICE WINDOWS
- EXISTING OFFICE AND CONFERENCE ROOM SIGNAGE

SALVAGED CASEWORK NOTES SEE SHEET A421 FOR RELOCATION

NOTE	COMMENT
C1	REMOVE AND RELOCATE EXISTING CASEWORK (1)
C2	REMOVE AND RELOCATE EXISTING CASEWORK (2)
C3	REMOVE AND RELOCATE EXISTING CASEWORK (3)
C4	REMOVE AND RELOCATE EXISTING CASEWORK (4)
C5	REMOVE AND RELOCATE EXISTING CASEWORK (5)
C6	REMOVE AND RELOCATE EXISTING CASEWORK (6)
C7	REMOVE AND RELOCATE EXISTING CASEWORK (7)
C8	REMOVE AND RELOCATE EXISTING CASEWORK (8)
C9	REMOVE AND RELOCATE EXISTING CASEWORK (9)
C10	REMOVE AND RELOCATE EXISTING CASEWORK (10)
C11	REMOVE AND RELOCATE EXISTING CASEWORK (11)
C12	REMOVE AND RELOCATE EXISTING CASEWORK (12)
C13	REMOVE AND RELOCATE EXISTING CASEWORK (13)
C14	REMOVE AND RELOCATE EXISTING CASEWORK (14)
C15	REMOVE AND RELOCATE EXISTING CASEWORK (15)
C16	REMOVE AND RELOCATE EXISTING CASEWORK (16)
C17	REMOVE AND RELOCATE EXISTING CASEWORK (17)

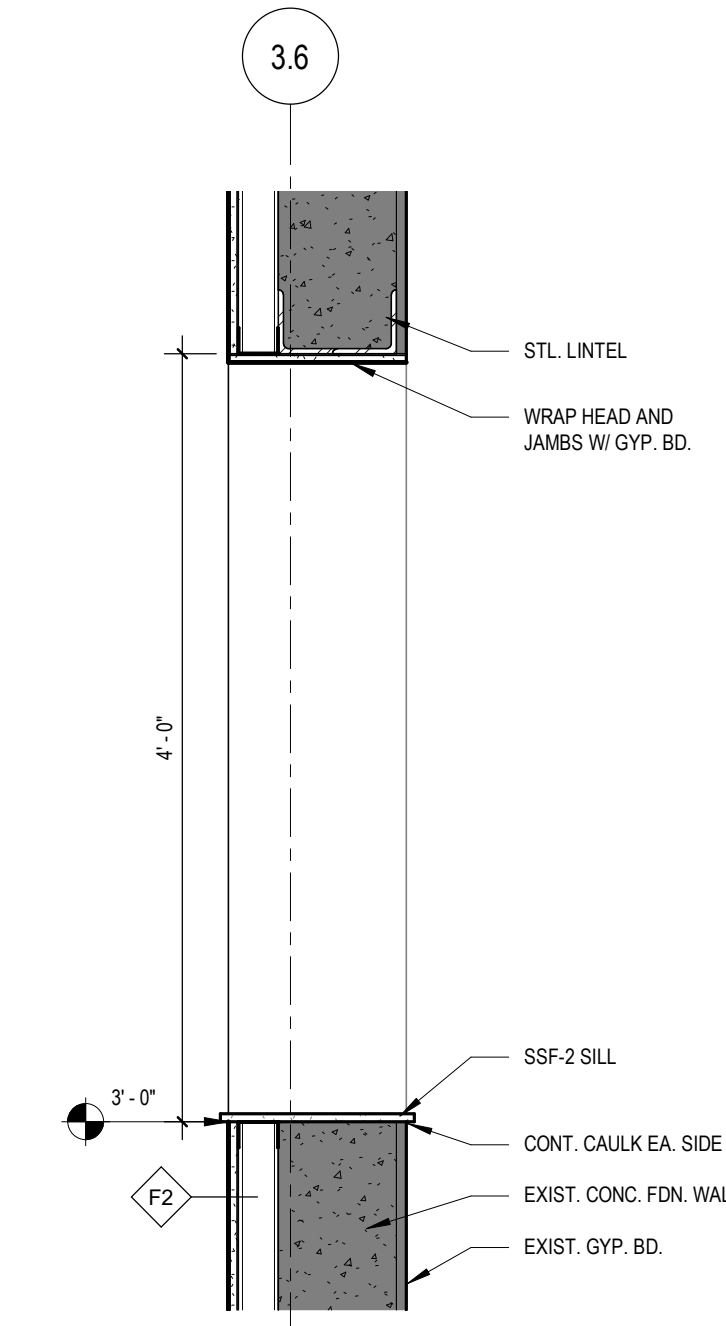
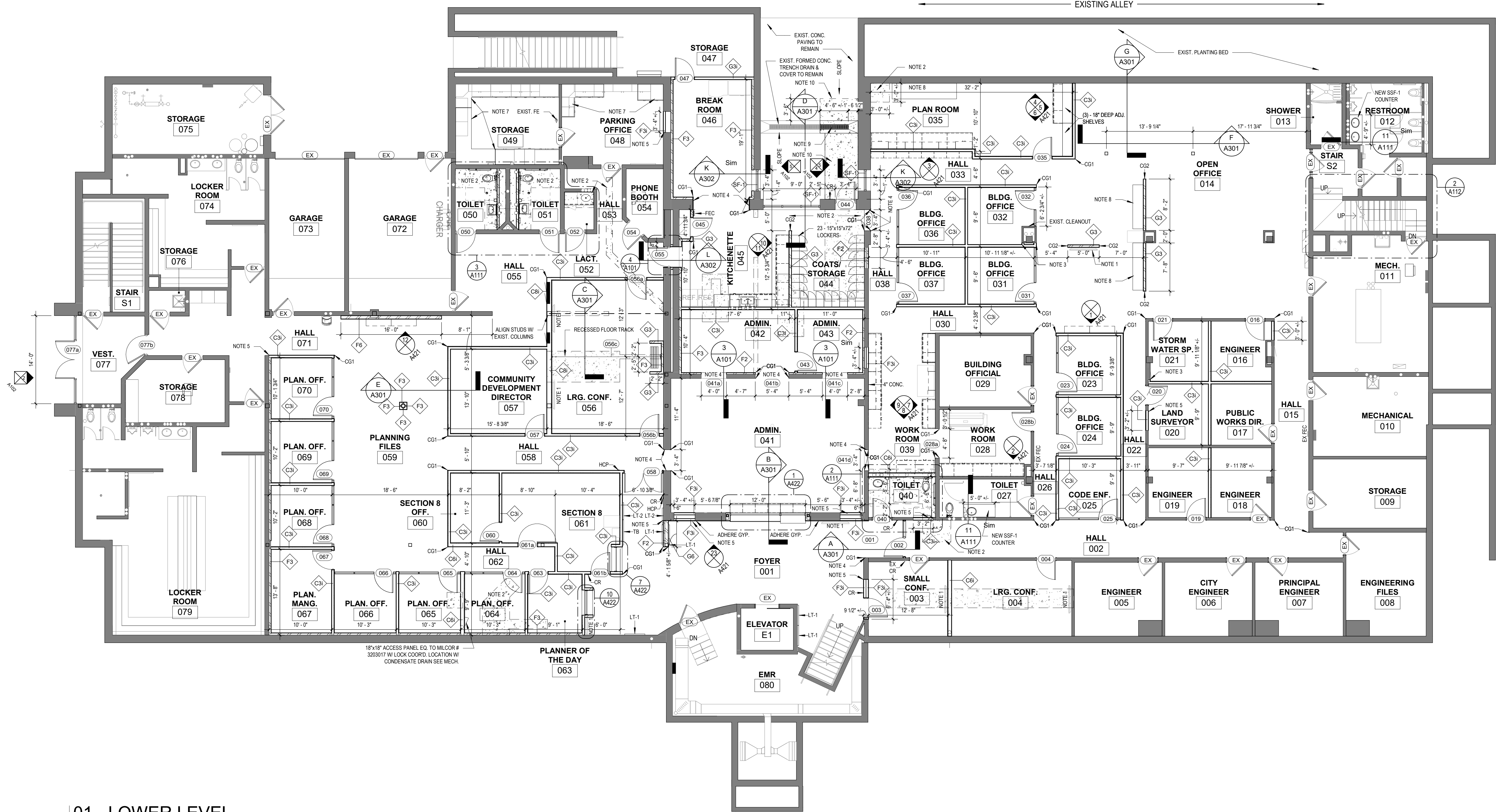
CODED DEMOLITION NOTES

NOTE	COMMENT
1	EXISTING FRAME WALL TO BE REMOVED INCLUDING ANY DOORS, WINDOWS AND SURFACE MOUNTED ITEMS. PATCH ADJACENT FLOOR/WALL/CEILING SURFACES BACK TO MATCH EXISTING.
2	EXISTING DOOR/WINDOW AND FRAME ASSEMBLY TO BE REMOVED. PATCH JAMBS AS REQUIRED. PATCH ADJACENT SURFACES TO MATCH EXISTING. PREPARE OPENING FOR INFILL.
3	EXISTING NEW OPENING IN EXISTING FRAME WALL PATCH ADJACENT REMAINING WALL SURFACES BACK TO MATCH EXISTING.
4	SAW CUT EXISTING MASONRY/CONCRETE WALL FOR NEW OPENING. SEE DOOR SCHEDULE FOR SIZE AND UNTEL. PATCH DAMAGE TO ADJACENT SURFACES TO MATCH EXISTING.
5	EXISTING DOOR PANEL TO BE REMOVED. PREPARE FRAME TO RECEIVE NEW DOOR PANEL AND HARDWARE. PATCH ANY UNUSED HOLES.
6	EXISTING DOOR AND FRAME IN MASONRY WALL TO BE REMOVED. PATCH JAMBS AS REQD. AND PREPARE OPENING FOR NEW DOOR AND FRAME.
7	EXISTING ALUM. STOREFRONT SYSTEM TO BE REMOVED AND REPLACED WITH NEW IN SAME LOCATION. PATCH ADJACENT SURFACES BACK TO MATCH EXISTING.
8	EXISTING PLUMBING FIXTURE TO BE REMOVED. PATCH REMAINING SURFACES BACK TO MATCH EXISTING. SEE MECHANICAL PLANS.
9	EXISTING COUNTER TOP TO BE REMOVED AND REPLACED WITH NEW. PATCH WALL SURFACES BACK TO MATCH EXISTING.
10	EXISTING CONC. BENCH AND MASONRY SUPPORT WALL BELOW TO BE REMOVED. PATCH REMAINING SURFACES BACK TO MATCH EXISTING.
11	EXISTING MASONRY WALL TO BE REMOVED. PATCH REMAINING ADJACENT FLOOR SURFACES BACK TO MATCH EXISTING. PROVIDE CONT. WATERSTOP RX AT PERIMETER OF CONCRETE FLOOR PATCH.
12	ALL EXISTING FLOORING, FRAME WALLS, CEILING TILE & GRID TO BE REMOVED IN THIS AREA. PATCH ANY REMAINING ADJACENT SURFACES BACK TO MATCH EXISTING. SEE M.E.P.T. PLANS.
13	EXISTING WALL MOUNTED M.B.T.B. OR A.V. SCREEN TO BE REMOVED. PATCH WALL SURFACE BACK TO MATCH EXISTING.
14	SAW CUT AND PATCH EXIST. CONC. FLOOR AS REQUIRED FOR BELOW FLOOR M.E.P.T. WORK. SEE M.E.P.T. PLANS. PROVIDE CONT. WATERSTOP RX AT PERIMETER OF OPENING.
15	EXISTING CASEWORK TO BE REMOVED. PATCH REMAINING WALL/FLOOR SURFACES BACK TO MATCH EXISTING.
16	SALVAGE EXISTING FIRE EXTINGUISHER FOR REUSE.
17	EXISTING V.C.T. FLOORING AND BASE MATERIAL TO BE REMOVED. PREPARE FLOORING SURFACE TO RECEIVE NEW FINISHES PER FINISH PLAN.
18	EXISTING CARPET TILE AND BASE TO BE REMOVED. PREPARE FLOOR SURFACE TO RECEIVE NEW FINISH PER FINISH PLANS.
19	EXISTING SPRUNDED ACOUSTICAL CEILING TILE AND GRID TO BE REMOVED. PATCH REMAINING WALL SURFACES BACK TO MATCH EXISTING. SEE M.E.P.T. PLANS FOR CEILING MOUNTED ITEMS TO BE REMOVED.
20	EXISTING GYP. BD. CEILING AND FRAMING TO BE REMOVED. PATCH REMAINING SURFACES AS REQUIRED TO MATCH EXISTING.
21	EXISTING CONCRETE PAVING TO BE REMOVED AND REPLACED.
22	EXISTING CONCRETE RAMP TO BE REMOVED.
23	EXISTING OVERHEAD DOOR, FRAME, AND SUPPORT STRUCTURE TO BE REMOVED. PREPARE OPENING AS REQUIRED FOR NEW WINDOW FRAMING.
24	EXISTING DOOR AND HOLLOW METAL FRAME TO BE REMOVED. INFILL OPENING AS REQUIRED TO MATCH ADJACENT SURFACES. SEE FLOOR PLAN.
25	EXISTING HOLLOW METAL DOOR, FRAME AND CONCRETE FLOOR INFILL TO BE REMOVED. PREPARE OPENING FOR NEW DOOR AND FRAME.
26	EXISTING MASONRY & PLASTER WALLS & DOOR TO BE REMOVED. PATCH ADJACENT WALL AND FLOOR SURFACES BACK TO MATCH EXISTING.
27	EXISTING ALUM. WINDOW TO BE REMOVED AND REPLACED WITH NEW IN SAME LOCATION. PATCH ADJACENT WALL SURFACES BACK TO MATCH EXISTING.
28	EXISTING MASONRY BEARING WALL TO BE REMOVED. SHORE EXISTING FLOOR STRUCTURE UNTIL NEW BEAM CAN BE INSTALLED. SHORING DESIGN BY G.C.
29	EXISTING STEEL BEAM TO BE REMOVED TO MAKE WAY FOR NEW STEEL BEAM IN SAME LOCATION. SHORE EXISTING FLOOR AS REQUIRED. SHORING DESIGN BY G.C.
30	EXISTING COUNTER WITH SINK TO BE REMOVED AND REPLACED WITH NEW. PATCH WALLS BACK TO MATCH EXISTING.
31	CUT & PATCH EXISTING MASONRY/BRICK WALL TO ALLOW FOR WALL HYDRANT INSTALLATION. PATCH BACK TO MATCH EXISTING SEE MECH. PLANS.
32	EXISTING PRECAST CORESLAB OR WAPLES SLAB TO BE CORE DRILLED FOR NEW PLUMBING. SEE MECH. PLANS.
33	REMOVE, SALVAGE AND REINSTALL EXISTING CEILING TILE AND GRID AS REQUIRED FOR ABOVE CEILING WORK. COORDINATE EXTENTS WITH MECHANICAL/ELECTRICAL.
34	CUT & PATCH EXISTING MASONRY WALL AS REQUIRED FOR NEW ABOVE CEILING DUCTWORK. PROVIDE NEW UNTEL PER SCHEDULE.
35	EXISTING HOOD TO BE REMOVED. PATCH ADJ. WALL SURFACES BACK TO MATCH EXISTING.
36	PATCH EXISTING GYP. BD. BULKHEAD WALL AS REQUIRED FOR NEW CEILING HEIGHT.
37	EXISTING HANDRAILS TO BE REMOVED. MODIFY EXISTING HANDRAIL/GUARDRAIL BRACKETS AS REQD. FOR NEW. SEE DETAILS.
38	EXISTING UNIT VENTILATOR TO BE REMOVED. SEE MECH. PATCH WALL OPENING WITH METAL FRAMING, GATT INSUL. AND GYP. BD. TO MEET EXISTING WALL SURFACE FLUSH.
39	CUT & PATCH EXISTING MASONRY WALL AS REQUIRED FOR NEW MECHANICAL WORK. SEE MECHANICAL PLANS. PATCH WALL SURFACE BACK TO MATCH EXISTING ADJACENT SURFACES.
40	MODIFY EXISTING FRAME WALL TO ADD NEW BLOCKING FOR WALL MOUNTED CABINETS. PATCH WALL BACK TO MATCH EXISTING.
41	EXISTING WOOD FRAMED STAIRS & PLATFORMED TO BE REMOVED. PATCH REMAINING WALL SURFACES BACK TO MATCH EXISTING.
42	EXISTING WALL MOUNTED WOOD DISPLAY & PICTURES TO BE SALVAGED AND TURNED OVER TO OWNER.
43	EXISTING DOOR AND FRAME TO BE REMOVED. PREP OPENING TO RECEIVE NEW DOOR AND FRAME. INFILL ABOVE NEW DOOR AND FRAME TO MATCH ADJACENT WALL SURFACES.
44	SAW CUT NEW OPENING IN EXISTING CORESLAB FLOOR. SEE MECHANICAL PLANS.
45	NEW OPENING IN EXISTING CORE SLAB FLOOR UNDER ALTERNATE #1.
46	EXISTING DOOR PANEL TO BE REPLACED. SALVAGE ALL HARDWARE FOR REUSE.
47	ALL CASEWORK NOT REUSED TO BE DEMOLISHED.
48	EXISTING WOOD ACCORDION DOORS & TRACK TO BE REMOVED. PATCH REMAINING SURFACES BACK TO MATCH EXISTING.
49	EXISTING ACOUSTICAL WALL CARPET TO BE REMOVED APPROX. 1/2" H.L. PREP WALL AS REQUIRED FOR NEW ACOUSTICAL WALL COVERING.
50	EXISTING BENCH TO REMAIN. PROVIDE NEW FINISHES AS INDICATED ON PLANS & ELEVATIONS.
51	EXISTING ACOUSTICAL WALL PANELS TO BE REMOVED AND REPLACED WITH NEW AT WALLS & BULKHEAD ABOVE. SEE INTERIOR ELEVATIONS.
52	EXISTING WOOD CHAIR RAIL TO BE REMOVED. PATCH WALL AS REQUIRED TO MATCH EXISTING.
53	EXISTING VINYL WALL COVERING TO BE REMOVED. SHORING REMAINING WALL SURFACE TO RECEIVE NEW FINISHES.



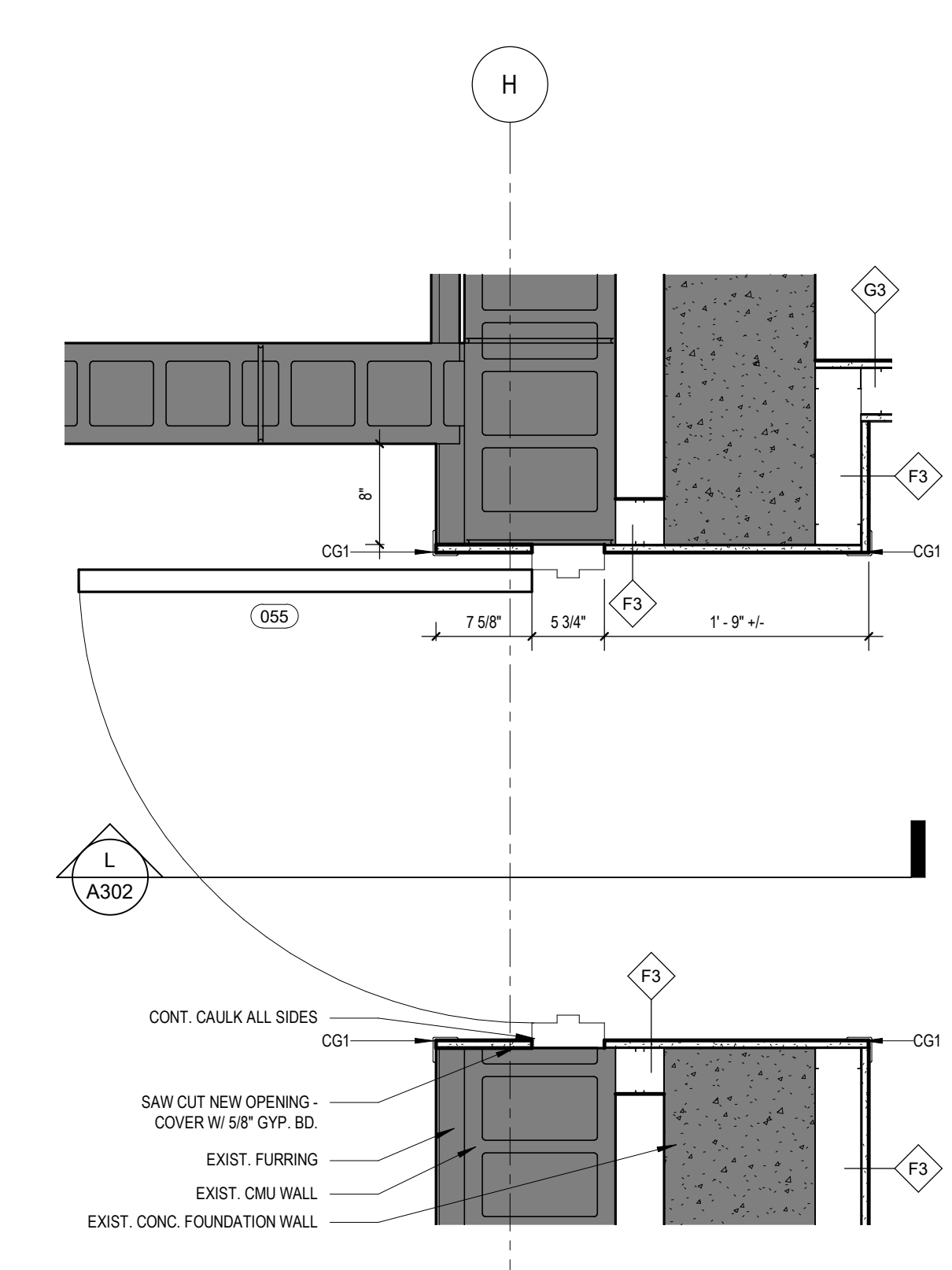
1 02 - UPPER LEVEL DEMOLITION PLAN
SCALE: 1/8" = 1'-0"

NUMBER	COMMENTS
1	PROVIDE SOLID BLOCKING AS REQUIRED.
2	HATCH DENOTES APPROXIMATE AREA OF CONCRETE FLOOR PATCHING.
3	EXTEND FLOORING TO NEW WALL.
4	WRAP OPENING WITH GYP. BD.
5	ALIGN TO FACE OF EXISTING WALL TO PROVIDE SMOOTH TRANSITION.
6	ALIGN FACE OF STUD TO OPENING. RETURN GYP. BD. TO FRAME.
7	REPLACE EXISTING COUNTER WITH NEW PL-2 COUNTER. MATCH EXISTING DEPTH, HEIGHT AND STYLE.
8	NEW PL-2 COUNTER STYLE 'X' OVER OWNER PROVIDED FILES. VERIFY DEPTH AND LENGTH.
9	FORMED CONCRETE TRENCH DRAIN EXTENSION AND COVER TO MATCH EXIST.
10	NEW 5" THK CONC. PAVING. MATCH ADJACENT SLOPE FLUSH.
11	FIRE-TREATED 3/4" PLYWOOD OVER 2X12 JOISTS @ 16" O.C. FRAMED PLATFORM AND/OR RAMP.
12	1 1/2" DIA. STL. WALL MOUNTED HANDRAIL W/ 1" - 0" EXTENSIONS - PAINT.

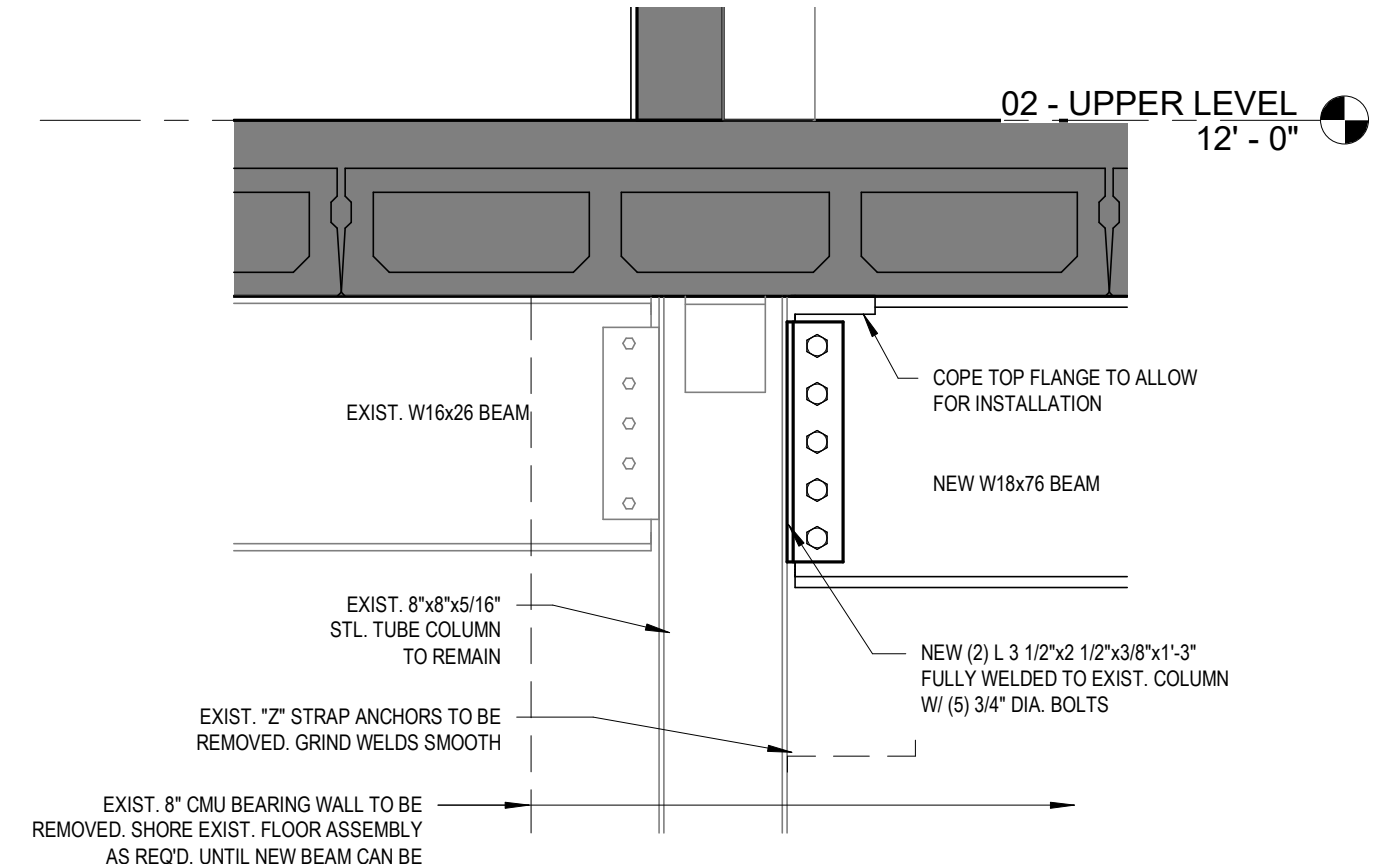


3 041 - ADMIN OPENINGS
SCALE: 1" = 1'-0"

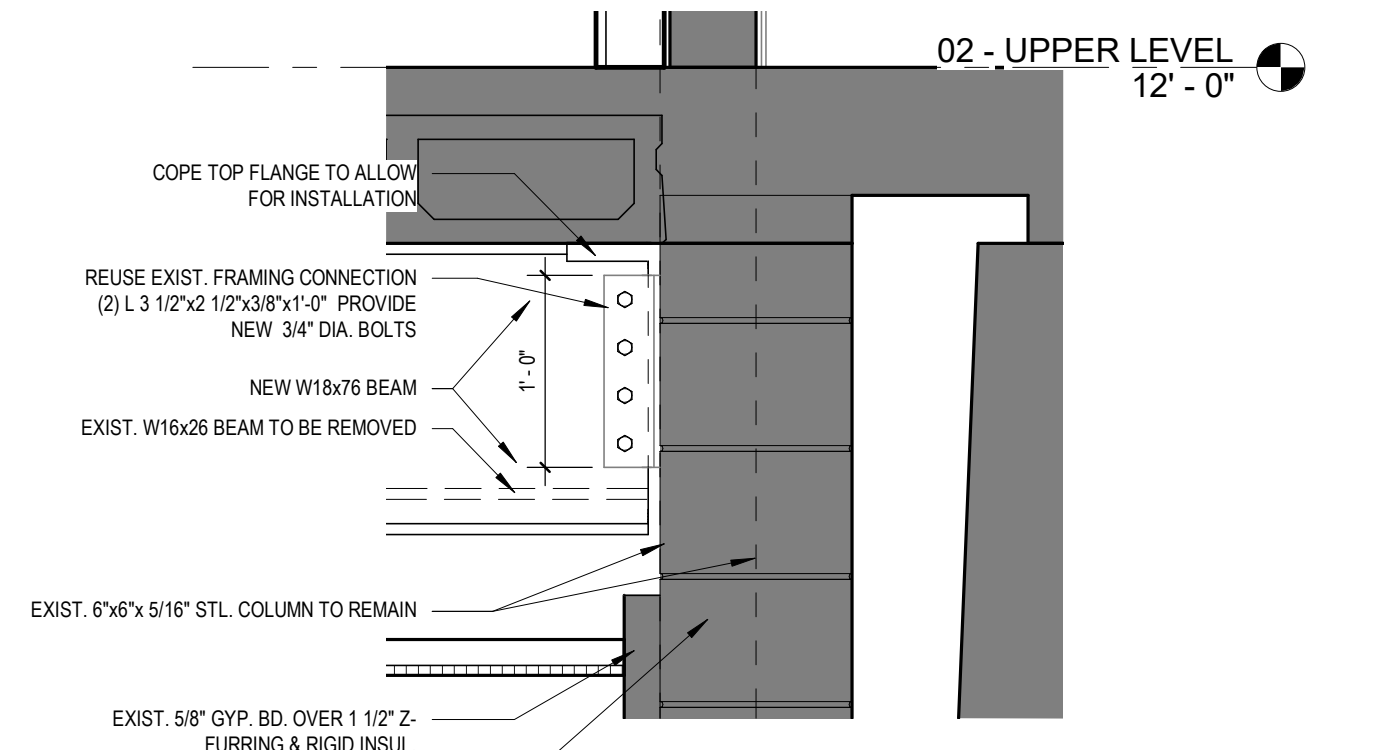
1 01 - LOWER LEVEL
SCALE: 1/8" = 1'-0"



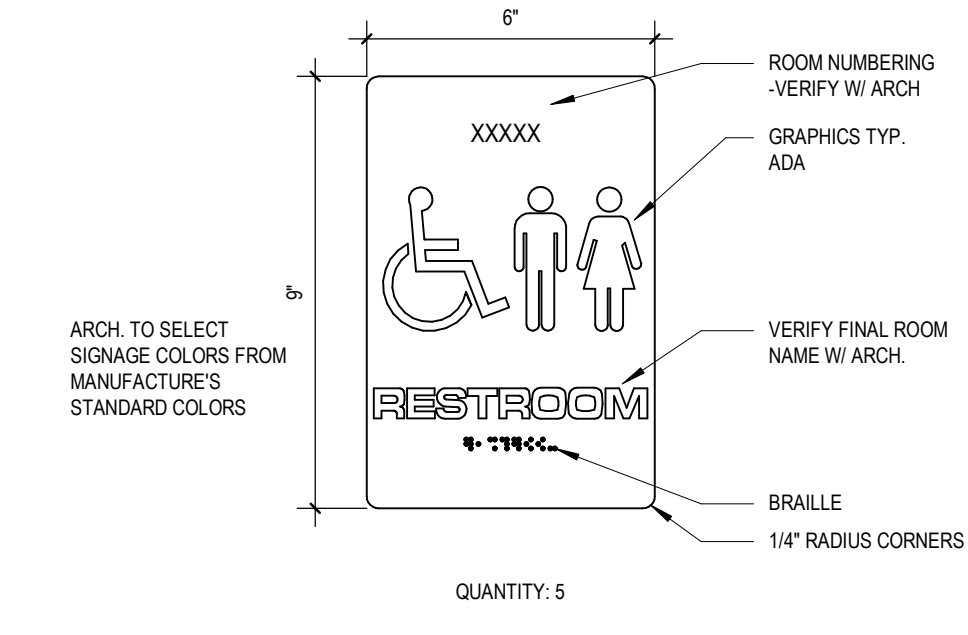
4 DOOR 055 JAMB DETAIL
SCALE: 1" = 1'-0"



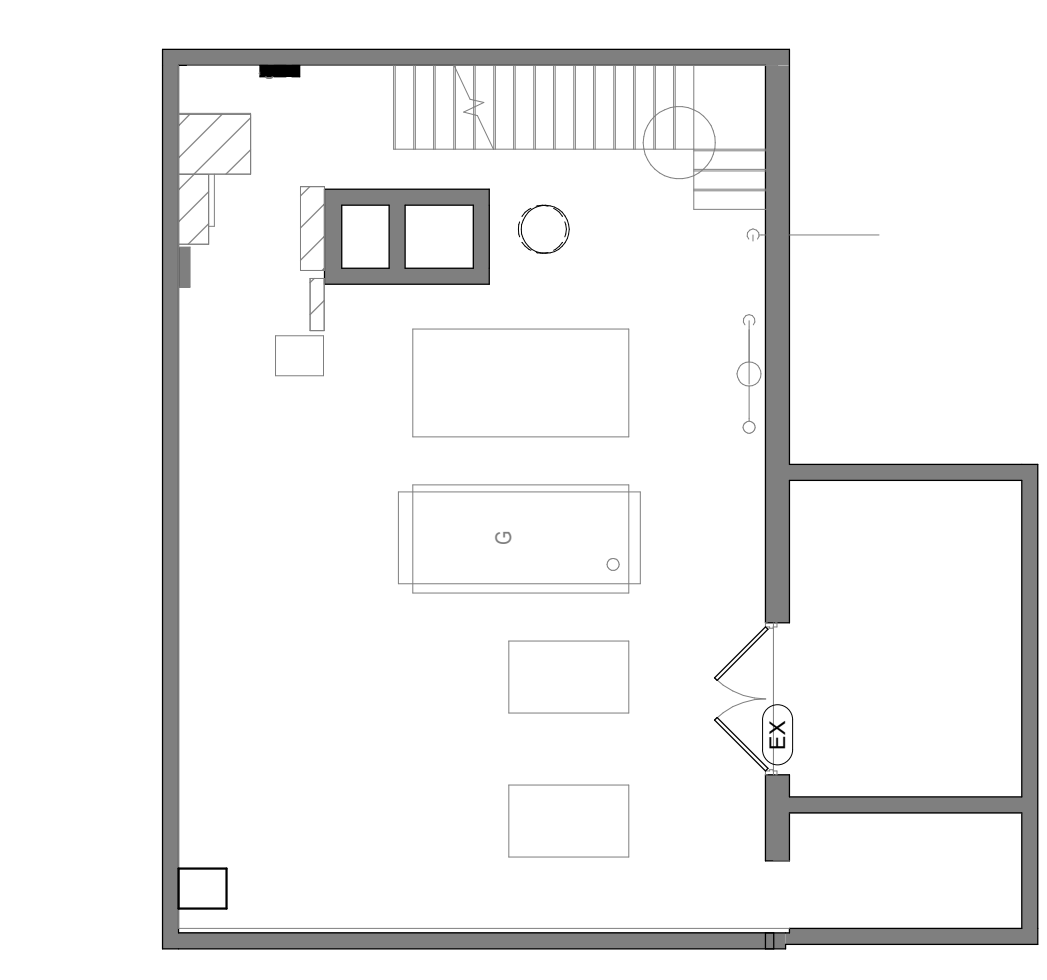
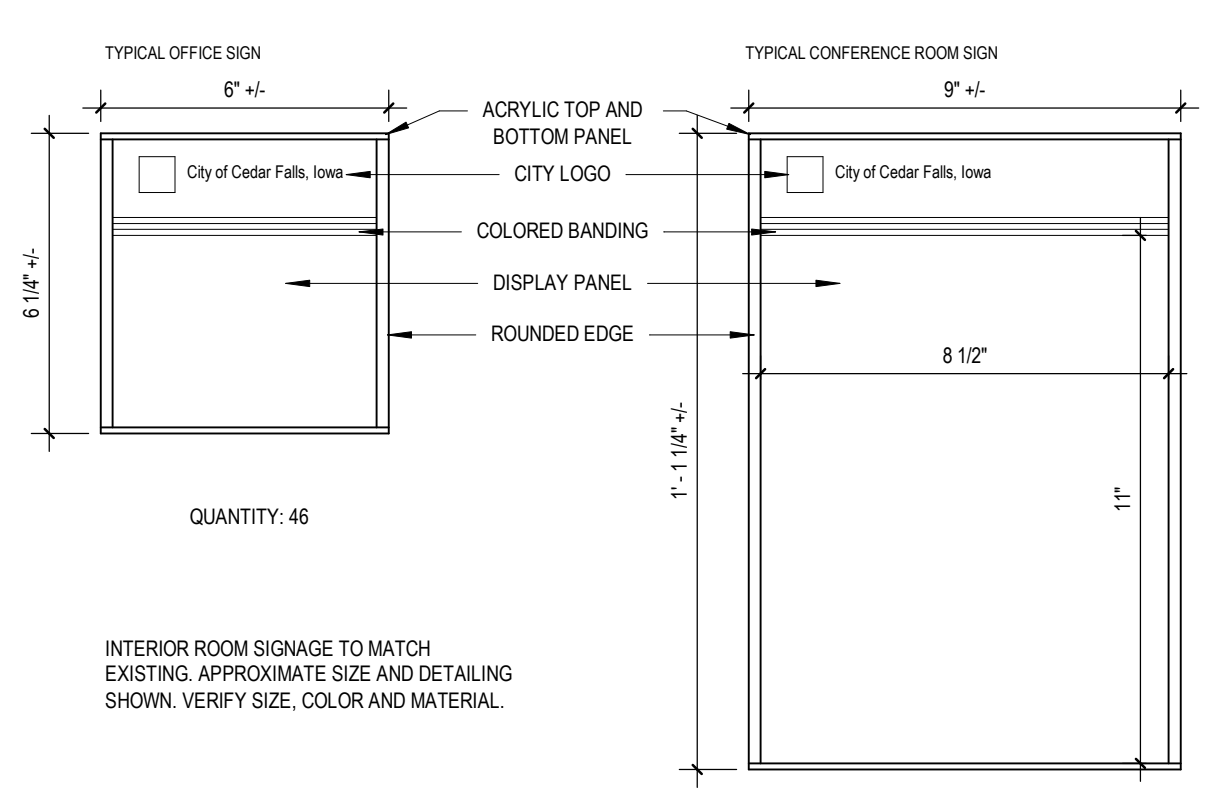
5 BEAM CONNECTION DETAIL
SCALE: 1" = 1'-0"



6 BEAM CONNECTION DETAIL
SCALE: 1" = 1'-0"



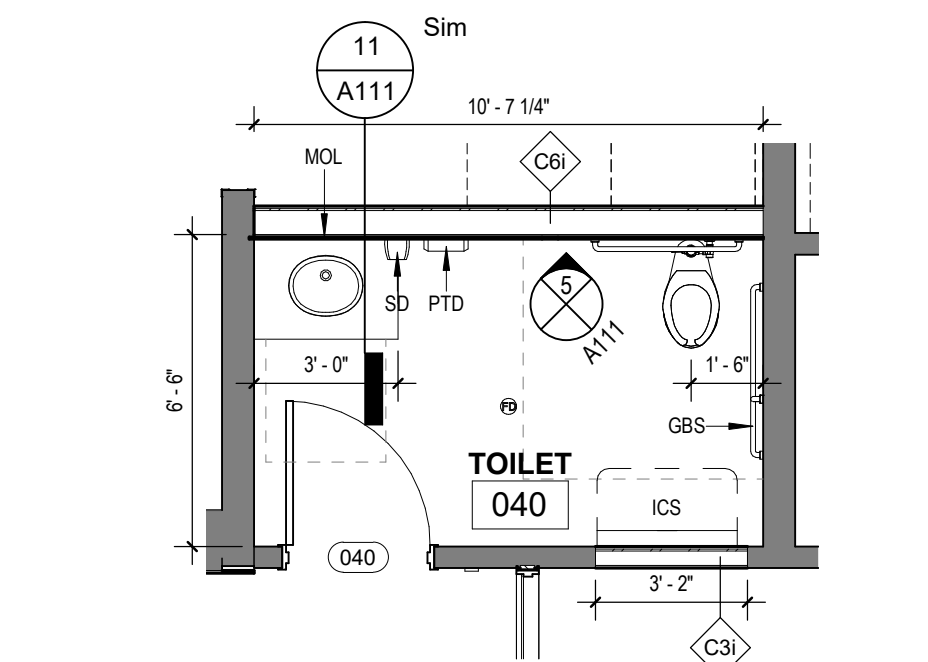
7 INTERIOR SIGNAGE
SCALE: 3" = 1'-0"



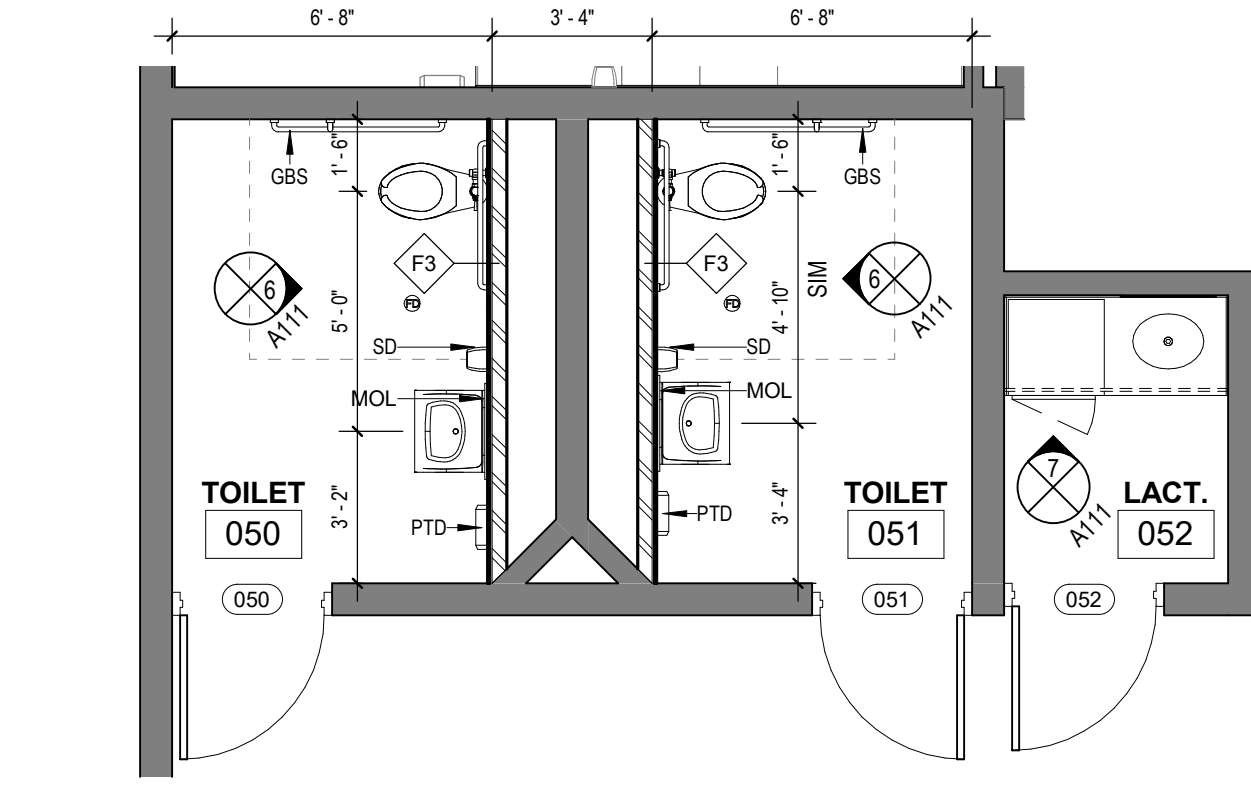
2 00 - SOUTH MECHANICAL
SCALE: 1/8" = 1'-0"

No.	Description	Date
	95% OWNER REVIEW SET	9-24-2021
	ISSUED FOR BID	10-5-2021

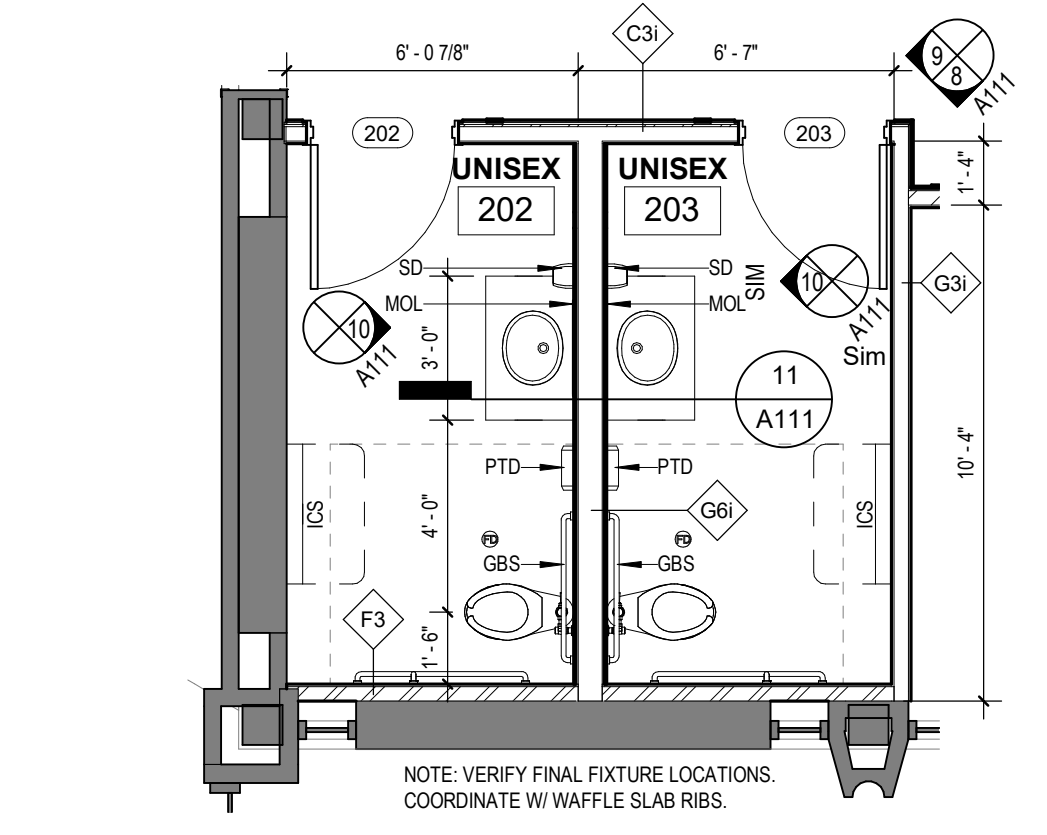
TOILET ACCESSORY LEGEND		NOTE: PROVIDE SOLID TR. WALL BLOCKING FOR ALL WALL MOUNTED ITEMS.
ITEM	FURNISHED BY / INSTALLED BY	
SD - SOAP DISPENSER	OWNER / OWNER	
PTD - PAPER TOWEL DISPENSER	OWNER / OWNER	
TPH - TOILET PAPER HOLDER	OWNER / OWNER	
GBS - GRAB BARS	G.C. / G.C. - 3" REAR WALL, 4" SIDE WALL & 18" VERT.	
MOL - MIRROR OVER LAV.	G.C. / G.C. - 24" W X 36" H	
CS - INFANT CHANGING STATION	G.C. / G.C.	



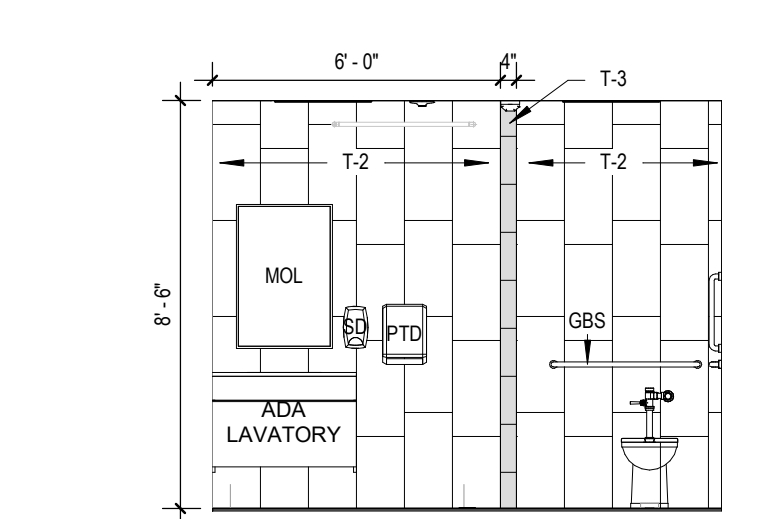
2 040 - ENLARGED TOILET
SCALE: 1/4" = 1'-0"



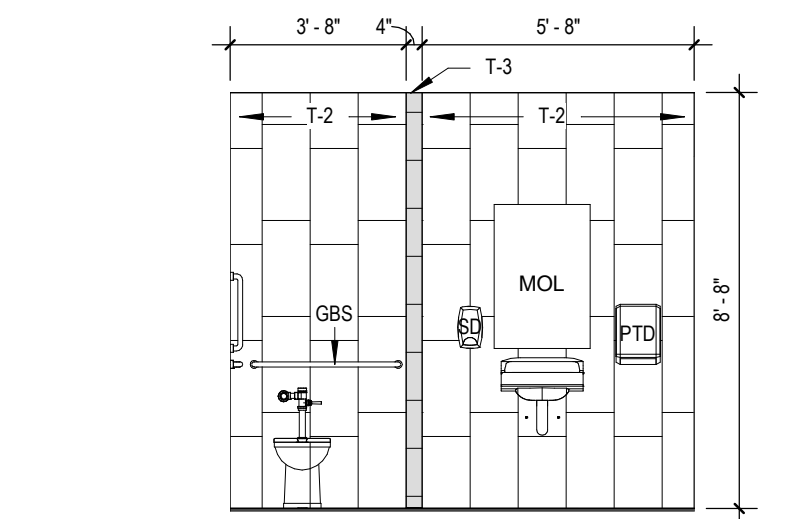
3 050 - 051 - ENLARGED TOILET
SCALE: 1/4" = 1'-0"



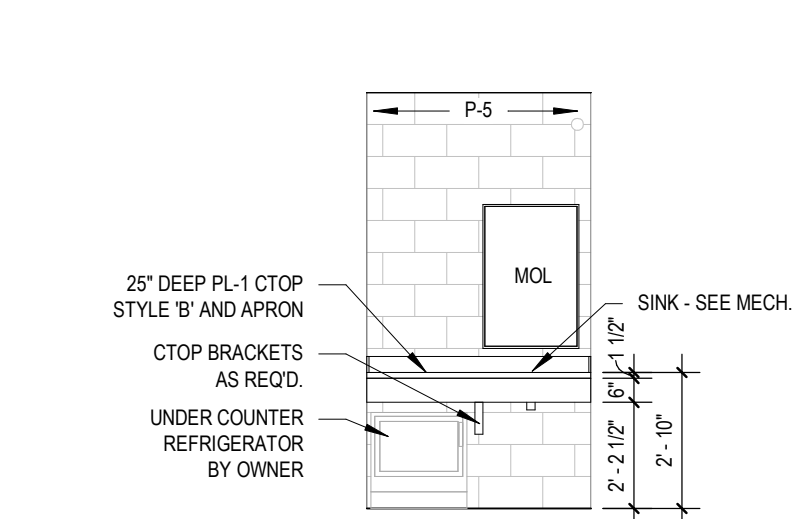
4 202 - 203 - ENLARGED TOILET
SCALE: 1/4" = 1'-0"



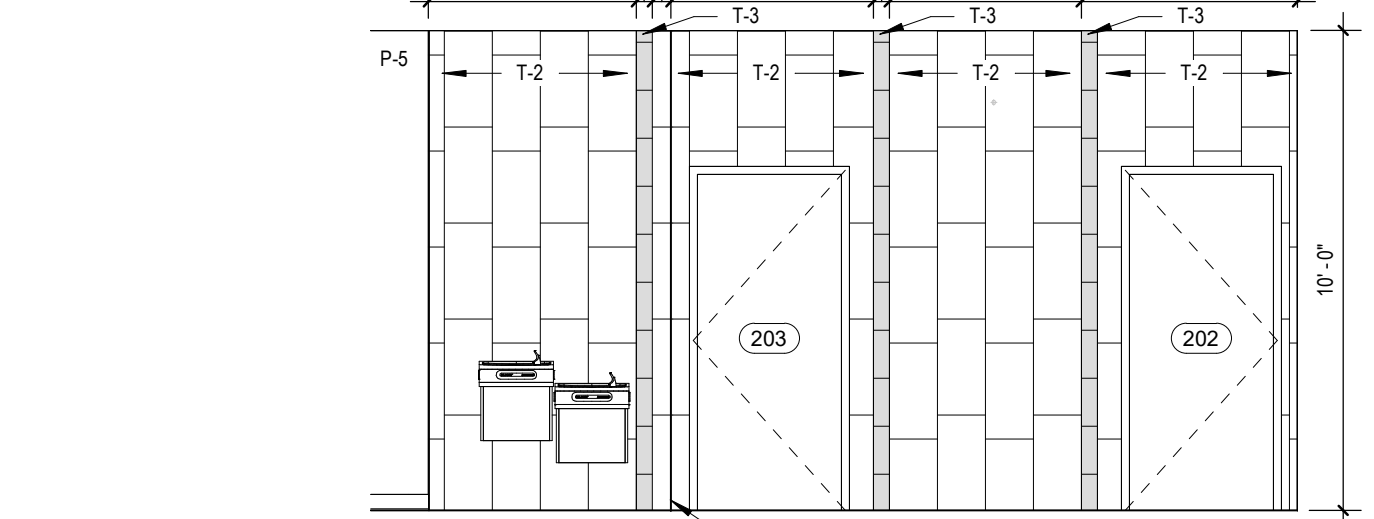
5 040 - TOILET - EAST
SCALE: 1/4" = 1'-0"



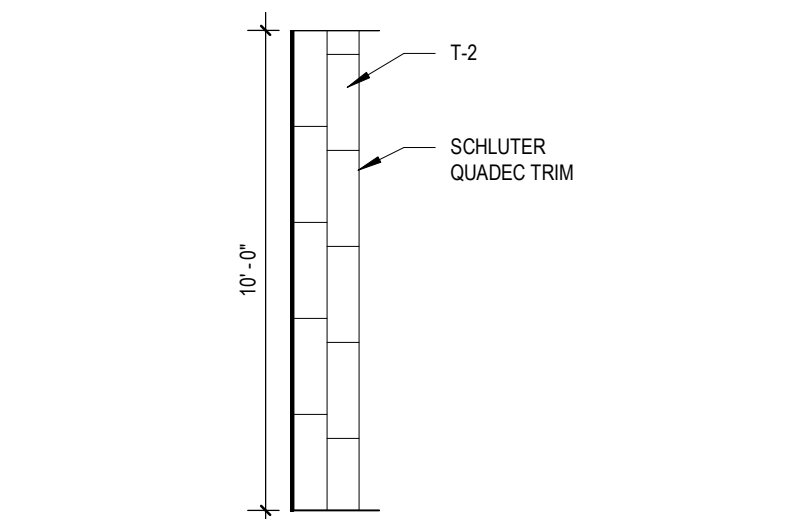
6 050 - TOILET - SOUTH
SCALE: 1/4" = 1'-0"



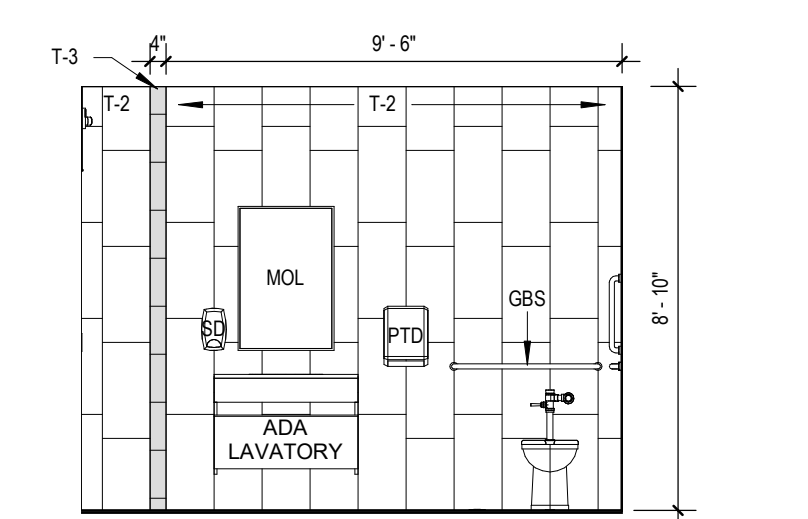
7 052 - LACTATION - EAST
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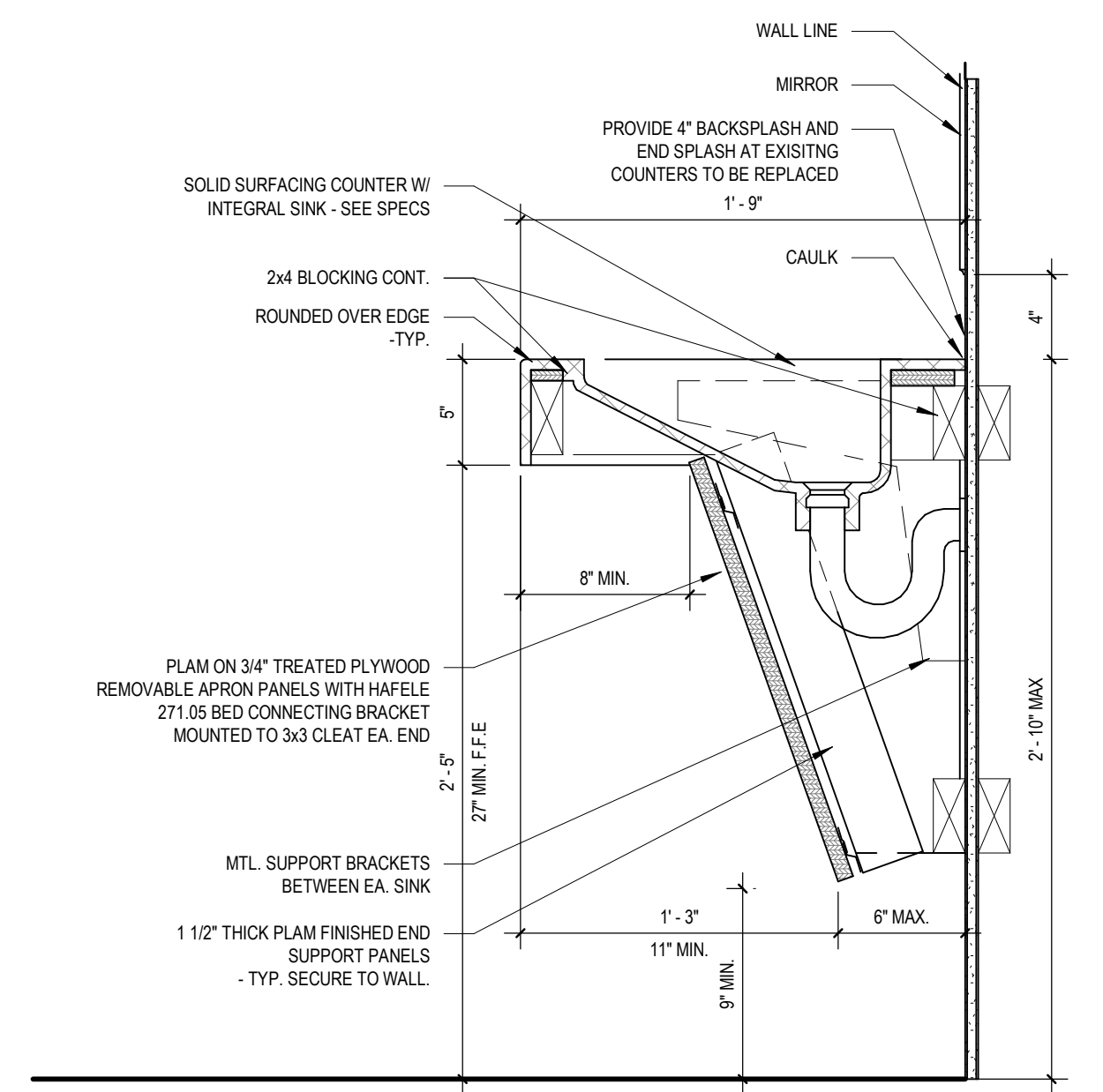
8 201 - HALL - WEST
SCALE: 1/4" = 1'-0"



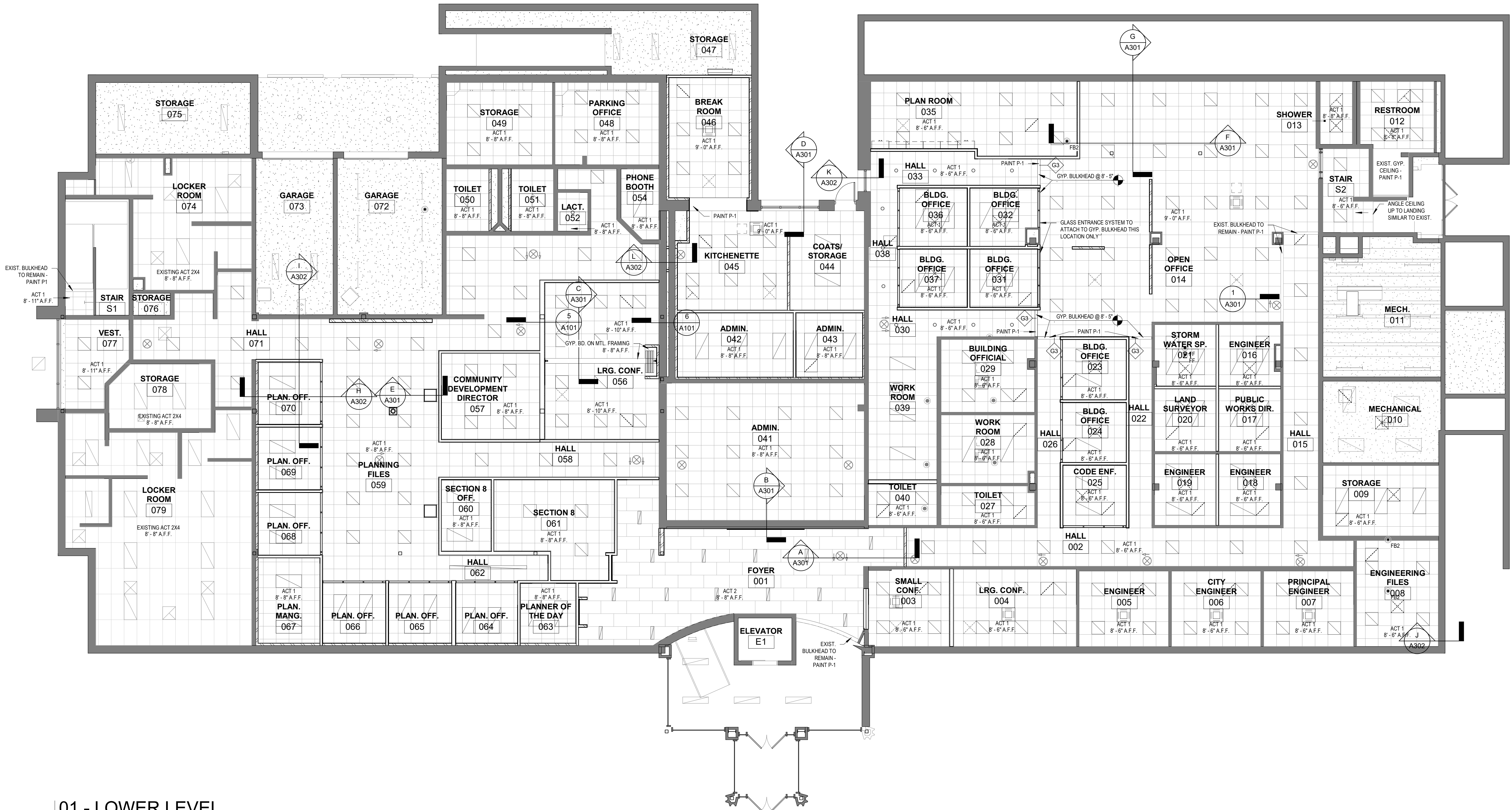
9 201 - HALL - NORTH
SCALE: 1/4" = 1'-0"



10 202 - UNISEX SOUTH
SCALE: 1/4" = 1'-0"



11 ADA COMPLIANT LAVATORY
SCALE: 1 1/2" = 1'-0"



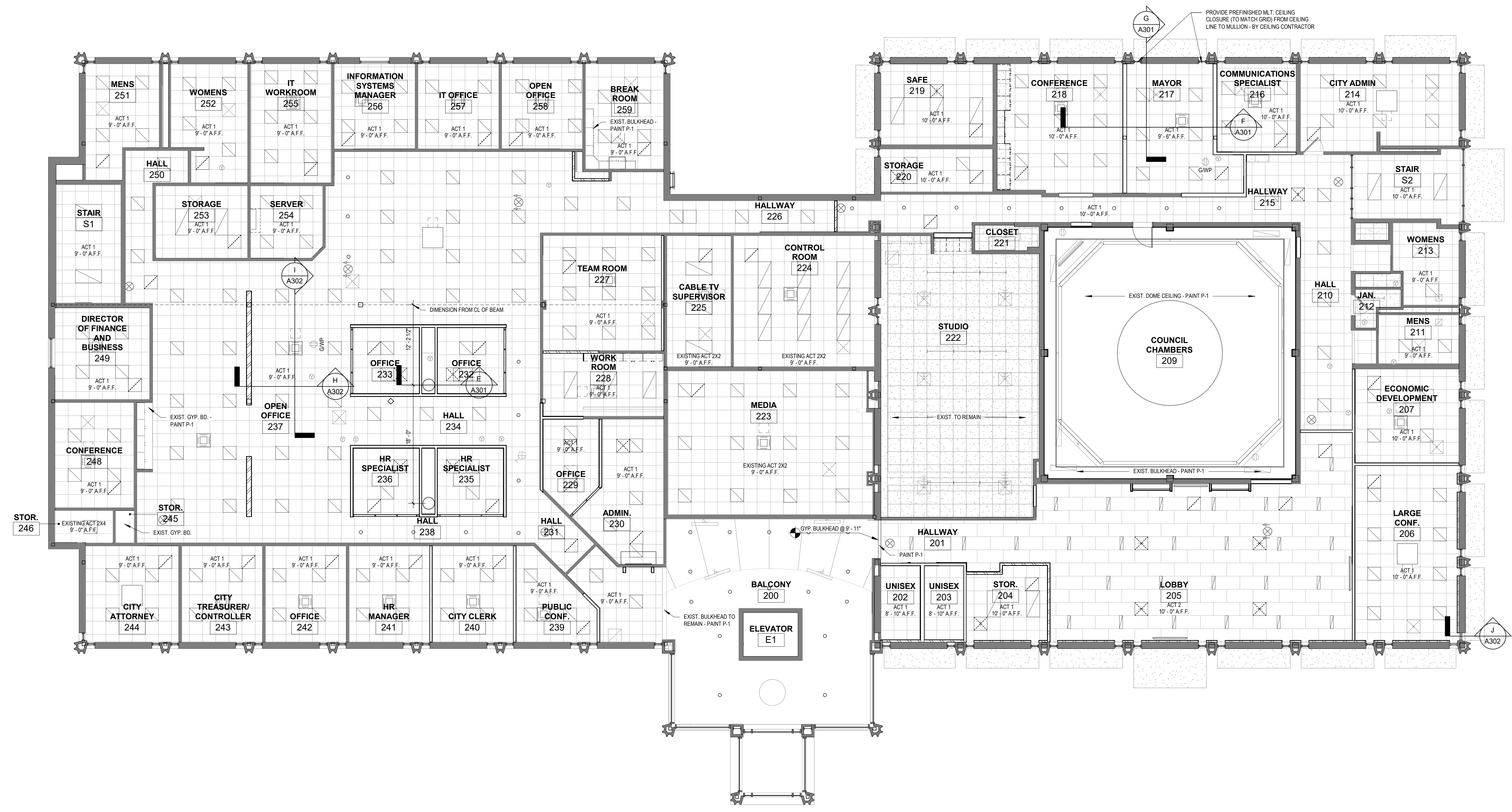
1 01 - LOWER LEVEL
SCALE: 1/8" = 1'-0"

**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

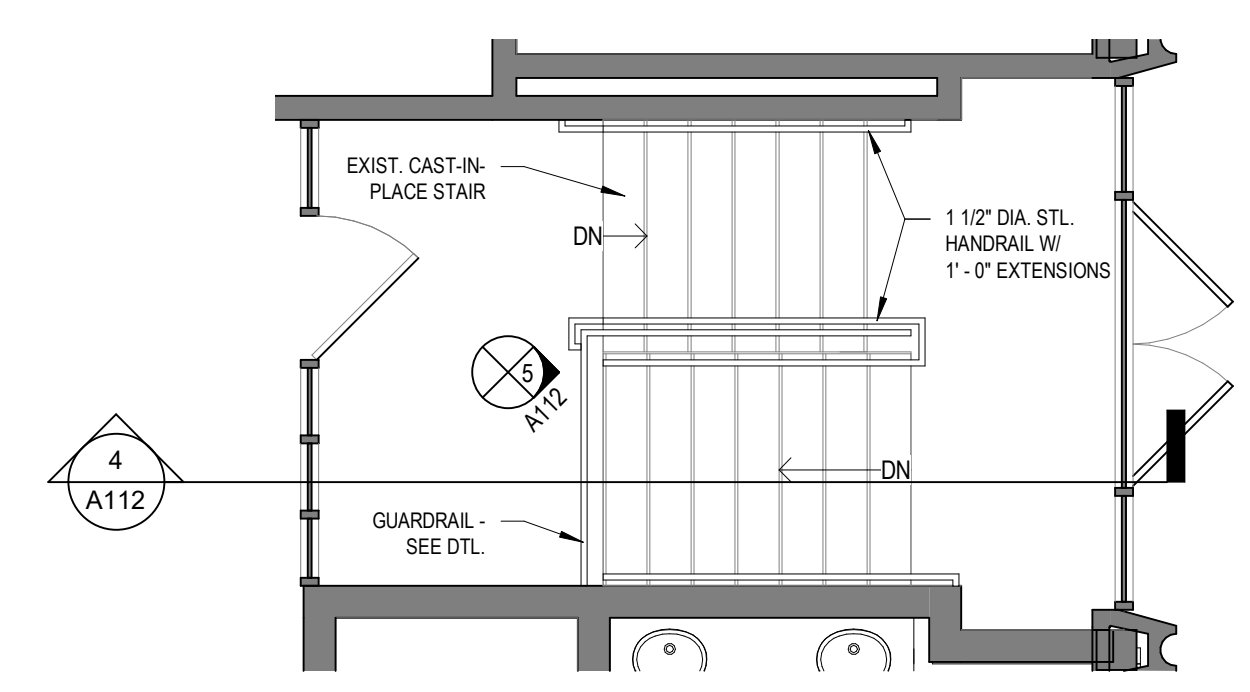
No.	Description	Date
	95% OWNER REVIEW SET	9-24-2021
	ISSUED FOR BID	10-5-2021

**REFLECTED
CEILING PLANS**
Project Number 21004
Date OCTOBER 5, 2021

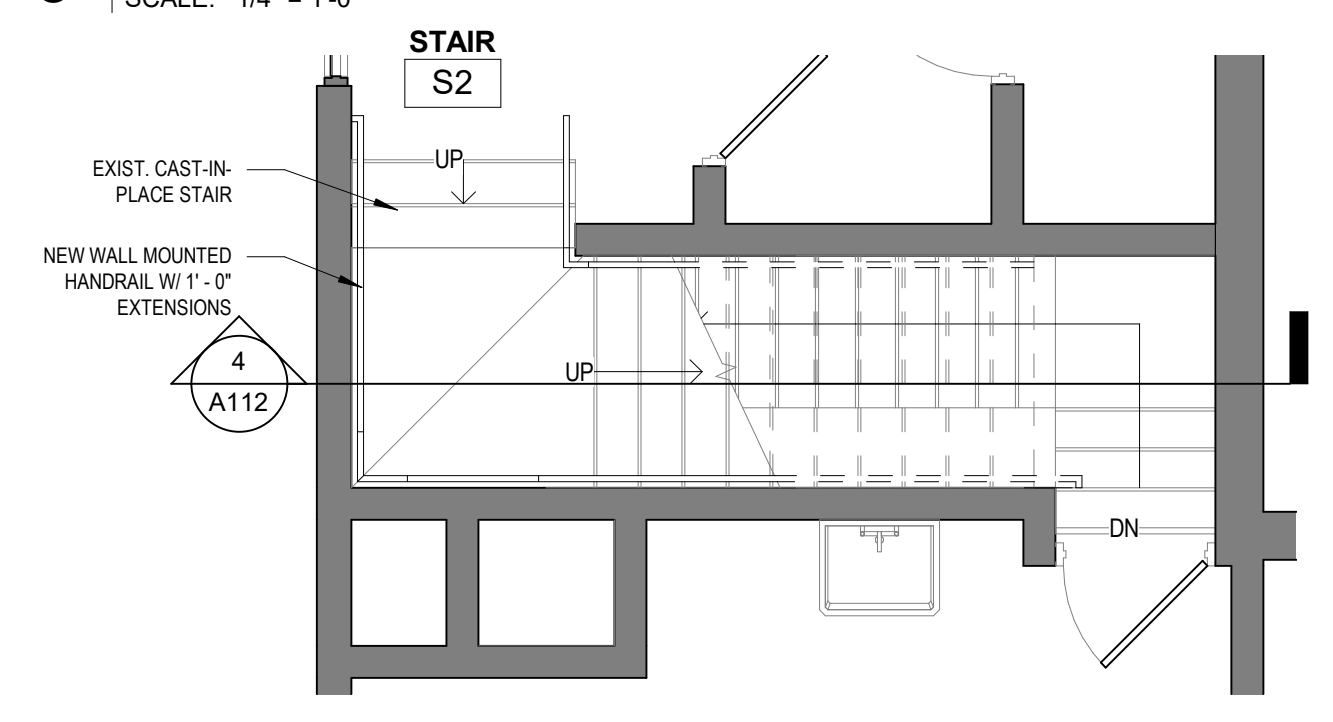
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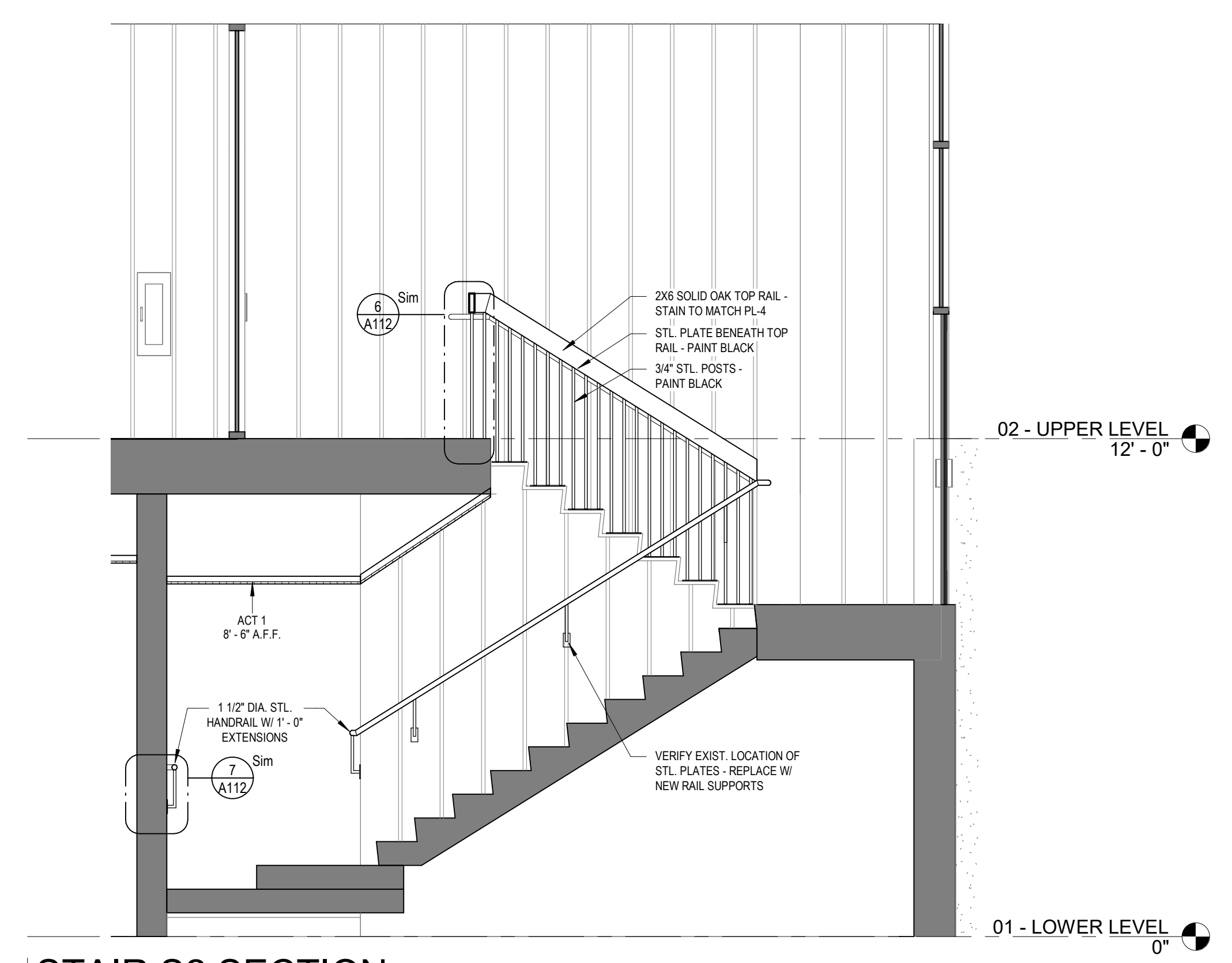
02 - UPPER LEVEL
SCALE: 1/8" = 1'-0"



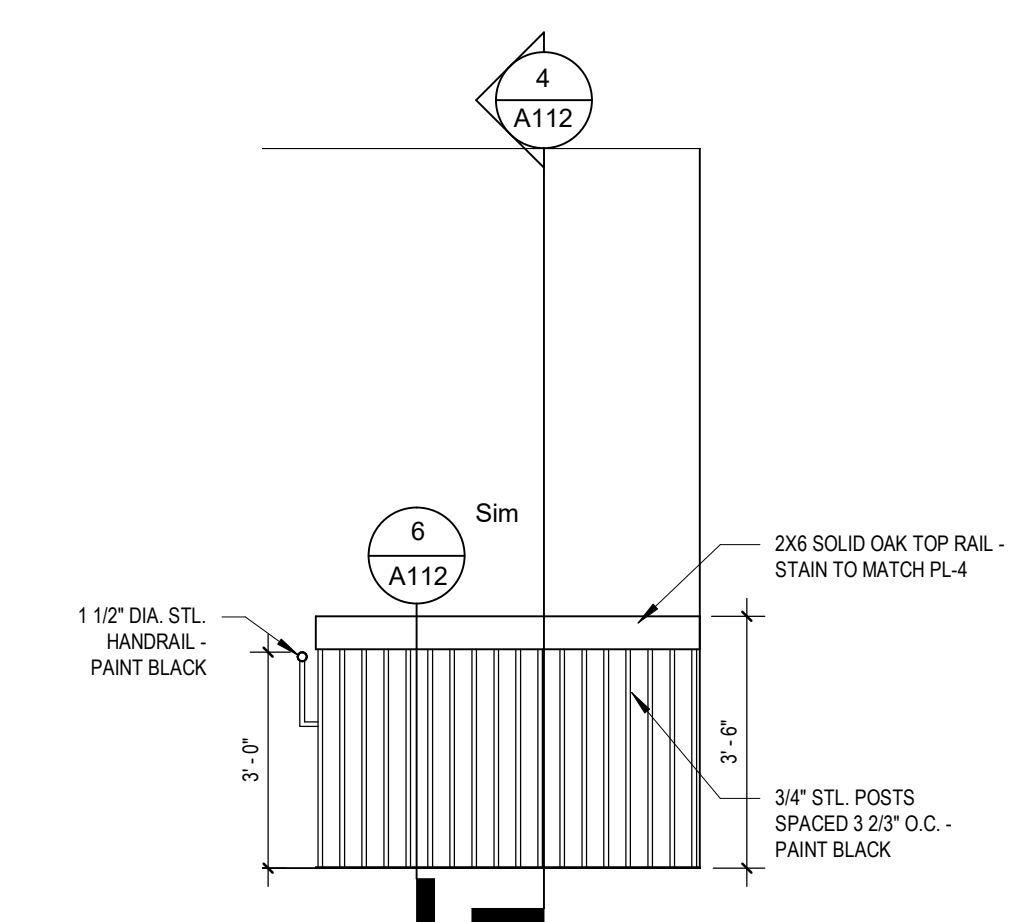
3 STAIR S2 - UPPER LEVEL
SCALE: 1/4" = 1'-0"



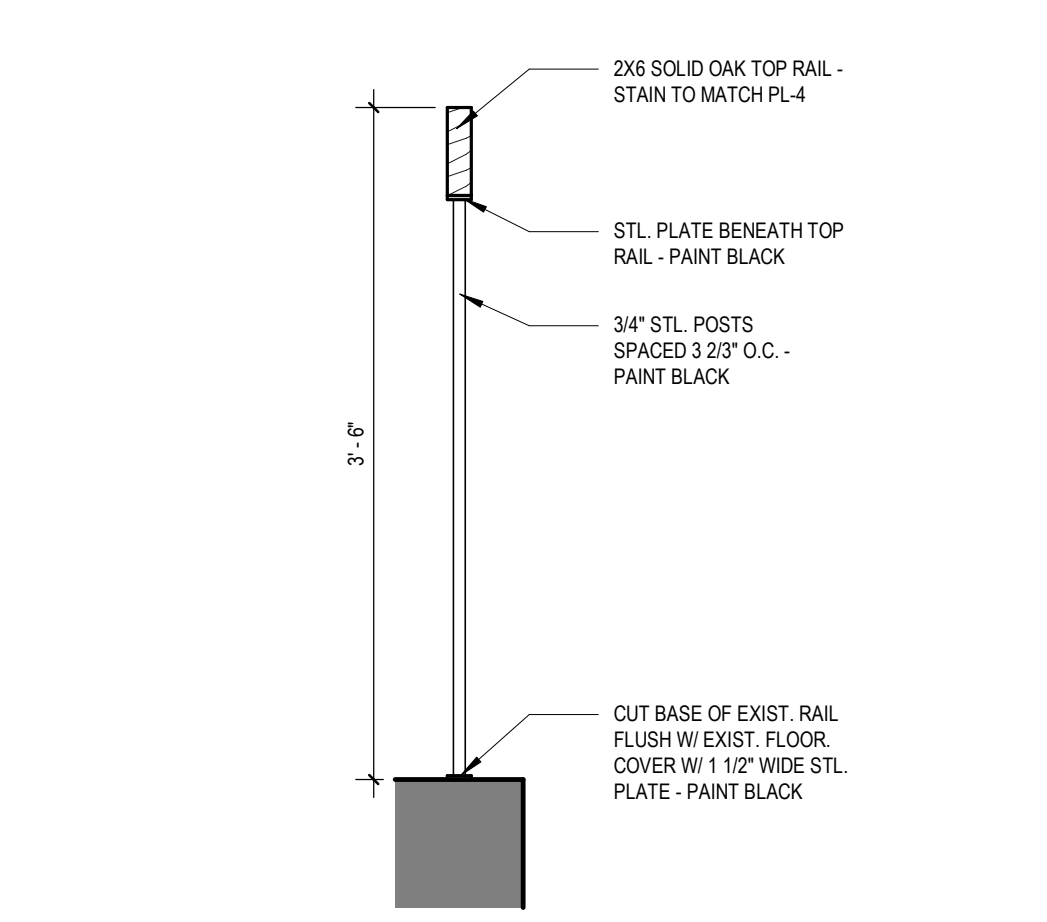
2 STAIR S2 - LOWER LEVEL
SCALE: 1/4" = 1'-0"



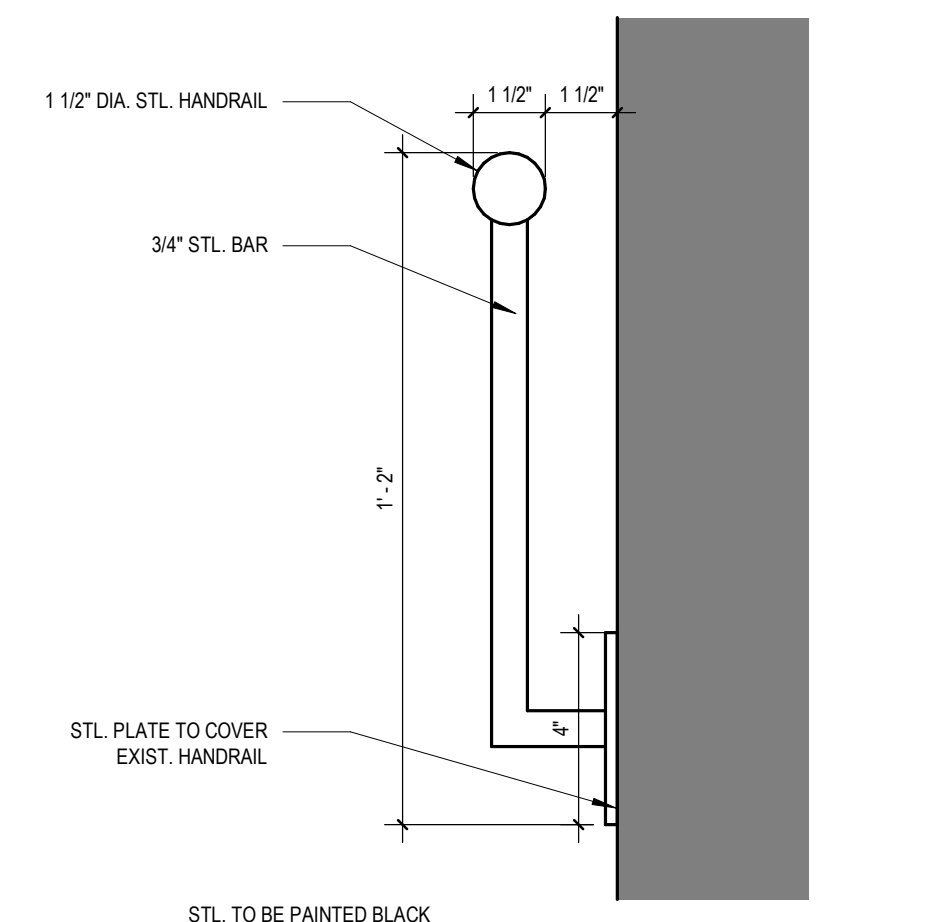
4 STAIR S2 SECTION
SCALE: 3/8" = 1'-0"



5 STAIR S2 - GUARDRAIL
SCALE: 3/8" = 1'-0"



6 STAIR S2 - GUARDRAIL DETAIL
SCALE: 1" = 1'-0"



7 STAIR S2 HANDRAIL
SCALE: 3/4" = 1'-0"

No.	Description	Date
95%	OWNER REVIEW SET ISSUED FOR BID	9-24-2021 10-5-2021

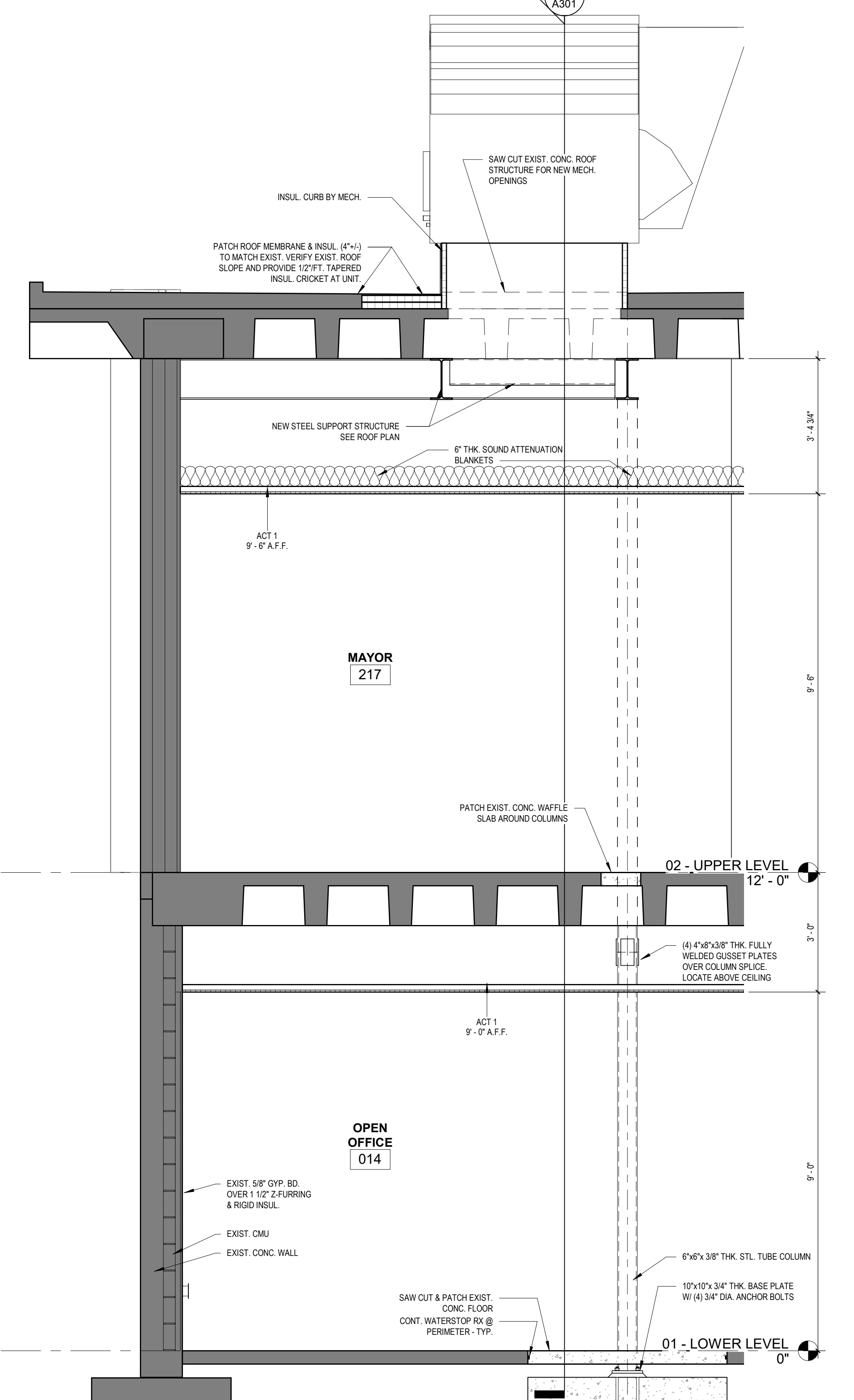
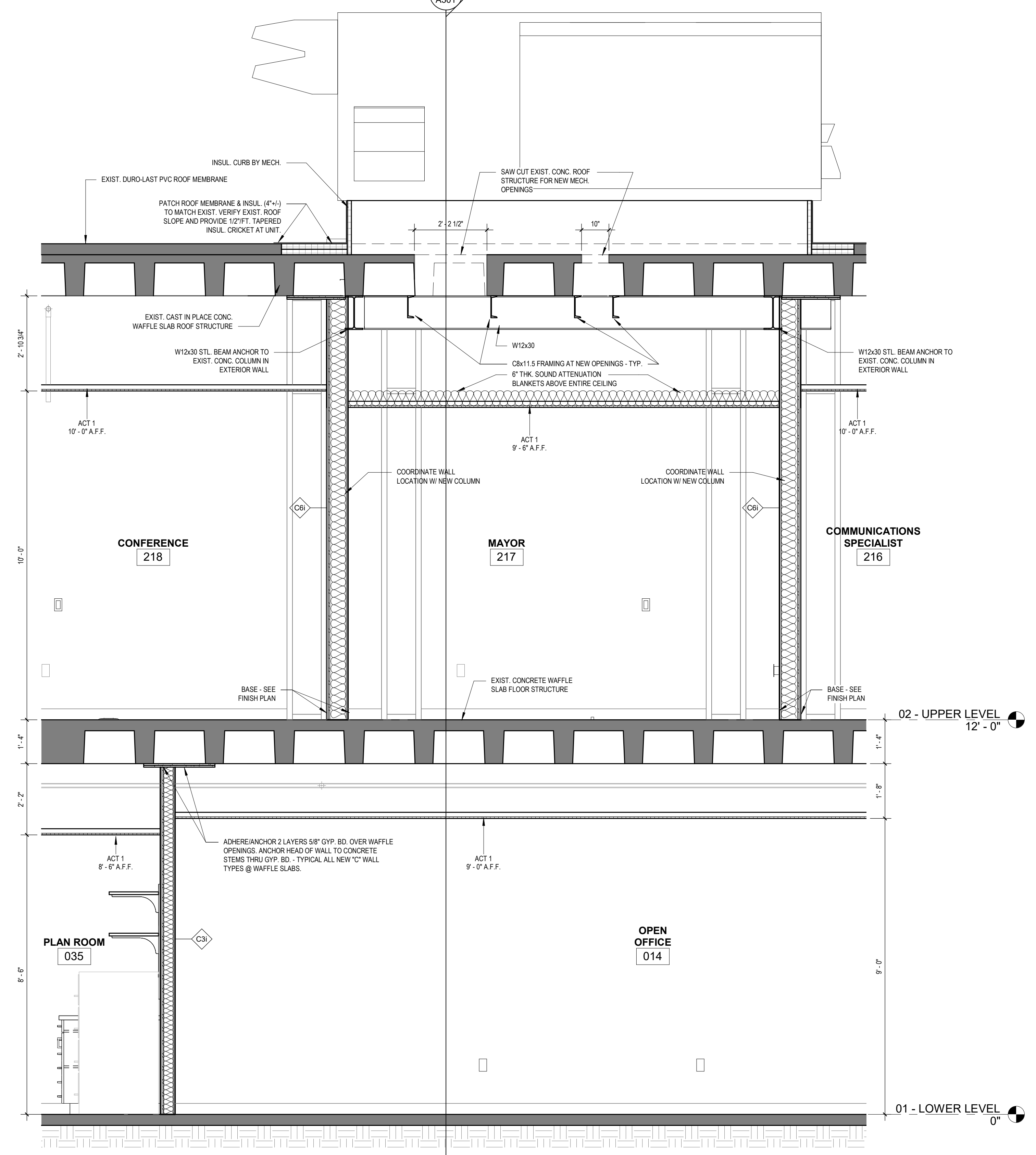
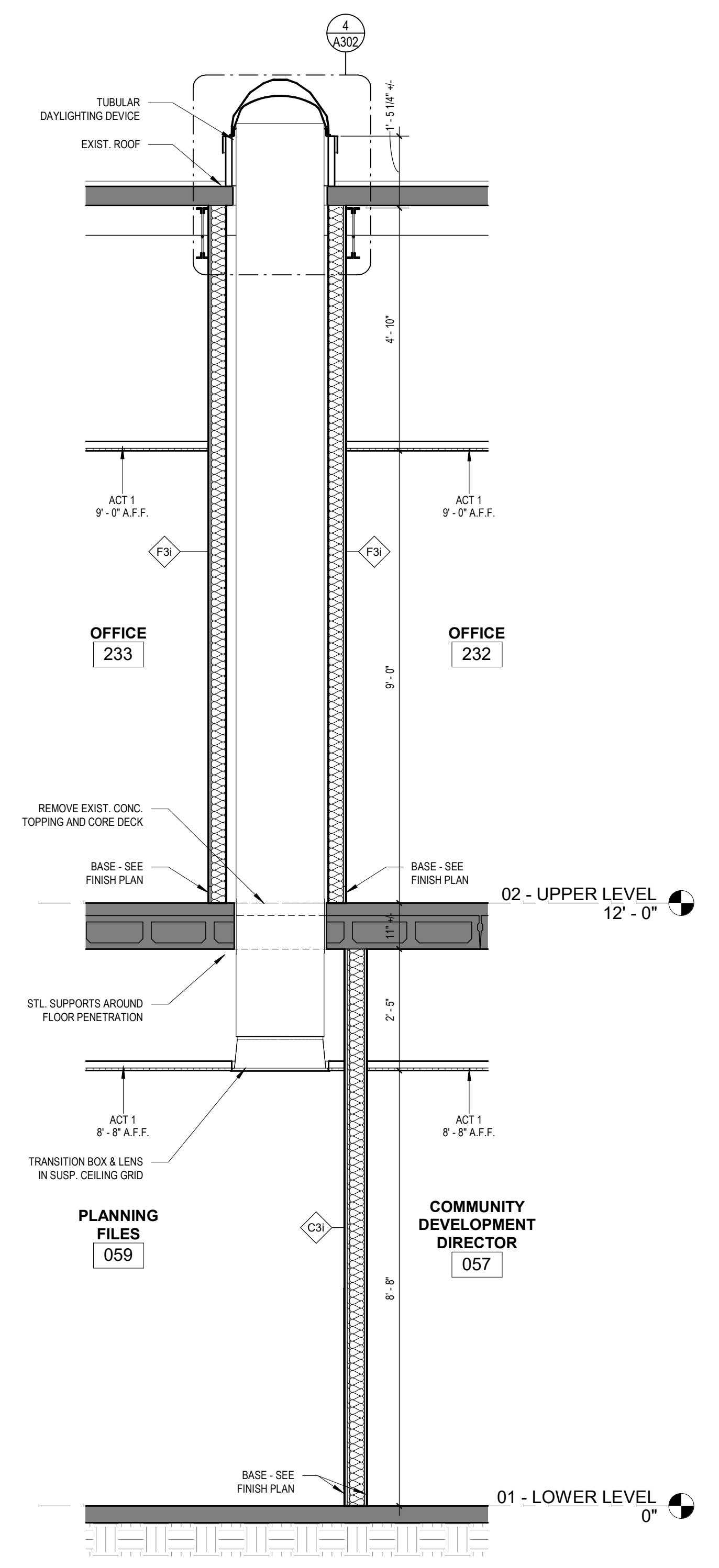
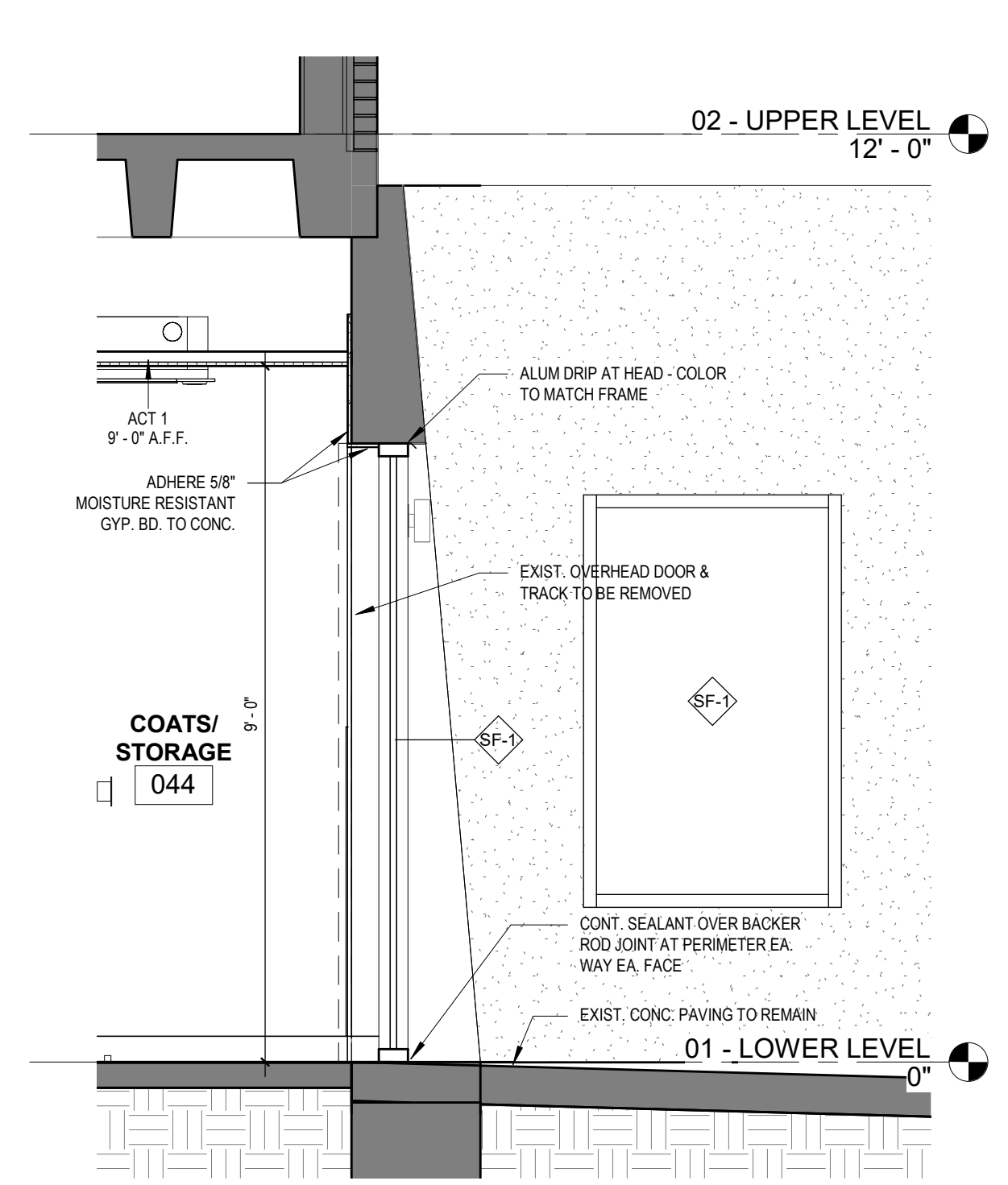
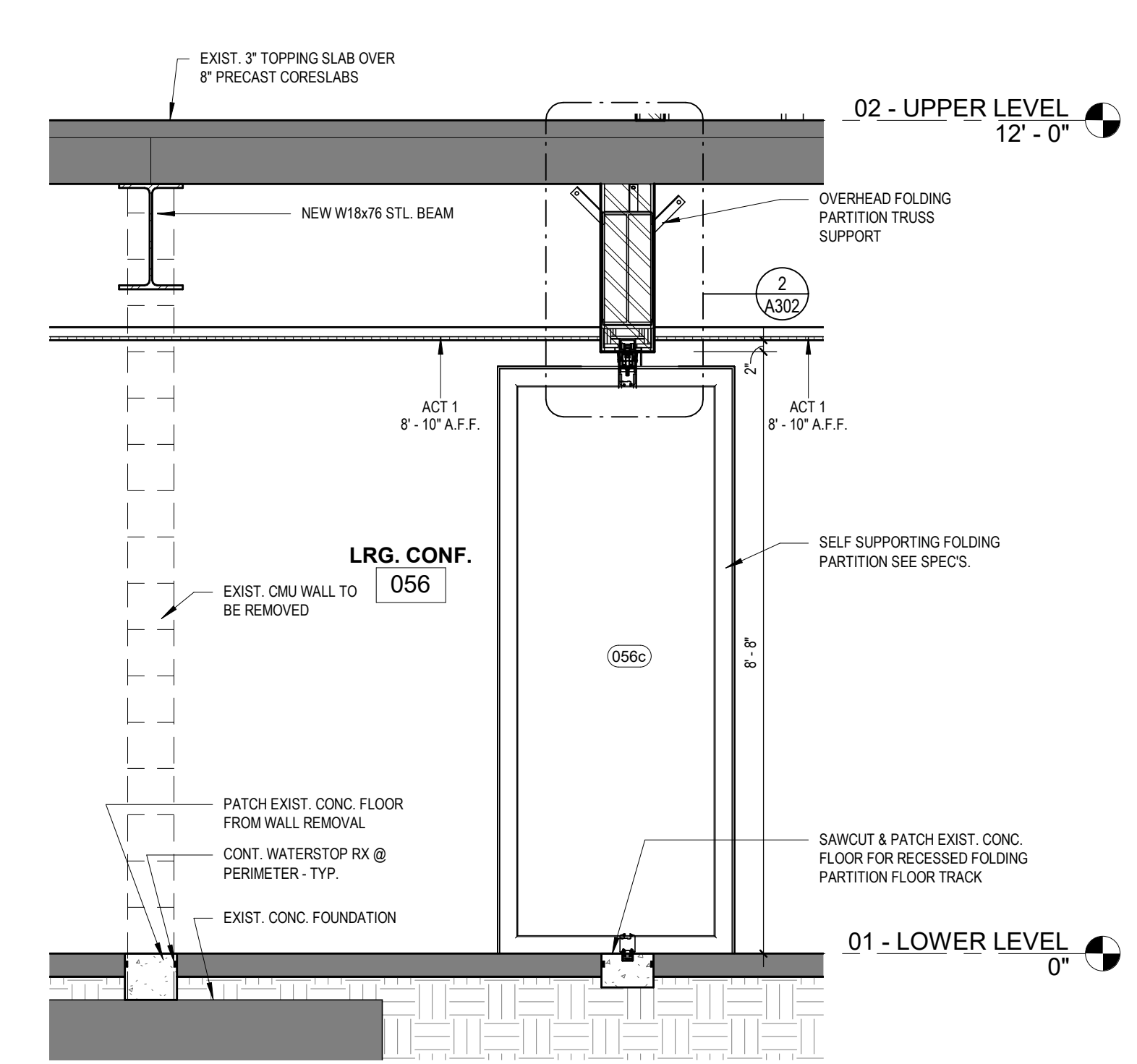
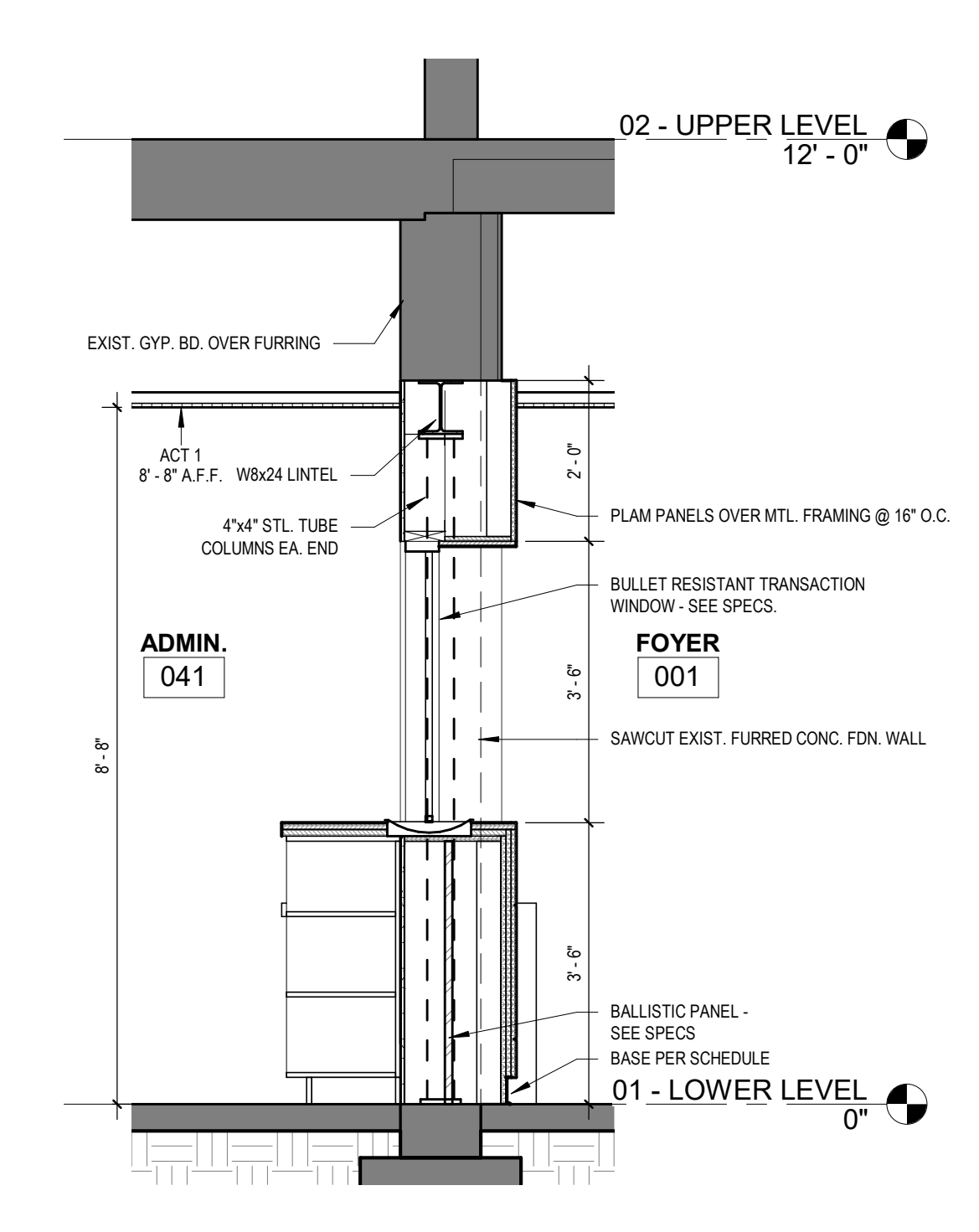
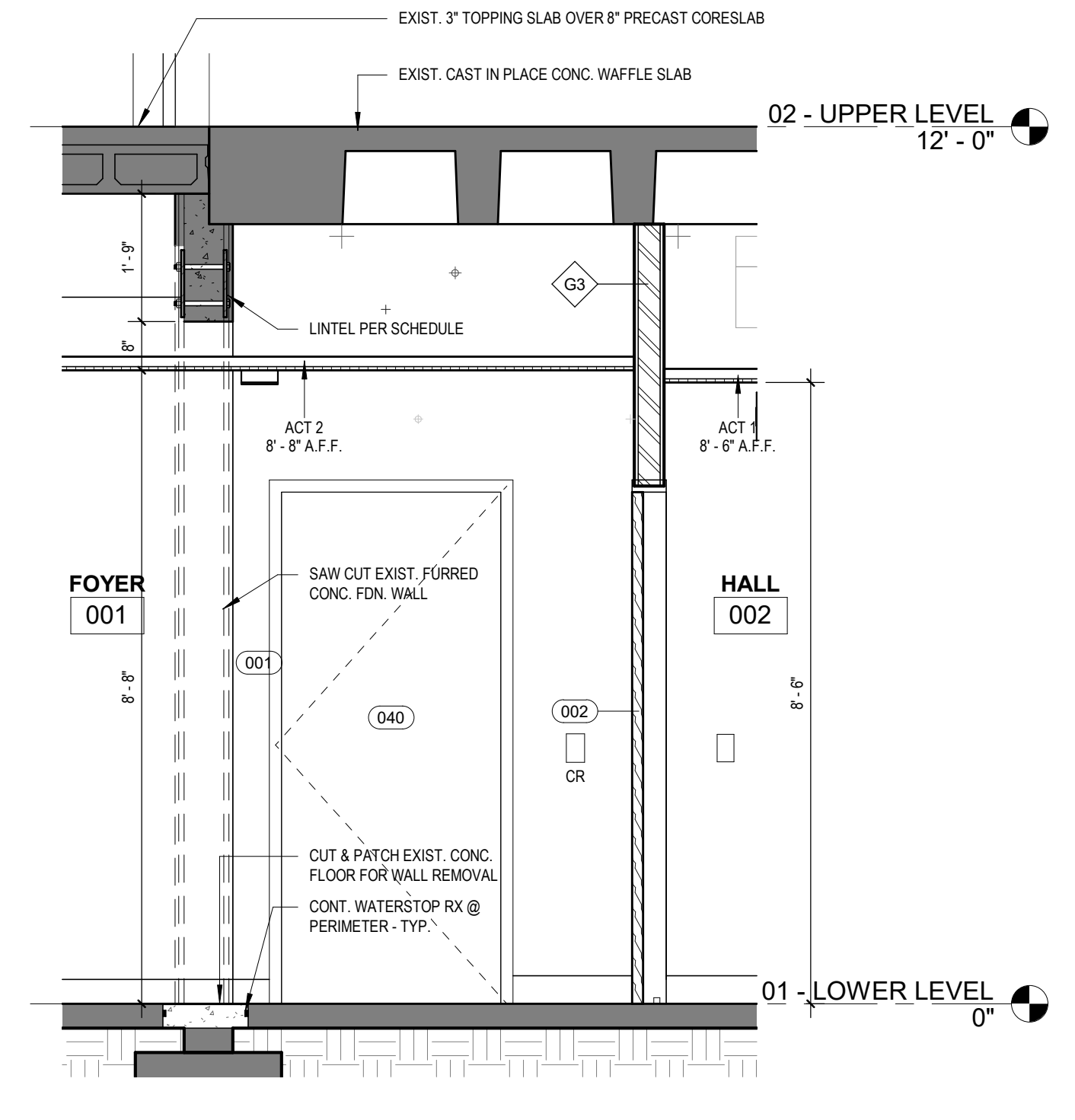
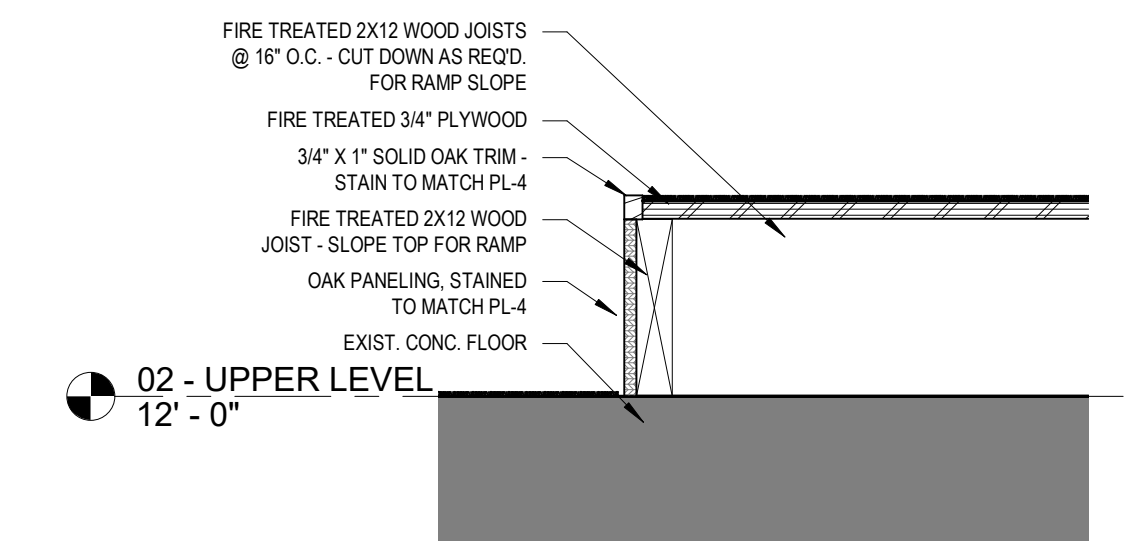
**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

No.	Description	Date
	95% OWNER REVIEW SET	9-24-2021
	ISSUED FOR BID	10-5-2021

**SECTIONS AND
DETAILS**

Project Number: 21004
Date: OCTOBER 5, 2021

A301

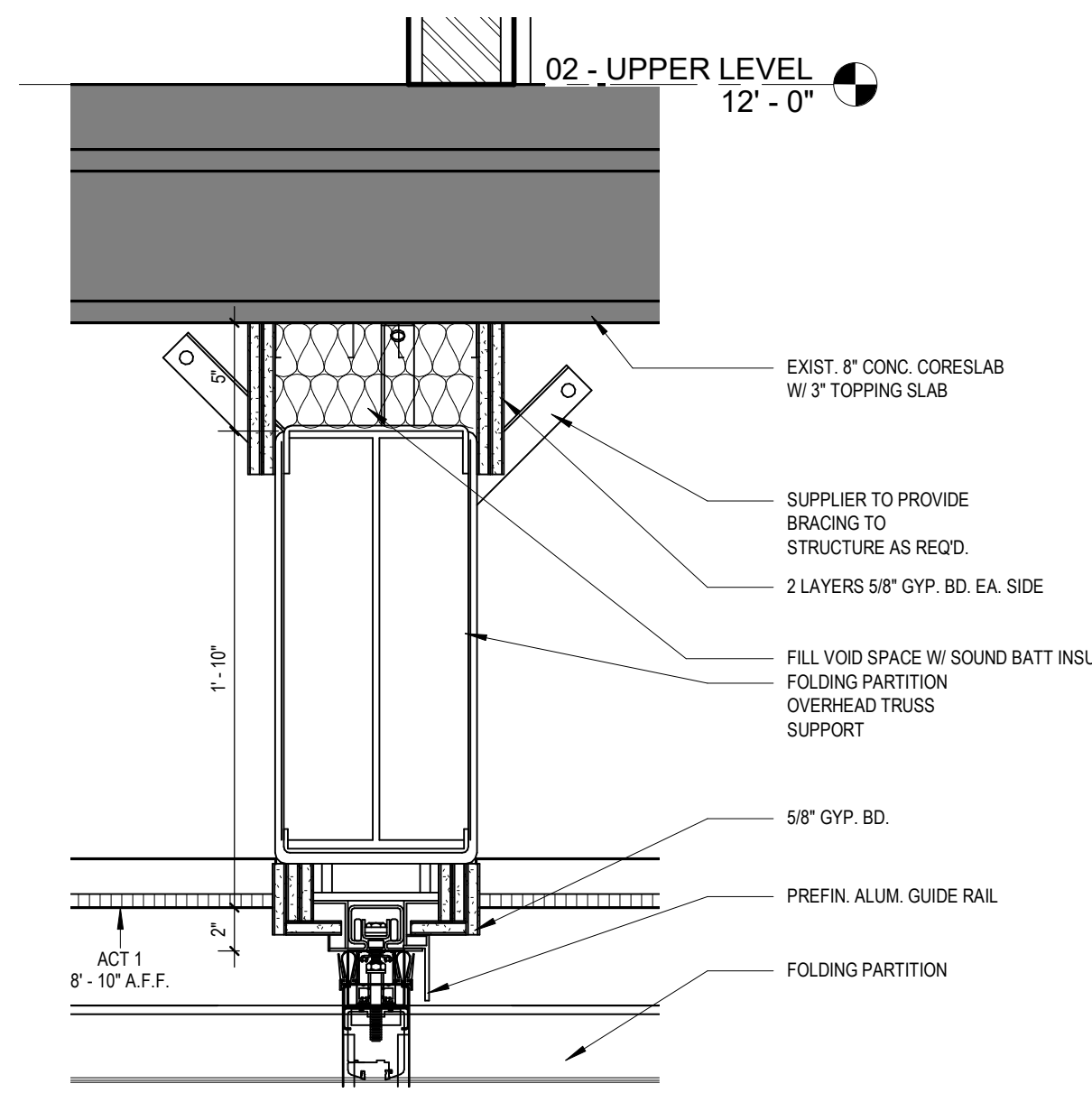
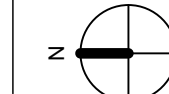


No.	Description	Date
	95% OWNER REVIEW SET	9-24-2021
	ISSUED FOR BID	10-5-2021

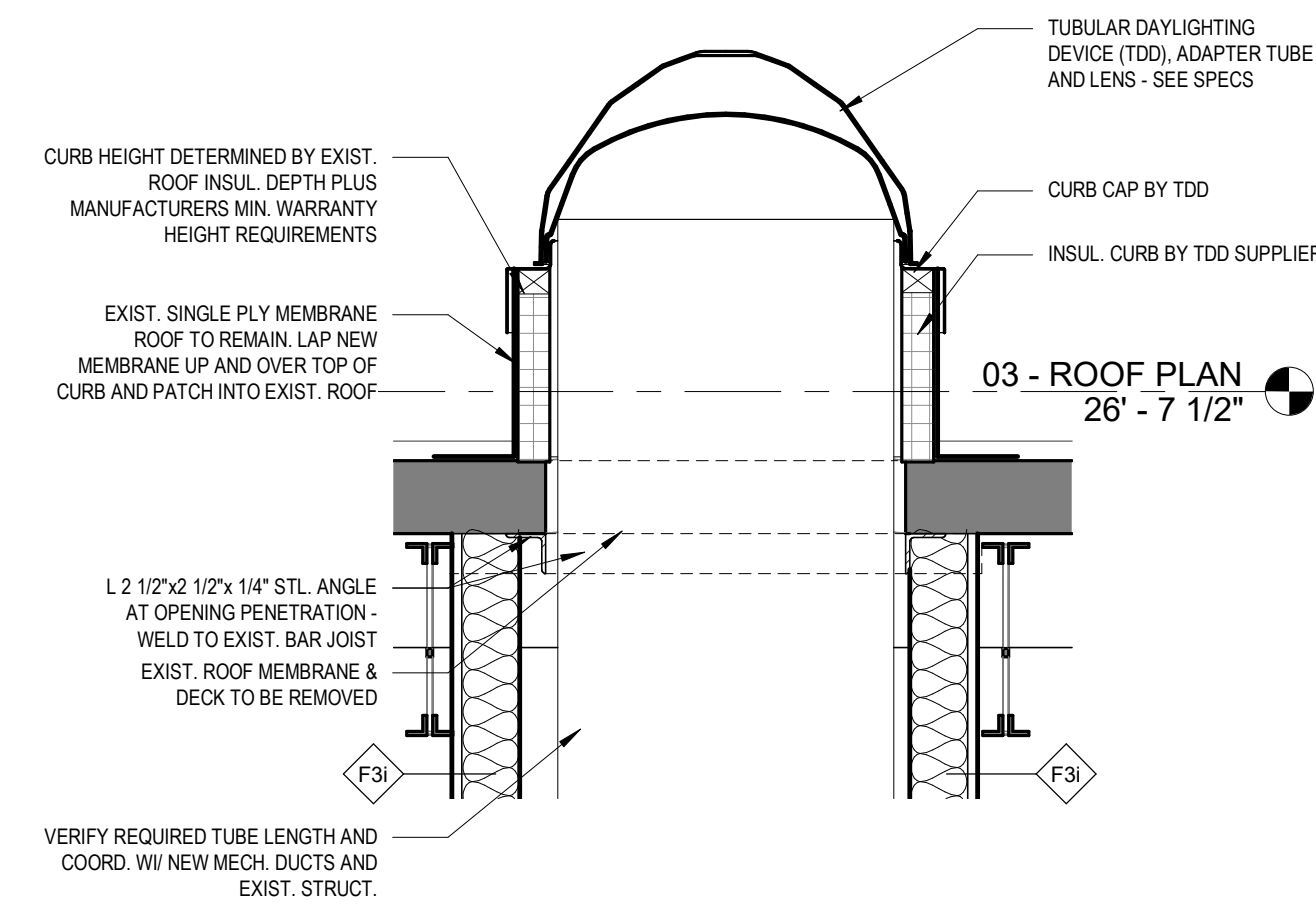
**SECTIONS AND
DETAILS**

Project Number
21004
Date
OCTOBER 5, 2021

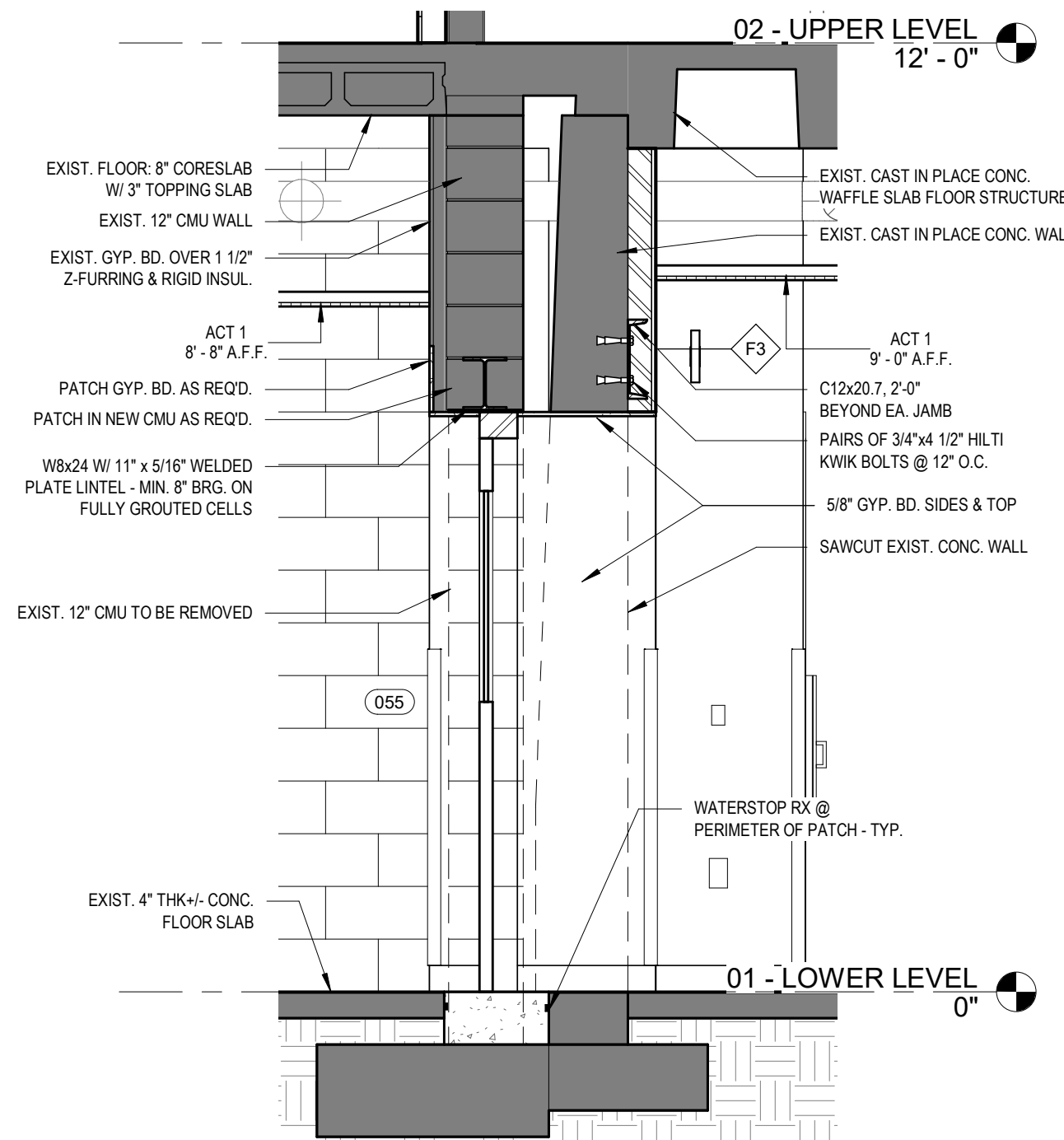
A302



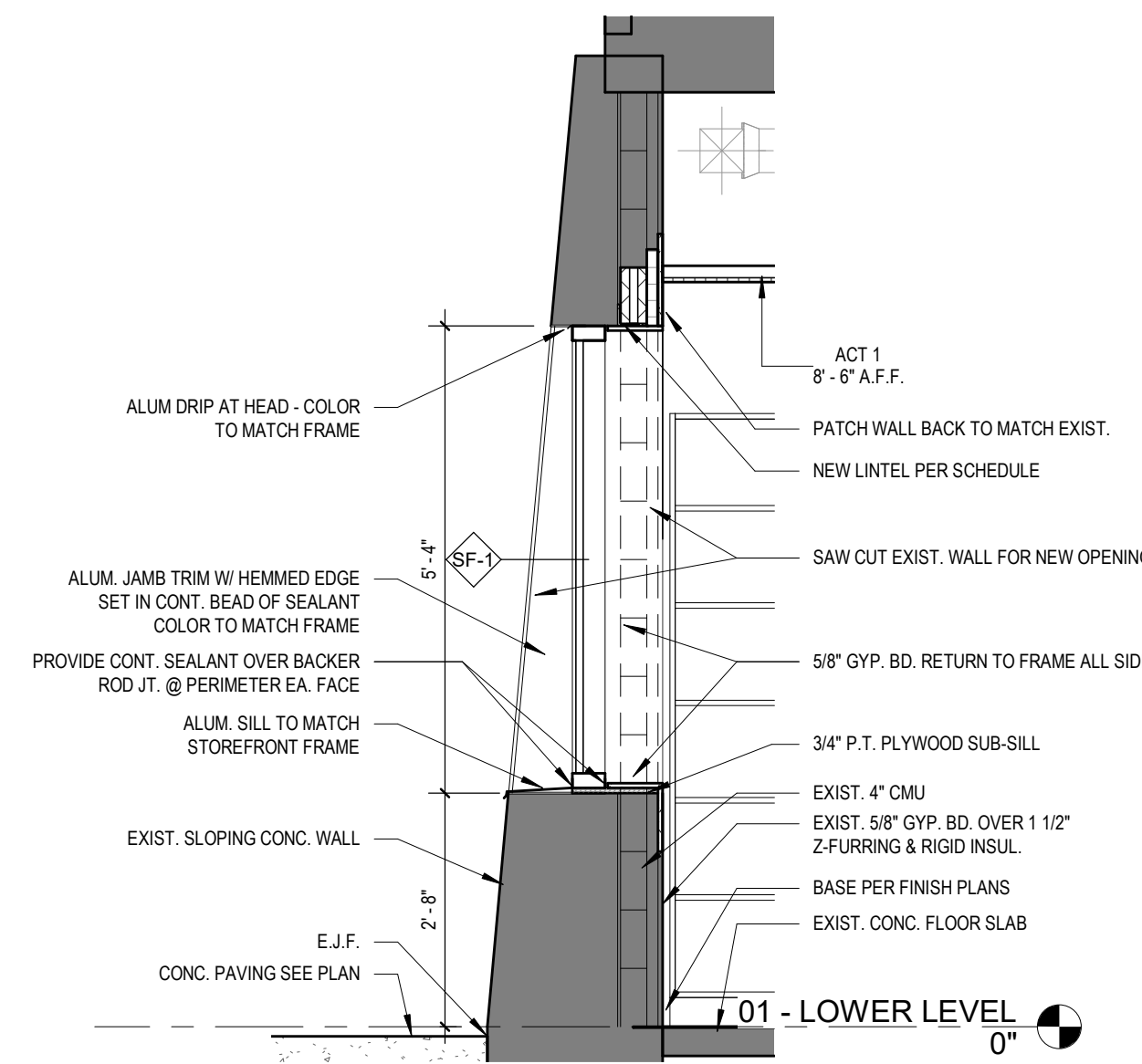
2 OPERABLE PARTITION HEAD DETAIL
SCALE: 1/2" = 1'-0"



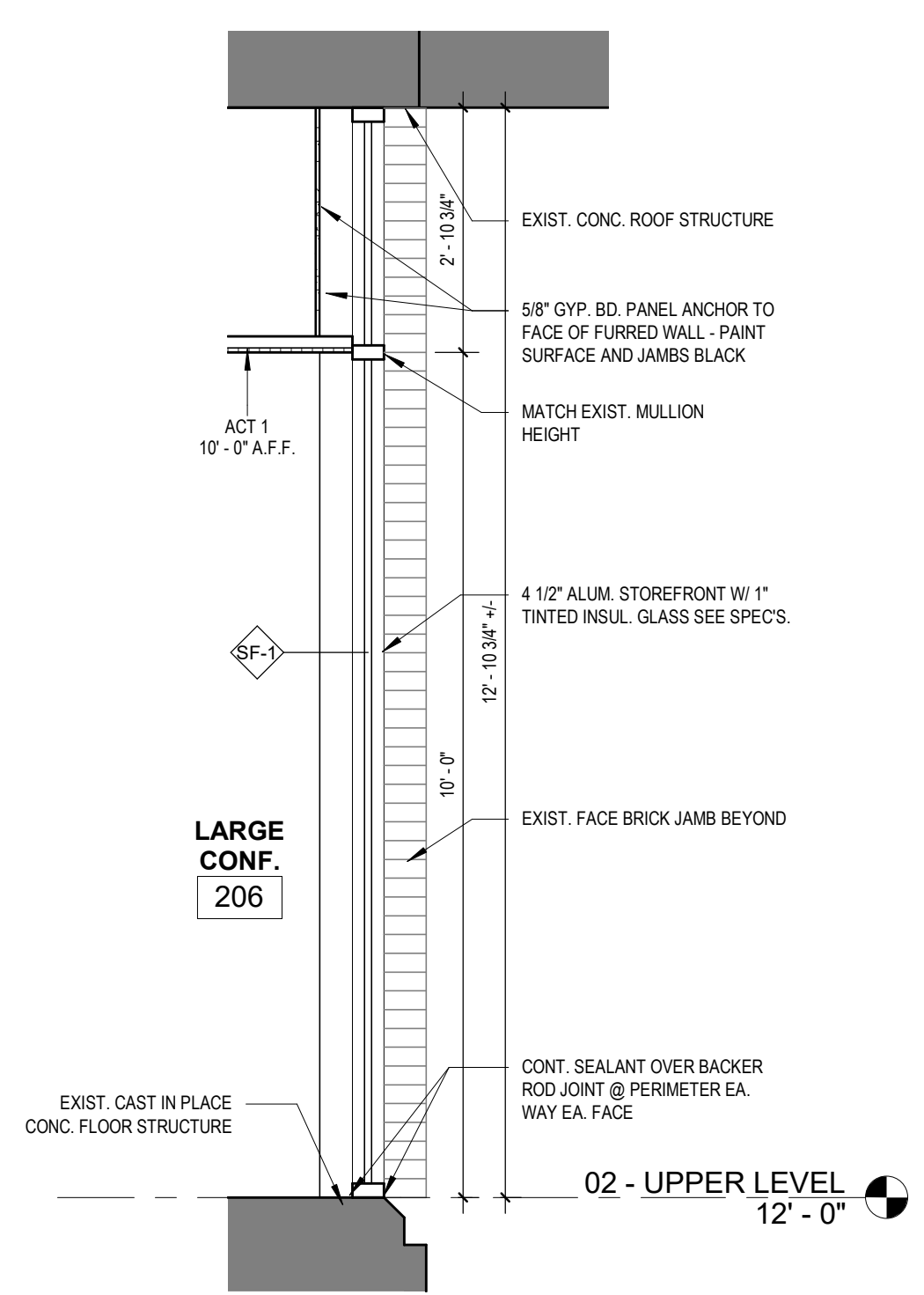
4 TUBULAR DAYLIGHTING DEVICE
SCALE: 1" = 1'-0"



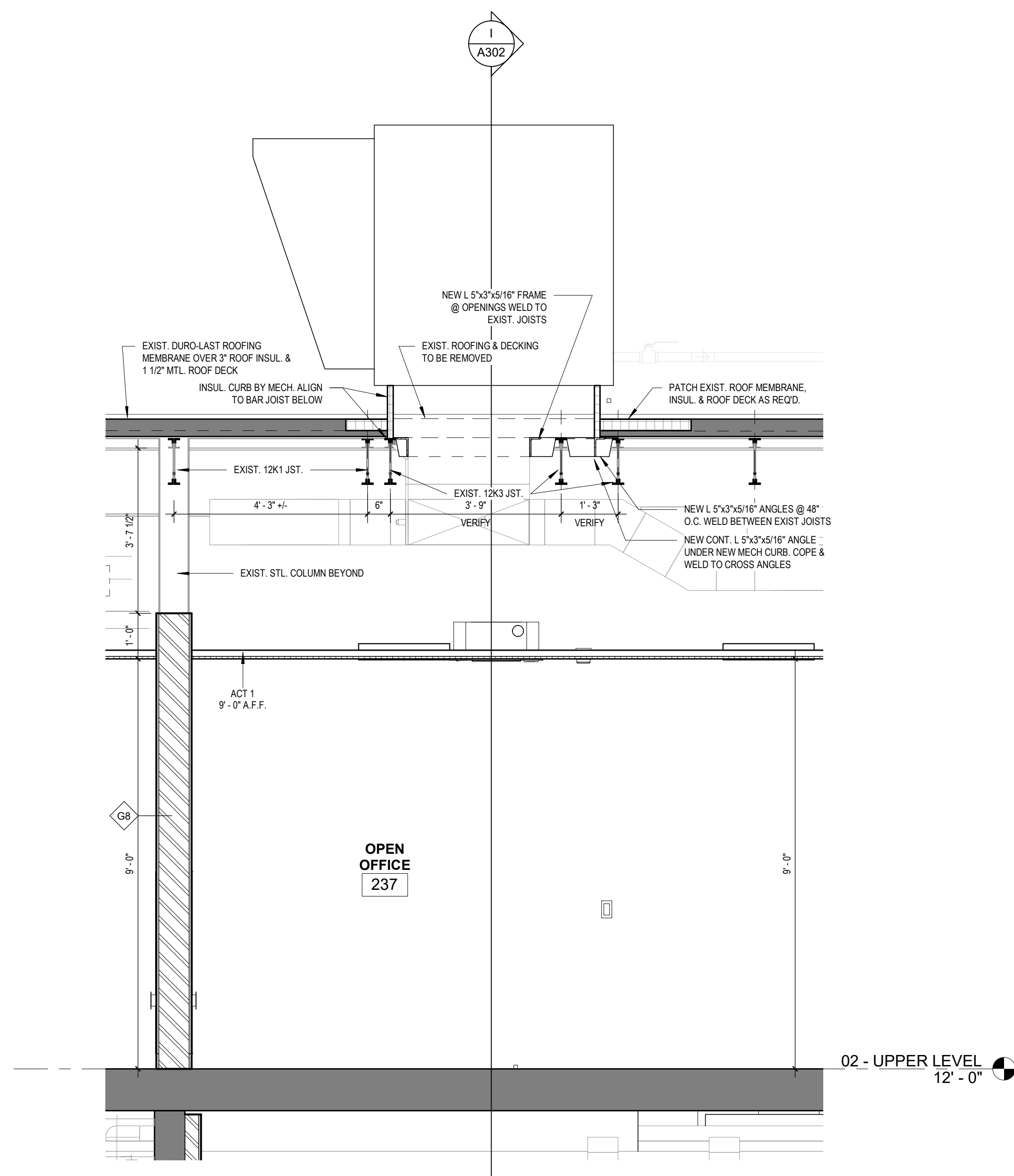
L SECTION - L
SCALE: 1/2" = 1'-0"



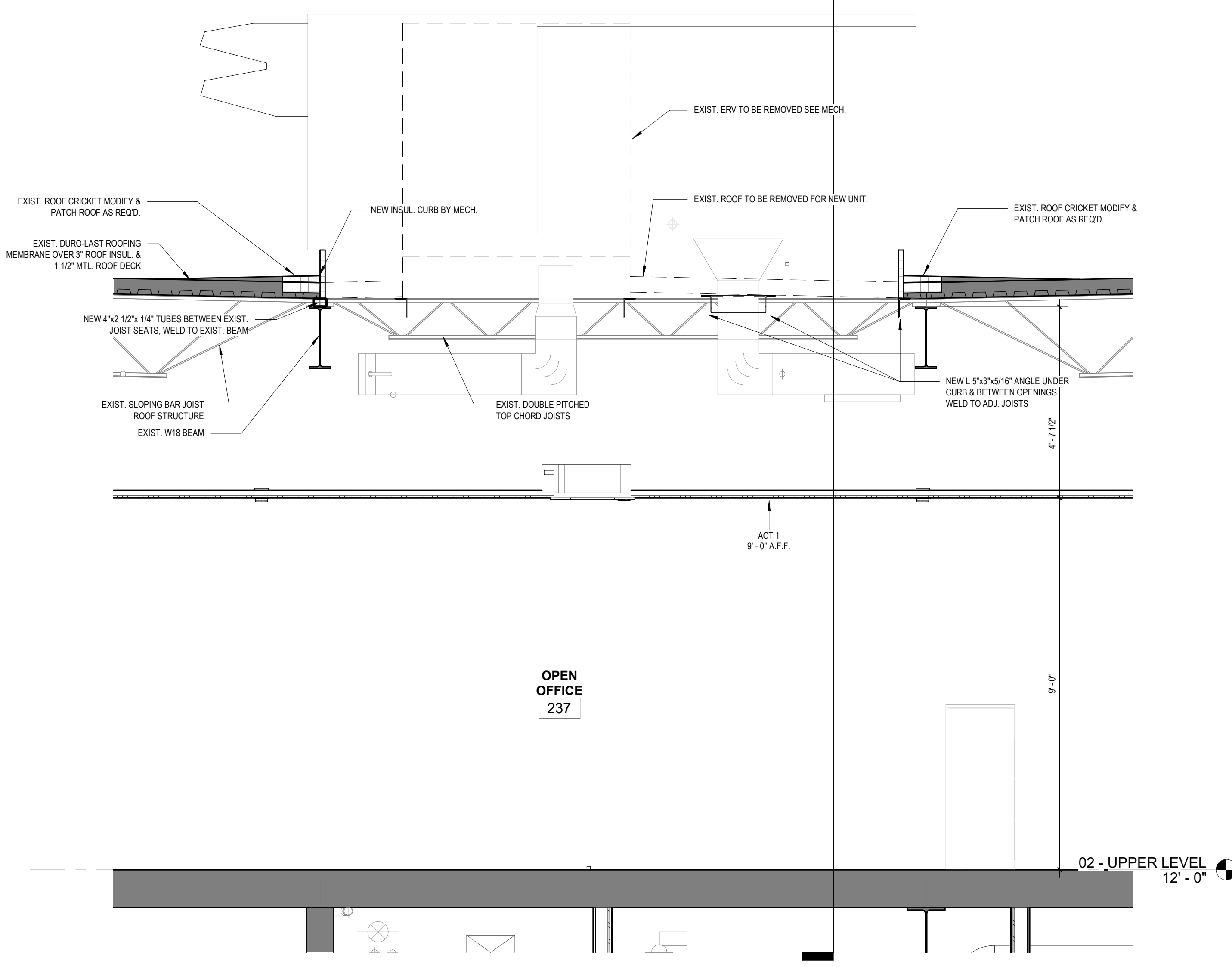
K SECTION - K
SCALE: 1/2" = 1'-0"



J SECTION - J
SCALE: 1/2" = 1'-0"



H SECTION H
SCALE: 1/2" = 1'-0"



I SECTION I
SCALE: 1/2" = 1'-0"

No.	Description	Date
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No.	Description	Date
21004	Project Number	OCTOBER 5, 2021

1 014 - OPEN OFFICE - WEST
SCALE: 1/4" = 1'-0"

2 028 - WORK ROOM - WEST
SCALE: 1/4" = 1'-0"

3 033 - HALL - EAST
SCALE: 1/4" = 1'-0"

4 035 - PLAN ROOM - EAST
SCALE: 1/4" = 1'-0"

5 035 - PLAN ROOM - SOUTH
SCALE: 1/4" = 1'-0"

6 035 - PLAN ROOM - WEST
SCALE: 1/4" = 1'-0"

7 039 - WORK ROOM - SOUTH
SCALE: 1/4" = 1'-0"

8 039 - WORK ROOM - WEST
SCALE: 1/4" = 1'-0"

9 039 - WORK ROOM - NORTH
SCALE: 1/4" = 1'-0"

10 045 - KITCHENETTE - SOUTH
SCALE: 1/4" = 1'-0"

11 045 - KITCHENETTE - WEST
SCALE: 1/4" = 1'-0"

12 071 - HALL - EAST
SCALE: 1/4" = 1'-0"

13 206 - CONFERENCE - EAST
SCALE: 1/4" = 1'-0"

14 218 - CONFERENCE - NORTH
SCALE: 1/4" = 1'-0"

15 222 - STUDIO - EAST
SCALE: 1/4" = 1'-0"

16 227 - TEAM ROOM - EAST
SCALE: 1/4" = 1'-0"

17 227 - TEAM ROOM - SOUTH
SCALE: 1/4" = 1'-0"

18 228 - WORK ROOM - EAST
SCALE: 1/4" = 1'-0"

19 228 - WORK ROOM - WEST
SCALE: 1/4" = 1'-0"

20 230 - ADMIN - WEST
SCALE: 1/4" = 1'-0"

21 231 - HALL - NORTH
SCALE: 1/4" = 1'-0"

22 248 - CONFERENCE - EAST
SCALE: 1/4" = 1'-0"

23 001 - FOYER - EAST
SCALE: 1/4" = 1'-0"

24 201 - HALLWAY - EAST
SCALE: 1/4" = 1'-0"

25 205 - LOBBY - SOUTH
SCALE: 1/4" = 1'-0"

26 209 - COUNCIL CHAMBERS - WEST
SCALE: 1/4" = 1'-0"

27 209 - COUNCIL CHAMBERS - NORTH
SCALE: 1/4" = 1'-0"

28 209 - COUNCIL CHAMBERS - EAST
SCALE: 1/4" = 1'-0"

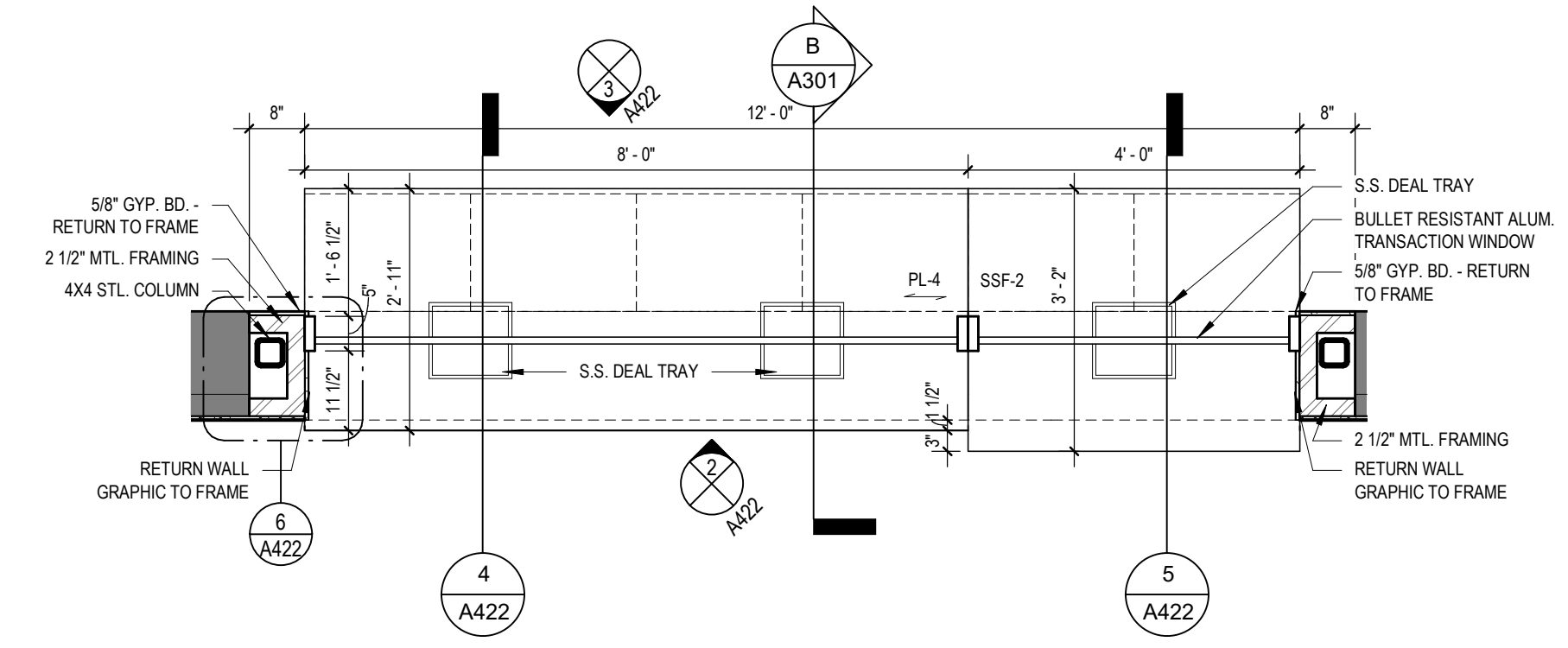
29 209 - COUNCIL CHAMBERS - SOUTH
SCALE: 1/4" = 1'-0"

No.	Description	Date
95%	OWNER REVIEW SET ISSUED FOR BID	9-24-2021 10-5-2021

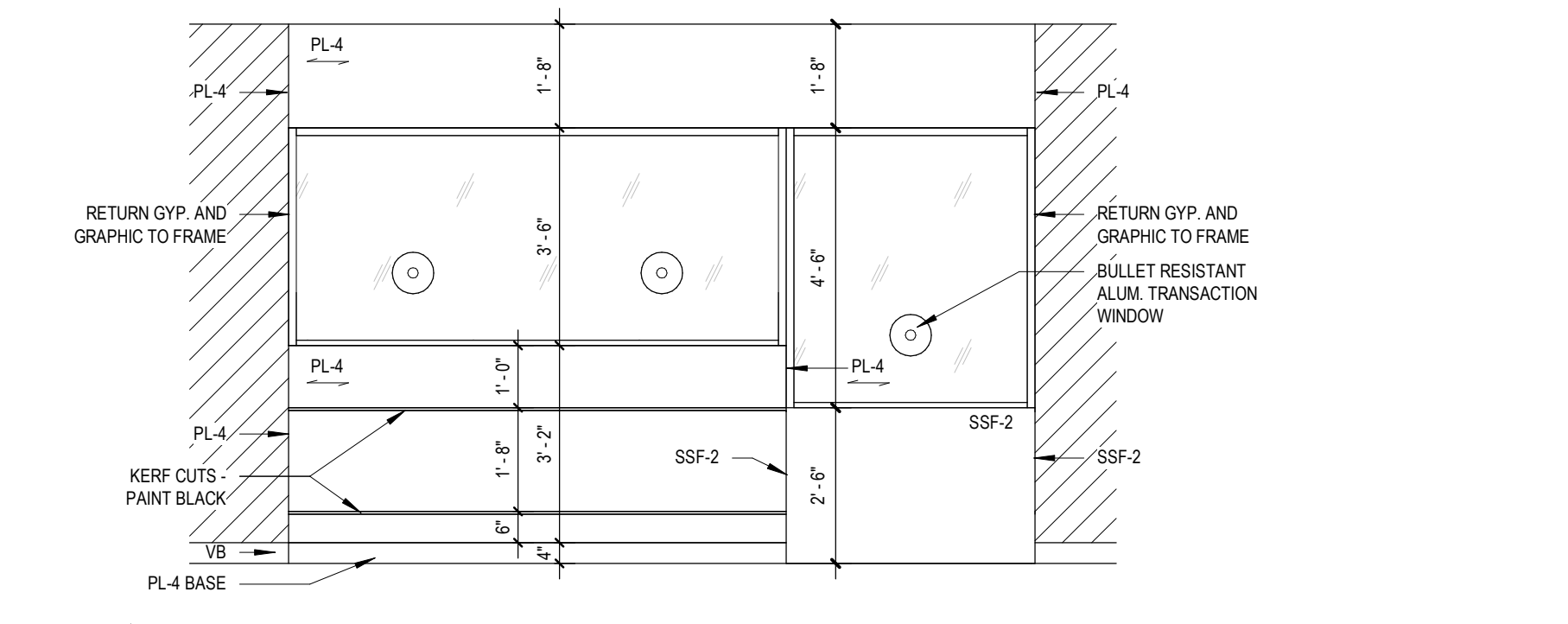
**CASEWORK
DETAILS**

Project Number: 21004
Date: OCTOBER 5, 2021

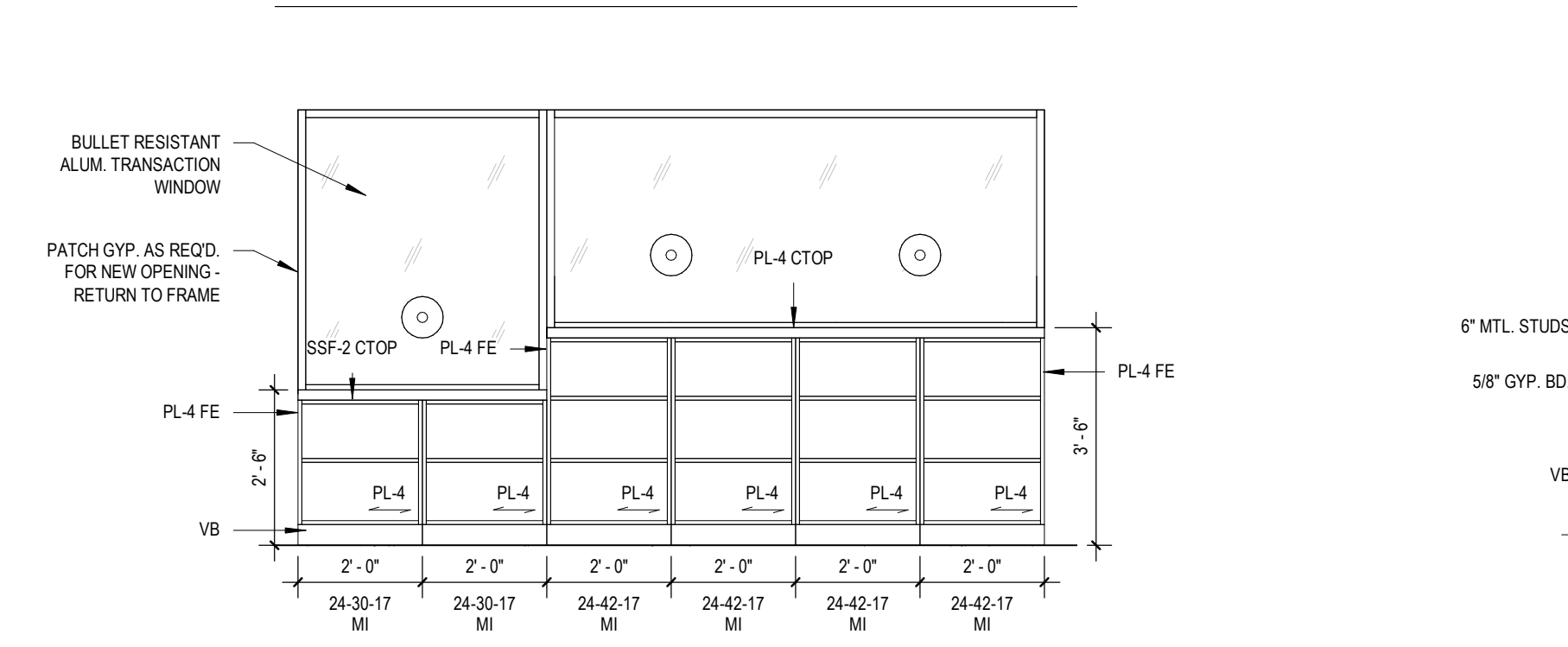
A422



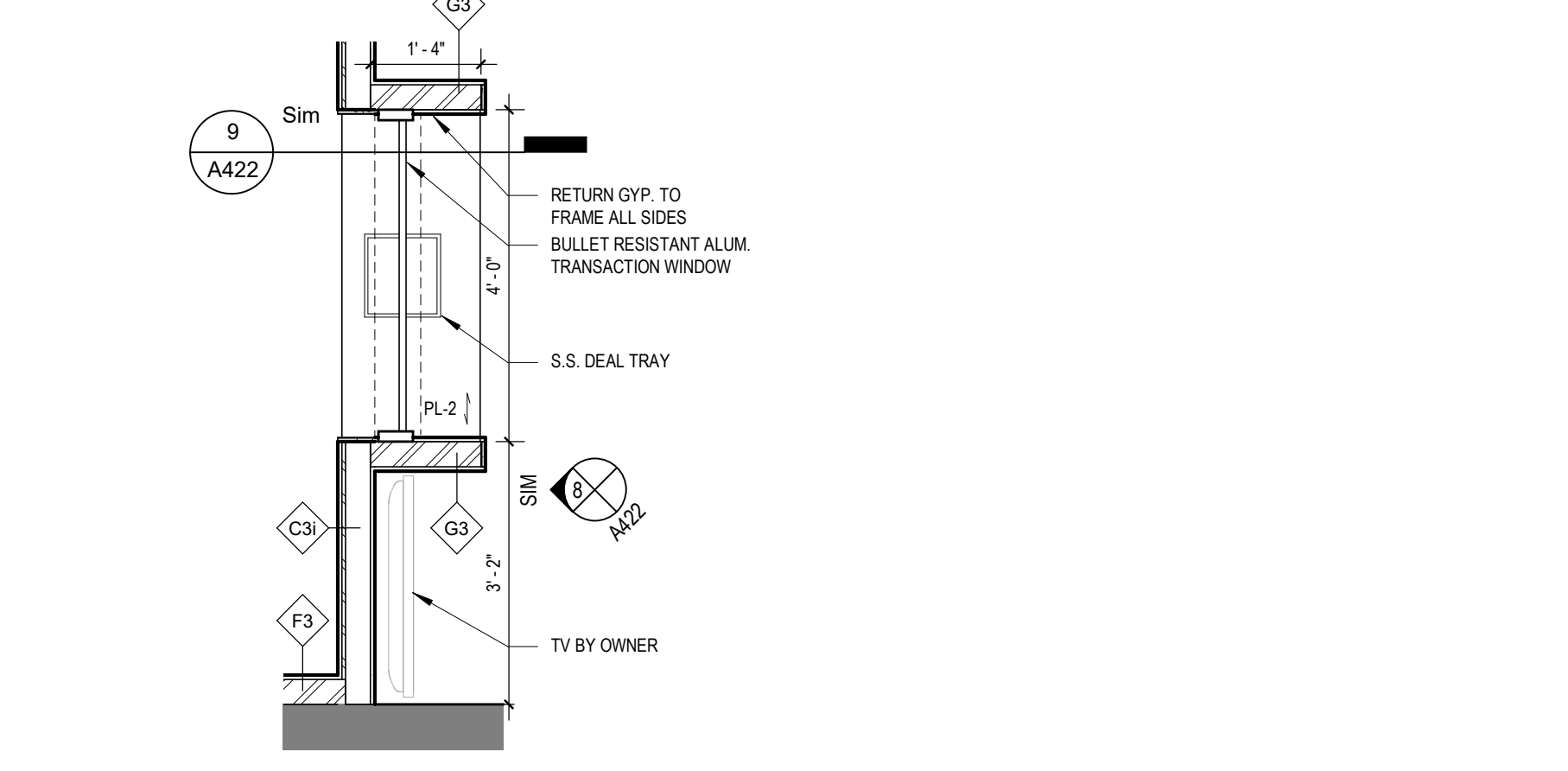
1 041 - ADMIN WINDOW
SCALE: 1/2" = 1'-0"



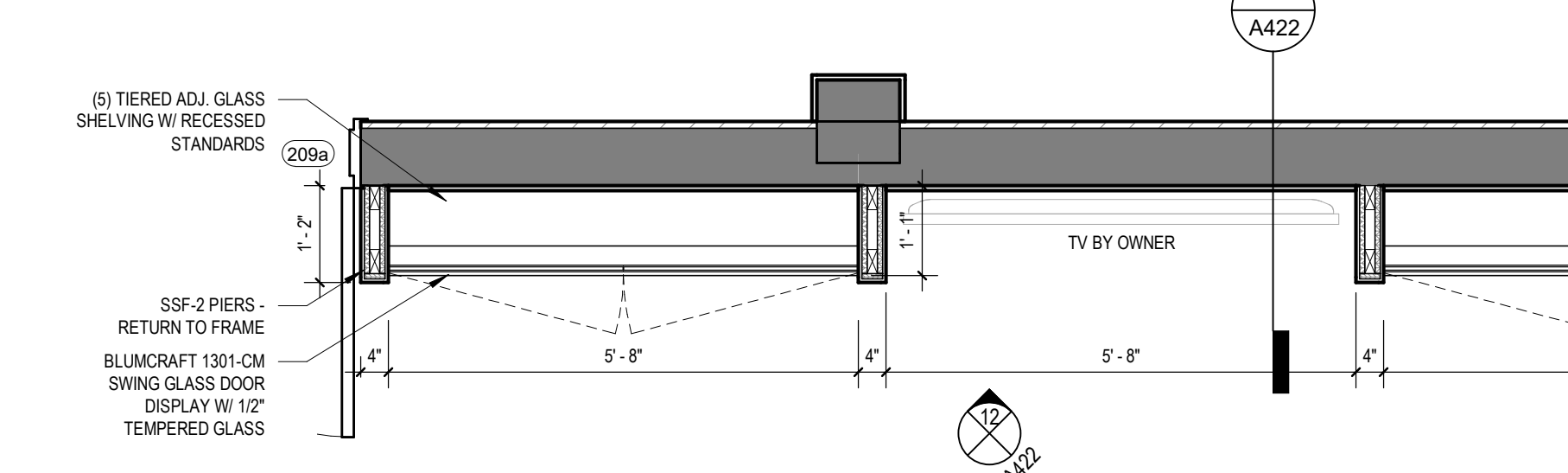
2 041 - ADMIN EXTERIOR
SCALE: 3/8" = 1'-0"



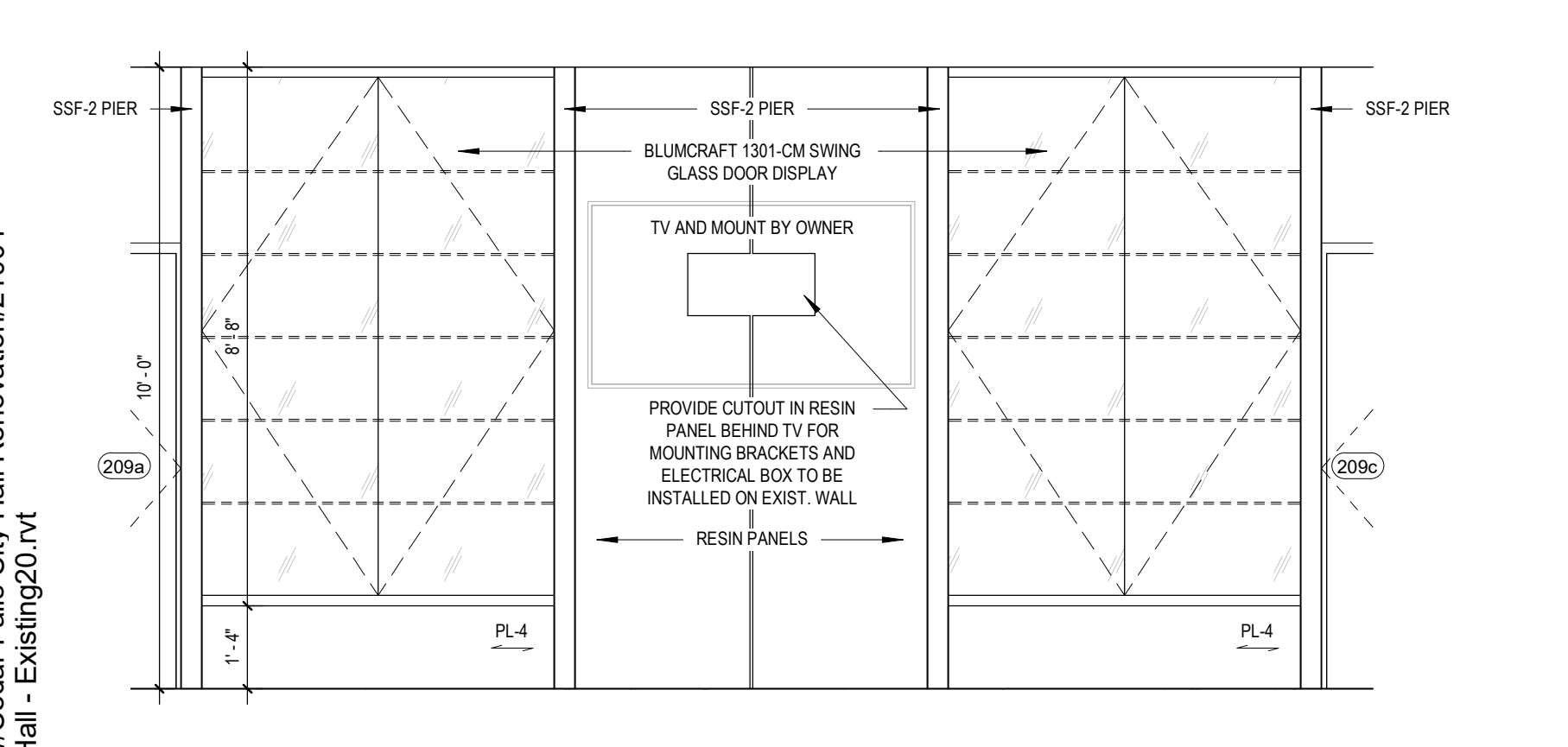
3 041 - ADMIN INTERIOR
SCALE: 3/8" = 1'-0"



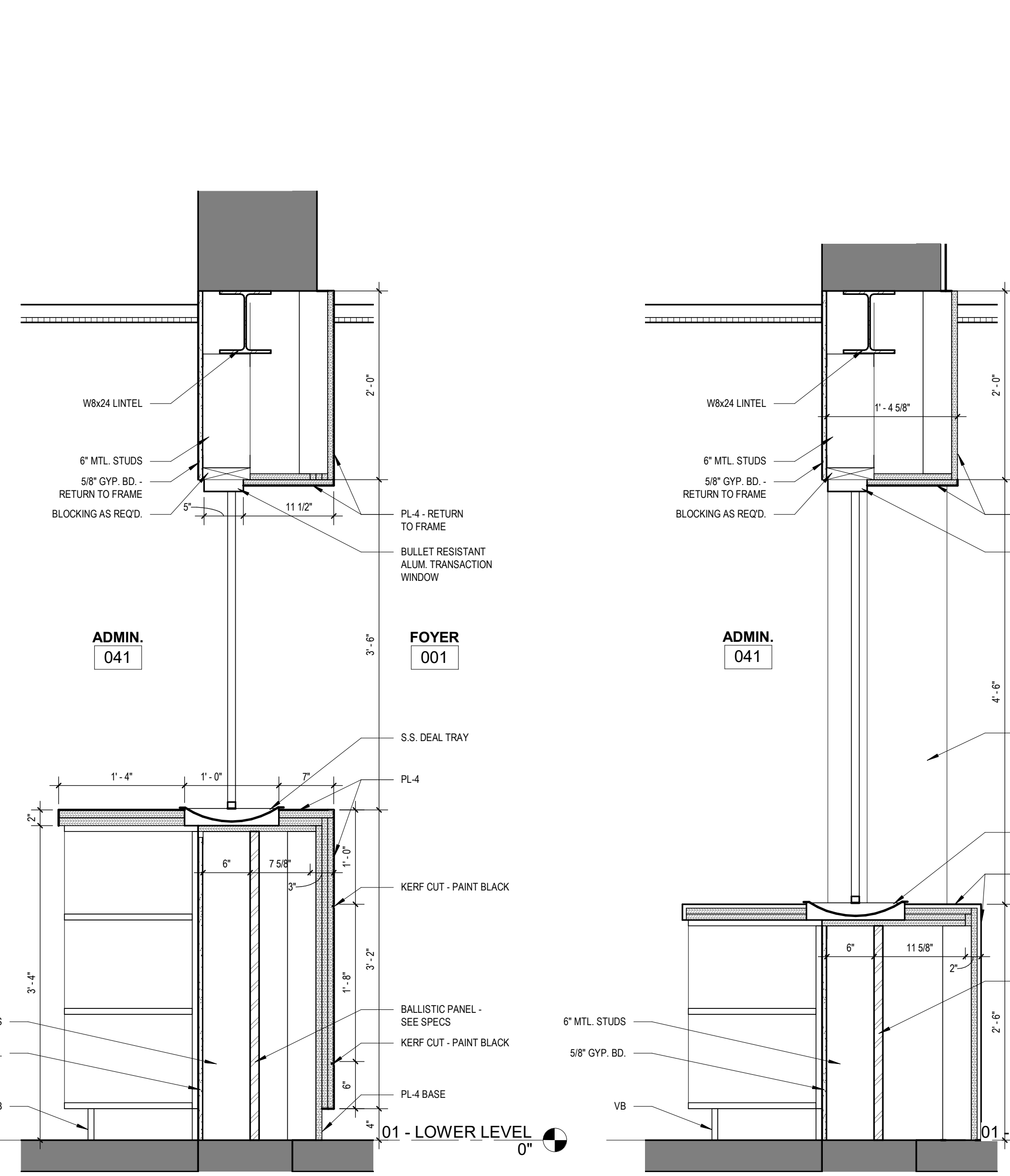
10 063 - PLANNING WINDOW
SCALE: 1/2" = 1'-0"



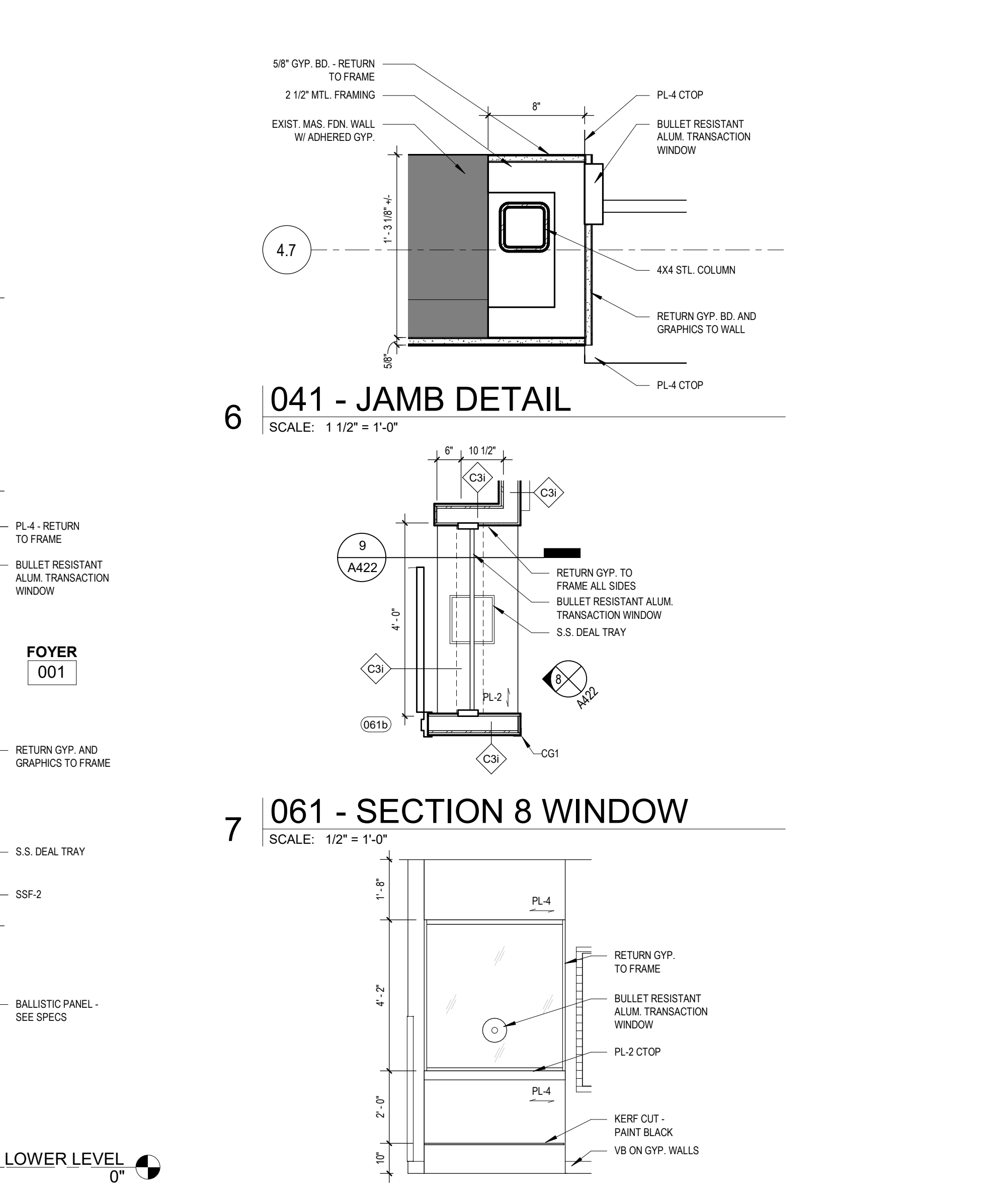
11 205 - LOBBY DISPLAY
SCALE: 1/2" = 1'-0"



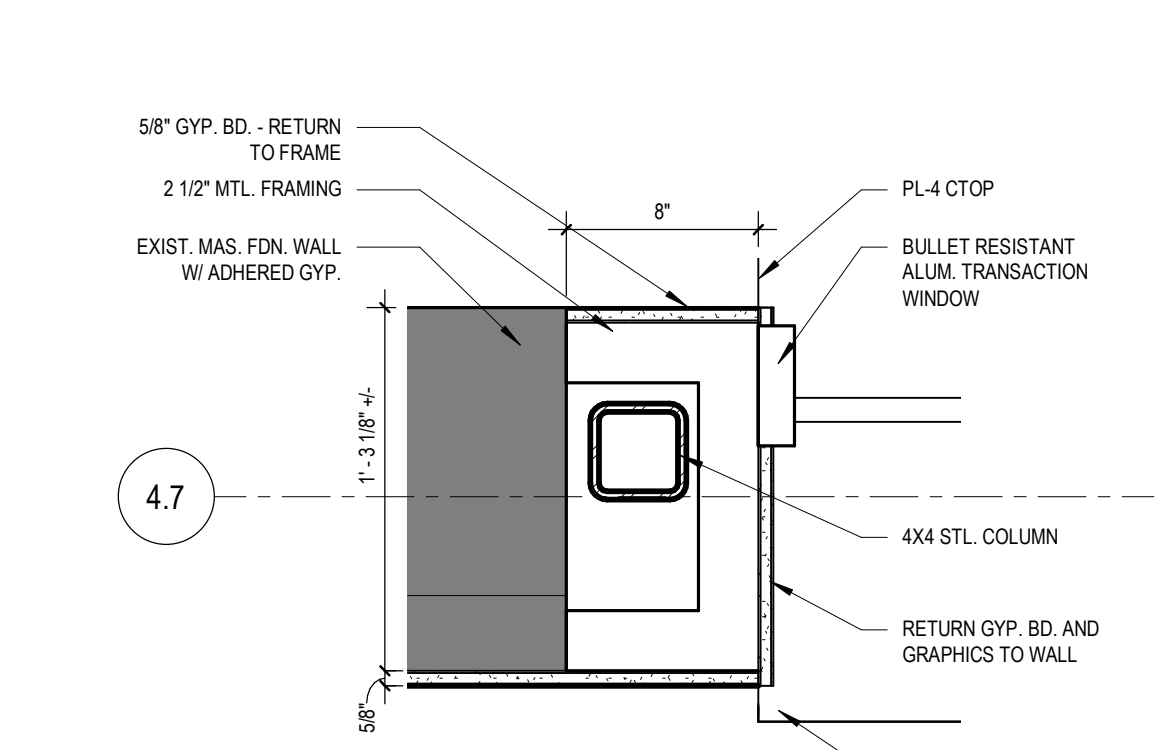
12 205 - LOBBY DISPLAY
SCALE: 3/8" = 1'-0"



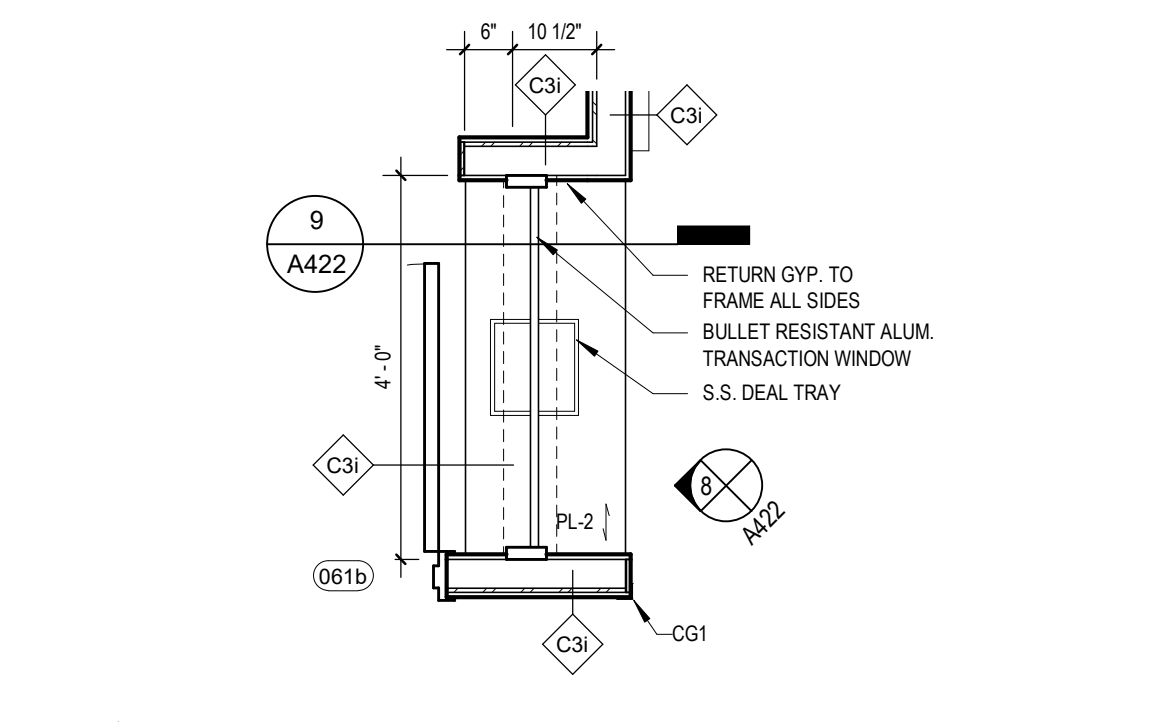
4 041 - SECTION 1
SCALE: 1" = 1'-0"



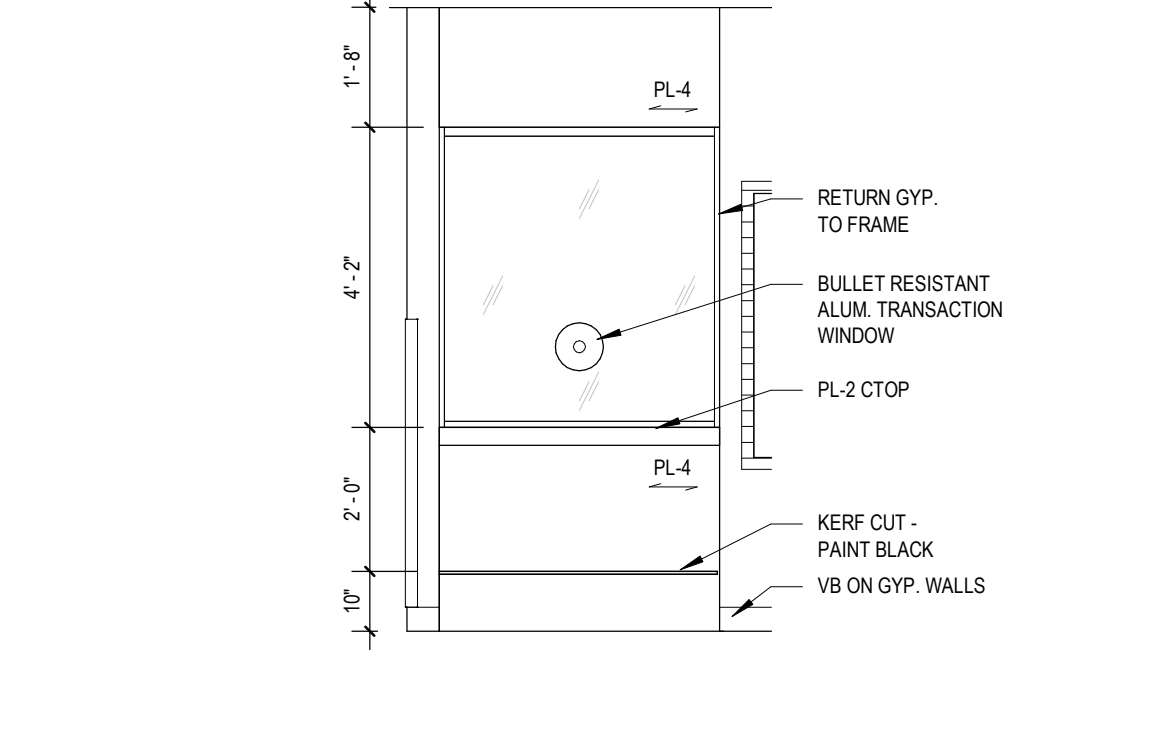
5 041 - SECTION 2
SCALE: 1" = 1'-0"



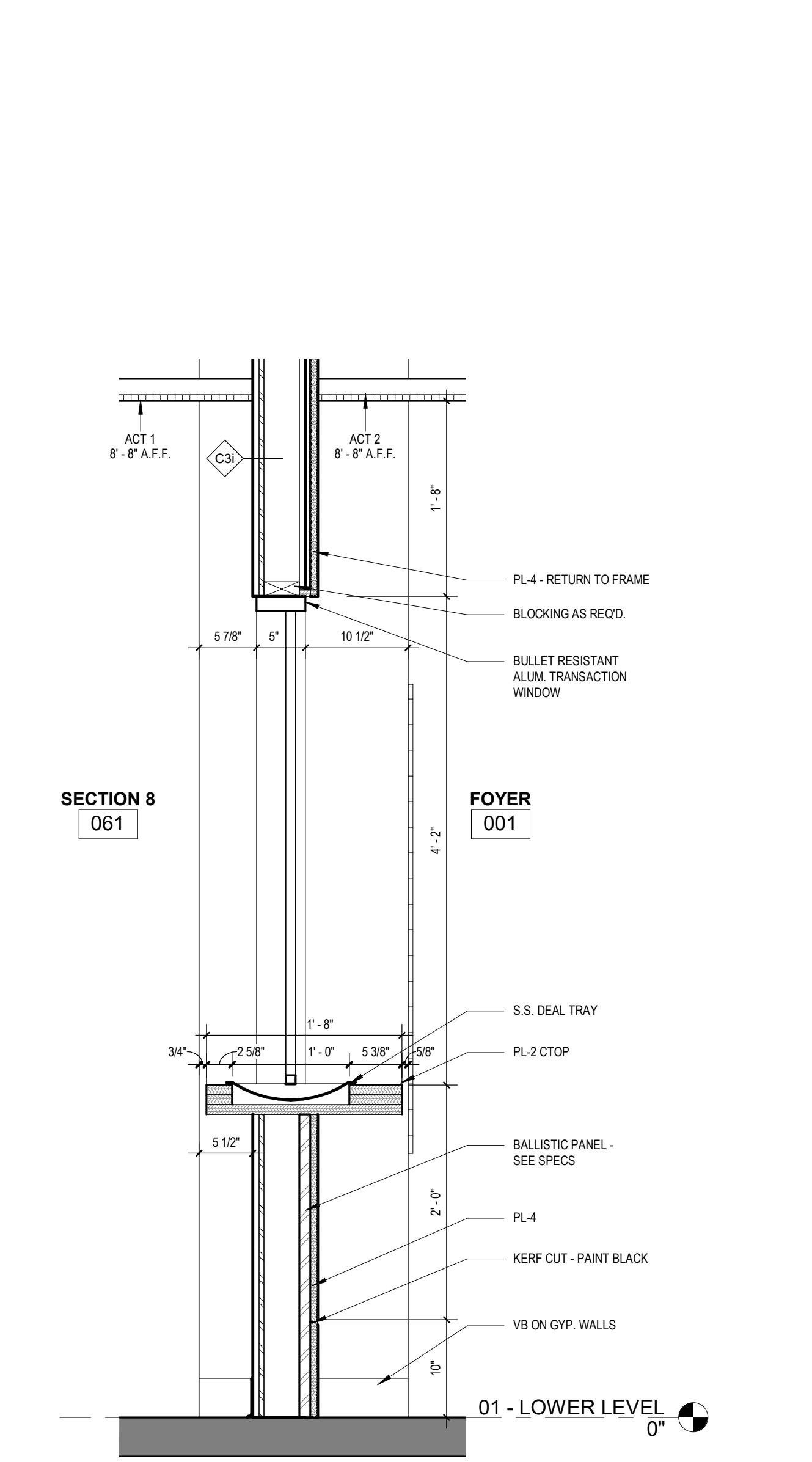
6 041 - JAMB DETAIL
SCALE: 1 1/2" = 1'-0"



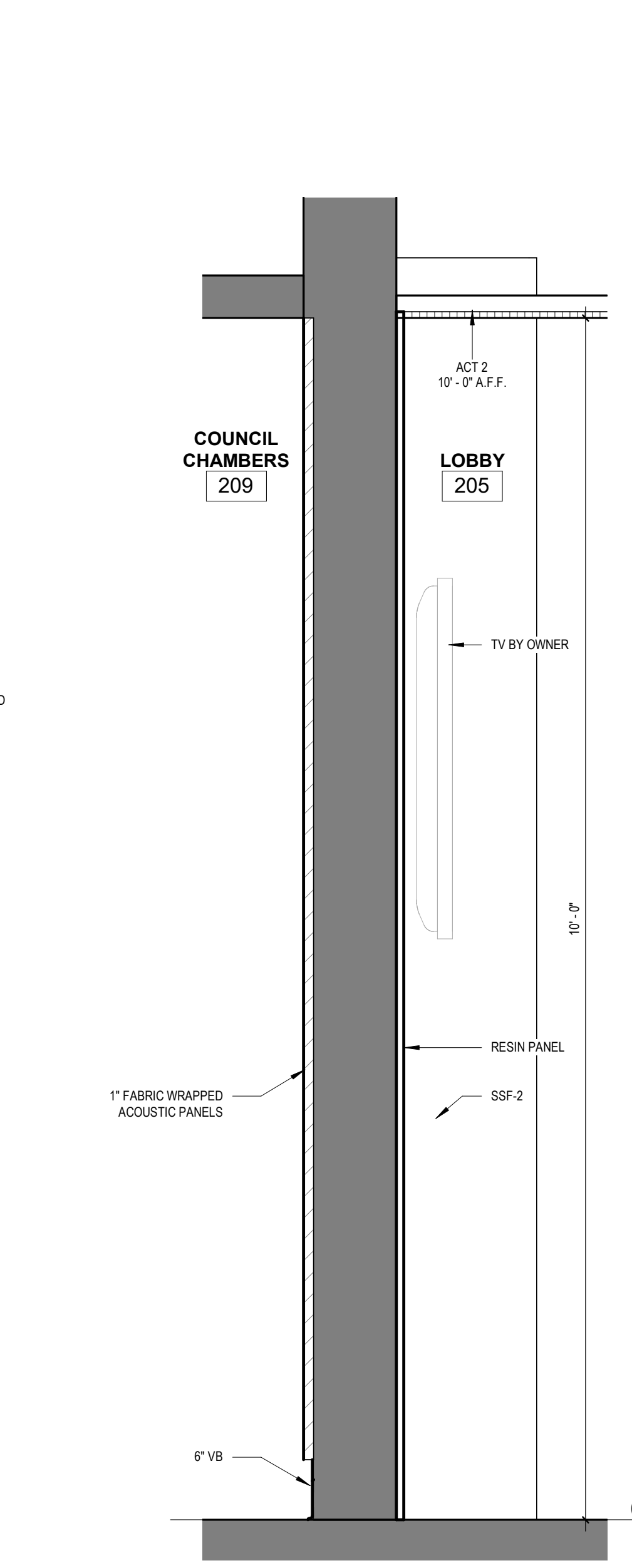
7 061 - SECTION 8 WINDOW
SCALE: 1/2" = 1'-0"



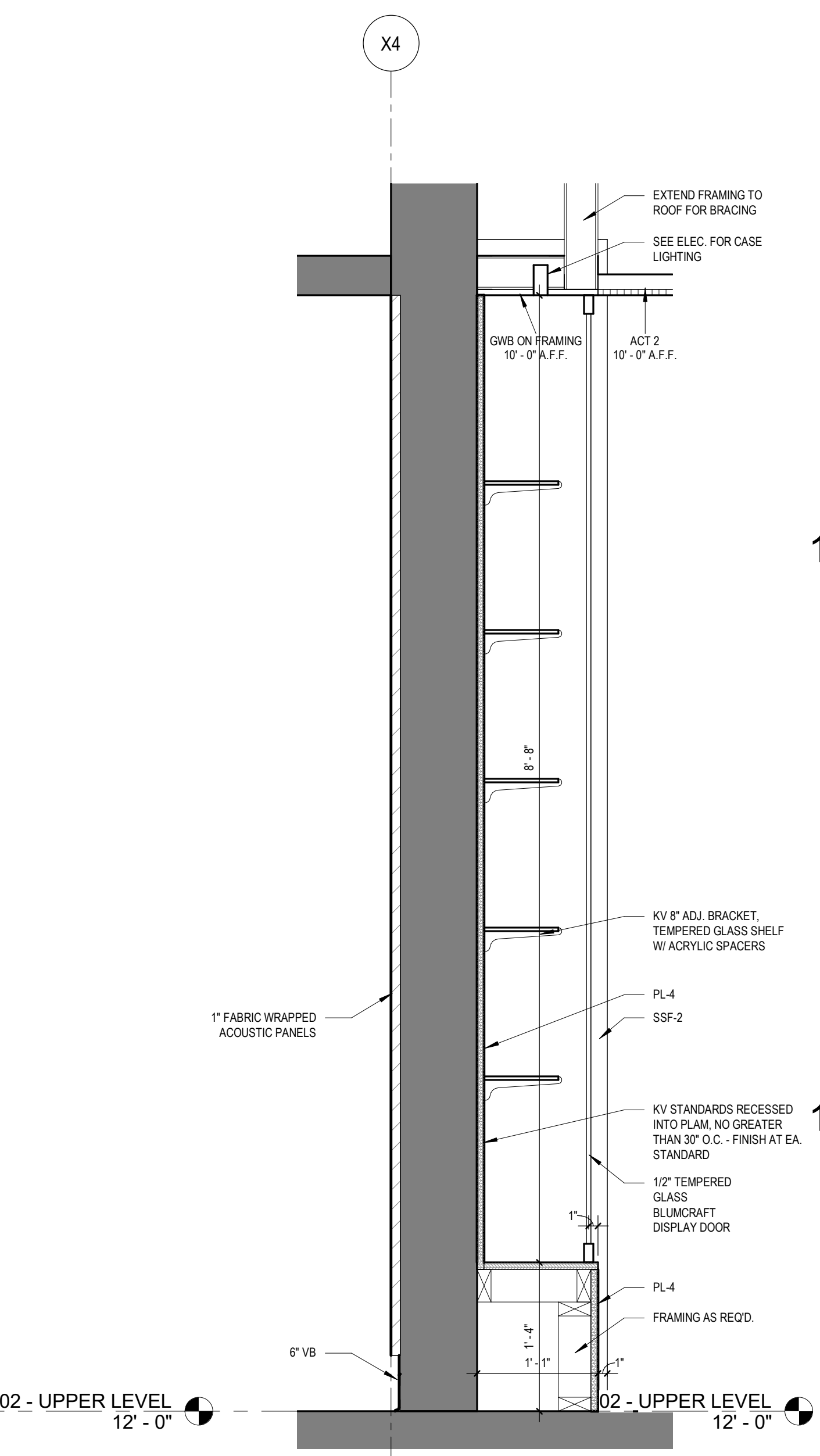
8 061 - SECTION 8
SCALE: 3/8" = 1'-0"



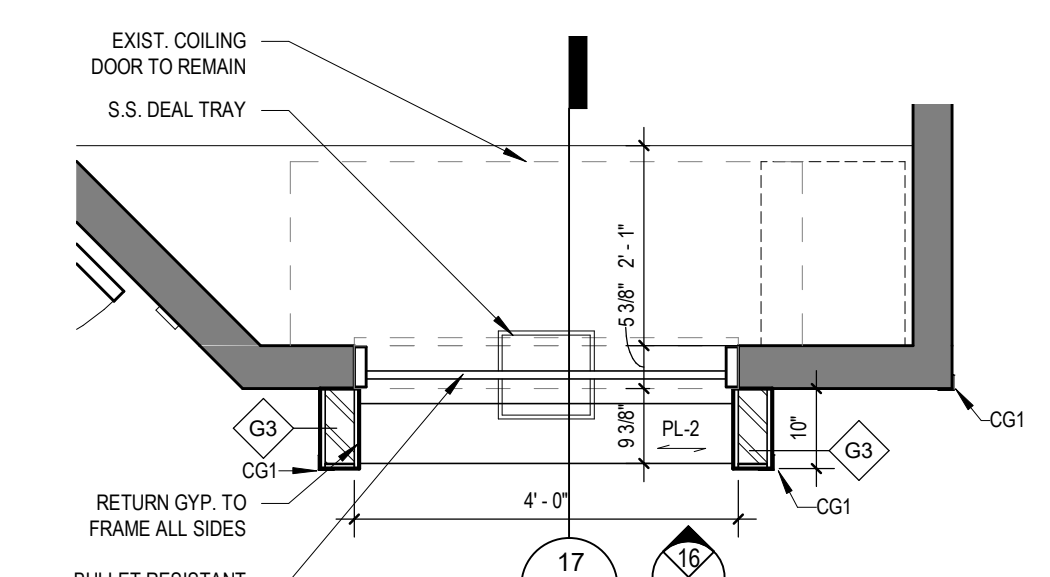
9 TRANSACTION WINDOW SECTION
SCALE: 1" = 1'-0"



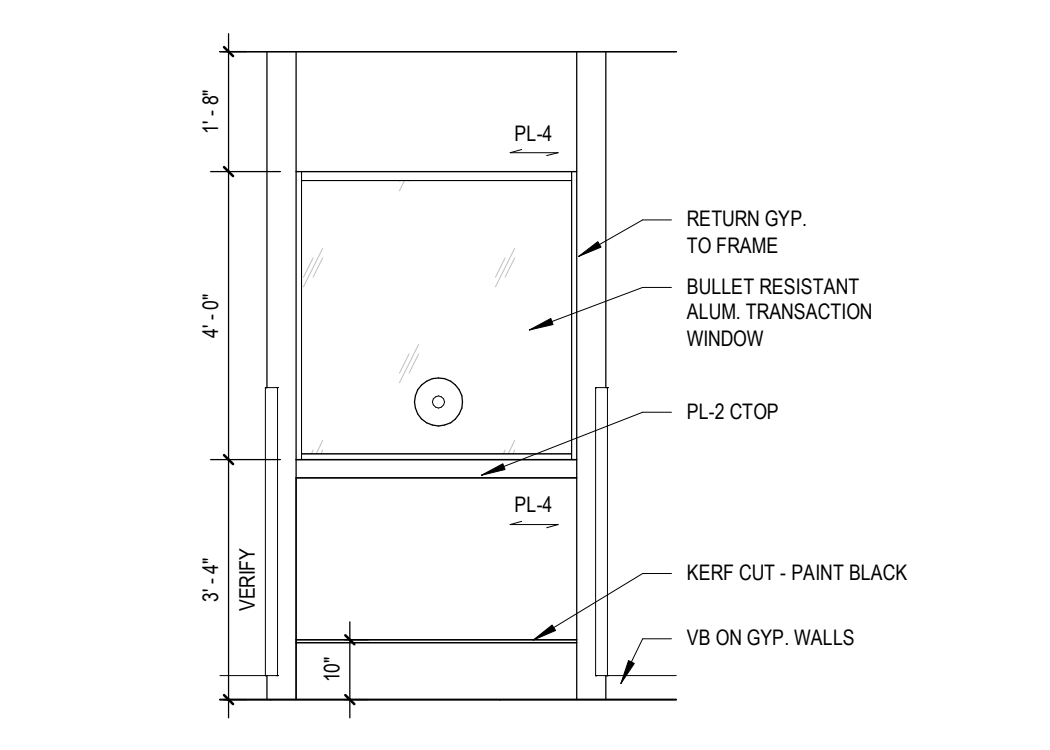
13 205 DISPLAY SECTION 1
SCALE: 1" = 1'-0"



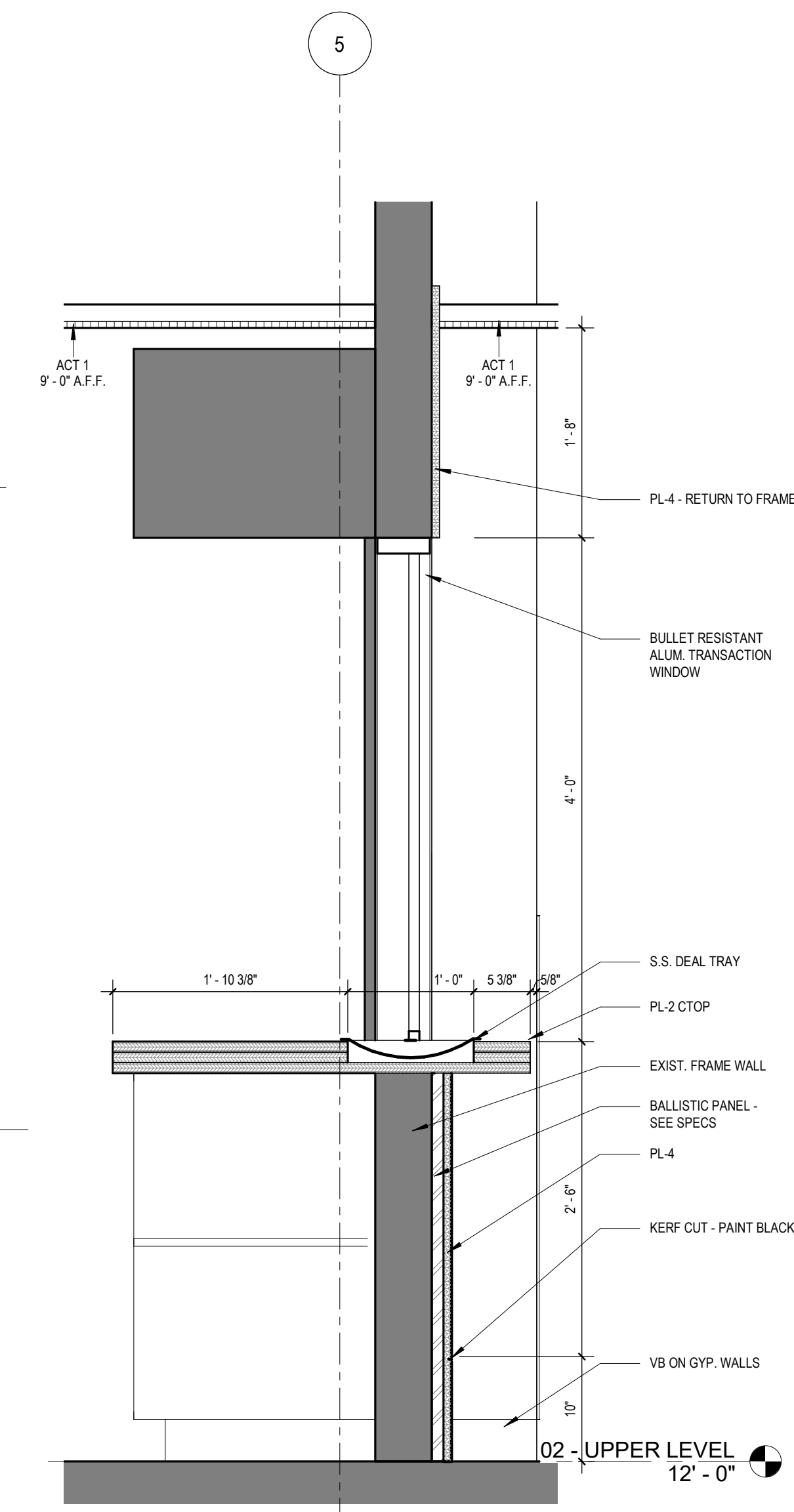
14 205 DISPLAY SECTION 2
SCALE: 1" = 1'-0"



15 230 - ADMIN WINDOW
SCALE: 1/2" = 1'-0"



16 230 - ADMIN
SCALE: 3/8" = 1'-0"



17 230 - ADMIN SECTION
SCALE: 1" = 1'-0"

**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

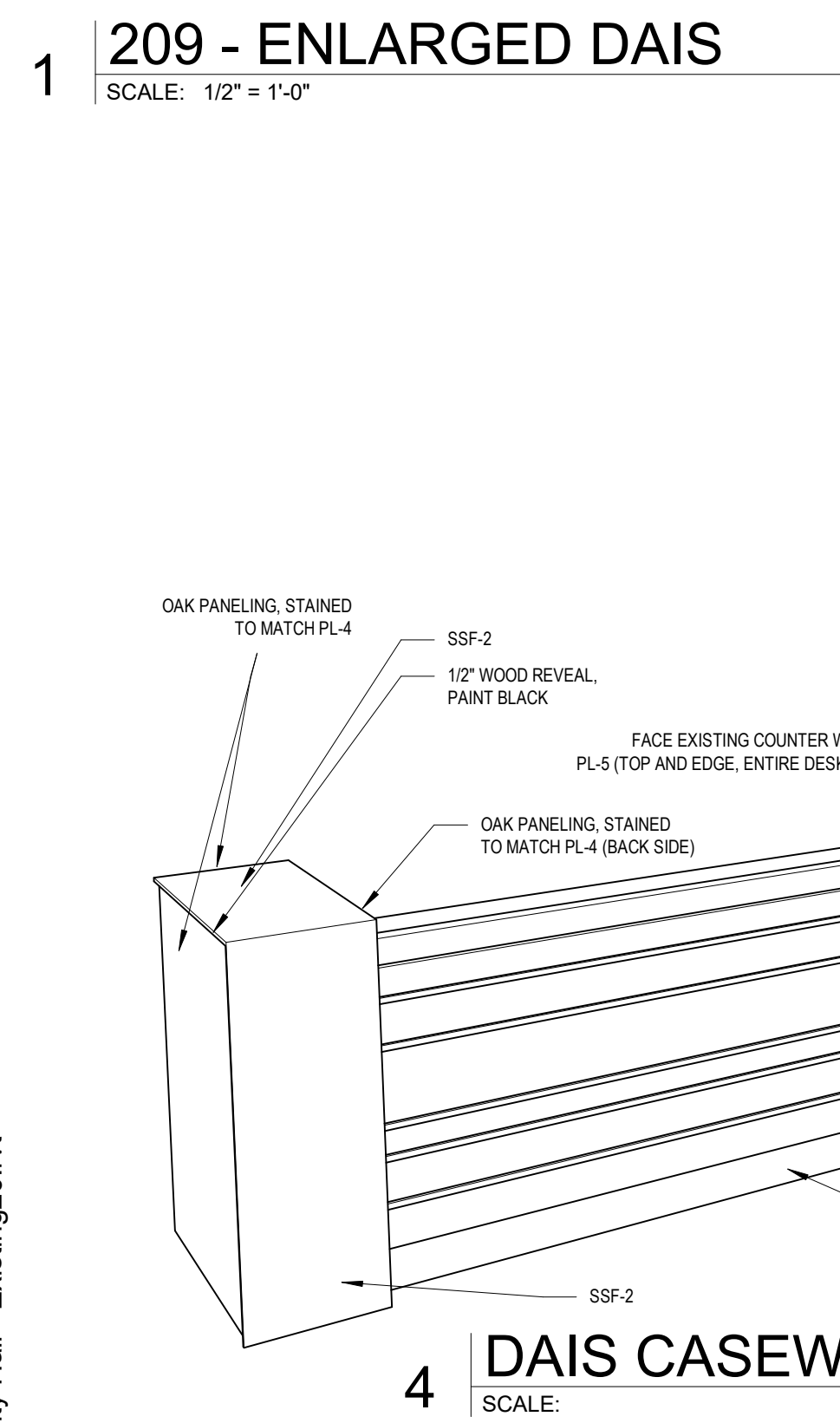
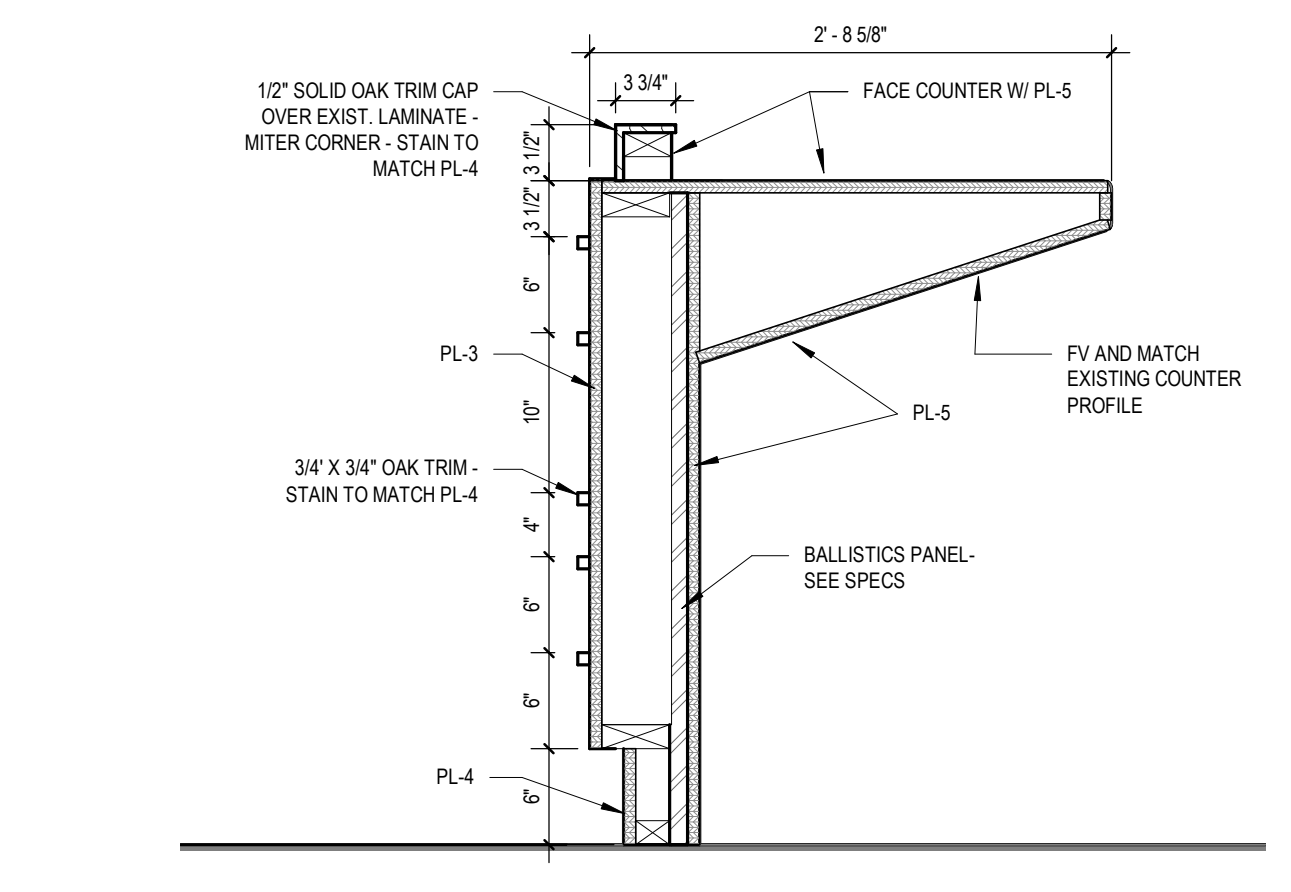
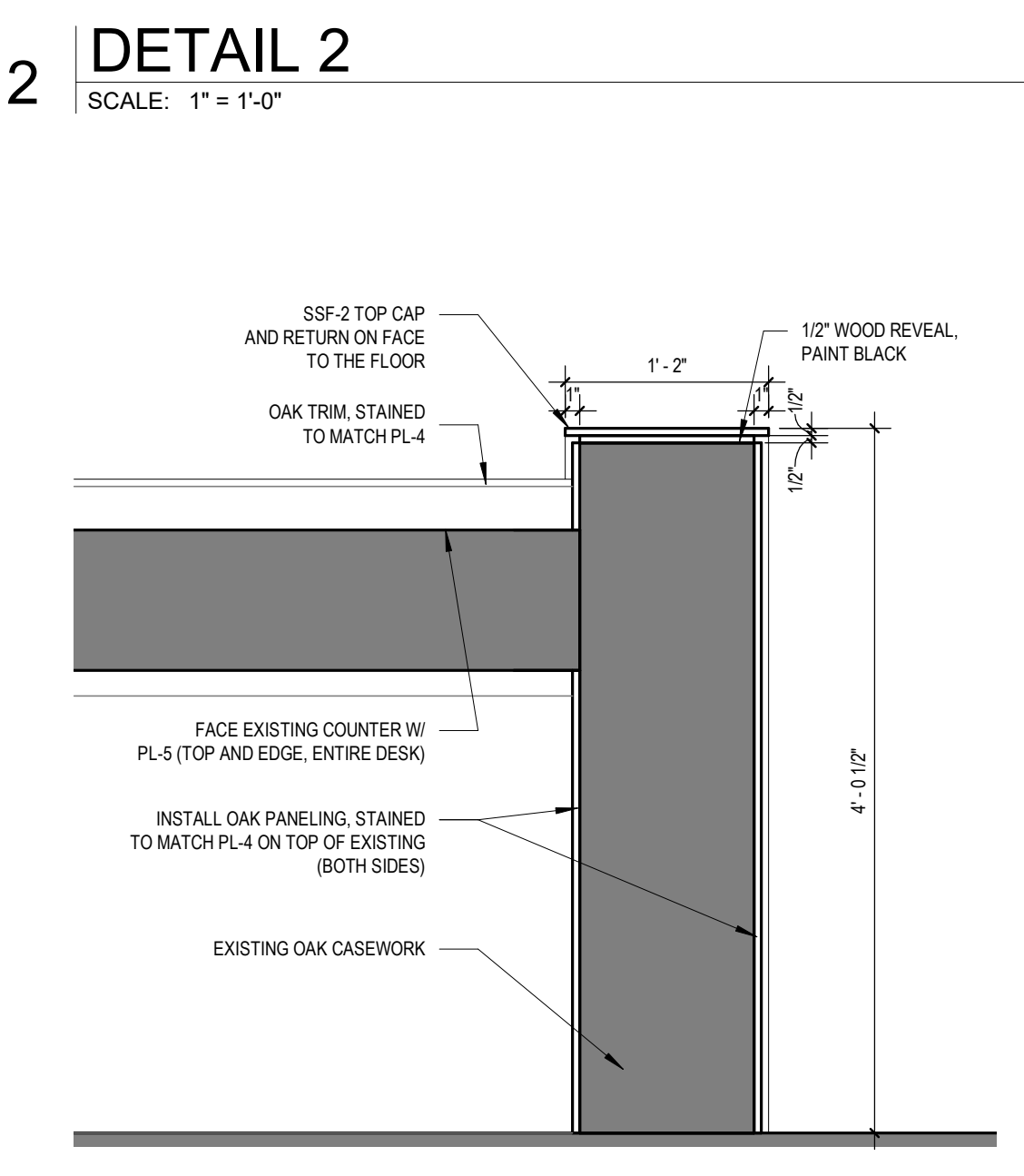
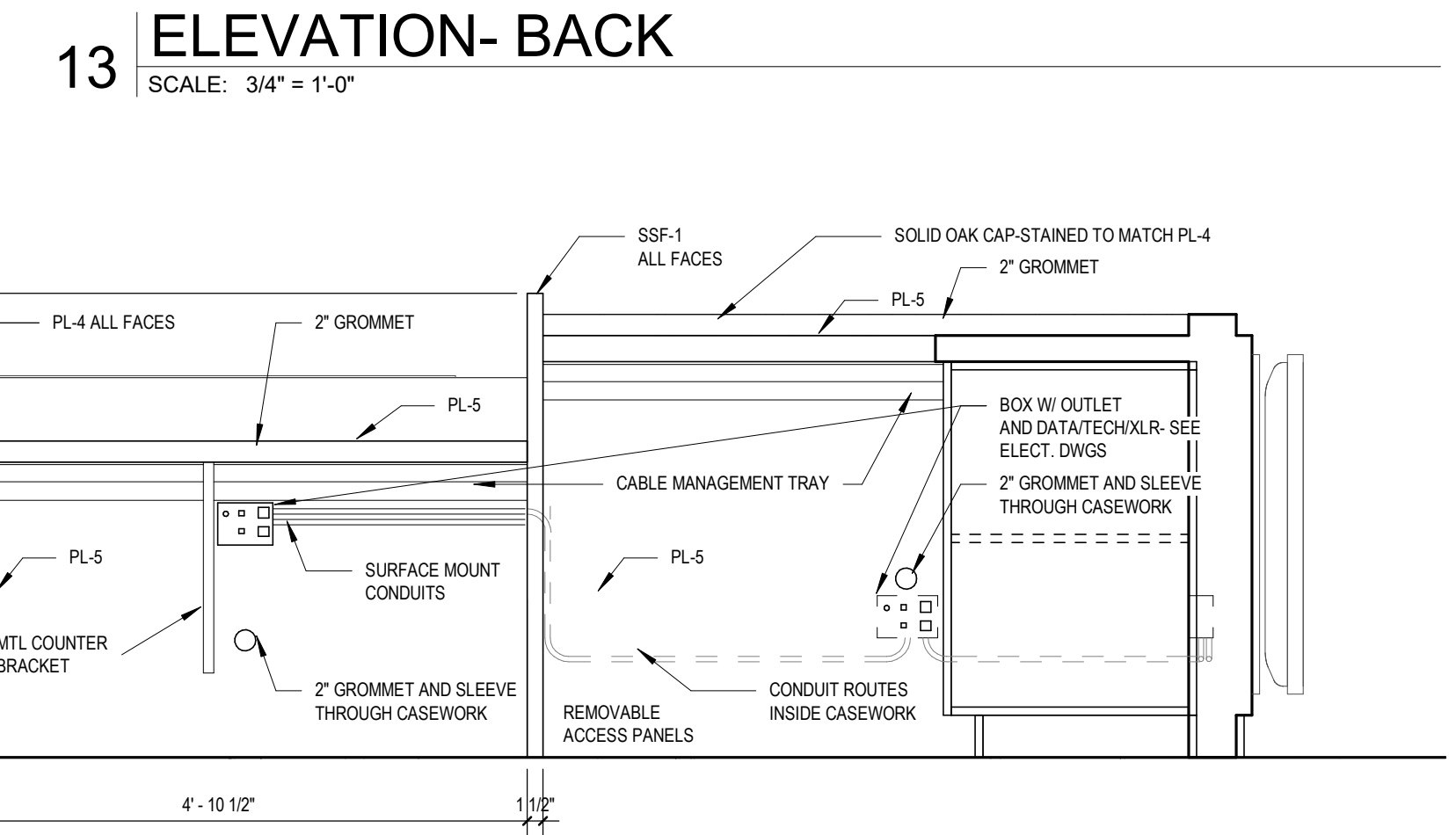
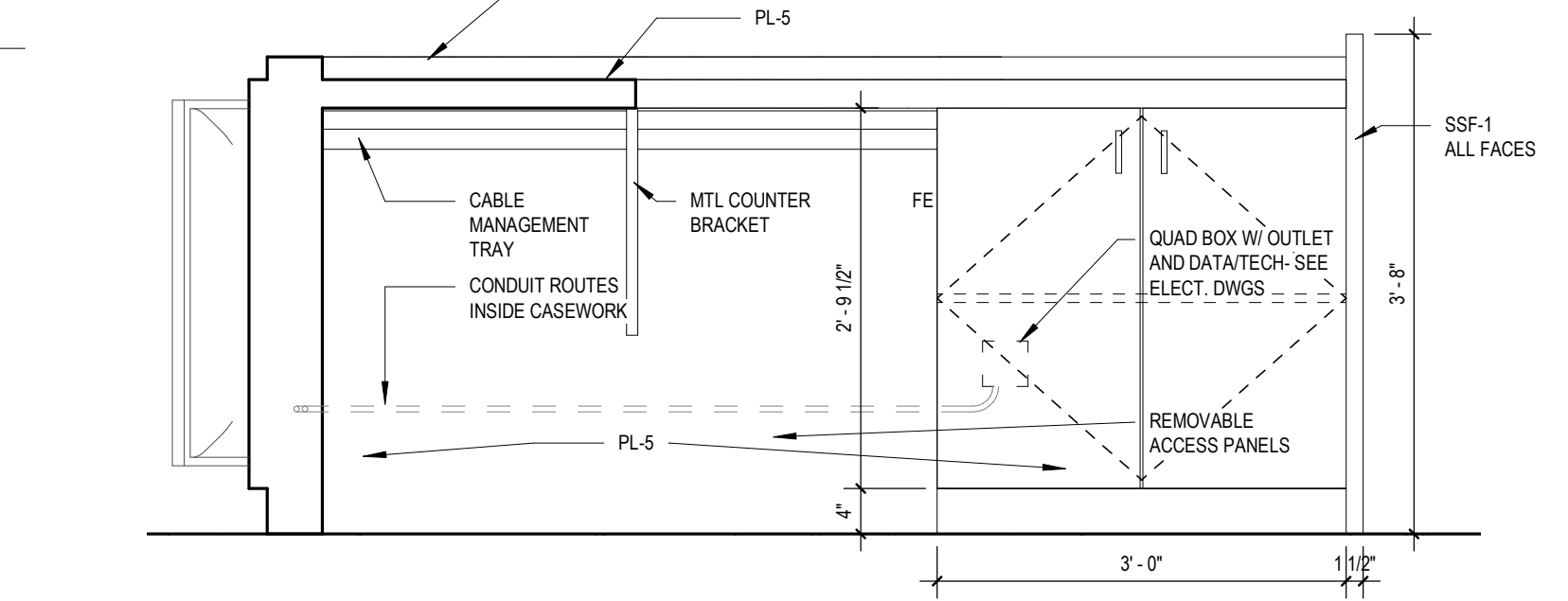
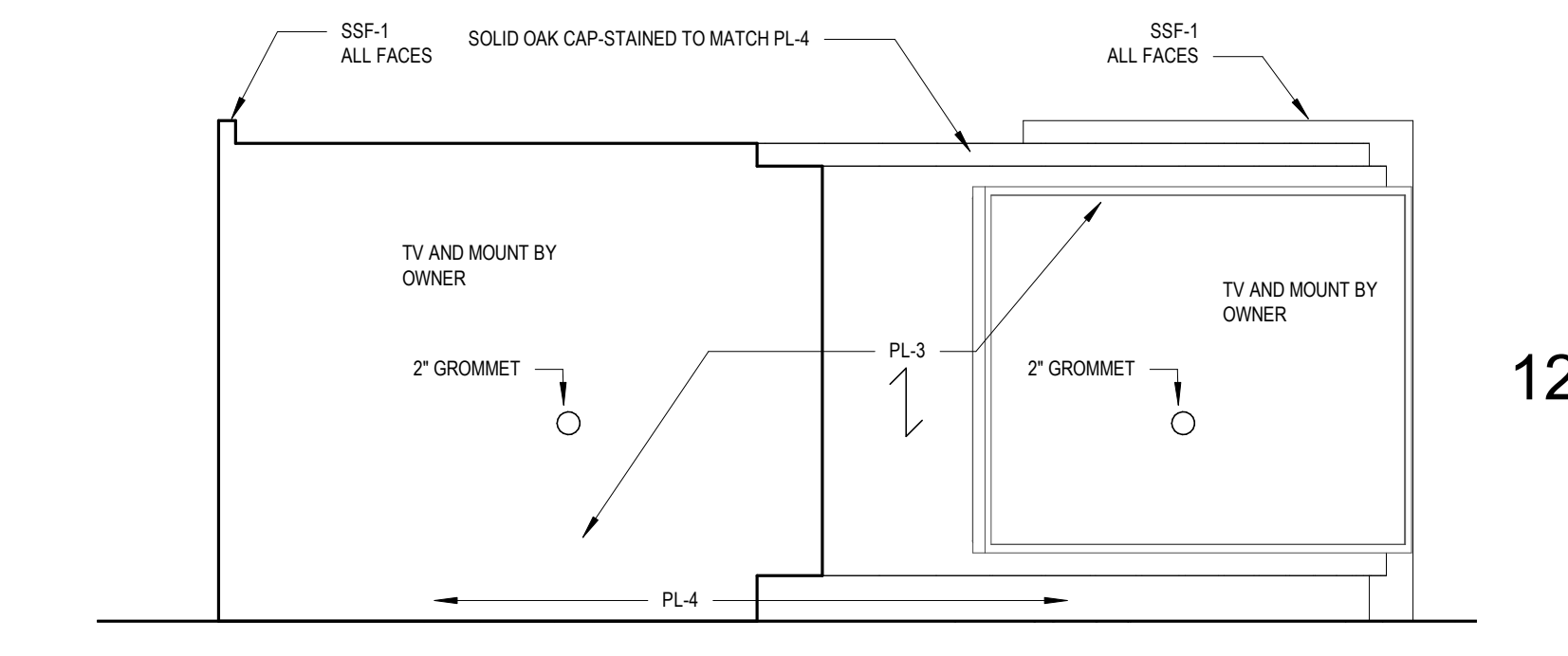
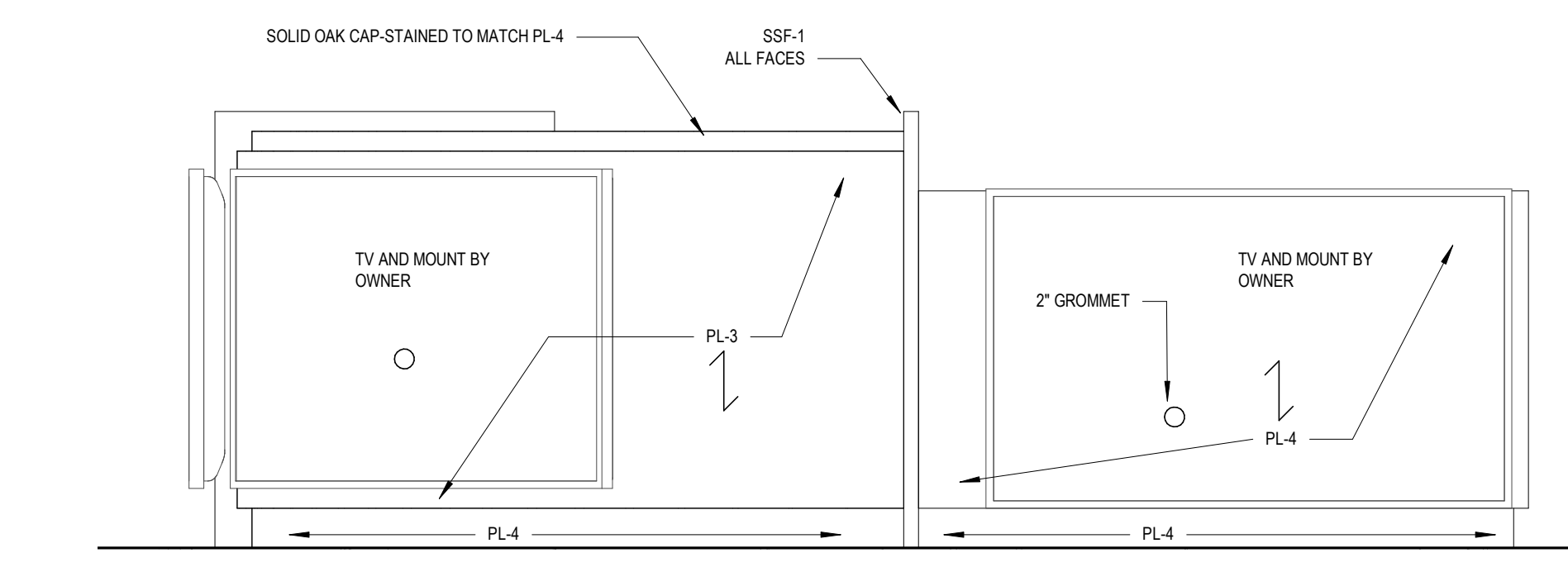
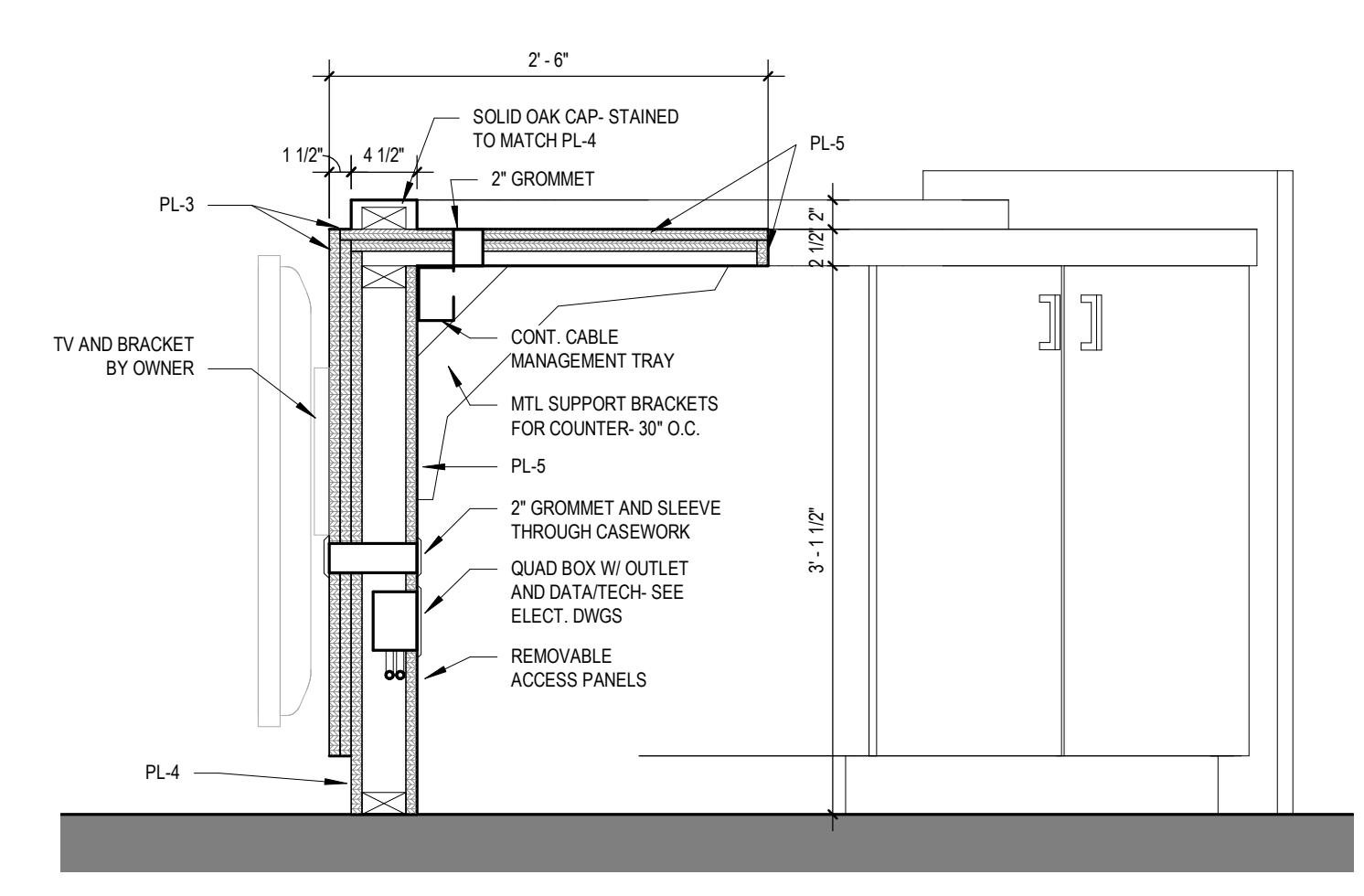
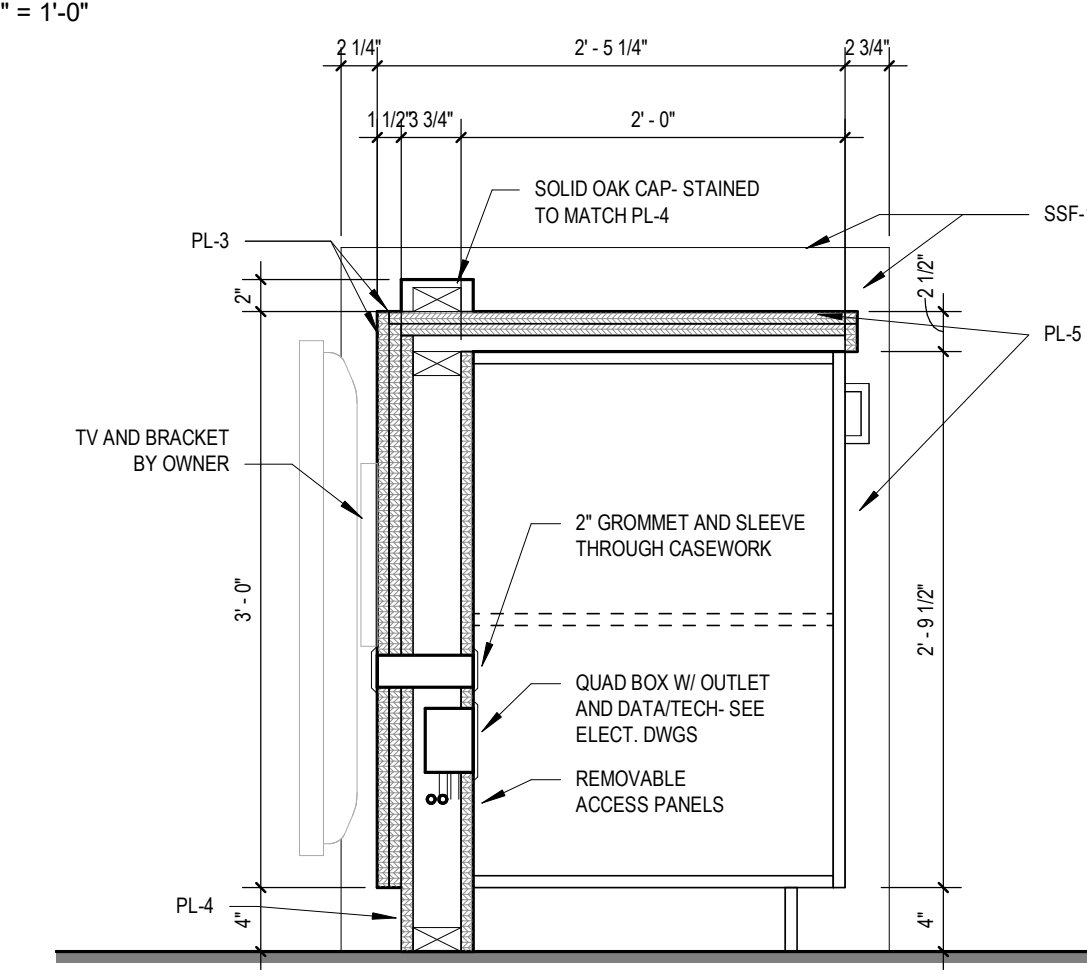
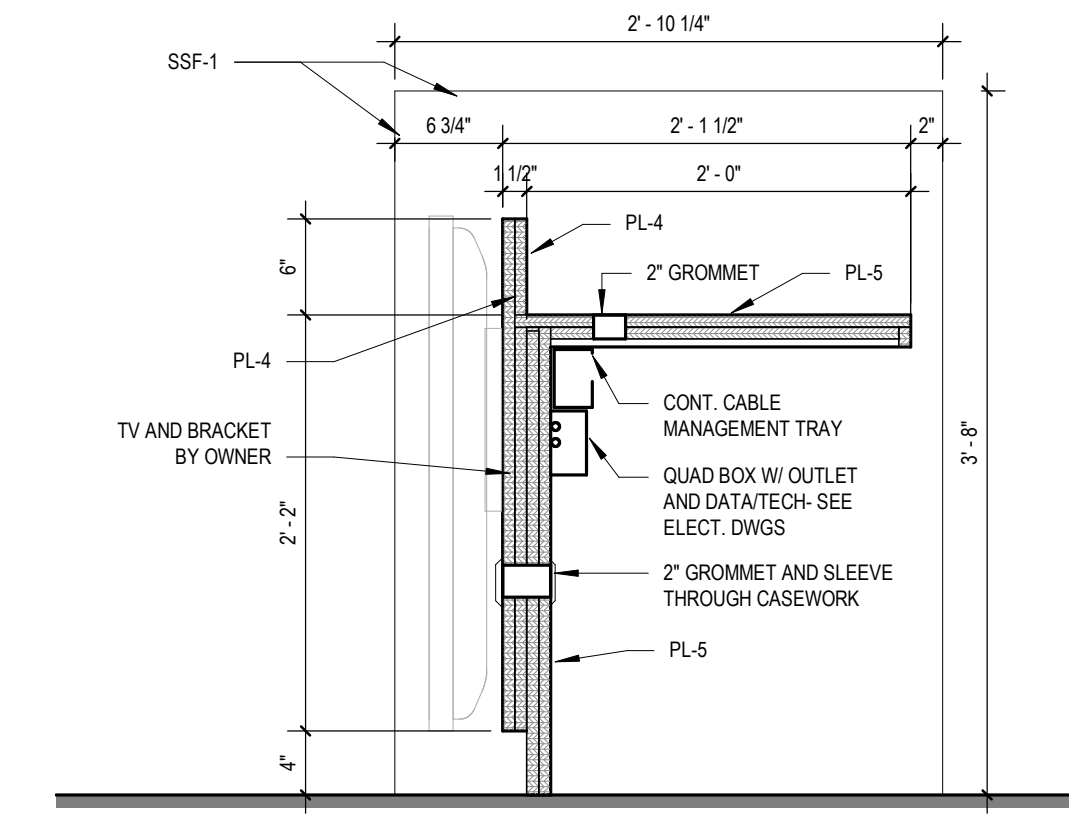
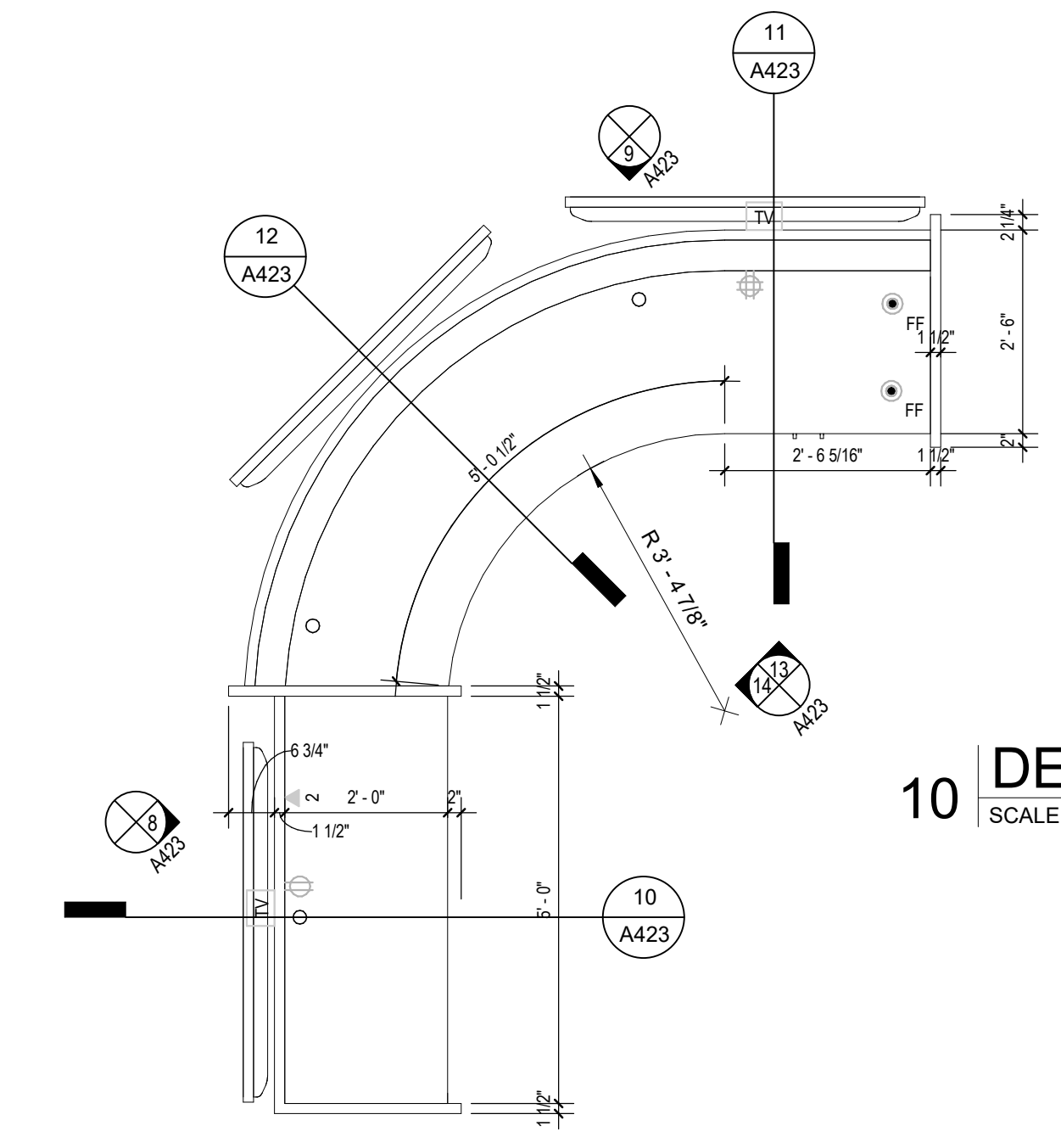
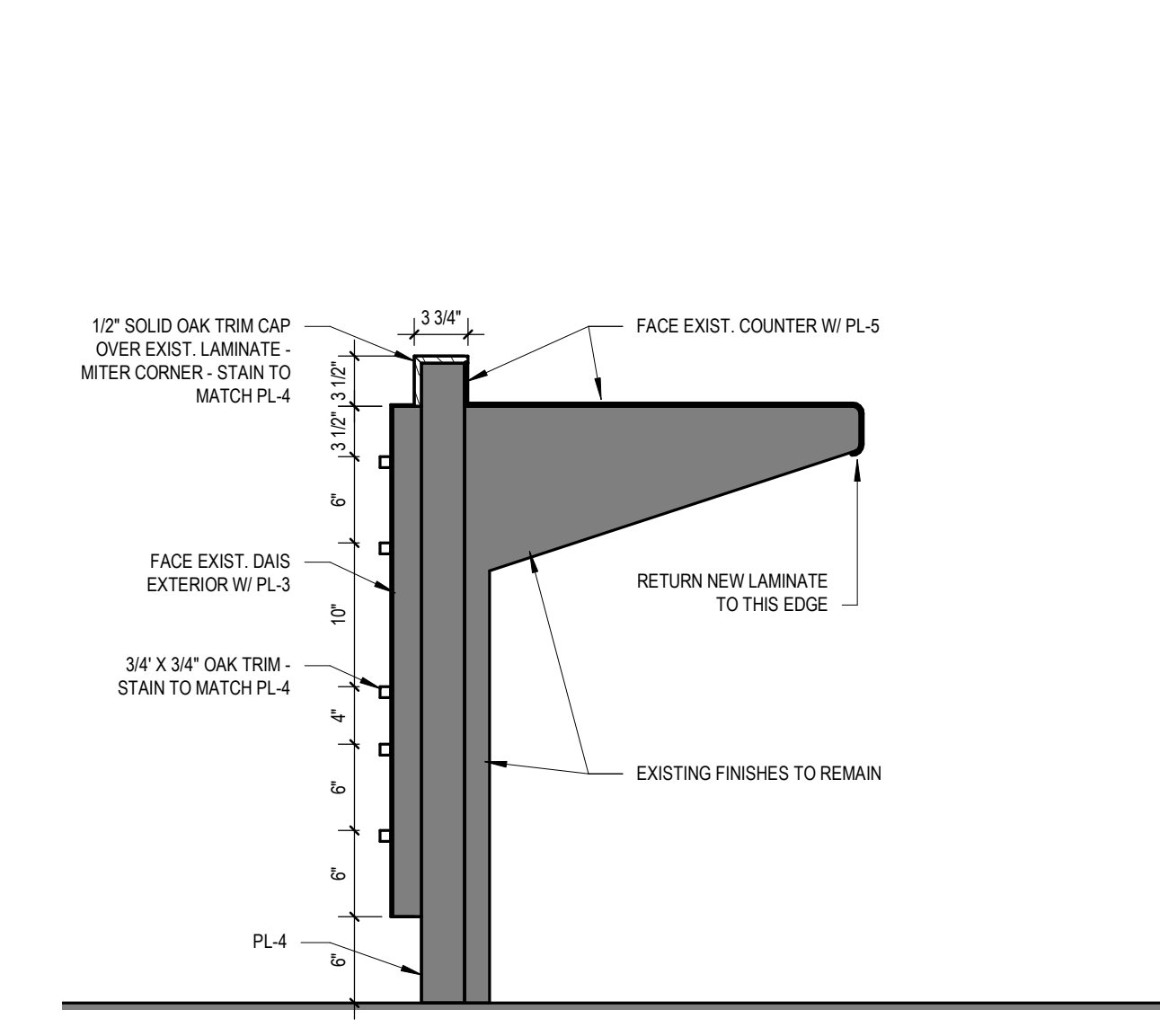
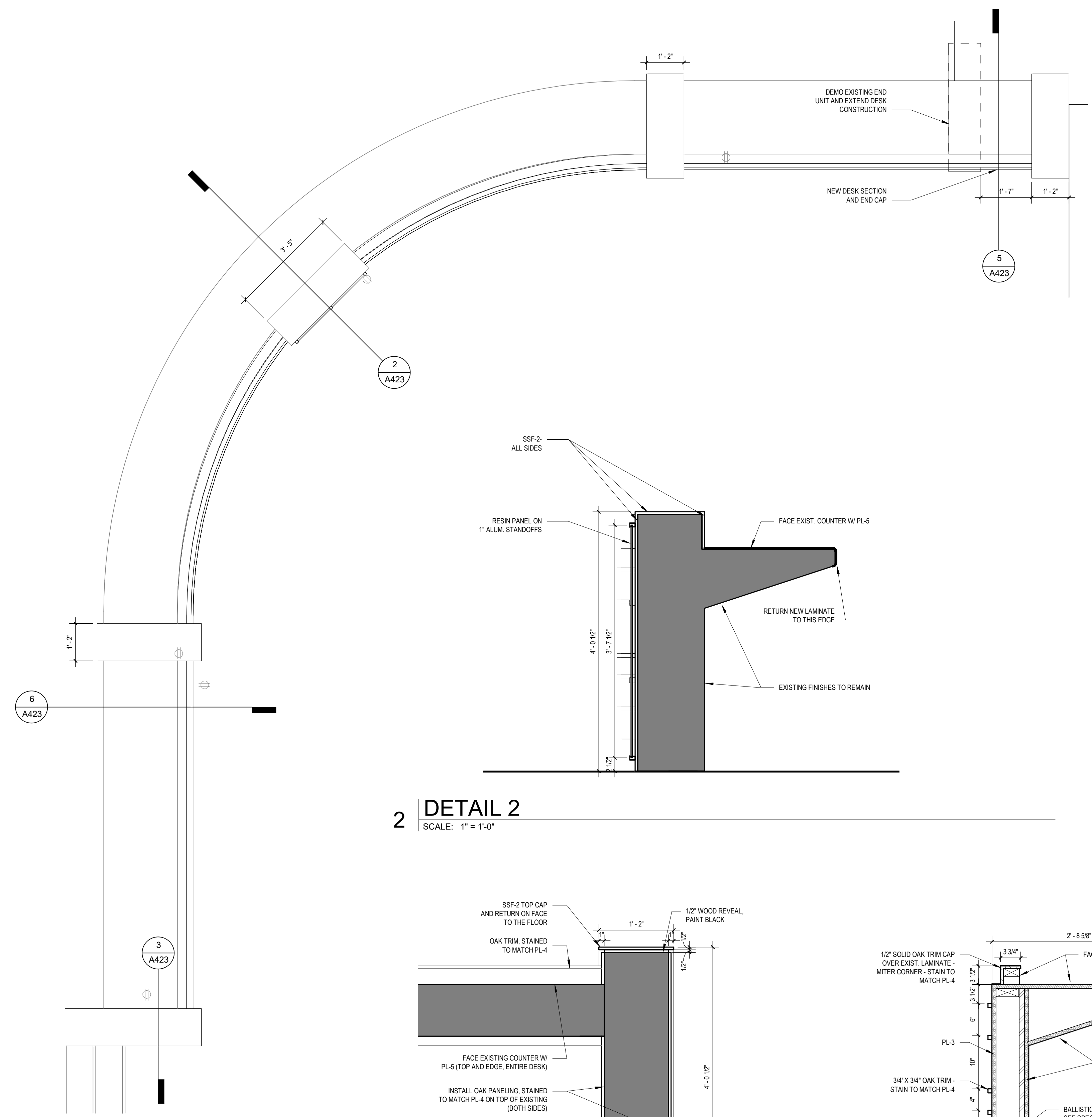
No.	Description	Date
	95% OWNER REVIEW SET ISSUED FOR BID	9-24-2021 10-5-2021

**CASEWORK
DETAILS**

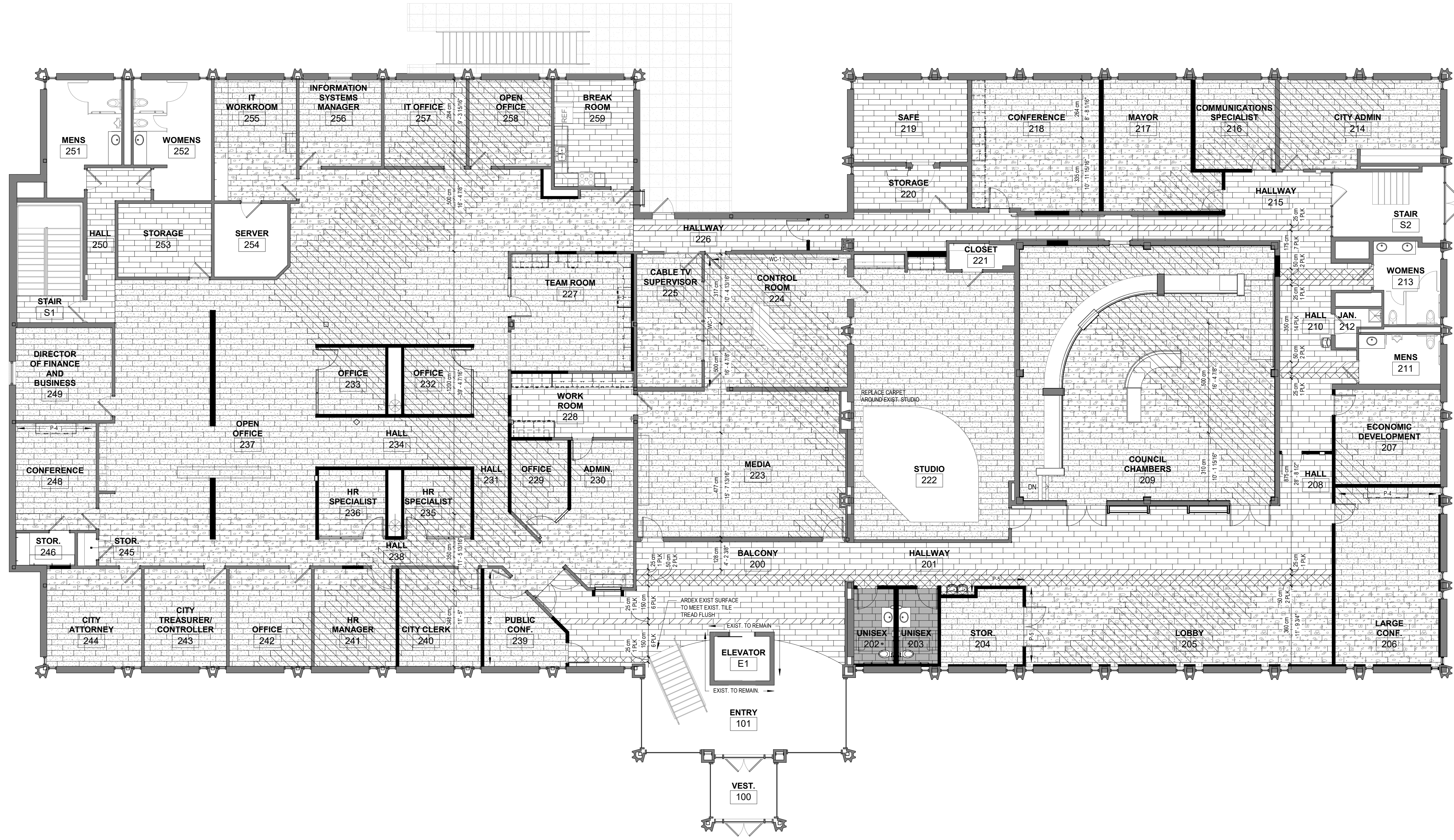
Project Number: 21004
Date: OCTOBER 5, 2021

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Project Number
Date



1 02 - UPPER LEVEL FINISH PLAN
SCALE: 1/8" = 1'-0"

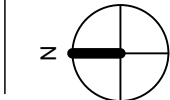


FINISH PLANS

No.	Description	Date
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	ISSUED FOR BID	10-5-2021

Project Number 21004
Date OCTOBER 5, 2021

AF102



CEDAR FALLS CITY HALL
REMODEL
CEDAR FALLS, IOWA

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JOHNSTON, IA 50131
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ARCHITECTURE

100 EAST SECOND STREET
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CEDAR FALLS, IA 50613

CEDAR FALLS CITY HALL
REMODEL
CEDAR FALLS, IOWA

MECHANICAL GENERAL NOTES & SYMBOLS

Project Number 21004
Date OCTOBER 5, 2021

M000

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021



5518 NW 88th Street
JOHNSTON, IA 50131
515-727-0700
www.bluestonemep.com/
Project #: 121-011

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*NOT ALL SYMBOLS/NOTES ARE USED

GENERAL NOTES: PLUMBING

- A. COORDINATE INSTALLATION WITH ARCHITECTURAL CODE PLANS. ALL WALL AND FLOOR PENETRATIONS OF FIRE RATED ASSEMBLIES TO BE SEALED.
- B. COORDINATE PIPING PENETRATIONS THRU WALLS, ROOFS, OR CEILING WITH ALL TRADES.
- C. ROUTE ALL PIPING IN EXPOSED AREAS AS HIGH AS POSSIBLE, UNLESS NOTED OTHERWISE.
- D. PLANS DO NOT INCLUDE ALL OFFSETS FOR COORDINATION WITH DUCT, PIPING, LIGHTING AND STRUCTURAL SYSTEMS. PROVIDE ALLOWANCES FOR REQUIRED OFFSETS.
- E. DO NOT ROUTE PIPE ABOVE OR BELOW ELECTRICAL PANELS INCLUDING PANEL SERVICE CLEARANCES.
- F. PIPES ARE SHOWN SPREAD OUT ON PLANS FOR DRAWING CLARITY.
- G. COORDINATE PIPE ROUTING TO AVOID RUNNING PIPING BELOW ROOF HATCHES, SKYLIGHTS AND ACCESS PANELS.
- H. PLUMBING CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING METHODS OF BRINGING IN PLUMBING EQUIPMENT THROUGH BUILDING INTO MECHANICAL ROOMS.
- I. PIPING SHALL NOT BE SUPPORTED FROM OTHER PIPING, CONDUIT, OR DUCTWORK.
- J. COORDINATE ROUTING OF ALL PIPING WITH OTHER TRADES. DO NOT ROUTE ANY PIPING BELOW TERMINAL AIR BOXES AND COORDINATE ROUTING OF PIPING WITHIN BLOCK WALLS.
- K. INSTALL PIPING, VALVES, AND ACCESSORIES SO THEY ARE ACCESSIBLE.
- L. PROVIDE CLEANOUTS IN SANITARY AND STORM DRAINAGE SYSTEMS AT THE ENDS OF RUNS, AT CHANGES IN DIRECTION, NEAR THE BASE OF STACKS, EVERY 100 FT IN HORIZONTAL RUNS AND ELSEWHERE AS INDICATED.
- M. REFER TO SCHEDULE FOR SIZE OF BRANCH PIPING SERVING INDIVIDUAL FIXTURES. BRANCH PIPING SIZE TO MATCH THE CONNECTION SIZE UNLESS OTHERWISE NOTED.
- N. CONTRACTOR TO ENSURE THAT CLEANOUT (FCO AND WCO) LOCATIONS DO NOT REST BELOW OR BEHIND CASEWORK.
- O. VERIFY THAT ALL PLUMBING VENTS ARE LOCATED 15' FROM OUTSIDE AIR INTAKES AND LOUVERS. SHIFT VTB AS REQUIRED.

GENERAL NOTES: HVAC

- A. COORDINATE INSTALLATION WITH ARCHITECTURAL CODE PLANS. ALL WALL AND FLOOR PENETRATIONS OF FIRE RATED ASSEMBLIES TO BE SEALED.
- B. PLANS DO NOT NECESSARILY SHOW ALL DUCTWORK TRANSFORMATION PIECES TO MECHANICAL EQUIPMENT CONTRACTOR TO PROVIDE ALL DUCTWORK TRANSITIONS AND FLEXIBLE CONNECTIONS AS REQUIRED. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
- C. COORDINATE DUCT PENETRATIONS THRU WALLS, ROOFS, OR CEILING WITH ALL TRADES.
- D. ROUTE ALL DUCTS IN EXPOSED AREAS AS HIGH AS POSSIBLE, UNLESS NOTED OTHERWISE.
- E. PLANS DO NOT INCLUDE ALL OFFSETS FOR COORDINATION WITH DUCT PIPING, LIGHTING AND STRUCTURAL SYSTEMS. PROVIDE ALLOWANCES FOR REQUIRED OFFSETS.
- F. DO NOT ROUTE DUCT ABOVE OR BELOW ELECTRICAL PANELS INCLUDING PANEL SERVICE CLEARANCES.
- G. IT IS ACCEPTABLE TO SUBSTITUTE SPIRAL DUCTWORK FOR RECTANGULAR DUCTWORK AS CONTRACTOR'S OPTION.
- H. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING METHODS OF BRINGING IN MECHANICAL EQUIPMENT THROUGH BUILDING INTO MECHANICAL ROOMS.
- I. MAINTAIN SERVICE CLEARANCE AND ACCESS TO ALL EQUIPMENT.

GENERAL NOTES: PIPING

- A. COORDINATE INSTALLATION WITH ARCHITECTURAL CODE PLANS. ALL WALL AND FLOOR PENETRATIONS OF FIRE RATED ASSEMBLIES TO BE SEALED.
- B. COORDINATE PIPING PENETRATIONS THRU WALLS, ROOFS, OR CEILING WITH ALL TRADES.
- C. ROUTE ALL PIPING IN EXPOSED AREAS AS HIGH AS POSSIBLE, UNLESS NOTED OTHERWISE.
- D. PLANS DO NOT INCLUDE ALL OFFSETS FOR COORDINATION WITH DUCT PIPING, LIGHTING AND STRUCTURAL SYSTEMS. PROVIDE ALLOWANCES FOR REQUIRED OFFSETS.
- E. DO NOT ROUTE PIPE ABOVE OR BELOW ELECTRICAL PANELS INCLUDING PANEL SERVICE CLEARANCES.
- F. PIPES ARE SHOWN SPREAD OUT ON PLANS FOR DRAWING CLARITY.
- G. COORDINATE PIPE ROUTING TO AVOID RUNNING PIPING BELOW ROOF HATCHES, SKYLIGHTS AND ACCESS PANELS.
- H. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING METHODS OF BRINGING IN MECHANICAL EQUIPMENT THROUGH BUILDING INTO MECHANICAL ROOMS.
- I. PIPING SHALL NOT BE SUPPORTED FROM OTHER PIPING, CONDUIT, OR DUCTWORK.
- M. MAINTAIN SERVICE CLEARANCE AND ACCESS TO ALL EQUIPMENT.
- N. PROVIDE CHAIN WHEEL OPERATORS FOR ALL VALVES IN EQUIPMENT ROOMS MOUNTED GREATER THAN 7'-0" ABOVE FLOOR LEVEL. CHAIN SHALL EXTEND TO 7'-0" ABOVE FLOOR LEVEL.

GENERAL NOTES: MECHANICAL

- A. PROVIDE CLEARANCE FOR INSPECTION, REPAIR, REPLACEMENT, AND SERVICE TO ALL EQUIPMENT TO INCLUDE A MINIMUM OF 36 INCHES FROM ALL OBSTRUCTIONS (WALLS, STRUCTURE, DUCTWORK, PIPES, ETC.). CLEARANCE SHALL MAINTAIN ACCESS TO ALL ELECTRICAL PANELS, ACCESS DOORS, CONTROLLERS, VALVES, JUNCTION BOXES AND OPERATORS AND INCLUDE THE AREA DIRECTLY IN FRONT OF AND ABOVE THE SYSTEM COMPONENTS.

GENERAL NOTES: MECHANICAL DEMOLITION

- A. THE DRAWINGS ARE INTENDED TO INDICATE THE GENERAL SCOPE OF DEMOLITION REQUIRED AND DOES NOT INDICATE EVERY PIPE OR PIECE OF EQUIPMENT THAT MUST BE REMOVED.
- B. ITEMS THAT ARE NOT IN THE REQUIRED SCOPE OF DEMOLITION, OR AS SPECIFICALLY NOTED, SHALL REMAIN IN PLACE. SUCH ITEMS, INCLUDING ASSOCIATED EQUIPMENT, FIXTURES, DOMESTIC PLUMBING, SANITARY AND STORM PIPING, SHALL BE MAINTAINED OPERATIONAL AND IN GOOD CONDITION BY THIS CONTRACTOR.
- C. SEE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR PHASES OF DEMOLITION AND CONSTRUCTION. COORDINATE WITH GENERAL CONTRACTOR AND ALL OTHER TRADES.
- D. PROVIDE TEMPORARY CONNECTIONS TO MAINTAIN EXISTING SYSTEMS IN SERVICE DURING CONSTRUCTION.
- E. REMOVE PIPING, DUCTWORK, EQUIPMENT, ETC INCLUDING DRAINAGE ABANDONED, TO SOURCE OF SUPPLY AND/OR MAIN LINES. REMOVE ALL ASSOCIATED CLAMPS, HANGERS, SUPPORTS, ETC., ASSOCIATED WITH REMOVAL.
- F. PATCH SURFACES TO MATCH EXISTING CONDITIONS.
- G. REPAIR ADJACENT CONSTRUCTION AND FINISHER DAMAGED DURING DEMOLITION AND EXTENSION WORK. MATCH ORIGINAL CONSTRUCTION. VERIFY ALTERNATIVE OR SPECIAL REPAIR METHODS WITH ARCHITECT/ENGINEER BEFORE PROCEEDING WITH DEMOLITION.
- H. REPAIR ANY PIPING OR DUCT INSULATION THAT IS DAMAGED OR REMOVED DURING CONSTRUCTION.

GENERAL NOTES: FIRE PROTECTION

- A. COORDINATE PIPING ROUTING WITH ALL TRADES PRIOR TO INSTALLATION.
- B. COORDINATE WITH ARCHITECTURAL PLANS FOR CEILING TYPES AND HEIGHTS.
- C. PROVIDE PROTECTION ABOVE AND BELOW CEILINGS WHERE COMBUSTIBLE CONSTRUCTION IS PRESENT.
- D. PIPING SHALL NOT BE SUPPORTED FROM OTHER PIPING, CONDUIT, OR DUCTWORK.
- E. COORDINATE INSTALLATION WITH ARCHITECTURAL CODE PLANS. ALL WALL AND FLOOR PENETRATIONS OF FIRE RATED ASSEMBLIES TO BE SEALED.
- F. ALL SPRINKLER PIPING TO BE INSTALLED SUCH THAT THE SYSTEM WILL COMPLETELY DRAIN BACK TO MAIN. IF A SECTION OF PIPING CANNOT BE SLOPED BACK TO MAIN, AN AUXILIARY DRAIN VALVE WITH PERMANENT LABEL AND HOSE THROUGH CONNECTION MUST BE INSTALLED BY THIS CONTRACTOR. ALL AUXILIARY DRAINS SHALL BE CONCEALED.
- G. NO SPRINKLER PIPE SHALL PASS THROUGH DUCTS OR SOLID STRUCTURAL MEMBERS, UNLESS CALLED OUT ON PLANS.
- H. VERIFY ALL WATER SERVICE CONNECTION REQUIREMENTS WITH LOCAL WATER UTILITY.
- I. DO NOT ROUTE PIPING ABOVE OR BELOW ELECTRICAL PANELS INCLUDING PANEL SERVICE CLEARANCES.
- J. DO NOT INSTALL PIPING BELOW SUSPENDED EQUIPMENT.

PIPING/PLUMBING VALVES AND FITTINGS SYMBOLS LIST

	ELBOW (90 DEGREE)
	TEE (HORIZONTAL)
	45 DEGREE ELBOW
	PIPE TEE RISER/DROP
	PIPE RISER
	PIPE DROP
	FLOW DIRECTION
	PIPE CAP
	PIPE BREAK
	UNION
	VALVE (GENERIC)
	VALVE CLOSED (GENERIC)
	LOCKABLE VALVE
	CHECK VALVE
	PRESSURE REDUCING VALVE
	THROTTLING VALVE
	PRESSURE RELIEF VALVE
	BALANCING VALVE
	CONTROL VALVE (TWO-WAY)
	CONTROL VALVE (THREE-WAY)
	SOLENOID VALVE
	PRESSURE GAUGE AND GAUGE/COCK
	DIFFERENTIAL PRESSURE SWITCH
	FLOW METER
	THERMOMETER
	TEMPERATURE SENSOR
	PRESSURE SENSOR
	CONCENTRIC PIPING REDUCER
	ECCENTRIC PIPING REDUCER
	PT PORT
	FLEXIBLE CONNECTION
	AIR VENT (AUTOMATIC)
	AIR VENT (MANUAL)
	STRAINER
	PUMP (GENERIC)
	ALIGNMENT GUIDE
	PIPE ANCHOR
	EXPANSION JOINT
	WATER METER
	HWV BALANCING VALVE (FLOW IN GPM)
	WATER HAMMER ARRESTOR
	GAS REGULATOR
	FLOOR DRAIN
	ROOF DRAIN
	FLOOR SINK
	TRENCH DRAIN
	HOSE BIB / WALL HYDRANT
	FLOAT VALVE
	STEAM TRAP

HVAC SYMBOLS LIST

	DIFFUSER CALLOUT SYMBOL
	SUPPLY
	EXHAUST
	RETURN
	RATED DAMPER (FD-FIRE, SD-SMOKE, FSD-FIRE/SMOKE, CFSD-CONTROL FIRE/SMOKE)
	MOTORIZED DAMPER
	VOLUME DAMPER
	AIRFLOW DIRECTION
	LEVEL SENSOR
	DRY CONTACTS
	CURRENT TRANSDUCER
	ANALOG OUTPUT
	BINARY OUTPUT
	ANALOG INPUT
	BINARY INPUT
	DDC SENSOR
	AIRFLOW STATION
	VARIABLE FREQUENCY DRIVE
	MOTOR
	THERMOSTAT/TEMP SENSOR
	HUMIDISTAT
	CARBON DIOXIDE SENSOR
	NITROGEN DIOXIDE SENSOR
	GENERIC SENSOR
	CARBON MONOXIDE SENSOR
	DIFFERENTIAL PRESSURE SENSOR
	REFRIGERANT SENSOR
	SMOKE DETECTOR
	BELLMOUTH FITTING
	SINGLE DUCT
	RETURN
	PARALLEL FAN POWERED
	PRECISION

GENERAL SYMBOLS LIST (CONT.)

X ¹ LPC	LOW PRESSURE CONDENSATE (PRESSURE)
X ¹ HPC	HIGH PRESSURE CONDENSATE (PRESSURE)
X ¹ BFW	BOILER FEEDWATER
X ¹ BD	BOILER BLOW DOWN
X ¹ FOS	FUEL OIL SUPPLY
X ¹ FOR	FUEL OIL RETURN
X ¹ CA	COMPRESSED AIR

GENERAL SYMBOLS LIST

	NEW TO EXISTING CONNECTION
	PIPING INVERT ELEVATION
	FINISHED FLOOR ELEVATION
	M.C. MECHANICAL CONTRACTOR
	P.C. PLUMBING CONTRACTOR
	A.T.C. AUTOMATIC TEMPERATURE CONTROLS CONTRACTOR
	G.C. GENERAL CONTRACTOR
	E.C. ELECTRICAL CONTRACTOR
	F.P.C. FIRE PROTECTION CONTRACTOR
	K.E.C. KITCHEN EQUIPMENT CONTRACTOR
	BF BOILER FLUE
	BI BOILER INTAKE
	EA EXHAUST AIR
	OA OUTSIDE AIR
	RA RETURN AIR
	SA SUPPLY AIR
	VA VENTILATION AIR
	EQUIPMENT SCHEDULED EQUIPMENT (UNDERLINED)
	EQUIPMENT NON-SCHEDULE EQUIPMENT
	XEQUIPMENT EXISTING EQUIPMENT (X PREFIX)

FIRE PROTECTION SYMBOLS LIST

	FIRE SPRINKLER ZONE DESIGNATION (EXISTING ZONE #) Z-# (NEW ZONE #) Z-# (DRY PIPE ZONE #) EXD-# (EXISTING DRY ZONE #) EXD-#
	FIRE PUMP TEST CONNECTION HEADER
	FIRE DEPARTMENT CONNECTION
	ZONE VALVE ASSEMBLY
	POST INDICATOR VALVE
	INSPECTOR TEST ASSEMBLY
	HOSE VALVE
	FIRE PROTECTION
	DRY DRY PIPE
	FP PRE-ACTION
	FP CLEAN AGENT

GENERAL SYMBOLS LIST

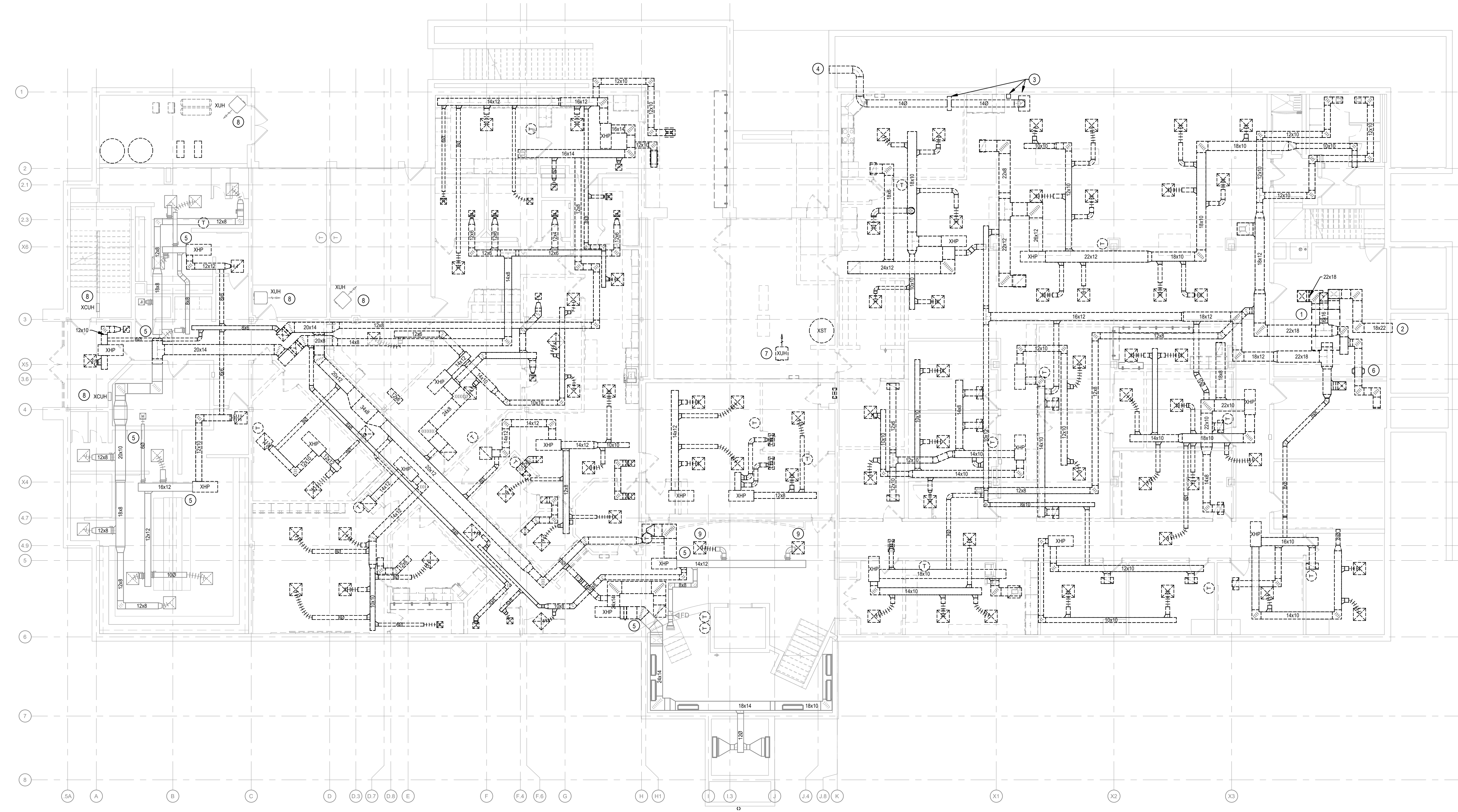
	COLD WATER
	SOFTENED COLD WATER
	FILTERED WATER
	HOT WATER
	SOFTENED HOT WATER
	HOT WATER 140'
	HOT WATER 180'
	HOT WATER RECIRC
	HOT WATER RECIRC 140'
	HOT WATER RECIRC 180'
	STORM UNDERGROUND
	SANITARY UNDERGROUND
	GREASE SANITARY UNDERGROUND
	ACID WASTE UNDERGROUND
	DRAIN TILE
	WATER UNDERGROUND
	PLUMBING/PIPING
	WATER
	SANITARY
	GREASE SANITARY
	PUMPED SANITARY
	ACID WASTE
	VENT
	ACID VENT
	STORM
	STORM OVERFLOW
	PUMPED STORM
	CONDENSATE
	PUMPED CONDENSATE
	DRAIN
	PUMPED DRAIN
	REFRIGERANT
	LIQUID
	SUCTION
	NATURAL GAS
	PROPANE
	NON-POTABLE WATER
	REVERSE OSMOSIS
	REVERSE OSMOSIS RETURN
	DEIONIZED WATER
	DEIONIZED WATER RETURN
	CHILLED WATER SUPPLY
	CHILLED WATER RETURN
	GLYCOL CHILLED WATER SUPPLY
	GLYCOL CHILLED WATER RETURN
	HEATING WATER SUPPLY
	HEATING WATER RETURN
	GLYCOL HEATING WATER SUPPLY
	GLYCOL HEATING WATER RETURN
	CONDENSER WATER SUPPLY
	CONDENSER WATER RETURN
	LOOP WATER SUPPLY
	LOOP WATER RETURN
	GLYCOL LOOP WATER SUPPLY
	GLYCOL LOOP WATER RETURN
	GEO THERMAL LOOP WATER SUPPLY
	GEO THERMAL LOOP WATER RETURN
	STEAM (PRESSURE)
	LOW PRESSURE STEAM
	HIGH PRESSURE STEAM
	CONDENSATE (PRESSURE)

**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

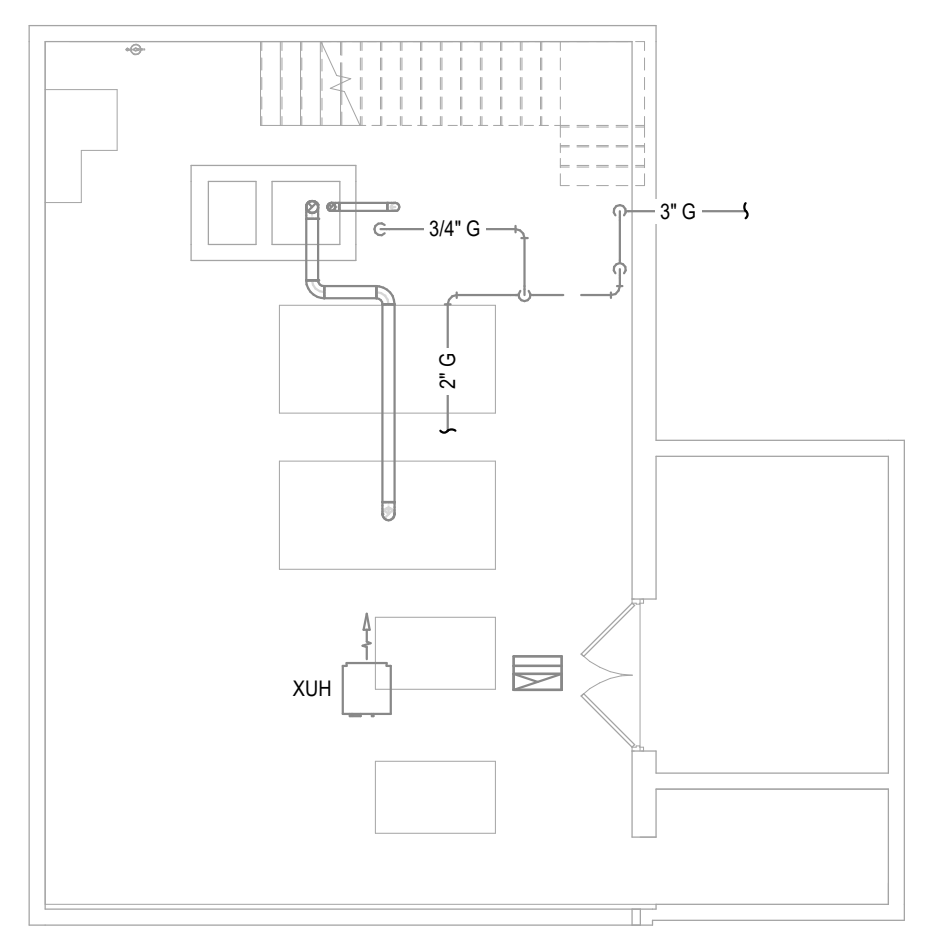
**LOWER LEVEL MECHANICAL DEMO
PLAN**

Project Number: 21004
Date: OCTOBER 5, 2021

MD101



1 LOWER LEVEL MECHANICAL DEMO PLAN
1/8" = 1'-0"



2 SOUTH MECH MECHANICAL DEMO PLAN
1/8" = 1'-0"

- GENERAL NOTES:**
1. DEMO DUCTWORK, HANGERS, AND ACCESSORIES BACK TO MAIN AS SHOWN AND CAP. PATCH INSULATION TO MATCH EXISTING.
 2. ALL EQUIPMENT SHOWN TO BE REMOVED SHALL INCLUDE ALL ASSOCIATED DUCTWORK, PIPING, CONTROLS, WIRING, AND SUPPORTS WITH GENERAL CONTRACTOR PRIOR TO STARTING WORK. COORDINATE ALL SHUTDOWNS WITH OWNER.
 3. CONTRACTOR TO COORDINATE PROJECT PHASING REQUIREMENTS WITH GENERAL CONTRACTOR PRIOR TO STARTING WORK. COORDINATE ALL SHUTDOWNS WITH OWNER.
 4. M.C. SHALL PATCH AND REPAIR ALL FLOOR, WALL, AND CEILING OPENINGS CREATED DURING DEMOLITION OF MECHANICAL EQUIPMENT IF THE OPENINGS ARE NOT BEING REUSED. PATCHES AND REPAIRS SHALL MATCH ADJACENT EXISTING FINISHES. THIS APPLIES TO ALL OPENINGS UNLESS SPECIFICALLY NOTED OTHERWISE.

- KEYED NOTES:**
1. DEMO ENERGY RECOVERY UNIT AND ASSOCIATED DUCTWORK, CONTROLS, ELECTRICAL CONNECTION, AND CURB
 2. DEMO EXHAUST LOUVER AND ASSOCIATED DUCTWORK, PATCH WITH INSULATED SHEET METAL PANEL. SEAL WATER TIGHT.
 3. DEMO HOOD AND ASSOCIATED DUCTWORK, CONTROL PANEL, AND EXHAUST FAN.
 4. LOUVERS ON EXTERIOR SHALL REMAIN. PROVIDE AN INSULATED BLANK OFF PANEL. SEAL WATER TIGHT.
 5. DEMO DUCTWORK TO POINT SHOWN AND PREPARE FOR NEW CONNECTION. EXISTING DUCTWORK TO REMAIN SHALL BE CLEANED.
 6. DEMO EXHAUST DUCT TAKEOFF ON DUCTWORK TO MECHANICAL ROOM BELOW. DUCTWORK SHALL BE CLEANED AND REUSED. PREPARE FOR NEW CONNECTION.
 7. SALVAGE UNIT HEATER AND TURN OVER TO OWNER. DEMO POWER AND CONTROLS.
 8. EXISTING UNIT HEATER/CABINET UNIT HEATER SHALL REMAIN.
 9. DEMO DIFFUSER AND ASSOCIATED FLEX DUCT.



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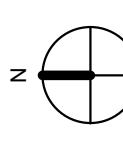
**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

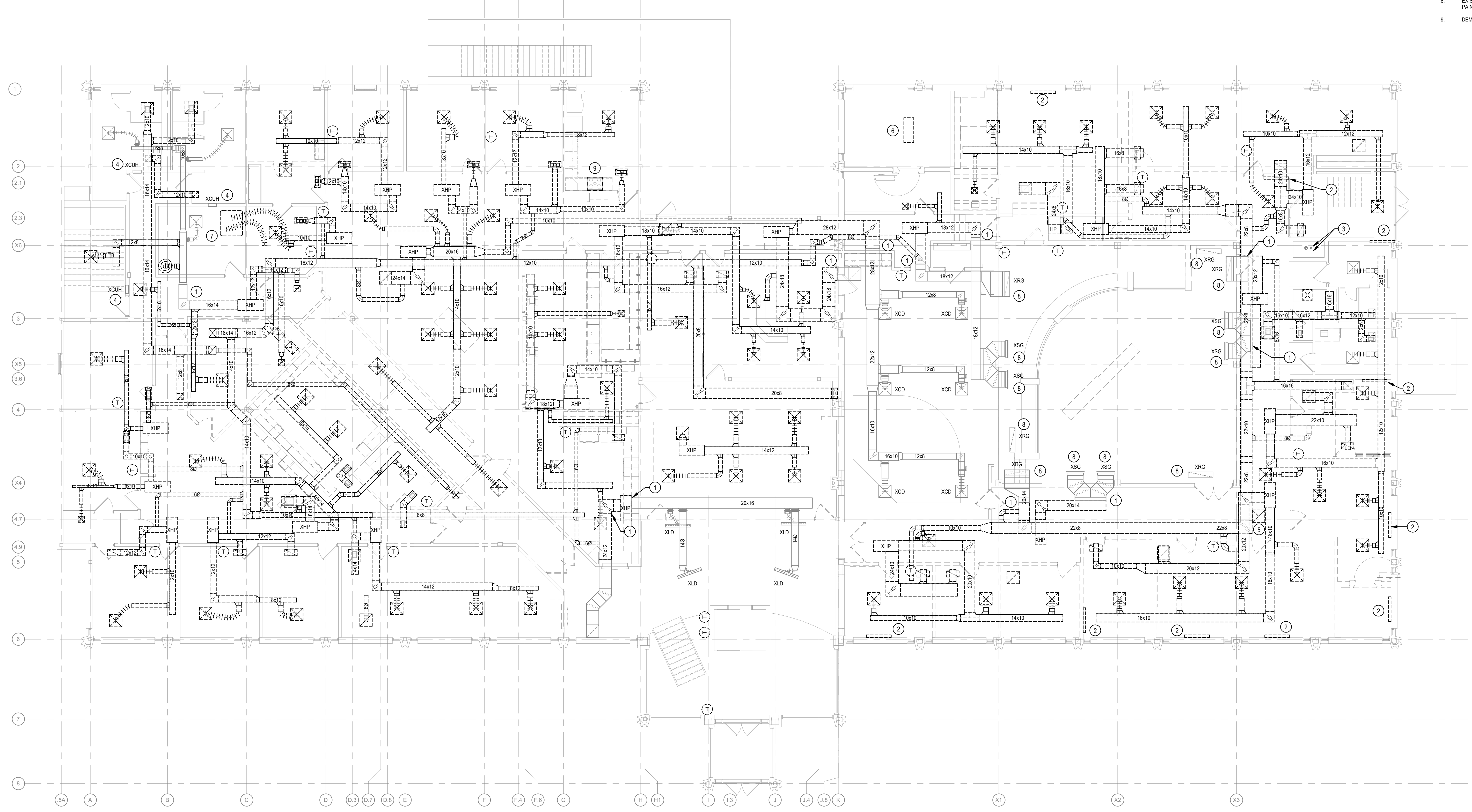
UPPER LEVEL MECHANICAL DEMO
PLAN

Project Number
21004
Date
OCTOBER 5, 2021

MD102



- GENERAL NOTES:**
1. DEMO DUCTWORK, HANGERS, AND ACCESSORIES BACK TO MAIN AS SHOWN AND CAP. PATCH INSULATION TO MATCH EXISTING.
 2. ALL EQUIPMENT SHOWN TO BE REMOVED SHALL INCLUDE ALL ASSOCIATED DUCTWORK, PIPING, CONTROLS, WIRING, SUPPORTS, AND CONCRETE PADS.
 3. CONTRACTOR TO COORDINATE PROJECT PHASING REQUIREMENTS WITH GENERAL CONTRACTOR PRIOR TO STARTING WORK. COORDINATE ALL SHUTDOWNS WITH OWNER.
 4. M.C. SHALL PATCH AND REPAIR ALL FLOOR, WALL, AND CEILING OPENINGS CREATED DURING DEMOLITION OF MECHANICAL EQUIPMENT IF THE OPENINGS ARE NOT BEING REUSED. PATCHES AND REPAIRS SHALL MATCH ADJACENT EXISTING FINISHES. THIS APPLIES TO ALL OPENINGS UNLESS SPECIFICALLY NOTED OTHERWISE.
- KEYED NOTES:**
1. DEMO DUCTWORK TO POINT SHOWN AND PREPARE FOR NEW CONNECTION. EXISTING DUCTWORK TO REMAIN SHALL BE CLEANED.
 2. DEMO RADIANT HEATER AND ASSOCIATED PIPING AND CONTROLS. COORDINATE PATCHING WITH ARCHITECTURAL PLANS.
 3. DEMO WATER HEATER FLUE AND INTAKE TO ABOVE CEILING ON UPPER LEVEL. RISERS SHALL BE RELOCATED TO ACCOMMODATE ERU INSTALLATION.
 4. EXISTING UNIT HEATER/CABINET UNIT HEATER SHALL REMAIN.
 5. DEMO EXHAUST DUCT AND ASSOCIATED DAMPER.
 6. DEMO ELECTRIC CEILING MOUNTED UNIT VENTILATOR AND ASSOCIATED CONTROLS.
 7. PORTABLE COOLER SHALL BE SALVAGED AND RETURNED TO THE OWNER. COOLER SHALL REMAIN OPERATIONAL UNTIL NEW SYSTEM HAS BEEN INSTALLED.
 8. EXISTING GRILLES IN COUNCIL CHAMBERS SHALL BE CLEANED, PAINTED, AND REINSTALLED. COORDINATE COLOR WITH ARCHITECT.
 9. DEMO EXISTING KITCHEN HOOD AND CONTROLS.



1 UPPER LEVEL MECHANICAL DEMO PLAN
1/8" = 1'-0"

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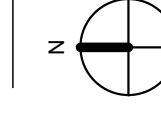
**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

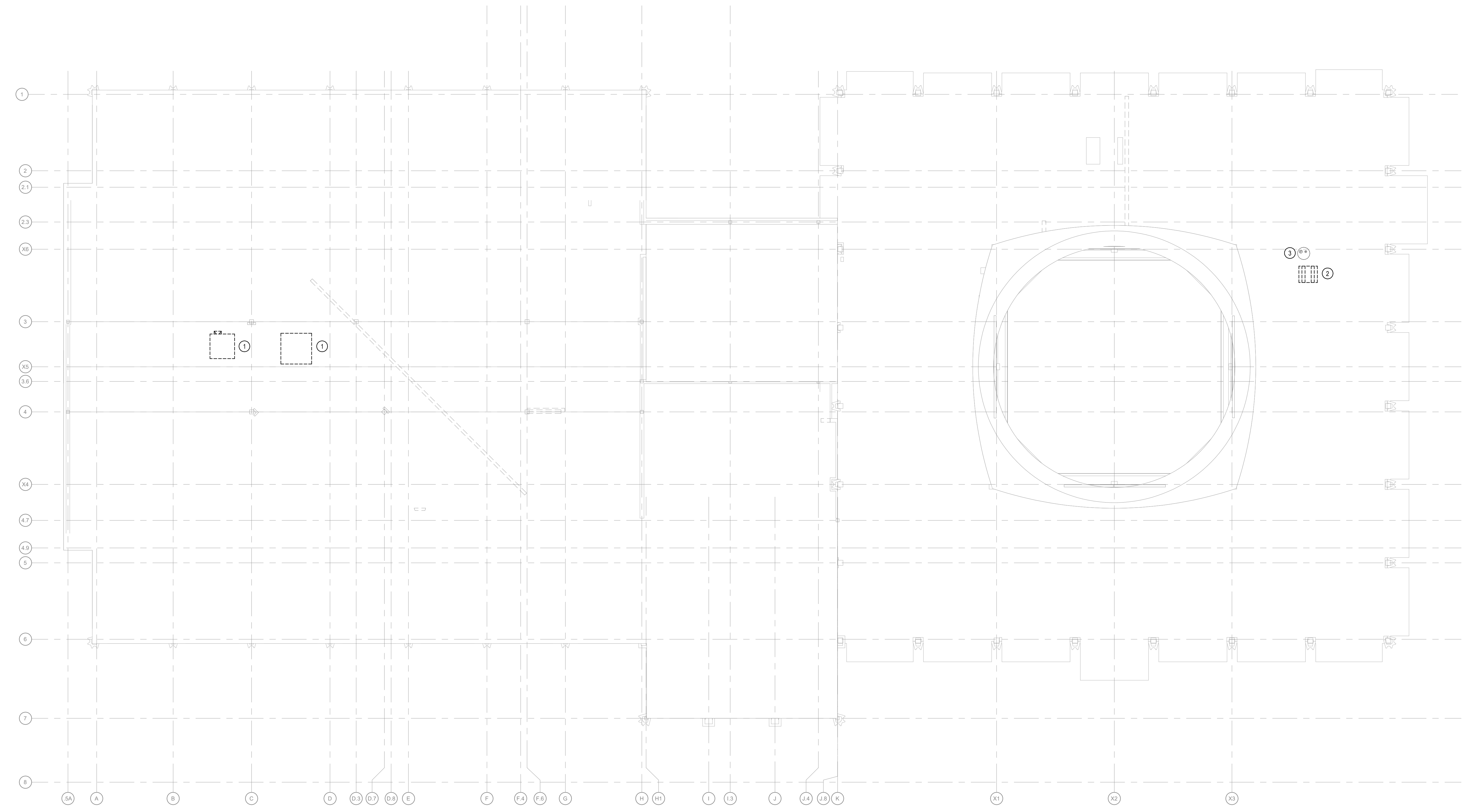
ROOF MECHANICAL DEMO PLAN

Project Number: 21004
Date: OCTOBER 5, 2021

MD103



- GENERAL NOTES:**
1. DEMO DUCTWORK, HANGERS, AND ACCESSORIES BACK TO MAIN AS SHOWN AND CAP. PATCH INSULATION TO MATCH EXISTING.
 2. ALL EQUIPMENT SHOWN TO BE REMOVED SHALL INCLUDE ALL ASSOCIATED DUCTWORK, PIPING, CONTROLS, WIRING, SUPPORTS, AND CONCRETE PADS.
 3. CONTRACTOR TO COORDINATE PROJECT PHASING REQUIREMENTS WITH GENERAL CONTRACTOR PRIOR TO STARTING WORK. COORDINATE ALL SHUTDOWNS WITH OWNER.
 4. M.C. SHALL PATCH AND REPAIR ALL FLOOR, WALL, AND CEILING OPENINGS CREATED DURING DEMOLITION OF MECHANICAL EQUIPMENT IF THE OPENINGS ARE NOT BEING REUSED. PATCHES AND REPAIRS SHALL MATCH ADJACENT EXISTING FINISHES. THIS APPLIES TO ALL OPENINGS UNLESS SPECIFICALLY NOTED OTHERWISE.
- KEYED NOTES:**
1. DEMO ENERGY RECOVERY UNIT AND ASSOCIATED DUCTWORK, CONTROLS, AND ROOF CURB. CAP WITH INSULATED SHEET METAL. CAP SEAL WATER TIGHT.
 2. DEMO ROOF HOOD AND ASSOCIATED DUCTWORK AND CURB. CAP WITH INSULATED SHEET METAL. CAP SEAL WATER TIGHT.
 3. EXISTING WATER HEATER AND GENERATOR FLUE PIPING SHALL REMAIN AND BE REUSED. EXISTING ABANDONED BOILER STACK SHALL ALSO REMAIN.



1 ROOF MECHANICAL DEMO PLAN
1/8" = 1'-0"

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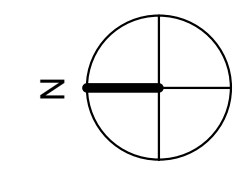
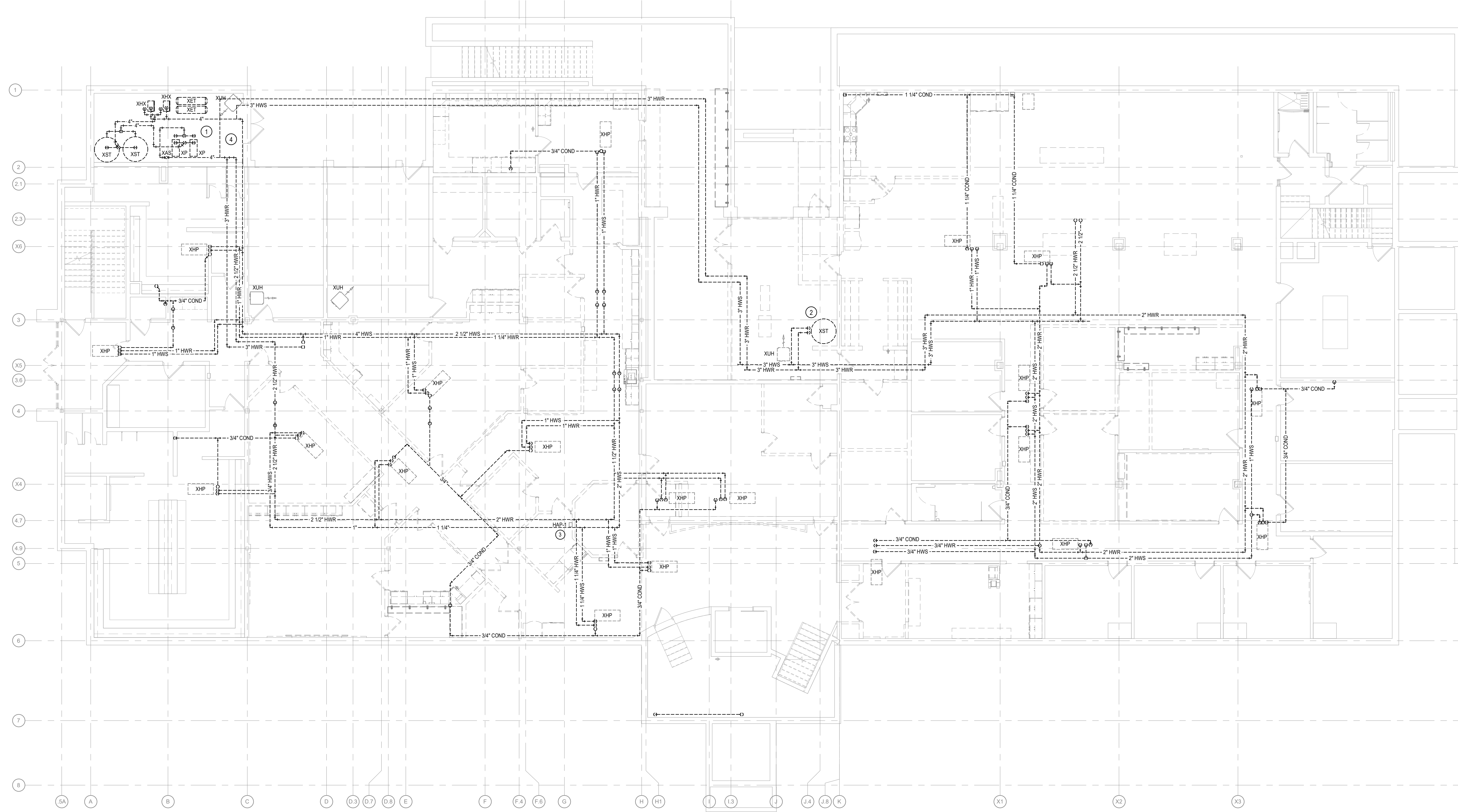
**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

GENERAL NOTES:

- CONTRACTOR TO COORDINATE PROJECT PHASING REQUIREMENTS WITH GENERAL CONTRACTOR PRIOR TO STARTING WORK. COORDINATE ALL SHUTDOWNS WITH OWNER.
- M.C. SHALL PATCH AND REPAIR ALL FLOOR, WALL, AND CEILING OPENINGS CREATED DURING DEMOLITION OF MECHANICAL EQUIPMENT IF THE OPENINGS ARE NOT BEING REUSED. PATCHES AND REPAIRS SHALL MATCH ADJACENT EXISTING FINISHES. THIS APPLIES TO ALL OPENINGS UNLESS SPECIFICALLY NOTED OTHERWISE.

KEYED NOTES:

- DEMO ALL EQUIPMENT AND PIPING ASSOCIATED WITH EXISTING HEATING WATER SYSTEM IN THIS ROOM. THIS INCLUDES PUMPS, AIR SEPARATOR, EXPANSION TANKS, STORAGE TANKS, HEAT EXCHANGERS, CHEMICAL FEEDER, AND ALL ASSOCIATED PIPING, SPECIALTIES, AND CONTROLS. HOUSEKEEPING PADS SHALL REMAIN.
- DEMO HOT WATER STORAGE TANK AND ALL ASSOCIATED PIPING AND SPECIALTIES.
- DEMO HEAT PUMP ALARM PANEL AND ASSOCIATED WIRING.
- COORDINATE HEAT PUMP PIPING DEMO WITH PHASING PLAN PRIOR TO DEMOLITION. PROVIDE A BYPASS IN LOOP WATER SYSTEM TO MAINTAIN OPERATION OF HYDRONIC PUMPS.



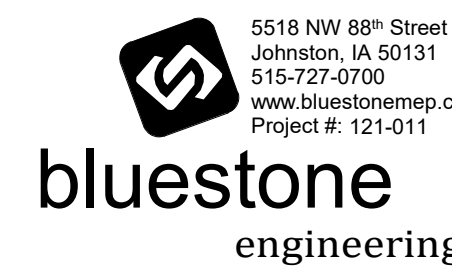
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LOWER LEVEL MECHANICAL PIPING DEMO PLAN
1/8" = 1'-0"

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

LOWER LEVEL MECHANICAL PIPING
DEMO PLAN

Project Number: 21004
Date: OCTOBER 5, 2021

MPD100

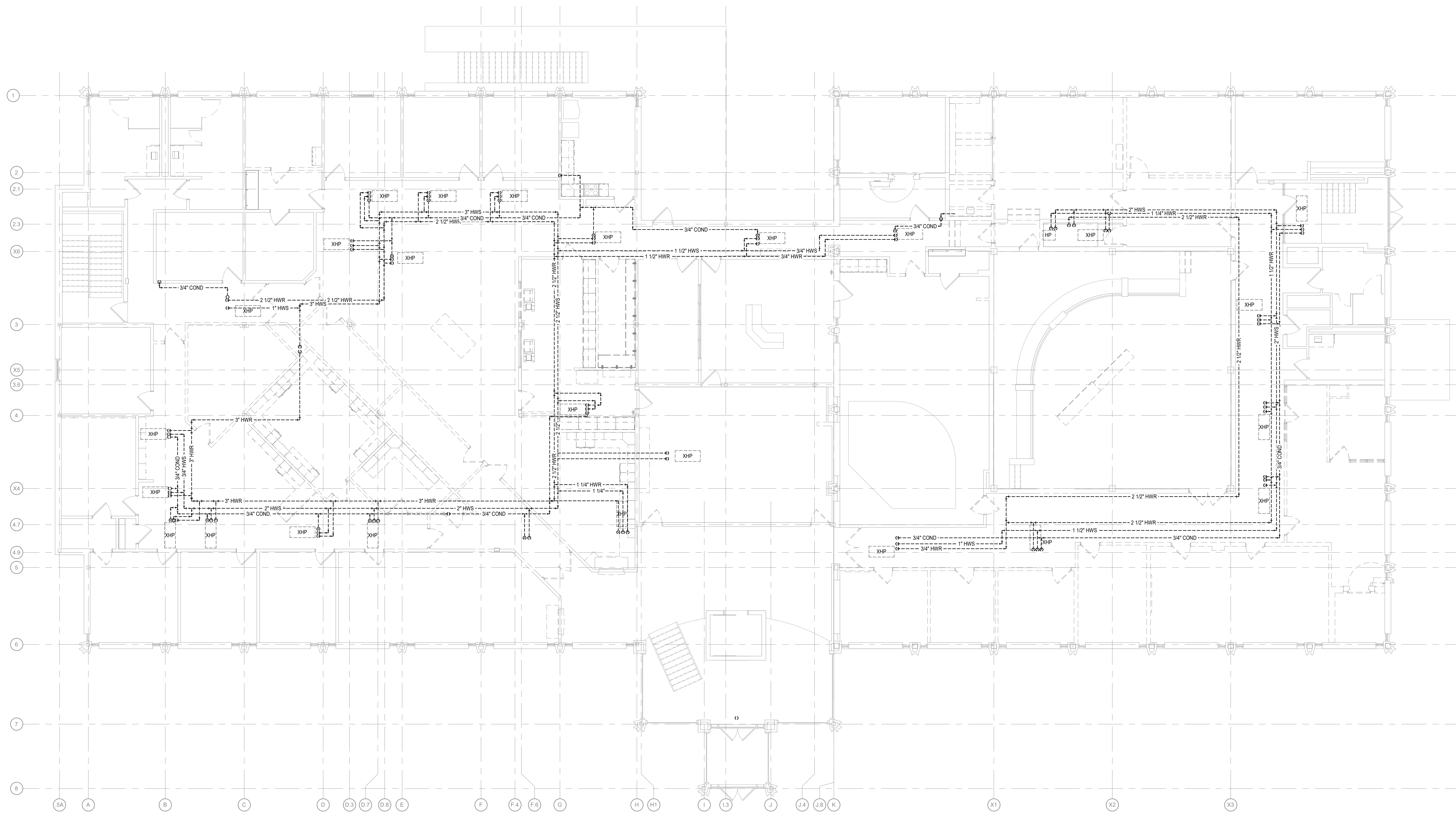


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CEDAR FALLS, IOWA

- GENERAL NOTES:**
- CONTRACTOR TO COORDINATE PROJECT PHASING REQUIREMENTS WITH GENERAL CONTRACTOR PRIOR TO STARTING WORK. COORDINATE ALL SHUTDOWNS WITH OWNER.
 - M.C. SHALL PATCH AND REPAIR ALL FLOOR, WALL AND CEILING OPENINGS CREATED DURING DEMOLITION OF MECHANICAL EQUIPMENT IF THE OPENINGS ARE NOT BEING REUSED. PATCHES AND REPAIRS SHALL MATCH ADJACENT EXISTING FINISHES. THIS APPLIES TO ALL OPENINGS UNLESS SPECIFICALLY NOTED OTHERWISE.



1 UPPER LEVEL MECHANICAL PIPING DEMO PLAN
1/8" = 1'-0"

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

UPPER LEVEL MECHANICAL PIPING DEMO PLAN

Project Number: 21004
Date: OCTOBER 5, 2021

MPD101

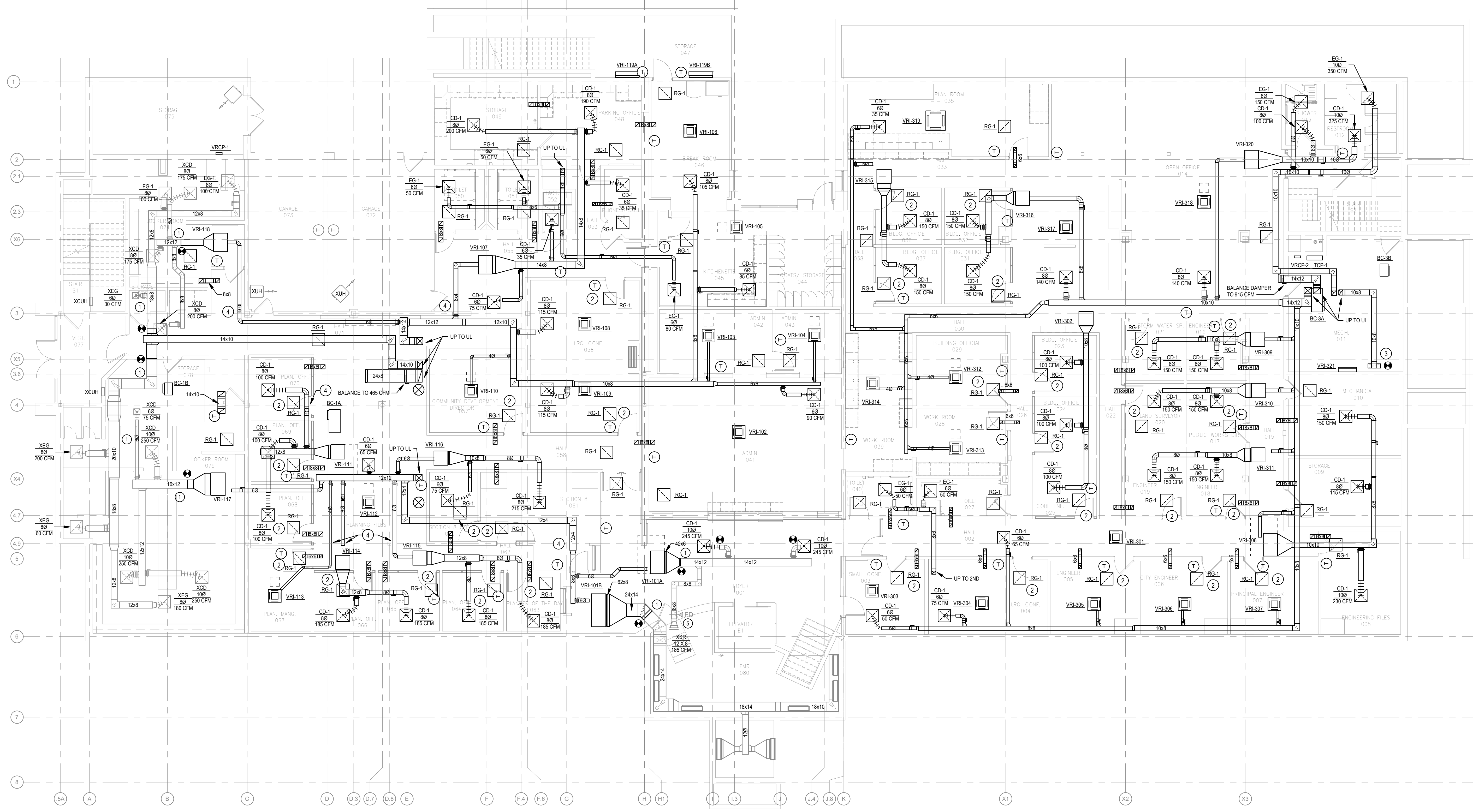


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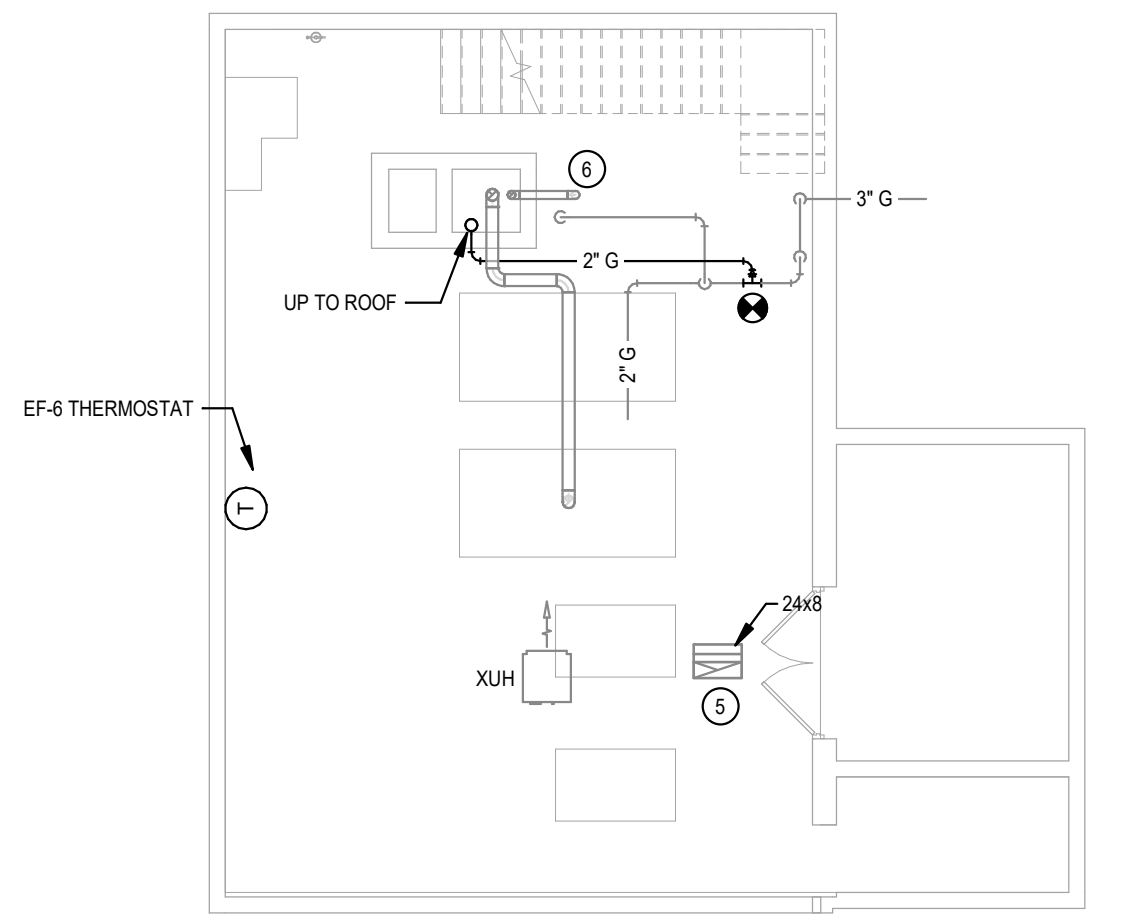
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**CEDAR FALLS CITY HALL
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- GENERAL NOTES:**
- REFER TO M500 SERIES DRAWINGS FOR THE FOLLOWING REFERENCED DETAILS:
 - BELLMOUTH INLET
 - SUSPENDED EQUIPMENT
 - FLEX DUCT INSTALL
 - TRANSFER DUCT - ACUSTIC TRANSFER DUCT
 - RETURN AIR DIFFUSER - NOISE Baffle
 - BALANCING CONTRACTOR TO REBALANCE ALL EXISTING DIFFUSERS TO AIRFLOWS LISTED ON THE DRAWINGS.
 - ALL BALANCING DAMPERS TO BE LOCATED IN ACCESSIBLE LOCATIONS. COORDINATE WITH ARCHITECTURAL DRAWINGS.
 - CONTRACTOR TO COORDINATE PROJECT PHASING REQUIREMENTS WITH GENERAL CONTRACTOR PRIOR TO STARTING WORK. COORDINATE ALL SHUTDOWNS WITH OWNER.
- KEYED NOTES:**
- DUCTWORK SHALL BE CLEANED AND REUSED. PREPARE FOR NEW CONNECTIONS.
 - PROVIDE GRILLE WITH RETURN AIR NOISE Baffle.
 - RECONNECT TO EXISTING EXHAUST DUCTWORK TO GENERATOR ROOM.
 - OFFSET DUCTWORK BELOW BEAM.
 - VERIFY FIRE DAMPER IS OPEN AND OPERATIONAL. REPLACE FLUIBLE LINK AS REQUIRED.
 - CONNECT EXISTING FLUE TO NEW WATER HEATER.



1 LOWER LEVEL MECHANICAL PLAN
1/8" = 1'-0"



2 SOUTH MECH -MECHANICAL PLAN
1/8" = 1'-0"

No.	Description	Date
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LOWER LEVEL MECHANICAL PLAN

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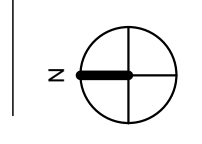
**CEDAR FALLS CITY HALL
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CEDAR FALLS, IOWA

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

ROOF MECHANICAL PLAN

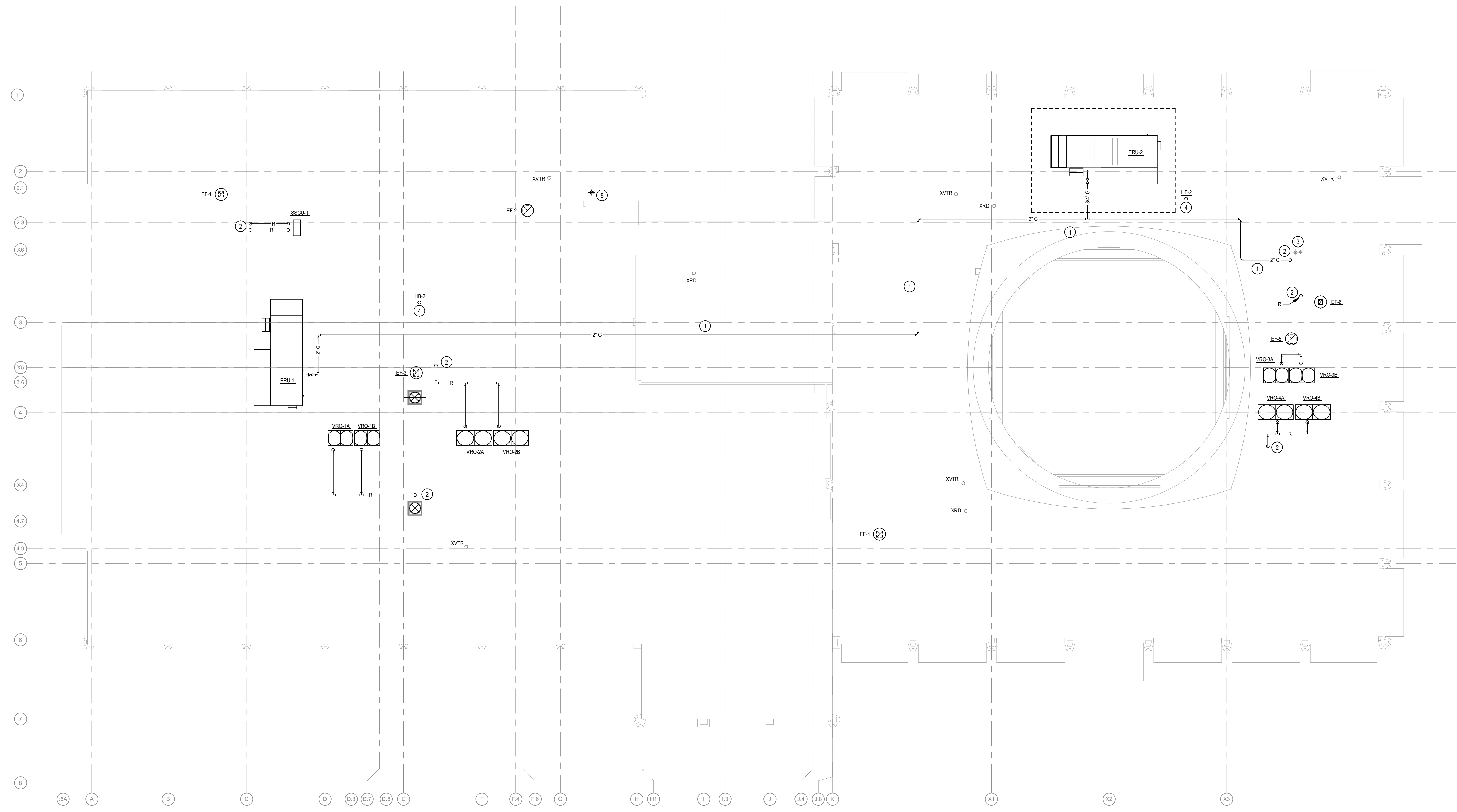
Project Number: 21004
Date: OCTOBER 5, 2021

M103



- GENERAL NOTES:**
- REFER TO M800 SERIES DRAWINGS FOR THE FOLLOWING REFERENCED DETAILS:
 - VARIABLE REFRIGERANT OUTDOOR UNIT SUPPORT
 - CONDENSATE DRAIN (DRAIN THROUGH)
 - EXHAUST FAN
 - SPLIT SYSTEM
 - ROOFTOP EQUIPMENT DETAIL
 - NATURAL GAS PIPING RISER
 - CONTRACTOR TO COORDINATE PROJECT PHASING REQUIREMENTS WITH GENERAL CONTRACTOR PRIOR TO STARTING WORK. COORDINATE ALL SHUTDOWNS WITH OWNER.
 - EXHAUST FANS AND PLUMBING VENTS SHALL BE A MINIMUM OF 10' AWAY FROM ALL OUTSIDE AIR INTAKES.
 - ALL MECHANICAL EQUIPMENT SHALL BE LOCATED A MINIMUM OF 10' FROM THE ROOF EDGE.
 - REFRIGERANT PIPING SHOWN IS FOR DIAGRAMMATICAL PURPOSES ONLY. REFER TO SPECIFICATIONS AND MANUFACTURERS INFORMATION FOR REQUIRED QUANTITY, SIZING, AND ROUTING REQUIREMENTS.
 - FIELD VERIFY FINAL REFRIGERANT PIPING ROUTING FOR SPLIT SYSTEM AIR CONDITIONERS. DO NOT EXCEED MANUFACTURERS LISTED LINE SET LENGTHS.

- KEYED NOTES:**
- PROVIDE ROOF SUPPORTS UNDER ALL HORIZONTAL GAS PIPING. COORDINATE SPACING WITH MANUFACTURER AND SPECIFICATIONS. PIPING ON ROOF SHALL BE PAINTED. COORDINATE COLOR WITH ARCHITECT.
 - PIPE PORTAL INTO THE BUILDING. SEAL ROOF PENETRATIONS WATER TIGHT.
 - EXISTING WATER HEATER AND GENERATOR FLUE SHALL REMAIN.
 - 3/4" CW DN. REFER TO PLUMBING DOCUMENTS FOR ADDITIONAL INFORMATION.
 - ROOF CAP PROVIDED WITH KITCHEN HOOD.



1 ROOF MECHANICAL PLAN
1/8" = 1'-0"

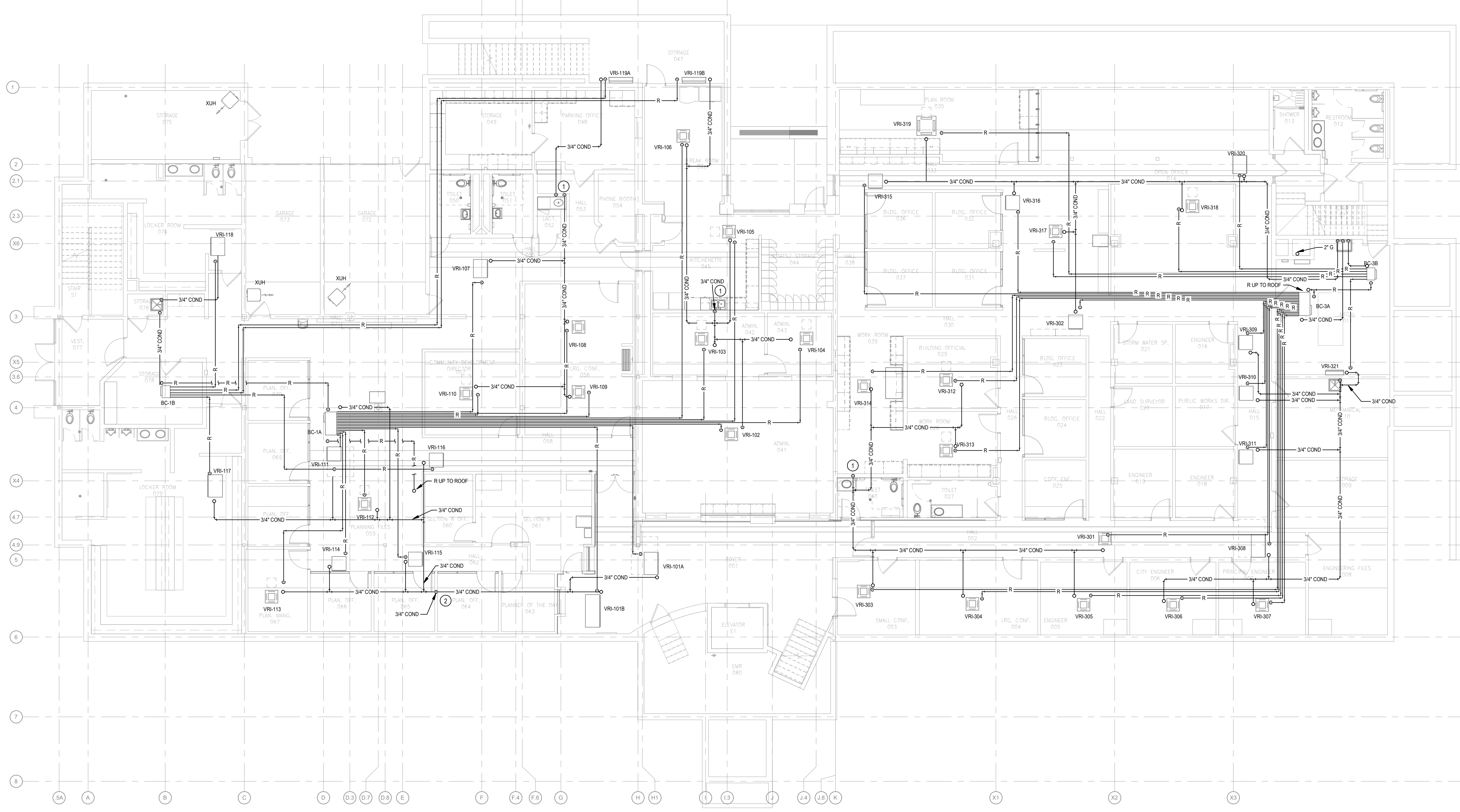
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**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

- GENERAL NOTES:**
- REFER TO M80 SERIES DRAWINGS FOR THE FOLLOWING REFERENCED DETAILS:
 - REFRIGERANT PIPING SUPPORT
 - NATURAL GAS PIPING RISER
 - CONTRACTOR TO COORDINATE PROJECT PHASING REQUIREMENTS WITH GENERAL CONTRACTOR PRIOR TO STARTING WORK. COORDINATE ALL SHUTDOWNS WITH OWNER.
 - ALL VALVES TO BE LOCATED IN ACCESSIBLE LOCATIONS. COORDINATE WITH ARCHITECTURAL DRAWINGS.
 - REFRIGERANT PIPING SHOWN IS FOR DIAGRAMMATICAL PURPOSES ONLY. REFER TO SPECIFICATIONS AND MANUFACTURERS INFORMATION FOR REQUIRED QUANTITY, SIZING, AND ROUTING REQUIREMENTS.
 - FIELD VERIFY FINAL REFRIGERANT PIPING ROUTING FOR SPLIT SYSTEM AIR CONDITIONERS. DO NOT EXCEED MANUFACTURERS LISTED LINE SET LENGTHS.
 - ALL EQUIPMENT DRAIN PIPING SHALL BE PIPED FULL SIZED, MINIMUM OF 1/2" ROUTE TO NEAREST FLOOR DRAIN / FLOOR SINK OR AS NOTED ON PLANS.
- KEYED NOTES:**
- TIE INTO TAIL PIECE OF SINK, TIE IN UPSTREAM OF P-TRAP.
 - ROUTE CONDENSATE TO OPEN SITE DRAIN IN WALL. REFER TO PLUMBING PLANS FOR MORE INFORMATION.



1 LOWER LEVEL MECHANICAL PIPING PLAN
1/8" = 1'-0"

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

LOWER LEVEL MECHANICAL PIPING PLAN

Project Number: 21004
Date: OCTOBER 5, 2021

MP100

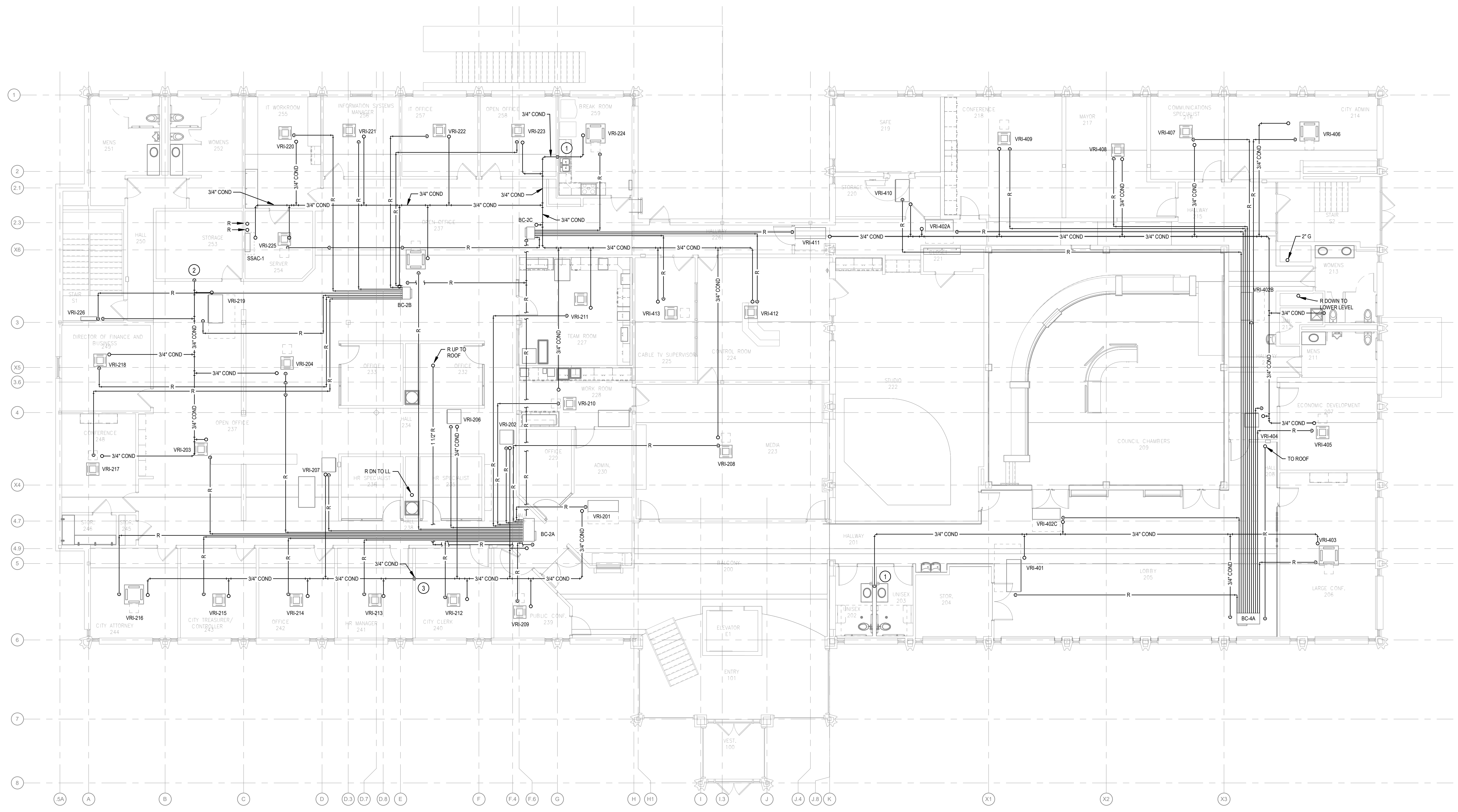


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**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

- GENERAL NOTES:**
- REFER TO M50 SERIES DRAWINGS FOR THE FOLLOWING REFERENCED DETAILS:
 - SPLIT SYSTEM
 - NATURAL GAS PIPING RISER
 - REFRIGERANT PIPING SUPPORT
 - CONTRACTOR TO COORDINATE PROJECT PHASING REQUIREMENTS WITH GENERAL CONTRACTOR PRIOR TO STARTING WORK. COORDINATE ALL SHUTDOWNS WITH OWNER.
 - ALL VALVES TO BE LOCATED IN ACCESSIBLE LOCATIONS. COORDINATE WITH ARCHITECTURAL DRAWINGS.
 - REFRIGERANT PIPING SHOWN IS FOR DIAGRAMMATICAL PURPOSES ONLY. REFER TO SPECIFICATIONS AND MANUFACTURERS INFORMATION FOR REQUIRED QUANTITY, SIZING, AND ROUTING REQUIREMENTS.
 - FIELD VERIFY FINAL REFRIGERANT PIPING ROUTING FOR SPLIT SYSTEM AIR CONDITIONERS. DO NOT EXCEED MANUFACTURERS LISTED LINE SET LENGTHS.
 - ALL EQUIPMENT DRAIN PIPING SHALL BE PIPED FULL SIZED. MINIMUM OF 1/2" ROUTE TO NEAREST FLOOR DRAIN/FLOOR SINK OR AS NOTED ON PLANS.

- KEYED NOTES:**
1. TIE INTO TAIL PIECE OF SINK. TIE IN UPSTREAM OF P-TRAP.
 2. ROUTE CONDENSATE TO MOP SINK IN STORAGE OPS ON LOWER LEVEL.
 3. ROUTE CONDENSATE PIPING TO OPEN SITE DRAIN LOCATED ON FLOOR BELOW. REFER TO PLUMBING PLANS FOR MORE INFORMATION.



1 UPPER LEVEL MECHANICAL PIPING PLAN
1/8" = 1'-0"

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

UPPER LEVEL MECHANICAL PIPING PLAN

Project Number: 21004
Date: OCTOBER 5, 2021

MP101



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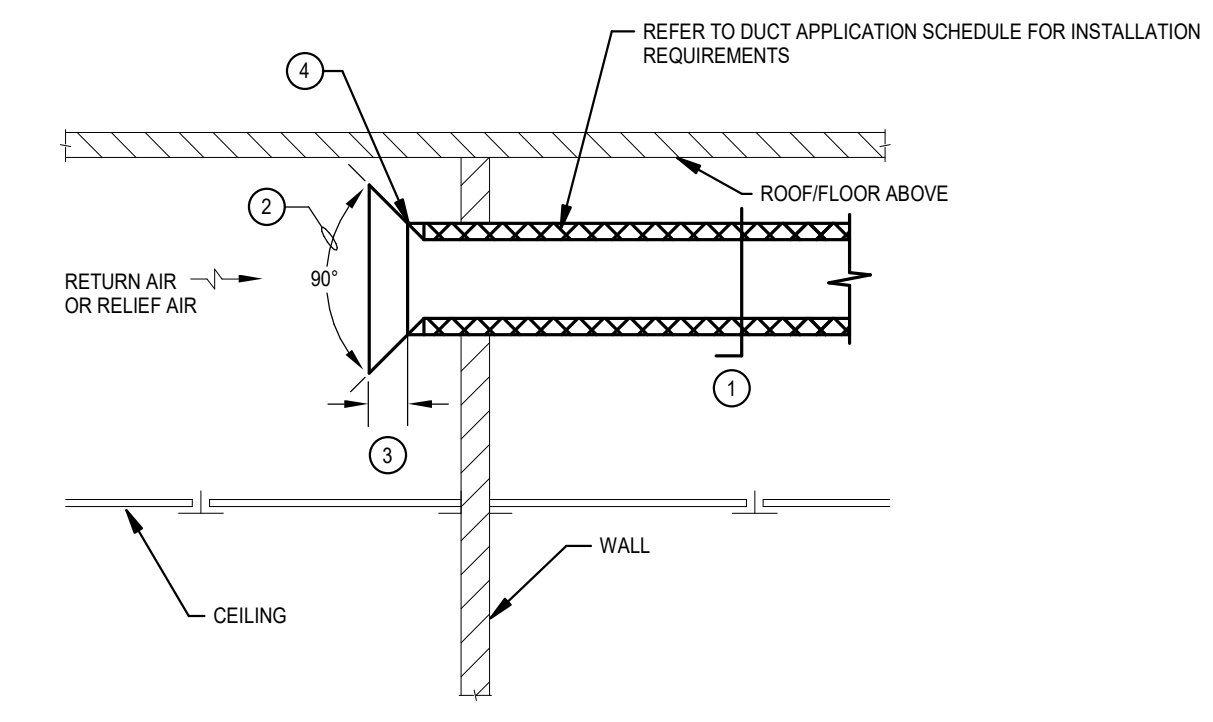
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No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

MECHANICAL DETAILS

Project Number 21004
Date OCTOBER 5, 2021

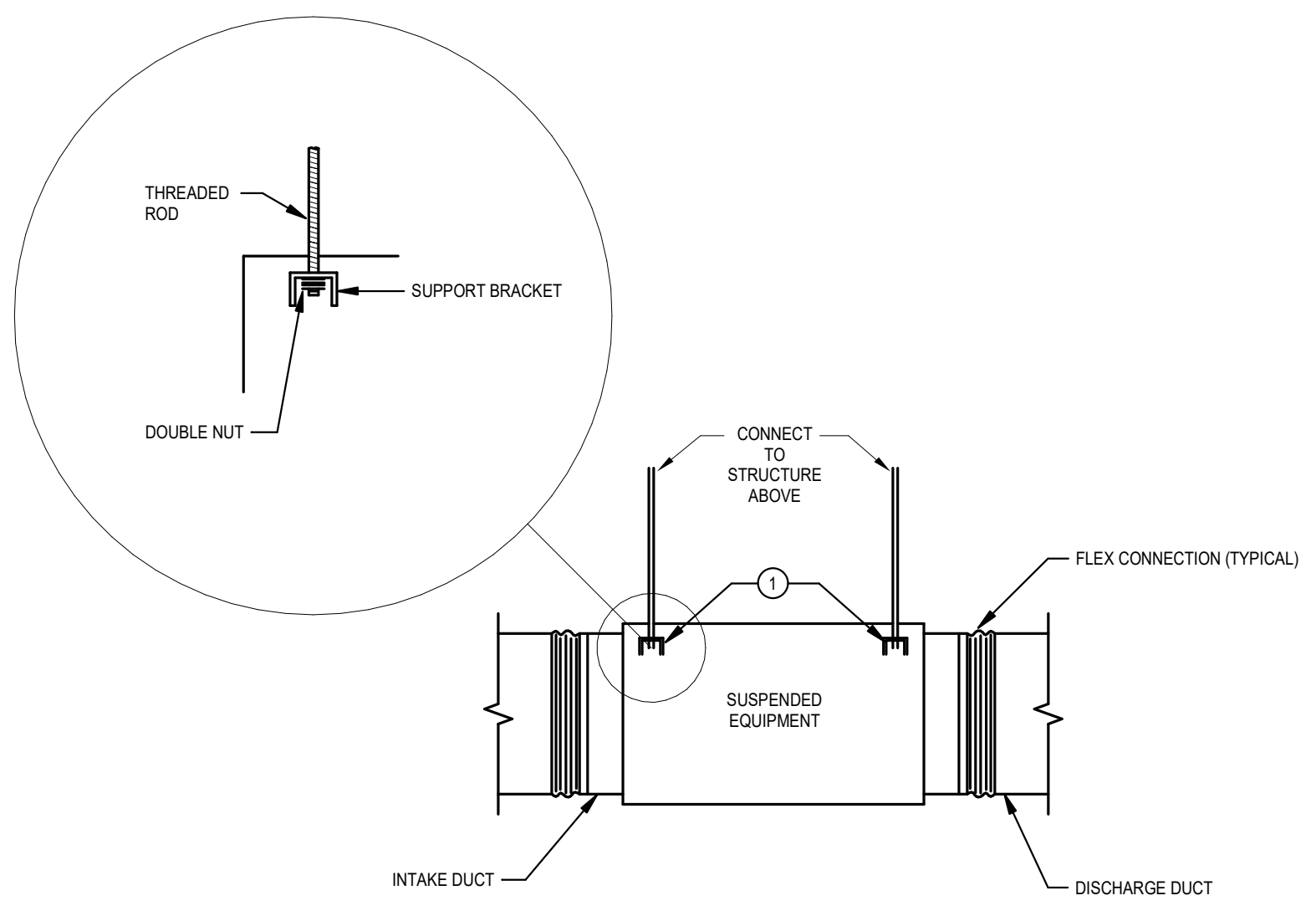
M501



3 BELLMOUTH INLET
N.T.S.

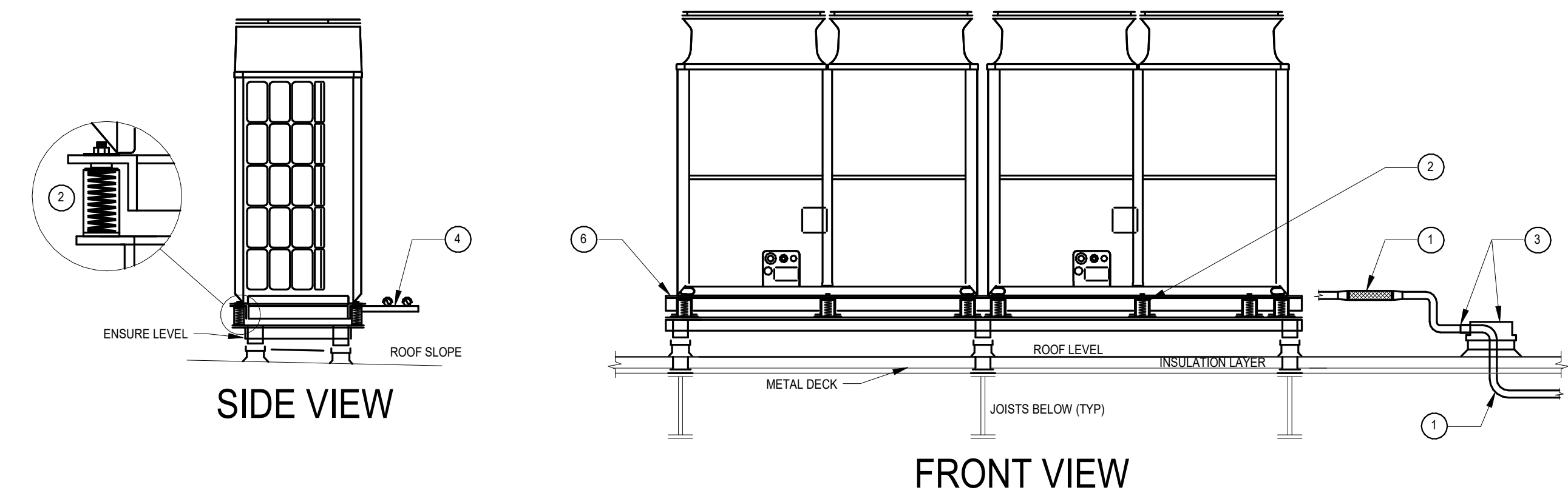
- KEYED NOTES:**
1. MOUNT BALANCING DAMPER AS FAR FROM INLET AS POSSIBLE.
 2. BELLMOUTH TRANSITION ANGLE TO BE A MINIMUM OF 90 DEGREES.
 3. BELLMOUTH TRANSITION LENGTH TO BE A MINIMUM OF 6" LONG.
 4. INSTALL METAL NOSING AT LEADING EDGE OF DUCT LINER.

- GENERAL NOTES:**
1. DUCTWORK IN HEALTHCARE FACILITIES SHALL NOT CONTAIN LINER.
 2. BELLMOUTH FITTING TO BE INSTALLED ON ALL RETURN/RELIEF AIR DUCT INLETS NOT DIRECTLY CONNECTED TO A GRILLE OR DIFFUSER.
 3. BELLMOUTH FITTING INSTALLED IN EXPOSED LOCATIONS SHALL INCLUDE A 1/2" MESH BIRDSCREEN.



6 SUSPENDED EQUIPMENT
N.T.S.

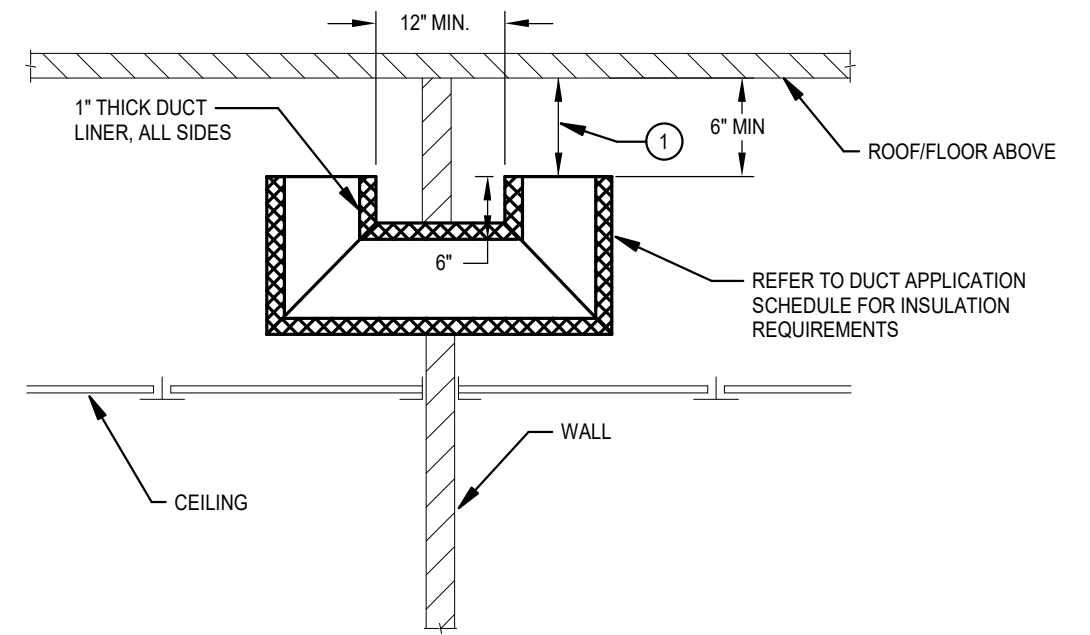
- KEYED NOTES:**
1. PROVIDE VIBRATION ISOLATION AS NOTED IN EQUIPMENT OR IN VIBRATION ISOLATION SCHEDULE.
- GENERAL NOTES:**
1. INSTALL EQUIPMENT WITH MOTOR ACCESSIBLE FOR SERVICE AND REMOVAL.



2 VARIABLE REFRIGERANT OUTDOOR UNIT SUPPORT
N.T.S.

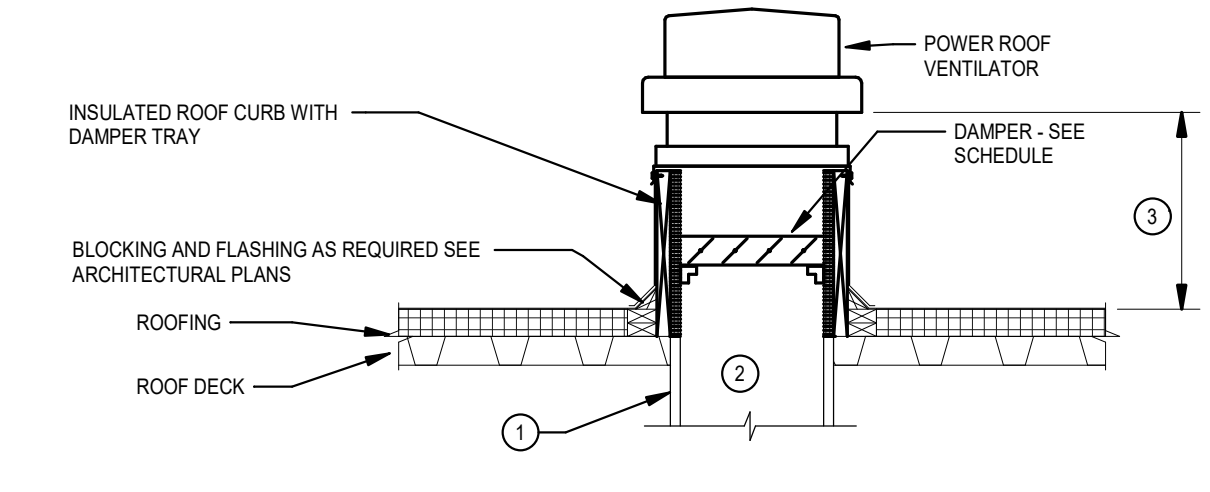
- GENERAL NOTES:**
1. PROVIDE A SUPPORT BASE FOR OUTDOOR UNITS THAT ATTACHES TO THE ROOF STRUCTURE. BASE CAN BE PRE-MANUFACTURED SIMILAR TO THE MITSUBISHI SUPER STAND OR CAN BE CUSTOM DESIGNED AND FABRICATED BY THE CONTRACTOR TO MEET THE INTENT OF THIS DETAIL.
 2. ALL POWER AND CONTROL CONNECTIONS TO THE UNIT TO BE VIA FLEXIBLE CONDUIT.
 3. ROOF PIPING SHALL BE SUPPORTED PER THE SPECIFICATIONS.
 4. SUPPORT TO ALLOW FOR APPROXIMATELY 12" OF CLEARANCE BELOW UNIT TO ALL FOR ROOFING AND MAINTENANCE ON THE UNIT.
 5. QUANTITY OF OUTDOOR UNITS WILL VARY BASED ON SYSTEM. COORDINATE SPECIFIC SUPPORT AND PIPING REQUIREMENTS WITH THE EQUIPMENT MANUFACTURER.

- KEYED NOTES:**
1. PROVIDED FLEXIBLE CONNECTIONS FOR THE INTERFACE BETWEEN THE ISOLATED UNITS AND THE BUILDING.
 2. UNITS TO SIT ON VIBRATION ISOLATORS. REFER TO SPECIFICATIONS AND SCHEDULE FOR ADDITIONAL REQUIREMENTS.
 3. PIPE PORTALS SHALL BE FLASHED AND SEALED WATER TIGHT WITH A FLEXIBLE WATER TIGHT COLLAR TO ALLOW FOR MOVEMENT WHERE PIPE ENTERS THE PORTAL. DO NOT ENTER THE PORTAL FROM VERTICAL DIRECTION.
 4. SUPPORT REFRIGERANT PIPING TO THE UNIT SUPPORTS. ATTACH PIPING USING NEOPRENE ISOLATION COLLARS ON PIPE CLAMPS.
 5. USE LONG RADIUS SWEEPING COPPER ACR TUBE PIPE BENDS WHERE THE PIPE ENTERS THE BUILDING AT THE FIRST ELBOW INTO THE CEILING SPACE TO MINIMIZE FLOW NOISE AND VIBRATION.
 6. COORDINATE SUPPORT OF UNITS TO ALLOW FOR PROPER DRAINAGE AND AVOID ICE BUILDUP.



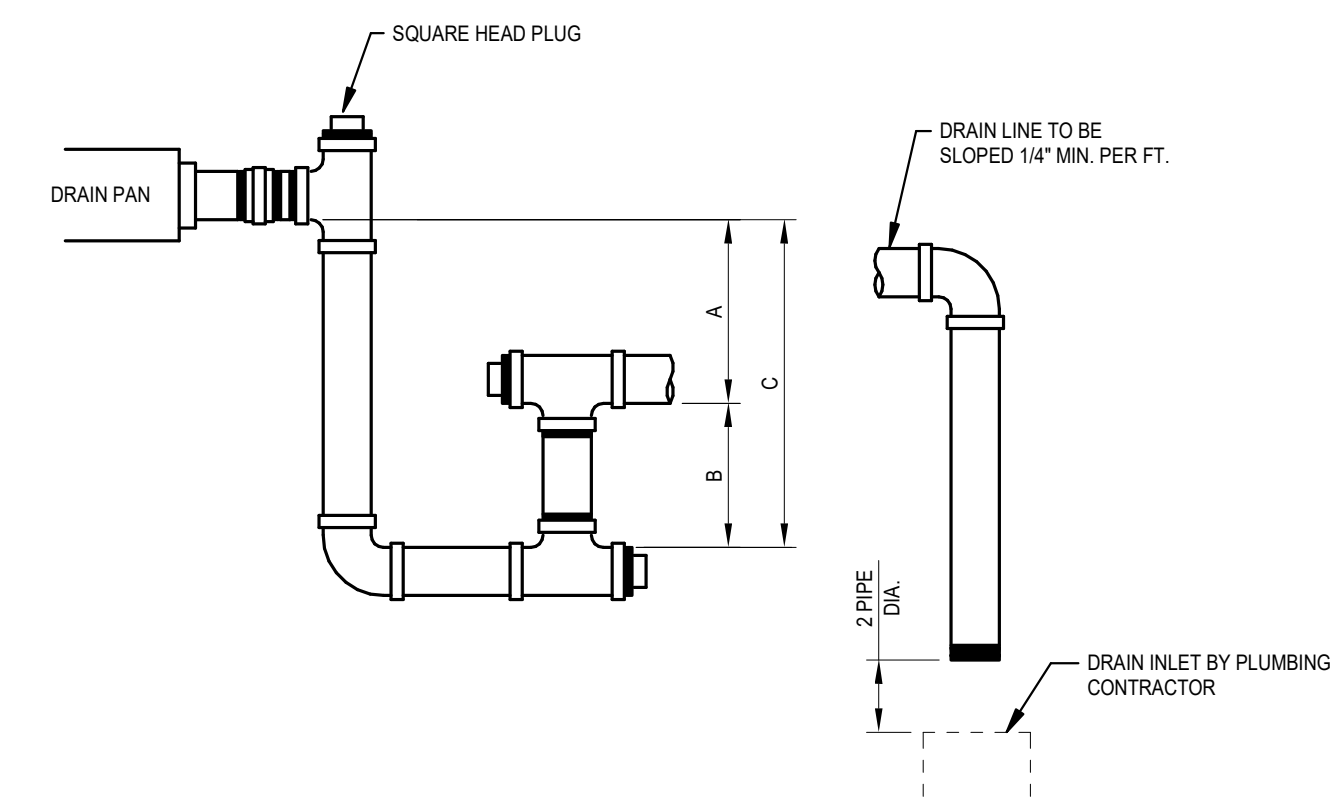
8 TRANSFER DUCT - ACOUSTIC TRANSFER DUCT
N.T.S.

- GENERAL NOTES:**
1. IF 1/2 DUCT HEIGHT IS NOT AVAILABLE FROM FLOOR/ROOF ABOVE, ROTATE TRANSFER DUCT ASSEMBLY 90 DEGREES.
 2. ELBOWS CAN BE INSTALLED HORIZONTALLY IF HEIGHT LIMITATIONS ARE PRESENT.
- KEYED NOTES:**
1. INSTALL HIGH, MAINTAIN CLEARANCE OF 1/2 DUCT HEIGHT FROM FLOOR/ROOF ABOVE.



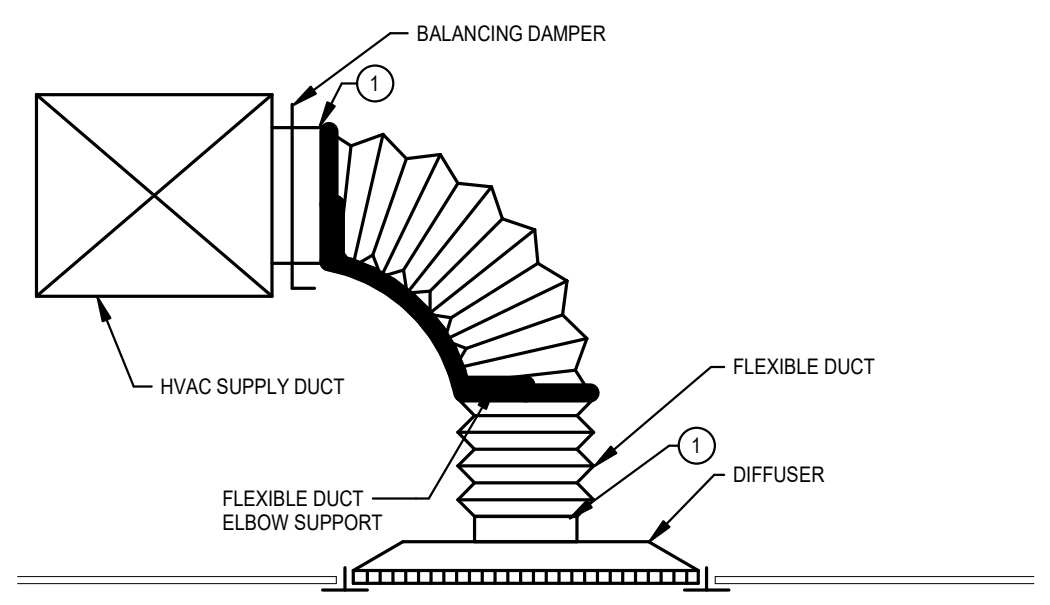
5 EXHAUST FAN
N.T.S.

- GENERAL NOTES:**
1. ROOF CURB PROVIDED BY MECHANICAL CONTRACTOR. COORDINATE INSTALLATION AND FLASHING WITH THE GENERAL CONTRACTOR. REFER TO SCHEDULE FOR HEIGHT REQUIREMENTS.
 2. MECHANICAL CONTRACTOR SHALL COORDINATE ROOF OPENING AND CURB SIZE REQUIRED FOR DUCT PENETRATION.
- KEYED NOTES:**
1. COORDINATE DUCT INSULATION AND CONSTRUCTION WITH DUCT USAGE SCHEDULE.
 2. REFER TO PLAN FOR DUCT SIZES AND ROUTING.
 3. EXHAUST AIR OUTLET TO BE A MINIMUM OF 18" ABOVE ROOF.



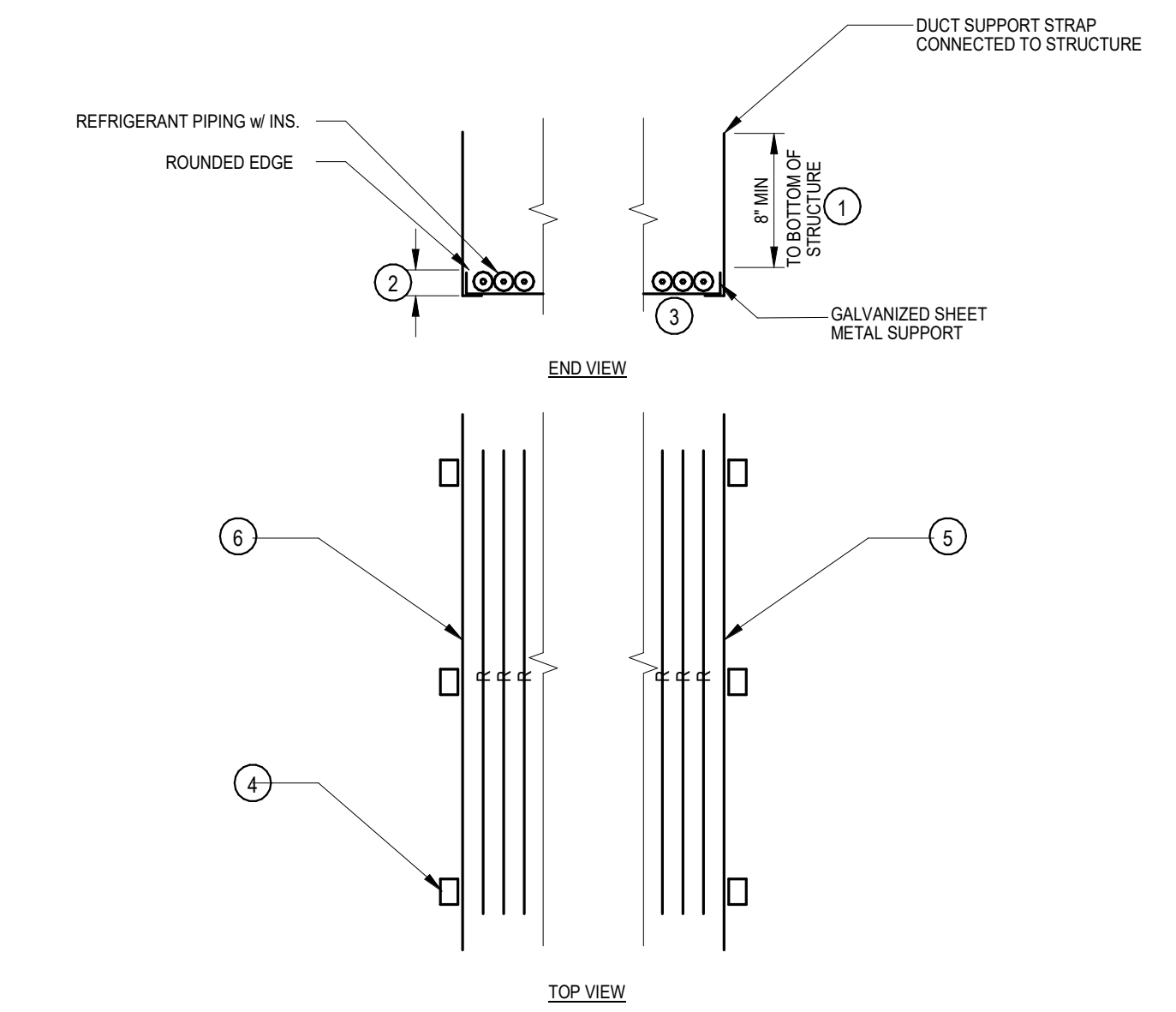
4 CONDENSATE DRAIN (DRAW THROUGH)
N.T.S.

- GENERAL NOTES:**
1. FILL TRAP MANUALLY ON INITIAL START-UP.
 2. TRAP EACH COMPONENT DRAIN CONNECTION.
 3. PIPE SIZE SHALL NOT BE LESS THAN DRAIN PAN CONNECTION SIZE.
 4. DRAW THROUGH UNITS:
A=(SP+1)
B=(SP+1)2
C=4" MIN
 5. RAISE COIL SECTION OR ENTIRE AIR HANDLING UNIT WITH STRUCTURAL MEMBERS OR STANDS TO PROVIDE TRAP HEIGHT.
- KEYED NOTES:**
- SP TO BE MAXIMUM STATIC PRESSURE (SP) ON THE DRAIN PAN INCLUDING MAXIMUM FILTER PRESSURE DROP AND PRESSURE DROP OF FUTURE COMPONENTS OF UNIT IF APPLICABLE.



7 FLEX DUCT INSTALL
N.T.S.

- GENERAL NOTES:**
1. INSTALL FLEXIBLE DUCT ELBOW SUPPORTS AT ALL FLEXIBLE DUCT 90 DEGREE BENDS.
 2. 5/8" MAX FLEXIBLE DUCT LENGTH ALLOWED.
- KEYED NOTES:**
1. M.C TO USE ZIP TIES TO ATTACH FLEX DUCT TO DUCT TAP AND DIFFUSER.



1 REFRIGERANT PIPING SUPPORT
N.T.S.

- KEYED NOTES:**
1. DISTANCE CAN BE LESS AS SUPPORT PASSES BELOW BEAMS OR TRUSSES.
 2. 6" MIN. DEPTH INCREASE IF MULTIPLE LEVELS OF PIPING ARE ROUTED IN SUPPORT.
 3. COORDINATE WIDTH WITH NUMBER OF PIPES.
 4. SUPPORT SPACING TO MEET OR EXCEED DUCT SUPPORT REQUIREMENTS TO ACCOMMODATE THE WEIGHT OF THE PIPING.
 5. SUPPORT TO BE CONTINUOUS FOR STRAIGHT RUNS. PROVIDE ALTERNATIVE SUPPORT AT OFFSETS OR ELBOWS AS NEEDED.
 6. NO OTHER UTILITIES SHALL BE ROUTED IN OR SUPPORTED FROM SUPPORT.

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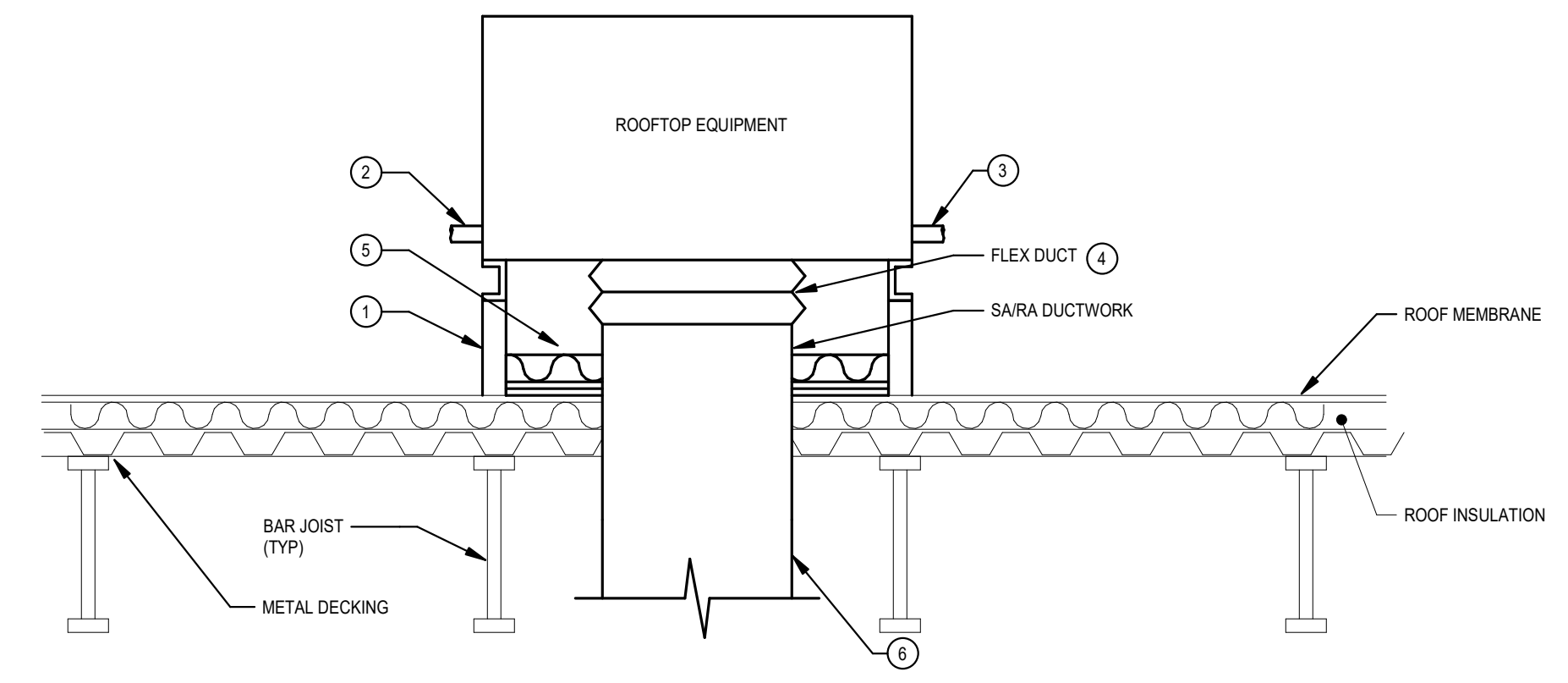
**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

MECHANICAL DETAILS

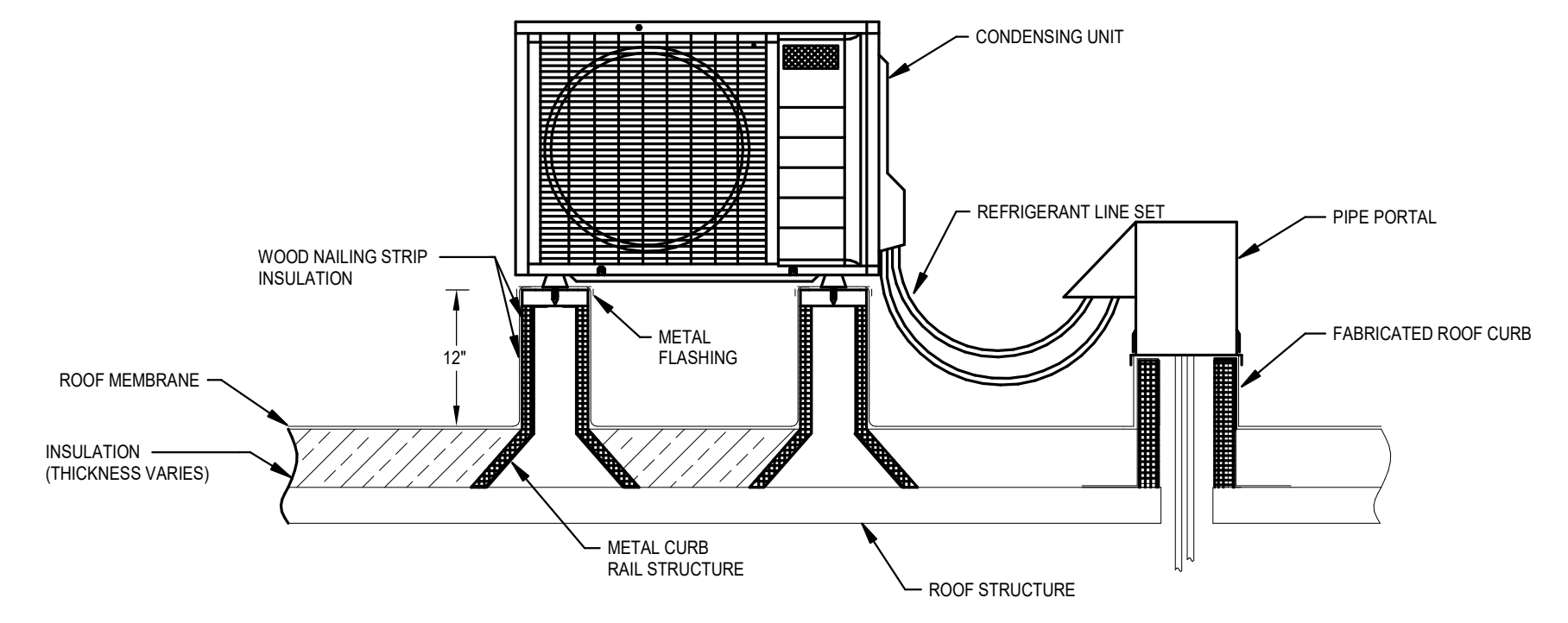
Project Number 21004
Date OCTOBER 5, 2021

M502



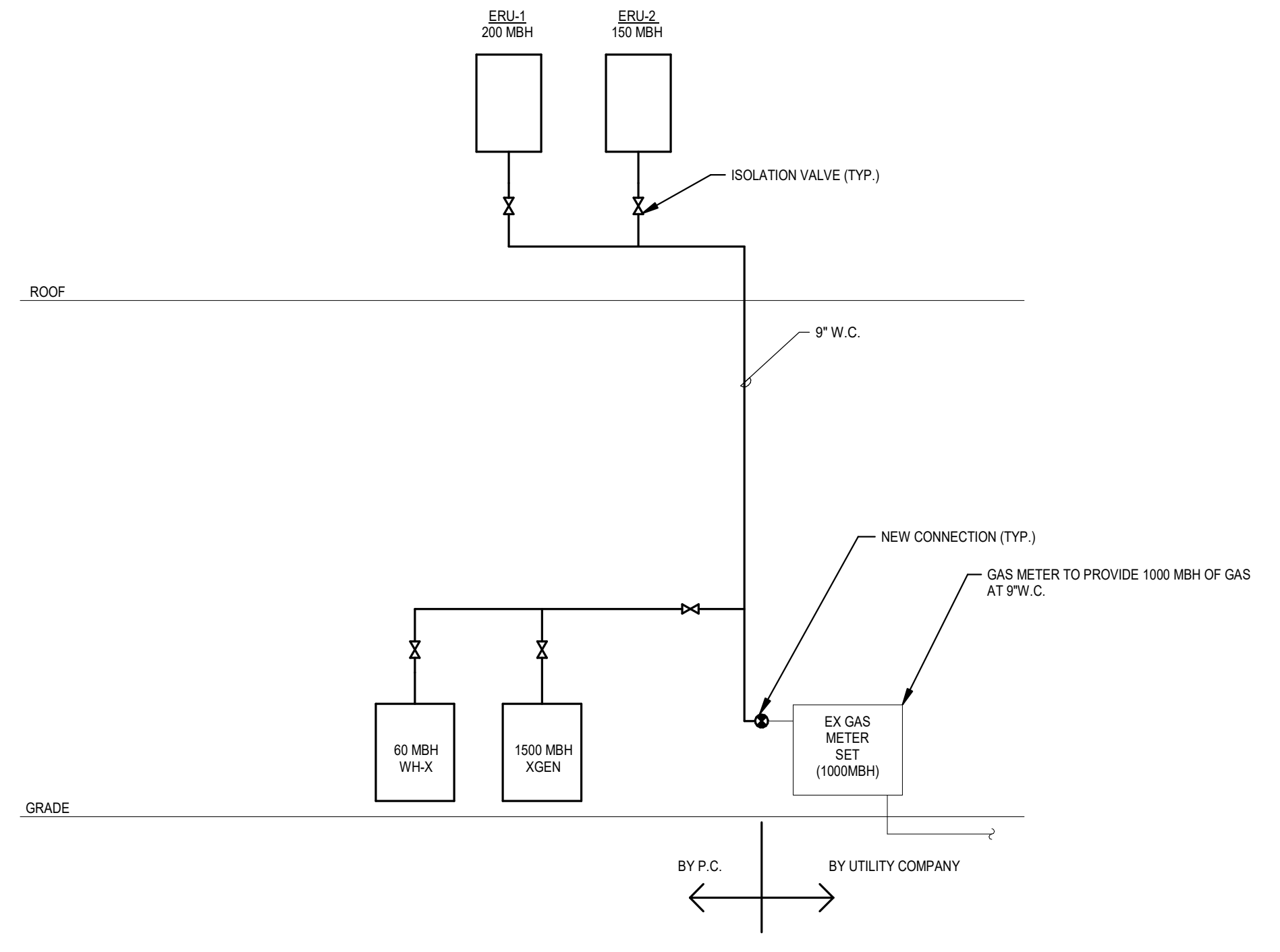
2 ROOFTOP EQUIPMENT DETAIL
N.T.S.

- KEYED NOTES:**
1. REFER TO SPECIFICATION AND ROOF CURB DETAIL FOR SPECIFIC INSTALLATION REQUIREMENTS FOR VIBRATION ISOLATION CURB.
 2. REFER TO CONDENSATE DRAIN DETAIL FOR INSTALLATION AND DEPTH REQUIREMENTS.
 3. GAS CONNECTION, PROVIDE DIRT LEG, SHUT-OFF VALVE AND REGULATOR AS REQUIRED.
 4. TRANSITION SUPPLY AND RETURN DUCT CONNECTION AS NEEDED TO CONNECT TO THE DUCT BELOW.
 5. PROVIDE TWO LAYERS OF 5/8" GYP BOARD AND A LAYER OF 1" 3 LB / CU FT BATT ON TOP OF THE GYP BOARD. CAULK ALL JOINTS BETWEEN THE GYP AND THE DUCTWORK.
 6. REFER TO DUCTWORK APPLICATION SCHEDULE FOR DUCT AND INSTALLATION REQUIREMENTS.



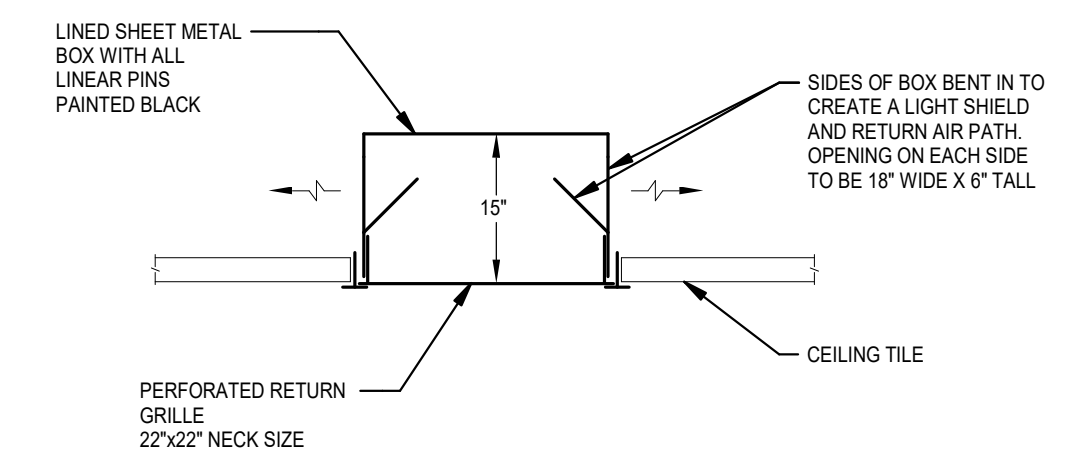
1 SPLIT SYSTEM
N.T.S.

- GENERAL NOTES:**
1. VERIFY REFRIGERANT PIPING LENGTH AND ELEVATION CHANGE. DO NOT EXCEED MANUFACTURER'S REQUIREMENTS.
 2. MAINTAIN ALL REQUIRED SERVICE CLEARANCES TO MEET MANUFACTURER'S REQUIREMENTS.



4 NATURAL GAS PIPING RISER
N.T.S.

- GENERAL NOTES:**
1. SEE PLANS FOR PIPE SIZES.
 2. PAINT ALL EXPOSED PIPING AND FITTINGS. COORDINATE COLOR WITH ARCHITECT.
 3. PAINT ALL EXTERIOR PIPING AND FITTINGS. COORDINATE COLOR WITH ARCHITECT.
 4. COORDINATE ANY MODIFICATIONS TO THE EXISTING METER WITH UTILITY COMPANY.



3 RETURN AIR DIFFUSER - NOISE BAFFLE
N.T.S.

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ENERGY RECOVERY UNIT SCHEDULE

Table with columns: MARK, MANUFACTURER, MODEL, SERVICE, SUPPLY / FRESH AIR STREAM, RETURN / EXHAUST AIR STREAM, MAX WHEEL PRESSURE DROP, UNIT COMPONENTS, ROOF CURB, ELECTRICAL, NOTES.

- NOTES: 1. REFER TO ENERGY RECOVERY UNIT TEMPERATURE SCHEDULE FOR TEMPERATURE PERFORMANCE REQUIREMENTS. 2. PROVIDE WITH SINGLE POINT POWER CONNECTION. 3. UNIT MANUFACTURER TO VERIFY TOTAL STATIC PRESSURE AND MOTOR HORSEPOWER REQUIRED BASED ON ACTUAL UNIT PERFORMANCE.

COIL SCHEDULE - REFRIGERANT COOLING

Table with columns: MARK, SERVICE, AIRFLOW (CFM), MAX FACE VELOCITY (FPM), AIR TEMPERATURE (°F), REHEAT COIL LEVAING (NOTE 3), TOTAL CAPACITY (MBH), SENS CAPACITY (MBH), EER, REFRIGERANT TYPE, MAX AIR PRESSURE DROP, NOTES.

- NOTES: 1. PRESSURE DROP BASED ON TOTALLY SATURATED COIL. 2. COIL PROVIDED WITH ENERGY RECOVERY UNIT. 3. VALUE SCHEDULED IS THE MAX REHEAT TEMPERATURE. MINIMUM ACCEPTABLE VALUE FOR REHEAT COIL IS 75 DB / 60 WB.

COIL SCHEDULE - GAS FURNACE

Table with columns: MARK, SERVICE, AIRFLOW (CFM), FUEL (NATURAL GAS OR PROPANE), OPERATING PRESSURE (IN. W.C.), AFUE, COIL PERFORMANCE (EAT, LAT, INPUT, OUTPUT, TURNDOWN), NOTES.

- NOTES: 1. COIL PROVIDED WITH ENERGY RECOVERY UNIT.

COIL SCHEDULE - ELECTRIC PREHEAT COIL

Table with columns: MARK, SERVICE, AIRFLOW (CFM), COIL PERFORMANCE (EAT, KW, COIL/LAT, VOLT, PH, NO. OF STEPS), NOTES.

- NOTES: 1. COIL PROVIDED INTEGRAL TO ENERGY RECOVERY UNIT. 2. COIL SHALL BE POWERED BY THE UNIT.

MISCELLANEOUS MECHANICAL EQUIPMENT SCHEDULE

Table with columns: MARK, MANUFACTURER, MODEL, DESCRIPTION, LOCATION, SERVICE, SYMBOL, DISCONNECT, NOTES.

- NOTES: 1. ALL CONTROL CABINETS IN WET OR DAMP LOCATIONS TO BE NEMA 3 RATED.

FILTER SCHEDULE

Table with columns: MARK, MANUFACTURER, MODEL, SERVICE, FILTER DEPTH, MAXIMUM VELOCITY, MERV RATING, NOMINAL EFF, TOTAL MEDIA AREA, PRESSURE DROP, NOTES.

- NOTES: 1. FILTER PERFORMANCE LISTED IS BASED ON 24x24 FILTERS. PROVIDE ADDITIONAL 6" OR 12" WIDE FILTERS AS NECESSARY TO MEET THE REQUIRED MAXIMUM VELOCITIES IN THE SPACE AVAILABLE.

ENERGY RECOVERY WHEEL SCHEDULE

Table with columns: MARK, SERVICE, AIRFLOW, MAX WHEEL PRESSURE DROP, SIEVE DIMENSION, MIN. THERMAL EFFECTIVENESS, NOTES.

- NOTES: 1. REFER TO ENERGY RECOVERY UNIT TEMPERATURE SCHEDULE FOR TEMPERATURE PERFORMANCE REQUIREMENTS. 2. PROVIDED WITH PACKAGED ENERGY RECOVERY UNIT.

VIBRATION ISOLATION SCHEDULE

Table with columns: EQUIPMENT SERVED, MANUFACTURER, ISOLATION INFORMATION, SERVICE, THICKNESS, DEFLECTION, NOTES.

- NOTES: 1. DEFLECTION SIZE LISTED IS FOR LATERAL MOVEMENT.

DUCTWORK APPLICATION SCHEDULE

Table with columns: AIR HANDLING SYSTEM, EQUIPMENT SERVICE, AIRSTREAM, DUCTWORK LOCATION, SYSTEM TYPE, ACTUAL PRESSURE RATING, DUCTWORK MATERIAL, SINGLE OR DOUBLE WALL, DUCT SHAPE, INSULATION APPLICATION, NOTES.

- NOTES: 1. DUCT DIMENSIONS SHOWN ON PLAN ARE CLEAR INSIDE DIMENSIONS AND DO NOT INCLUDE INSULATION. 2. R-VALUE LISTED IN SCHEDULE IS THE MINIMUM ALLOWABLE INSTALLED R-VALUE. 3. INSULATION THICKNESS LISTED IS THE MINIMUM ALLOWABLE INSULATION THICKNESS. CONTRACTOR TO VERIFY REQUIRED INSULATION THICKNESS BASED ON INSULATION DENSITY USED.

- INSULATION TYPES: TYPE A: FLEXIBLE FIBERGLASS - OUTSIDE WRAP. TYPE B: SEMI-RIGID FIBERGLASS BOARD (EXTERIOR OF DUCT). TYPE C: FLEXIBLE FIBERGLASS LINER. TYPE D: PREFORMED RIGID FIBERGLASS ACoustical LINER. TYPE E: FLEXIBLE MINERAL FIBER DUCT WRAP. TYPE F: FLEXIBLE FIBERGLASS SPIRAL DUCT LINER.

GRILLES, REGISTERS, & DIFFUSERS SCHEDULE

Table with columns: MARK, MANUFACTURER, MODEL, STYLE, BORDER, INLET SIZE, FACE SIZE, DAMPER NEEDED, MATERIAL, COLOR, NOTES.

- NOTES: 1. CONTRACTOR SHALL DETERMINE PROPER MARGIN STYLE TO MATCH CEILING TYPE. 2. BRANCH DUCT TO DIFFUSERS SHALL BE AT THE SAME SIZE AS THE DIFFUSER NECK, UNLESS SHOWN OTHERWISE.

FAN SCHEDULE

Table with columns: MARK, MANUFACTURER, MODEL, SERVICE, TYPE, AIRFLOW, S.P., MAX FAN RPM, DRIVE, WHEEL DIA., MAX. AMCA SONES, ROOF CURB, FAN CONSTRUCTION, ELECTRICAL (FAN), DAMPER, CONTROL TYPE, NOTES.

- NOTES: 1. MOTORIZED BACKDRAFT DAMPER WIRED TO OPEN WHEN FAN OPERATES. FAN TO HAVE A SINGLE POINT POWER CONNECTION FOR FAN AND DAMPER FOR ON / OFF FANS. 2. HEIGHT LISTED IS THE MINIMUM REQUIRED HEIGHT ABOVE THE FINISHED ROOF LEVEL. COORDINATE REQUIRED CURB HEIGHT WITH ARCHITECTURAL DRAWINGS AND ROOF CONSTRUCTION. 3. LINE VOLTAGE THERMOSTAT PROVIDED BY A.T.C., INSTALLED BY E.C.

- CONTROL TYPE: TYPE 1: TIME OF DAY SCHEDULE (DDC). TYPE 2: WALL MOUNTED T-STAT.

CEDAR FALLS CITY HALL REMODEL

CEAR FALLS, IOWA

Table with columns: No., Description, Date. Includes OWNER REVIEW, ISSUED FOR BID.

MECHANICAL SCHEDULES

Project Number 21004 Date OCTOBER 5, 2021

M601



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No.	Description	Date
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	ISSUED FOR BID	10-5-2021

CIRCUIT	MARK	MANUFACTURER	MODEL	MODULES				TOTAL CIRCUIT CAPACITY (TONS) (NOTE 4)	REFRIGERANT (NOTE 5)	ELECTRICAL						NOTES
				QUANTITY	MODULE CAPACITY					VOLT	PH	MCA	MOCP	DISCONNECT		
					NOMINAL CAPACITY (TONS)	COOLING (BTUH) (NOTE 1)	HEATING (BTUH) (NOTE 2, 3)							BY	TYPE	
VRO-1	VRO-1A	DAIKIN	TURY	1	12	144	160	24	R-410A	208	3	49	80	MFR	NF	6
	VRO-1B	DAIKIN	TURY	1	12	144	160			208	3	49	80	MFR	NF	
VRO-2	VRO-2A	DAIKIN	TURY	1	18	216	243	36	R-410A	208	3	73	125	MFR	NF	6
	VRO-2B	DAIKIN	TURY	1	18	216	243			208	3	73	125	MFR	NF	
VRO-3	VRO-3A	DAIKIN	TURY	1	8	96	108	16	R-410A	208	3	31	45	MFR	NF	6
	VRO-3B	DAIKIN	TURY	1	8	96	108			208	3	31	45	MFR	NF	
VRO-4	VRO-4A	DAIKIN	TURY	1	16	192	180	32	R-410A	208	3	66	110	MFR	NF	6
	VRO-4B	DAIKIN	TURY	1	16	192	180			208	3	66	110	MFR	NF	

- NOTES:
- MAX. AMBIENT OUTSIDE AIR TEMP TO BE 90°F.
 - REFER TO SPECIFICATION FOR MINIMUM HEATING REQUIREMENTS.
 - HEATING CAPACITY LISTED IN THE SCHEDULE IS BASED ON 60 DEG F OUTSIDE AIR CONDITIONS. UNIT TO BE CAPABLE OF PROVIDING THE FOLLOWING HEATING CAPACITY AT THE CORRESPONDING OUTSIDE AIR TEMPERATURES LISTED TO THE RIGHT.
 - MAX CIRCUIT LENGTH NOT TO EXCEED 500'. MAX CIRCUIT LENGTH BETWEEN SOLENOID BOX AND INDOOR UNIT NOT TO EXCEED 100'.
 - SIZE AND ROUTE ALL REFRIGERANT PIPING PER MANUFACTURER'S REQUIREMENTS.
 - INDOOR UNITS CONNECTED TO THIS CIRCUIT TO BE CAPABLE OF SIMULTANEOUS HEATING AND COOLING.

MARK	AREA SERVED	MANUFACTURER	DESCRIPTION	MODEL	SERVED BY THE BC UNIT NOTED	NOMINAL UNIT AIRFLOW (CFM) (NOTE 2)	VENTILATION AIRFLOW (CFM)	CAPACITY INFORMATION								ELECTRICAL						NOTES
								COOLING MODE				HEATING MODE				VOLTS	PH	MCA	MOCP	DISCONNECT BY	TYPE	
								NOMINAL UNIT CAPACITY (BTUH) (NOTE 4)	COOLING CAPACITY (BTUH) (NOTE 3)	EAT DB (°F)	EAT WB (°F)	NOMINAL UNIT CAPACITY (BTUH) (NOTE 4)	HEATING CAPACITY (BTUH) (NOTE 3)	EAT DB (°F)	EAT LB (°F)							
VRI-201	BALCONY 200	DAIKIN	MEDIUM STATIC DUCTED CONCEALED	PEFY-NMAU	BC-2A	1483	50	54000	5990	75	63	60000	6640	70	74.1	208	1	3.31	15	MFR	NON-FUSED	1, 7
VRI-202	ADMIN 230	DAIKIN	MEDIUM STATIC DUCTED CONCEALED	PEFY-NMAU	BC-2A	300	55	6000	4900	75	63	6700	1556	70	74.8	208	1	1.05	15	MFR	NON-FUSED	1, 7
VRI-203	OPEN OFFICE 237	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2A	335	90	12000	9660	75	63	13500	3780	70	80.4	208	1	0.29	15	MFR	NON-FUSED	1
VRI-204	OPEN OFFICE 237	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2A	390	105	15000	12290	75	63	17000	5280	70	82.5	208	1	0.35	15	MFR	NON-FUSED	1
VRI-205	OPEN OFFICE 237	DAIKIN	3 x 3' CASSETTE	PLFY-NEMU	BC-2A	812	115	30000	14910	75	63	34000	13080	70	84.9	208	1	0.57	15	MFR	NON-FUSED	1
VRI-206	PRIVATE OFFICE 232	DAIKIN	MEDIUM STATIC DUCTED CONCEALED	PEFY-NMAU	BC-2A	300	45	6000	3700	75	63	6700	969	70	73.0	208	1	1.05	15	MFR	NON-FUSED	1, 7
VRI-207	PRIVATE OFFICE 236	DAIKIN	MEDIUM STATIC DUCTED CONCEALED	PEFY-NMAU	BC-2A	300	45	6000	3690	75	63	6700	965	70	73.0	208	1	1.05	15	MFR	NON-FUSED	1, 7
VRI-208	MEDIA 223	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2A	390	120	15000	11400	75	63	17000	3200	70	77.6	208	1	0.35	15	MFR	NON-FUSED	1
VRI-209	PUBLIC CONF. 239	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2A	390	30	15000	6200	75	63	17000	5770	70	83.7	208	1	0.35	15	MFR	NON-FUSED	1
VRI-210	WORK ROOM 228	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2A	280	15	5000	4390	75	63	5600	828	70	72.7	208	1	0.24	15	MFR	NON-FUSED	1
VRI-211	TEAM ROOM 227	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2A	335	90	12000	8750	75	63	13500	1510	70	74.2	208	1	0.29	15	MFR	NON-FUSED	1
VRI-212	OFFICE 240	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2A	335	30	12000	6080	75	63	13500	5960	70	86.5	208	1	0.29	15	MFR	NON-FUSED	1
VRI-213	OFFICE 241	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2A	335	30	12000	6080	75	63	13500	5990	70	86.6	208	1	0.29	15	MFR	NON-FUSED	1
VRI-214	OFFICE 242	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2A	335	30	12000	6080	75	63	13500	5990	70	86.6	208	1	0.29	15	MFR	NON-FUSED	1
VRI-215	OFFICE 243	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2A	335	30	12000	6080	75	63	13500	5990	70	86.6	208	1	0.29	15	MFR	NON-FUSED	1
VRI-216	OFFICE 244	DAIKIN	3 x 3' CASSETTE	PLFY-NCMU	BC-2A	812	30	30000	8990	75	63	34000	11200	70	82.8	208	1	0.57	15	MFR	NON-FUSED	1
VRI-217	CONFERENCE 248	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2B	335	105	12000	9630	75	63	13500	9600	70	98.5	208	1	0.29	15	MFR	NON-FUSED	1
VRI-218	OFFICE 249	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2B	335	30	12000	3830	75	63	13500	5840	70	86.1	208	1	0.29	15	MFR	NON-FUSED	1
VRI-219	MENS 251	DAIKIN	MEDIUM STATIC DUCTED CONCEALED	PEFY-NMAU	BC-2B	1165	15	36000	8627	75	63	40000	17552	70	84.0	208	1	3.33	15	MFR	NON-FUSED	1, 7
VRI-220	WORK ROOM 255	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2B	335	30	12000	5010	75	63	13500	5930	70	86.4	208	1	0.29	15	MFR	NON-FUSED	1
VRI-221	IT OFFICE 256	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2B	335	25	12000	4700	75	63	13500	5640	70	85.6	208	1	0.29	15	MFR	NON-FUSED	1
VRI-222	IT OFFICE 257	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2B	335	50	12000	4700	75	63	13500	5620	70	85.5	208	1	0.29	15	MFR	NON-FUSED	1
VRI-223	OPEN OFFICE 258	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2B	335	50	12000	4700	75	63	13500	5620	70	85.5	208	1	0.29	15	MFR	NON-FUSED	1
VRI-224	BREAKROOM 259	DAIKIN	3 x 3' CASSETTE	PLFY-NEMU	BC-2C	812	135	30000	9830	75	63	34000	11000	70	82.5	208	1	0.57	15	MFR	NON-FUSED	1
VRI-225	SERVER 254	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-2C	460	0	18000	11400	75	63	20000	580	70	71.1	208	1	0.5	15	MFR	NON-FUSED	1
VRI-226	NORTH STAIR	DAIKIN	WALL MOUNTED	PKFY	BC-2C	390	15	12000	1990	75	63	13500	6220	70	84.8	208	1	0.38	15	MFR	NON-FUSED	6

- NOTES:
- PROVIDE WITH UNIT MOUNTED CONDENSATE PUMP. PUMP TO BE WIRED TO SINGLE POINT POWER CONNECTION.
 - NOMINAL AIRFLOW BASED ON UNIT FAN SPEED ON HIGH.
 - THE CAPACITY LISTED IS THE MINIMUM REQUIRED CAPACITY INCLUDING ALL REFRIGERANT PIPING LOSSES & BASED ON ACTUAL INLET CONDITIONS NOTED.
 - NOMINAL CAPACITY - DOES NOT INCLUDE REFRIGERANT LINE LOSSES OR ANY DERATE. UNIT NOMINAL CAPACITY MAY VARY BETWEEN EQUIPMENT MANUFACTURERS TO MEET DESIRED VALUES.
 - SIZE & ROUTE ALL REFRIGERANT PIPING PER MANUFACTURER'S REQUIREMENTS.
 - CONTRACTOR TO PROVIDE FIELD MOUNTED CONDENSATE PUMP FOR ALL WALL MOUNTED UNITS.
 - CONTRACTOR TO PROVIDE RETURN AIR FILTER BOX ON ALL DUCTED CONCEALED UNITS.

MARK	MANUFACTURER	MODEL	SERVICE	REFRIGERANT	NUMBER OF REFRIGERANT CIRCUITS	COOLING CAPACITY (BTUH)	HEATING CAPACITY (BTUH)	ELECTRICAL INFORMATION						NOTES
								VOLT	PH	MCA	MOCP	DISCONNECT BY	CONTROLLER BY	
BC-1A	DAIKIN	TCMM	VRO-1	R-410A	16	260000	200000	208	1	2	15	E.C.	MFR	1, 2, 3
BC-1B	DAIKIN	TCMS	VRO-1	R-410A	4	734000	57000	208	1	1	15	E.C.	MFR	1, 2, 3
BC-2A	DAIKIN	TCMM	VRO-2	R-410A	16	440000	200000	208	1	2	15	E.C.	MFR	1, 2, 3
BC-2B	DAIKIN	TCMS	VRO-2	R-410A	4	100000	45000	208	1	1	15	E.C.	MFR	1, 2, 3
BC-2C	DAIKIN	TCMS	VRO-2	R-410A	8	110000	50000	208	1	1	15	E.C.	MFR	1, 2, 3
BC-3A	DAIKIN	TCMM	VRO-3	R-410A	16	190000	134000	208	1	2	15	E.C.	MFR	1, 2
BC-3B	DAIKIN	TCMS	VRO-3	R-410A	8	78000	55000	208	1	1	15	E.C.	MFR	1, 2
BC-4A	DAIKIN	TCMM	VRO-4	R-410A	16	264000	200000	208	1	2	15	E.C.	MFR	1, 2, 3

- NOTES:
- PROVIDE ISOLATION VALVES ON ALL REFRIGERANT PIPING CIRCUITS.
 - M.C. TO ROUTE DRAIN TO NEAREST CONDENSATE LINE.
 - PROVIDE WITH EXTERNALLY MOUNTED CONDENSATE PUMP.

SYSTEM (NOTE 1)	LOCATION	DESIGN WORKING PRESSURE (PSI)	MATERIAL	JOINTS	USAGE SIZE RANGE	INSULATION APPLICATION		NOTES
						THICKNESS (IN.)	TYPE (NOTES 3, 4)	
NATURAL GAS	ABOVE GRADE	125	SCH 40 BLACK STEEL	THREADED OR WELDED	LESS THAN 2"	-	-	5, 6
				WELDED	2" & GREATER	-	-	5, 6
REFRIGERANT	GENERAL	500	ACR COPPER	FLARED END WITH SOLDER	LESS THAN 1-1/2"	1"	ELASTOMERIC FOAM	7
EQUIPMENT DRAINS (GRAVITY & PUMPED CONDENSATE)	ABOVE GRADE (RETURN AIR PLENUM)	N/A	DWV COPPER	SOLDER	ALL	1"	FIBERGLASS	2
	ABOVE GRADE (EXTERIOR)	N/A	SCH 40 CPVC	SOLVENT	ALL	-	-	

- NOTES:
- REFER TO EACH PIPING SPECIFICATION FOR SPECIFIC PIPING REQUIREMENTS.
 - INSULATION ONLY REQUIRED FOR COLD SERVICE PIPING. EQUIPMENT DRAIN PIPING LESS THAN 2" IN LENGTH NEED NOT BE INSULATED.
 - SEE SPECIFICATION SECTION 230719 FOR COMPLETE INSULATION AND JACKETING REQUIREMENTS. ALL INSULATION SHALL BE PLENUM RATE MEETING ASTM E84 WHERE INSTALLED IN A RETURN AIR PLENUM.
 - INSTALL RIGID CALCIUM SILICATE INSERTS AT ALL PIPING HANGERS.
 - ALL CONCEALED NATURAL GAS PIPING TO BE WELDED.
 - ALL NATURAL GAS PIPING LOCATED IN A CEILING RETURN AIR PLENUM SHALL BE WELDED.
 - PAINT EXPOSED & EXTERIOR INSULATION WITH TWO COATS EXTERIOR GRADE LATEX.

MARK	AREA SERVED	MANUFACTURER	DESCRIPTION	MODEL	SERVED BY THE BC UNIT NOTED	NOMINAL UNIT AIRFLOW (NOTE 2)	VENTILATION AIRFLOW (CFM)	CAPACITY INFORMATION								ELECTRICAL						NOTES
								COOLING MODE				HEATING MODE				VOLTS	PH	MCA	MOCP	DISCONNECT BY	TYPE	
								NOMINAL UNIT CAPACITY (BTUH) (NOTE 4)	COOLING CAPACITY (BTUH) (NOTE 3)	EAT DB (°F)	EAT WB (°F)	NOMINAL UNIT CAPACITY (BTUH) (NOTE 4)	HEATING CAPACITY (BTUH) (NOTE 3)	EAT DB (°F)	EAT LB (°F)							
VRI-101A	FOYER 001	DAIKIN	MEDIUM STATIC DUCTED CONCEALED	PEFY-NMAU	BC-1A	671	105	24000	9160	75	63	27000	3980	70	75.5	208	1	2.25	15	MFR	NON-FUSED	1, 7
VRI-101B	EMR E3	DAIKIN	MEDIUM STATIC DUCTED CONCEALED	PEFY-NMAU	BC-1A	1483	45	54000	23587	75	63	60000	35190	70	92.0	208	1	3.31	15	MFR	NON-FUSED	1, 7
VRI-102	ADMIN 041	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-1A	315	90	8000	6010	75	63	9000	0	70	70.0	208	1	0.28	15	MFR	NON-FUSED	1
VRI-103	ADMIN 042	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-1A	280	25	5000	1370	75	63	5600	0	70	70.0	208	1	0.24	15	MFR	NON-FUSED	1
VRI-104	ADMIN 043	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-1A	280	30	5000	1890	75	63	5600	0	70	70.0	208	1	0.24	15	MFR	NON-FUSED	1
VRI-105	KITCHENETTE 045	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-1A	390	85	15000	12960	75	63	17000	7540	70	87.9	208	1	0.35	15	MFR	NON-FUSED	1
VRI-106	BREAKROOM 046	DAIKIN	2 x 2' CASSETTE	PLFY-NCMU	BC-1A	335	105	12000	10590	75	63	13500	6950	70	89.2	208						

ZONE SENSOR SCHEDULE table with columns for Zone Type, Thermostat Configuration, Unoccupied Mode, Heating Setpoint, Heating Setback, Cooling Setpoint, Cooling Setback, and Notes.

- NOTES: 1. VERIFY LOCATION OF ALL THERMOSTATS WITH THE OWNER, ARCHITECT AND ENGINEER PRIOR TO ROUGH-IN. 2. ALL TEMPERATURE SENSORS & THERMOSTATS THAT HAVE USER ADJUSTMENT SHALL BE INSTALLED AT 42" A.F.F. TO THE CENTERLINE OF THE DEVICE...

KITCHEN HOOD SCHEDULE

KITCHEN HOOD SCHEDULE table with columns for Symbol, Manufacturer, Model, Service, Max Exhaust (CFM), Hood Size (in.), Exhaust, Controller Location, Volts, Phase, Amps, and Notes.

- NOTES: 1. PROVIDE WITH ROOF CAP EQUAL TO BROAN MODEL 611. PROVIDE WITH BACKDRAFT DAMPER AND BIRDSCREEN

VARIABLE REFRIGERANT INDOOR UNIT SCHEDULE (VRO-4)

VARIABLE REFRIGERANT INDOOR UNIT SCHEDULE (VRO-4) table with columns for Mark, Area Served, Manufacturer, Description, Model, Capacity Information (Cooling/Heating Modes), Electrical, and Notes.

- NOTES: 1. PROVIDE WITH UNIT MOUNTED CONDENSATE PUMP. PUMP TO BE WIRED TO SINGLE POINT POWER CONNECTION. 2. NOMINAL AIRFLOW BASED ON UNIT FAN SPEED ON HIGH. 3. THE CAPACITY LISTED IS THE MINIMUM REQUIRED CAPACITY INCLUDING ALL REFRIGERANT PIPING LOSSES & BASED ON ACTUAL INLET CONDITIONS NOTED.

VARIABLE REFRIGERANT INDOOR UNIT SCHEDULE (VRO-3)

VARIABLE REFRIGERANT INDOOR UNIT SCHEDULE (VRO-3) table with columns for Mark, Area Served, Manufacturer, Description, Model, Capacity Information (Cooling/Heating Modes), Electrical, and Notes.

- NOTES: 1. PROVIDE WITH UNIT MOUNTED CONDENSATE PUMP. PUMP TO BE WIRED TO SINGLE POINT POWER CONNECTION. 2. NOMINAL AIRFLOW BASED ON UNIT FAN SPEED ON HIGH. 3. THE CAPACITY LISTED IS THE MINIMUM REQUIRED CAPACITY INCLUDING ALL REFRIGERANT PIPING LOSSES & BASED ON ACTUAL INLET CONDITIONS NOTED.

CABINET UNIT HEATER SCHEDULE - ELECTRIC

CABINET UNIT HEATER SCHEDULE - ELECTRIC table with columns for Mark, Manufacturer, Model, Service, Configuration, Electric Heating Coil, Cabinet Dimensions, Electrical, and Notes.

- NOTES: 1. VERIFY FINAL COLOR SELECTION WITH ARCHITECT. CONFIGURATION NOTES: CABINET: HORIZONTAL OR VERTICAL. MOUNTING: CONCEALED / RECESSED / SEMI-RECESSED / SURFACE. DISCHARGE: BOTTOM / TOP / DUCTED. CONTROL TYPES: 1. UNIT MOUNTED THERMOSTAT. 2. WALL MOUNTED THERMOSTAT - STAND ALONE. 3. WALL MOUNTED THERMOSTAT - DDC.

CEDAR FALLS CITY HALL REMODEL CEDAR FALLS, IOWA

Table with columns for No., Description, Date, and Owner Review/Issued for Bid.



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**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

MECHANICAL CONTROLS

Project Number: 21004
Date: OCTOBER 5, 2021

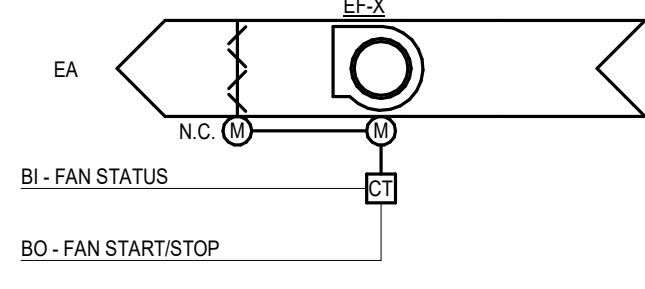
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TEMPERATURE CONTROLS RESPONSIBILITY MATRIX

ITEM	PROVIDED BY	INSTALLED BY
THERMOSTATS AND TEMPERATURE SENSORS FOR EQUIPMENT CONTROLLED BY THE DDC SYSTEM	ATC	ATC
THERMOSTATS FOR THE VRF SYSTEM	MFR	MC
THERMOSTATS AND TEMPERATURE SENSORS FOR STAND-ALONE EQUIPMENT	EQUIP MFR OR MC	EC
SENSORS AND METERS REFERENCED IN THE CONTROLS DOCUMENTS	ATC (NOTE 1)	MC
CONTROL DAMPERS IN ERUS	MFR	MFR
DAMPER ACTUATORS	ATC	ATC
TEMPERATURE CONTROL WIRING AND CONDUIT	ATC	ATC
INTERFACE FROM PACKAGED EQUIPMENT CONTROLS TO THE DDC	MC	ATC (NOTE 2)
VARIABLE FREQUENCY DRIVES IN ERUS	MFR	MFR

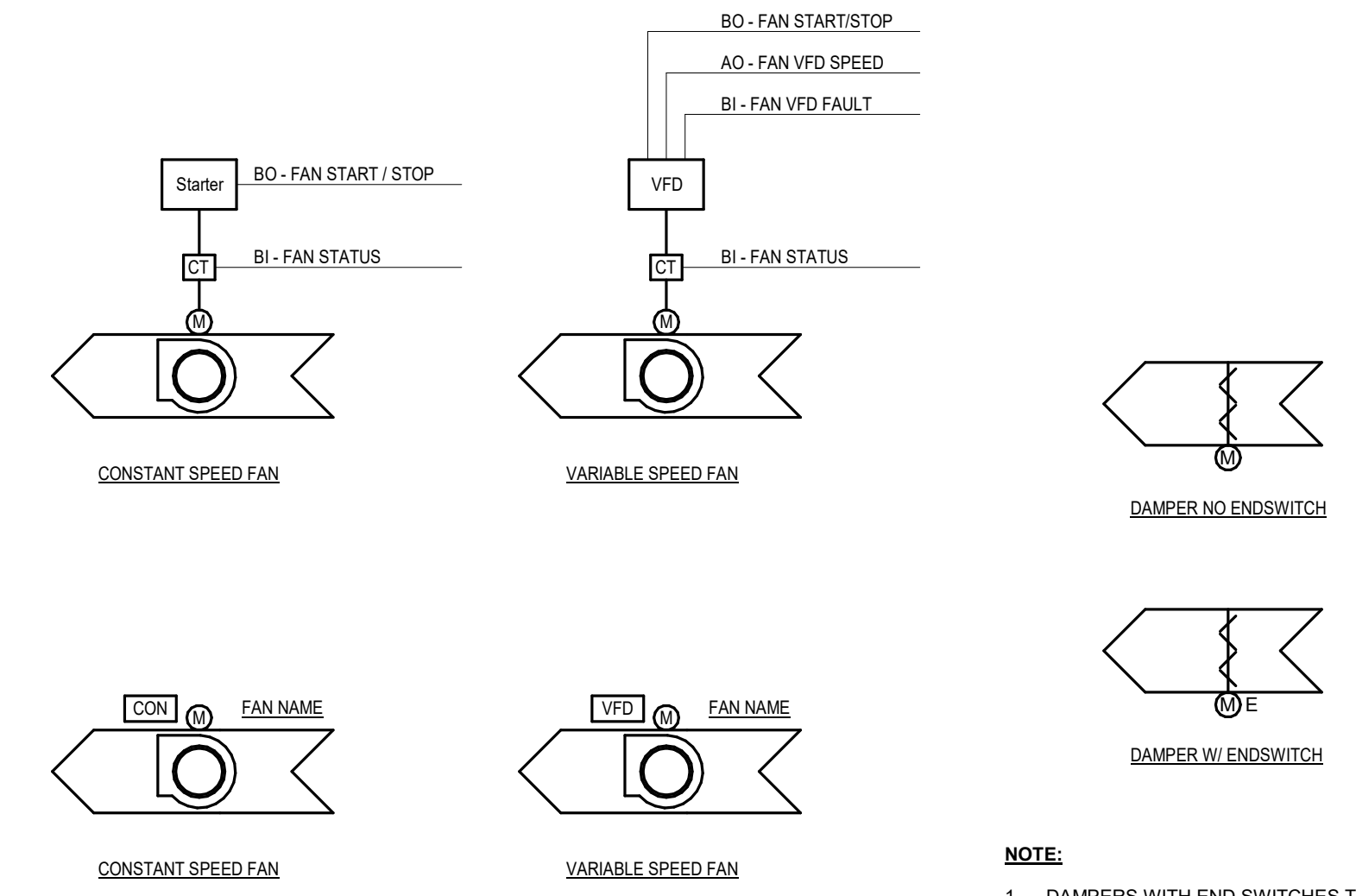
- NOTES:
1. THE TEMPERATURE CONTROLS CONTRACTOR SHALL PROVIDE ALL NECESSARY ADDITIONAL SENSORS TO EXCEED ALL SEQUENCES AS INDICATED ON THE DRAWINGS. COORDINATE ADDITIONAL SENSOR REQUIREMENTS WITH EQUIPMENT MANUFACTURERS.
 2. ATC TO CONNECT THE PACKAGED CONTROLS TO THE DDC SYSTEM.
 3. CONTROLS SHALL INTERFACE WITH EXISTING WOODMAN CONTROLS SYSTEM.

2 EXHAUST FAN - ON/OFF
N.T.S.



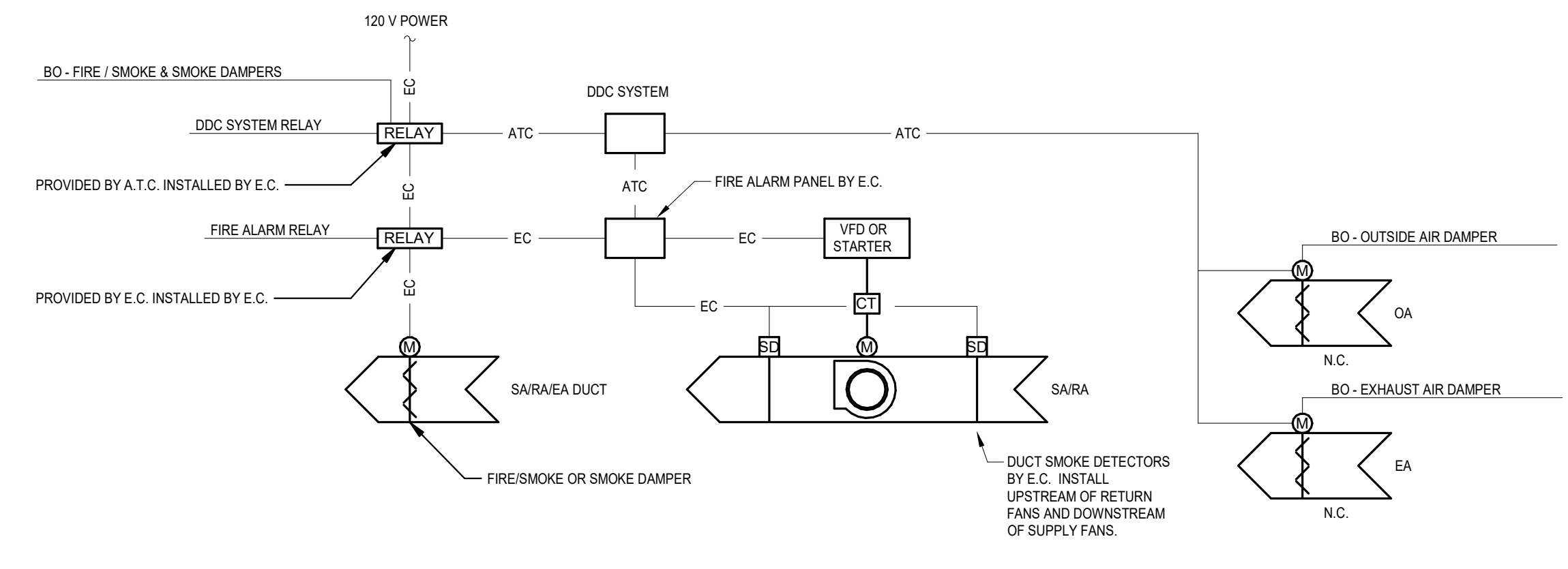
- CONTROL SEQUENCE:**
- RUN CONDITIONS - SCHEDULED:**
THE FAN SHALL RUN ACCORDING TO A USER DEFINABLE SCHEDULE.
- EXHAUST AIR DAMPER:**
THE EXHAUST AIR DAMPER SHALL BE PROVIDED WITH THE EXHAUST FAN AND OPEN ANYTIME THE UNIT RUNS AND SHALL CLOSE ANYTIME THE UNIT STOPS.
- FAN STATUS:**
THE CONTROLLER SHALL MONITOR THE FAN STATUS.
- ALARMS SHALL BE PROVIDED AS FOLLOWS:
- FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
 - FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- AREAS SERVED:**
1. MEN'S 240 / WOMEN'S 241
 2. BREAK ROOM 249
 3. LOCKER ROOMS
 4. UNISEX 204
 5. MEN'S 211 / WOMEN'S 213

4 TYPICAL FAN CONTROL REQUIREMENTS
N.T.S.



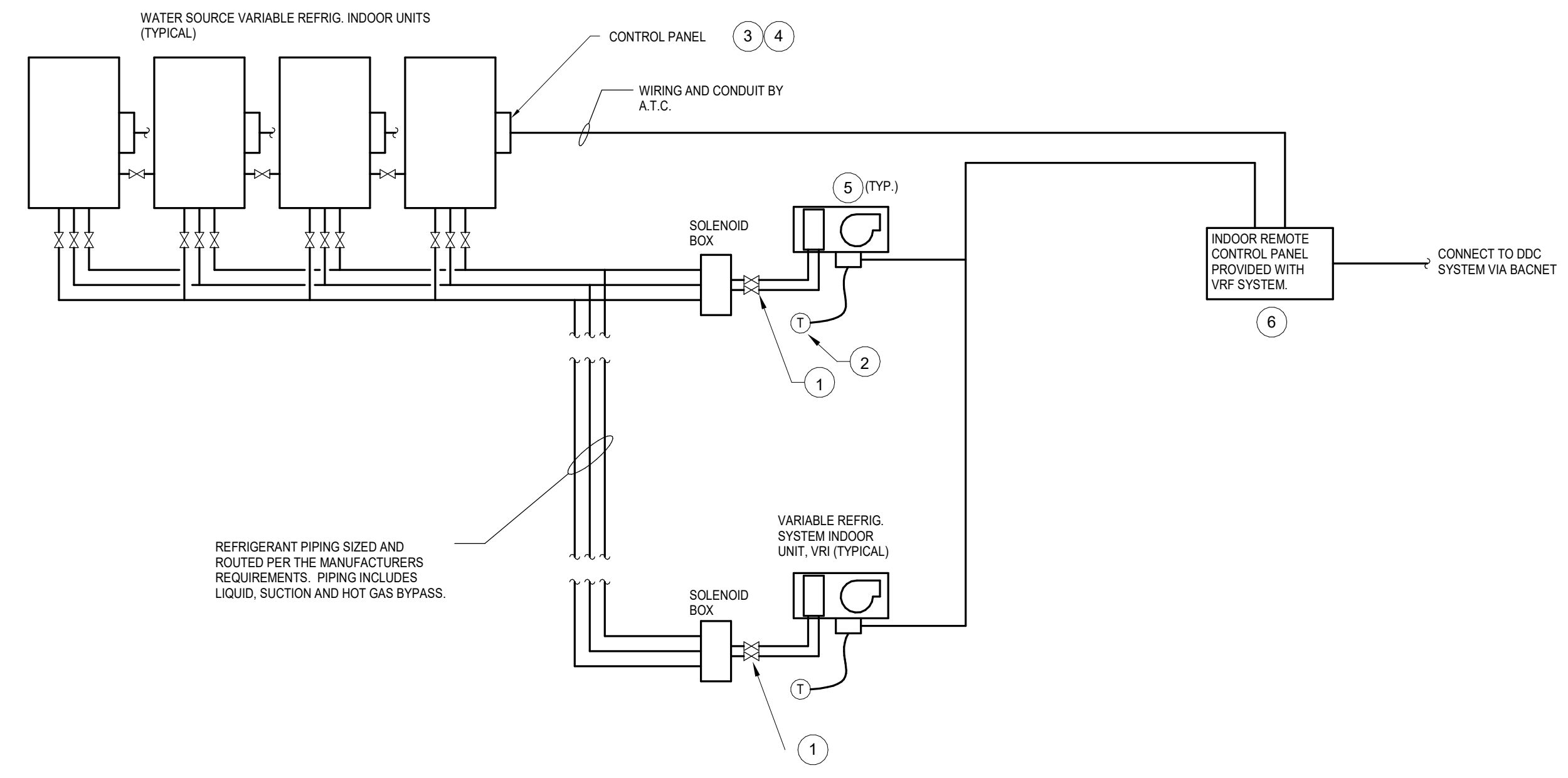
- NOTE:
1. DAMPERS WITH END SWITCHES TO ALSO INCLUDE POSITION INDICATORS TO SHOW PERCENT OPEN ON CONTROLS GRAPHICS.

3 FIRE ALARM SYSTEM & DDC INTEGRATION DIAGRAM
N.T.S.



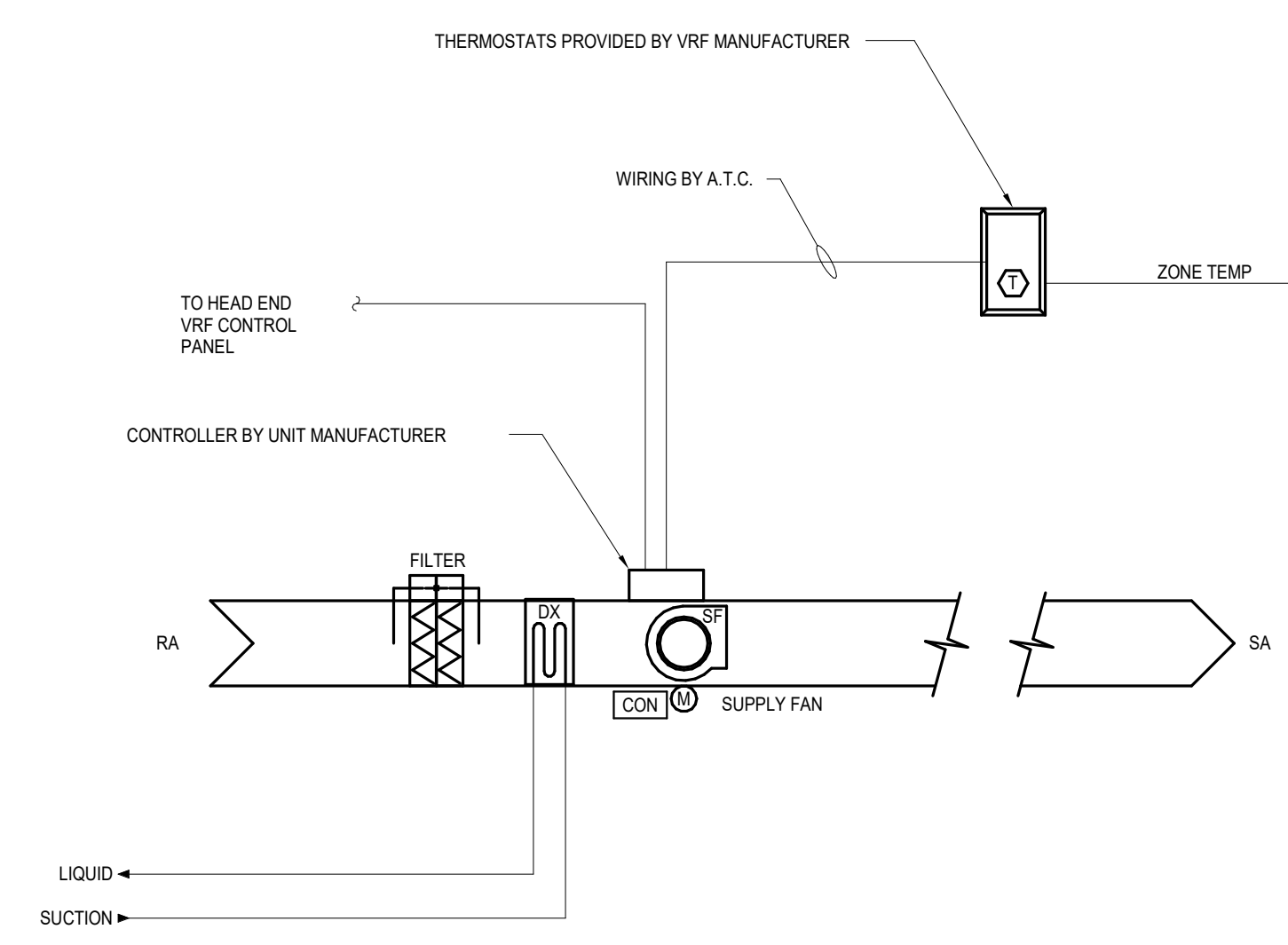
- CONTROL SEQUENCE:**
- THE FIRESMOKE AND SMOKE DAMPERS WILL OPERATE IN THE THREE MODES AS NOTED BELOW:
- NORMAL:**
- 120V POWER IS PROVIDED TO THE DAMPER CIRCUIT.
 - THE FIRE ALARM SYSTEM WILL CLOSE THE F.A. RELAY.
 - THE DDC SYSTEM WILL CLOSE THE DDC RELAY.
- SMOKE IS DETECTED IN THE SYSTEM:**
- SMOKE IS DETECTED IN THE DUCT OR ROOM BASED ON A SMOKE DETECTOR.
 - THE DDC SYSTEM MONITORING THE FIRE ALARM PANEL RECEIVES AN ALARM INDICATING THE FANS SERVING THE AREA WHERE SMOKE IS DETECTED WILL BE DISABLED.
 - THE FIRE ALARM SYSTEM SENDS A SIGNAL TO SHUT DOWN ALL VFD'S OR MOTOR STARTERS THAT ARE PART OF THE SYSTEMS SERVING THE AREA WHERE SMOKE IS DETECTED.
 - THE FIRE ALARM SIGNAL SENDS A SIGNAL TO CLOSE ALL FIRE / SMOKE AND SMOKE DAMPERS THAT ARE SERVED BY THE UNIT IN THE AREA WHERE SMOKE IS DETECTED. PROVIDE A 60 SECOND (A/D) DELAY BETWEEN THE SHUT-DOWN OF THE FAN AND THE CLOSURE OF DAMPERS TO ALLOW FOR FANS TO STOP.
 - THE DDC SYSTEM WILL CLOSE ALL OUTSIDE AIR AND EXHAUST AIR DAMPERS ASSOCIATED WITH THE SYSTEMS SERVING THE AREA WHERE SMOKE IS DETECTED. THIS WILL OCCUR TO PREVENT FREEZING OF COLDS OR OTHER DEVICES IF A PROLONGED OUTAGE OCCURS.
- AIR HANDLING EQUIPMENT SHUTDOWN:**
- AIR HANDLING UNIT IS DISABLED BASED ON ALARM SCHEDULE, MAINTENANCE, OR USER COMMAND.
 - THE DDC SENDS A SIGNAL TO CLOSE ALL FIRESMOKE AND SMOKE DAMPERS ASSOCIATED WITH THE AIR HANDLING EQUIPMENT USING THE DDC RELAY IN THE DAMPER POWER CIRCUIT. PROVIDE A 90 SECOND (A/D) DELAY BETWEEN THE SHUT-DOWN OF THE FAN AND THE CLOSURE OF DAMPERS TO ALLOW FOR FANS TO STOP. ALL OTHER DAMPERS, VALVES, DEVICES, ETC WILL BE DISABLED OR CLOSED BASED ON A TYPICAL SHUT-DOWN PROCEDURE. FREEZE PROTECTION SEQUENCES WILL TAKE PRECEDENCE.
- WORK RESPONSIBILITY:**
- 120V WIRING TO DAMPER, FIRE ALARM RELAY, JUNCTION BOX FOR DDC RELAY - BY E.C.
 - FIRE ALARM WIRING TO FIRE ALARM RELAY, VFD'S & STARTERS - BY E.C.
 - CONTROL WIRING TO FIRE ALARM PANEL AND INSTALLATION AND WIRING OF THE DOOR RELAY - BY THE ATC.

5 VRF CONTROL DIAGRAM
N.T.S.



- KEYED NOTES:**
1. PROVIDE SHUTOFF VALVES ON ALL REFRIGERANT PIPING BRANCHES ON ALL SOLENOID BOXES.
 2. THERMOSTATS PROVIDED WITH INDOOR VRF UNITS, (TYP.)
 3. SEE FLOW DIAGRAMS FOR ADDITIONAL CONTROLS INFORMATION.
 4. VRF UNIT CONTROL PANELS TO BE WIRED TOGETHER TO CONTROL UNIT STAGING. A.T.C. TO PROVIDE ALL WIRING.
 5. REFER TO INDOOR UNIT VRF CONTROLS DETAIL FOR REQUIRED ALARM & CONTROLS POINTS.
 6. ALL ALARMS & CONTROLS POINTS FOR THE VRF SYSTEM SHALL BE INTERFACED INTO THE BUILDING DDC SYSTEM VIA THE HEAD END CONTROL PANEL SERVING THE VRF SYSTEM.

1 VRF - INDOOR UNIT CONTROL DIAGRAM
N.T.S.



- UNIT LOCATIONS:**
1. SEE FLOOR PLANS.
- CONTROL SEQUENCE - CONSTANT VOLUME UNITS**
- RUN CONDITIONS - REQUESTED:**
THE UNIT SHALL BE ENABLED TO RUN CONTINUOUSLY ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUT-DOWN ON SAFETIES.
- SUPPLY FAN:**
THE SUPPLY FAN SHALL RUN CONTINUOUSLY ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUT-DOWN ON SAFETIES.
- DDC SYSTEM TO MONITOR/CONTROL THE FOLLOWING POINTS VIA THE HEAD END CONTROL PANEL SERVING THE VRF SYSTEM:
- BO ON/OFF SETUP
 - BO OPERATIONAL MODE SETUP (HEATING OR COOLING)
 - BO FAN SPEED SETUP
 - AI-ZONE TEMPERATURE
 - AO-ZONE TEMPERATURE SETPOINT
 - GENERAL EQUIPMENT ALARM
 - ERROR CODE



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No.	Description	Date
	OWNER REVIEW	9-24-2021
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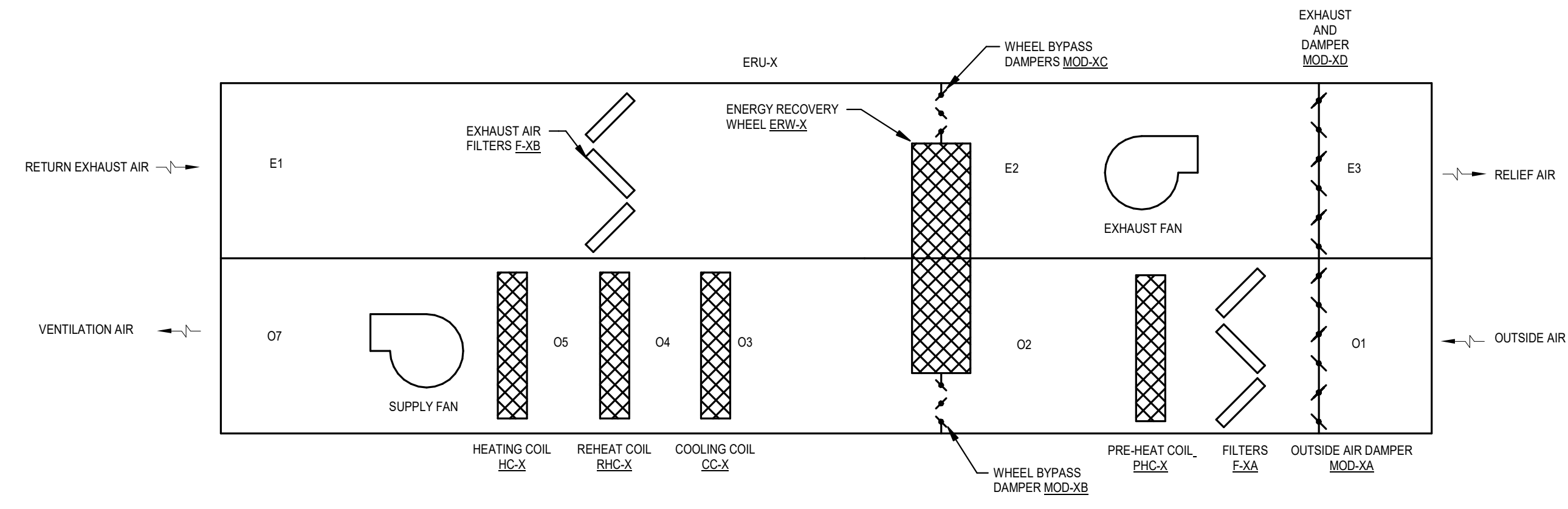
MECHANICAL CONTROLS

Project Number 21004
Date OCTOBER 5, 2021

M702

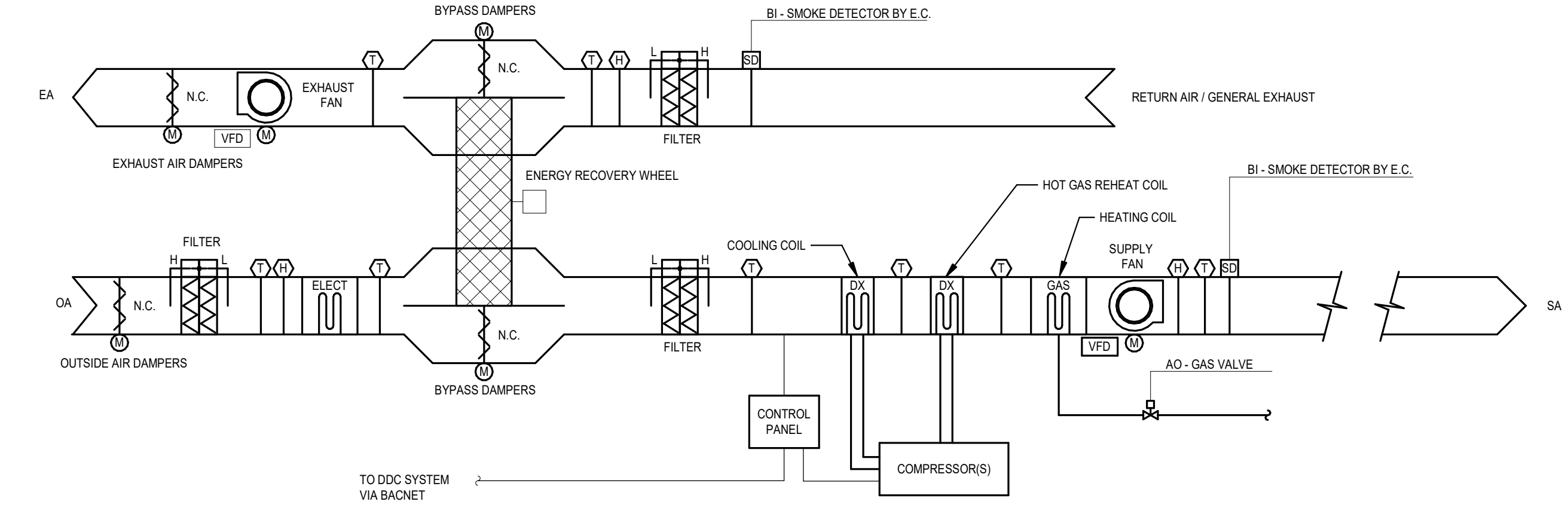
MARK	SEASON	EXHAUST AIR STREAM (DEG F)						VENTILATION AIR STREAM (DEG F)										NOTES				
		BLDG EXH		WHEEL DISCH		UNIT DISCH		OUTSIDE AIR		WHEEL INLET		WHEEL DISCH		CC DISCH		RHC DISCH			HC DISCH		UNIT DISCH	
		E1	E2	E3	E4	E5	E6	O1	O2	O3	O4	O5	O6	O7	O8	O9	O10		O11	O12	O13	O14
ERU-1	SUMMER	75.0	62.0	88.5	71.0	88.5	71.0	95.0	78.0	95.0	78.0	85.0	71.5	50.5	50.0	85.1	64.0	-	-	75.0	62.0	
	WINTER	70.0	-	36.0	30.6	30.0	30.6	-20.0	-	5.8	2.9	35.7	29.1	-	-	-	-	101.6	-	75.0	-	
ERU-2	SUMMER	75.0	62.0	89.2	74.0	89.2	74.0	95.0	78.0	95.0	78.0	81.8	68.8	51.1	50.7	84.7	64.0	-	-	75.0	62.0	
	WINTER	70.0	-	20.1	17.9	20.1	17.9	-20.0	-	0.5	-1.6	44.2	36.1	-	-	-	-	107.9	-	75.0	-	

NOTES:



2 ENERGY RECOVERY - PERFORMANCE

- GENERAL NOTES:**
- REFER TO EQUIPMENT SCHEDULES FOR ADDITIONAL INFORMATION.
 - REFER TO TEMPERATURE PROFILE SCHEDULE FOR REQUIRED CONDITIONS AT O1-O7 AND E1-E3 FOR THE VARIOUS UNITS.



1 ENERGY RECOVERY UNIT CONTROL DIAGRAM

CONTROL SEQUENCE, VARIABLE AIR VOLUME UNITS:

THE DDC SYSTEM SHALL BE CAPABLE OF MONITORING THE POINTS NOTED ON THE CONTROL DIAGRAM VIA THE UNIT CONTROL PANEL. THE FOLLOWING ITEMS SHALL BE ABLE TO ADJUST LOCALLY OR THROUGH THE BAS:

- ENABLE / DISABLE
- SET POINT ADJUSTMENT
- ALARM MONITORING

RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN WHENEVER THE BUILDING IS SCHEDULED TO BE OCCUPIED. THE UNIT SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

HIGH STATIC SHUTDOWN:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A HIGH STATIC SHUTDOWN SIGNAL.

RETURN AIR SMOKE DETECTION (BY E.C.):
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A RETURN AIR SMOKE DETECTOR STATUS.

SUPPLY AIR SMOKE DETECTION (BY E.C.):
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SUPPLY AIR SMOKE DETECTOR STATUS.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- SUPPLY FAN FAILURE, COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND, COMMANDED OFF, BUT THE STATUS IS ON.

EXHAUST FAN:
THE EXHAUST FAN SHALL RUN WHENEVER THE SUPPLY FAN RUNS. FAN WILL OPERATE MAINTAIN A FIXED AIRFLOW OFFSET FROM SUPPLY FAN.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- EXHAUST FAN FAILURE, COMMANDED ON, BUT THE STATUS IS OFF.
- EXHAUST FAN IN HAND, COMMANDED OFF, BUT THE STATUS IS ON.
- EXHAUST FAN VFD FAULT.

ELECTRIC REHEAT HEATING COIL:
THE CONTROLLER SHALL MEASURE THE OUTSIDE AIR TEMPERATURE AND MODULATE THE HEATING COIL TO PREVENT WHEEL FROSTING.

THE HEATING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 40°F (ADJ.)
- AND THE SUPPLY FAN STATUS IS ON.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HEATING COIL FAILURE, COMMANDED ON, BUT THE STATUS IS OFF.

GAS HEATING COIL:
THE HEATING SHALL BE ENABLED WHENEVER:

- LEAVING AIR TEMPERATURE IS LESS THAN 45°F (ADJ.)
- AND THE SUPPLY FAN STATUS IS ON.

MAIN COOLING COIL AND COMPRESSORS:
THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND MODULATE THE COOLING COIL AND CONDENSING UNIT TO MAINTAIN ITS COOLING SETPOINT OF 75° F (ADJ.).

THE COOLING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS GREATER THAN 80° F (ADJ.)
- AND THE SUPPLY FAN STATUS IS ON.
- AND THE PRE-HEATING COIL IS NOT ACTIVE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- THE OUTSIDE AIR ENTHALPY IS LESS THAN 20 BTU/LB (ADJ.)
- AND THE SUPPLY FAN STATUS IS ON.

ECONOMIZER:
THE CONTROLLER SHALL MEASURE THE WHEEL SUPPLY AIR TEMPERATURE AND OPEN THE BYPASS DAMPERS IF THE COOLING SUPPLY AIR SETPOINT OR GREATER THAN THE HEATING SUPPLY AIR SETPOINT. THE ECONOMIZER SHALL BE ENABLED WHENEVER:

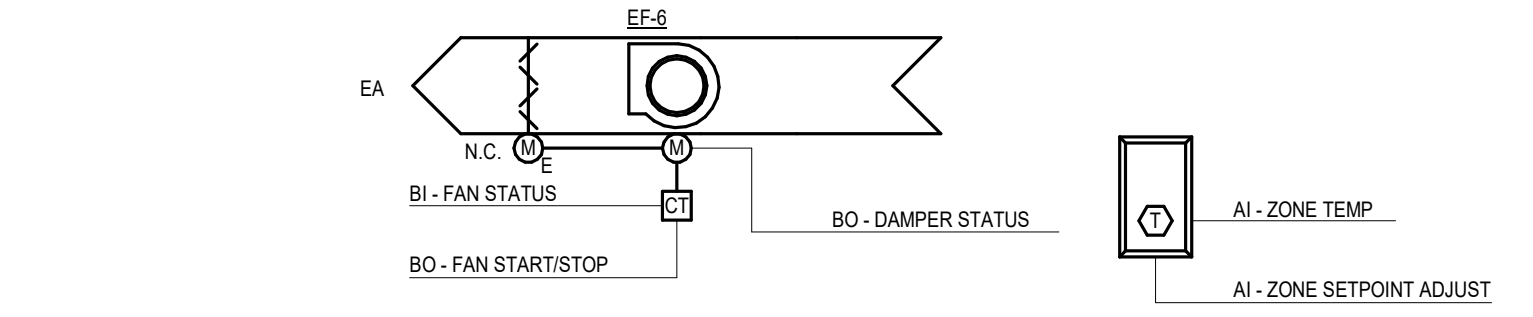
- THE OUTSIDE AIR ENTHALPY IS LESS THAN 20 BTU/LB (ADJ.)
- AND THE SUPPLY FAN STATUS IS ON.

REHEAT COIL:
THE CONTROLLER SHALL MEASURE THE OUTSIDE AIR HUMIDITY AND MODULATE THE COOLING COIL AND CONDENSING UNIT TO MAINTAIN DISCHARGE AIR HUMIDITY AT OR BELOW 50% RH (ADJ.). THE REHEAT COIL SHALL BE ENABLED WHENEVER THE SUPPLY FAN STATUS IS ON. AIR HANDLER REHEAT COIL SHALL MODULATE TO MAINTAIN LEAVING AIR TEMPERATURE TO PREVENT SUB-COOLING.

FILTER STATUS:
THE CONTROLLER SHALL MONITOR THE FILTER BANK STATUS OF EACH BANK. ALARMS SHALL BE PROVIDED AS FOLLOWS:

- FILTER CHANGE REQUIRED - FILTER DEFERRABLE LIMIT (ADJ.)

DISCHARGE AIR CONTROL:
THE SUPPLY AIR TEMPERATURE SHALL BE SPACED NEUTRAL TO DEG F (ADJ.) FOR PERIODS WHEN THE OUTSIDE AIR TEMP IS BETWEEN 40 DEG (ADJ.) AND 80 DEG F (ADJ.) IF THE SPACE IS BELOW 40 DEG F THE DISCHARGE TEMP SHALL INCREASE TO 80 DEG F (ADJ.) IF THE OUTSIDE AIR TEMP IS ABOVE 80 DEG F THE DISCHARGE AIR TEMP SHALL DECREASE TO 55 DEG F (ADJ.)



4 EXHAUST FAN - THERMOSTAT CONTROL

CONTROL SEQUENCE:

RUN CONDITIONS - SCHEDULED:
THIS UNIT SHALL RUN WHEN THE SPACE TEMPERATURE RISES ABOVE 80 DEGREES (ADJ.) AND THE GENERATOR IS RUNNING.

FAN:
THE FAN SHALL HAVE A 5 MINUTE (ADJ.) MINIMUM RUNTIME.

EXHAUST AIR DAMPER:
THE EXHAUST AIR AND TRANSFER AIR DAMPERS SHALL OPEN ANYTIME THE UNIT RUNS AND SHALL CLOSE ANYTIME THE UNIT STOPS. THE EXHAUST AIR DAMPER SHALL CLOSE 15-30 SEC (ADJ.) AFTER THE FAN STOPS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- DAMPER FAILURE, COMMANDED OPEN, BUT THE STATUS IS CLOSED.
- DAMPER IN HAND, COMMANDED CLOSED, BUT THE STATUS IS OPEN.

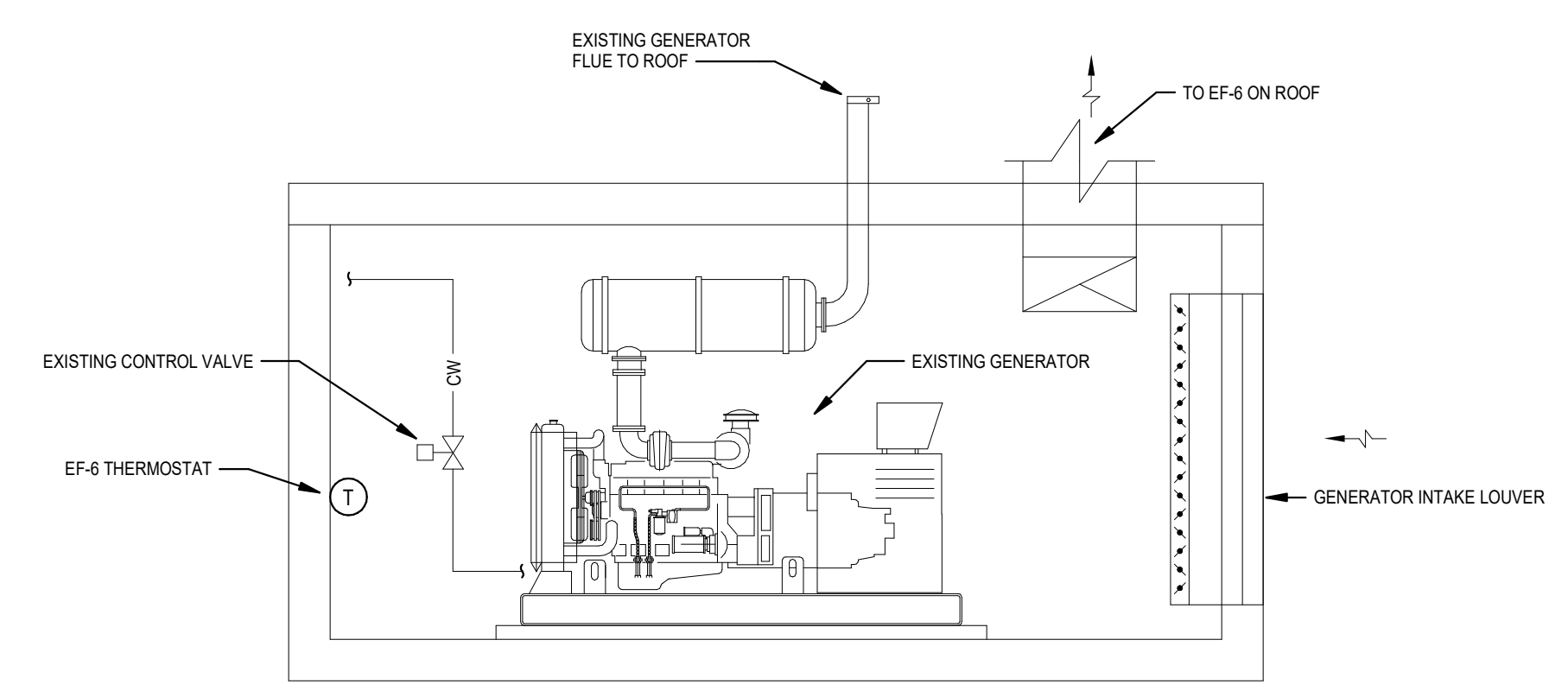
FAN STATUS:
THE CONTROLLER SHALL MONITOR THE FAN STATUS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- FAN FAILURE, COMMANDED ON, BUT THE STATUS IS OFF.
- FAN IN HAND, COMMANDED OFF, BUT THE STATUS IS ON.

AREAS SERVED:

- GENERATOR ROOM



3 GENERATOR ROOM

**CEDAR FALLS CITY HALL
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No.	Description	Date
	OWNER REVIEW	9-24-2021
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**LOWER LEVEL FIRE PROTECTION
PLAN**

Project Number: 21004
Date: OCTOBER 5, 2021

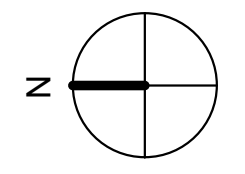
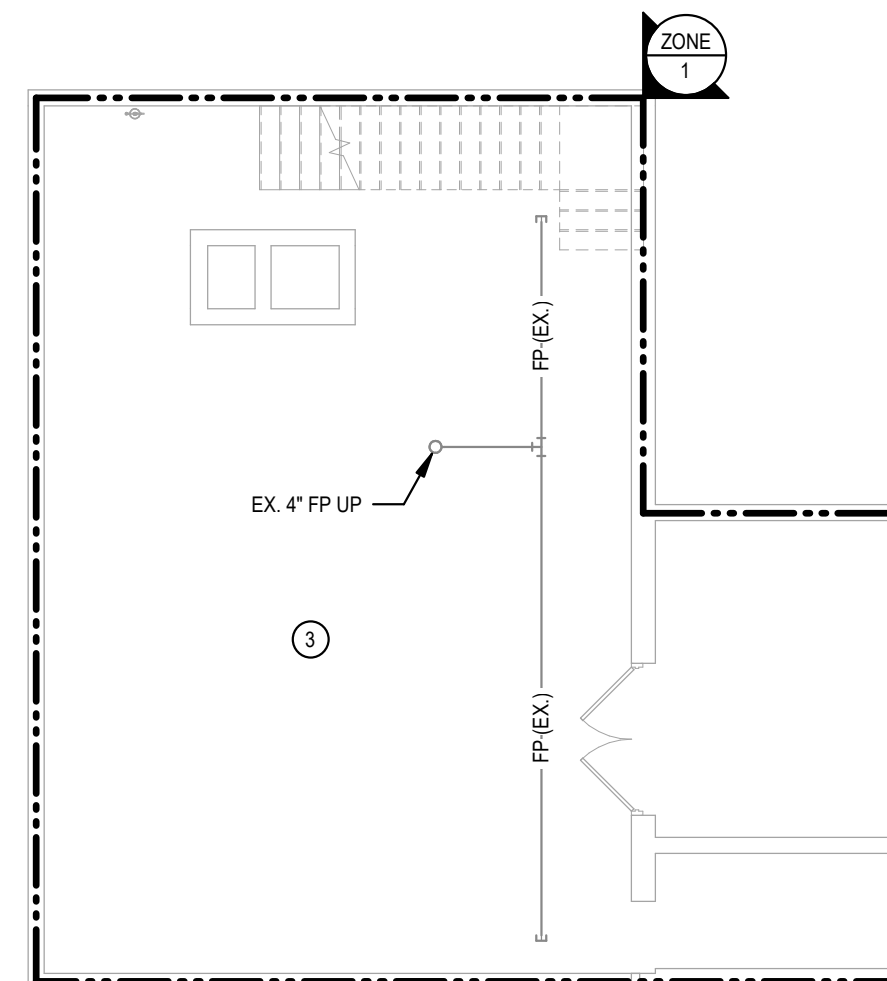
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GENERAL NOTES:

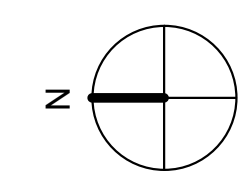
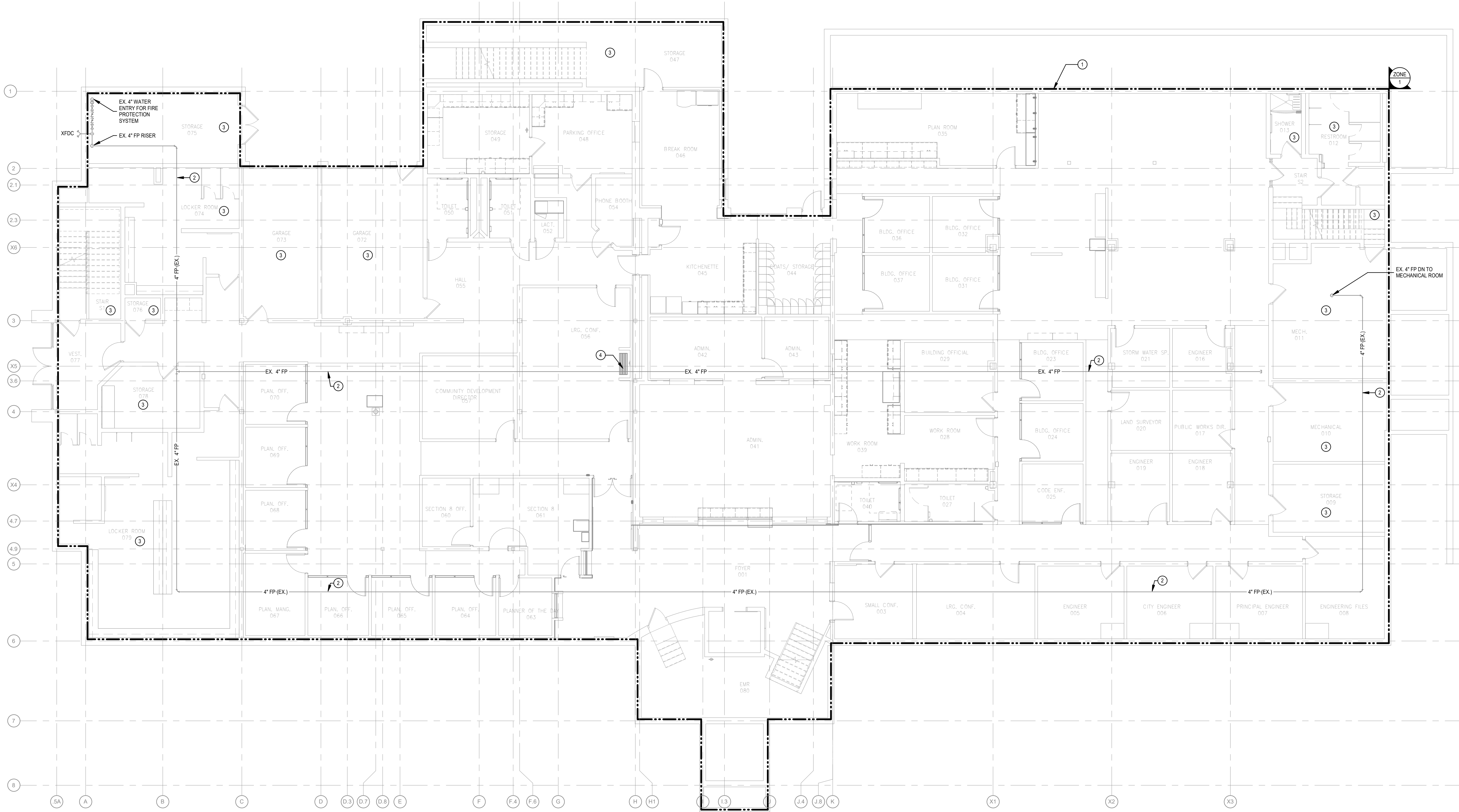
1. REFER TO ARCHITECTURAL PLANS FOR CEILING TYPES / TYPES.
2. CONTRACTOR TO COORDINATE PROJECT PHASING REQUIREMENTS WITH GENERAL CONTRACTOR AND ARCHITECT PRIOR TO STARTING WORK. COORDINATE ALL SHUTDOWNS WITH OWNER.
3. ROUTE ALL NEW PIPING AS HIGH AS POSSIBLE. COORDINATE WITH OTHER UTILITIES AND DUCTWORK FABRICATION DRAWINGS PRIOR TO PIPING FABRICATION AND INSTALLATION.
4. ONLY THE LOWER LEVEL AND BASEMENT FLOORS OF THE BUILDING ARE CURRENTLY SPRINKLERED. NO FIRE PROTECTION WORK WILL BE REQUIRED ON THE UPPER LEVEL.

KEYED NOTES:

1. DEMO AND REPLACE ALL EXISTING SPRINKLER HEADS AND BRANCH PIPING TO ACCOMMODATE THE REMODEL OF THIS AREA.
2. REUSE EXISTING SPRINKLER MAINS.
3. EXISTING SPACE TO REMAIN. SPRINKLER HEADS SHALL BE REPLACED.
4. OFFSET PIPING TO ACCOMMODATE STRUCTURE ABOVE ROOM PARTITION.



2 BASEMENT FIRE PROTECTION PLAN
1/8" = 1'-0"



1 LOWER LEVEL FIRE PROTECTION PLAN
1/8" = 1'-0"



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**CEDAR FALLS CITY HALL
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CEDAR FALLS, IOWA

**FIRE PROTECTION SCHEDULES &
DETAILS**

Project Number 21004
Date OCTOBER 5, 2021

FP501

No.	Description	Date
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FIRE SPRINKLER USAGE MATRIX

SPRINKLER CALLOUT	AREA TYPE SERVED	HAZARD CLASSIFICATION					SPRINKLER TYPE					TYPE OF SYSTEM SERVED					CEILING TYPE					SPRINKLER FINISH					RESPONSE TYPE			NOTES								
		LIGHT	ORD. GROUP 1	ORD. GROUP 2	ESTER. GROUP 1	ESTER. GROUP 2	PENDANT	UPRIGHT	RECESSED	GASKETED	SUBHALL	CONCEALED	WET PIPE	DRY PIPE	WET-PIPE INTERLOCK	CHESNUT SYSTEM	WET PIPE W/ DRY PENDANT	GLYCOL	LAV. IN	GYP BOARD	CLOUDS	EXPOSED STRUCTURE	CHROME	WHITE	CUSTOM COLOR	POLISHED BRASS	ROUGH BRASS	QUICK	STANDARD		ESFR							
SPR-1	OFFICE / CONFERENCE ROOM	X									X	X												X														
SPR-2	STORAGE		X								X	X											X														1	
SPR-3	JANITOR CLOSET		X								X	X							X				X													1		
SPR-4	MECHANICAL / ELECTRICAL ROOMS		X								X	X											X													1.2		
SPR-5	ENTRANCE VESTIBULE	X									X	X											X													3		
SPR-6	CANOPY (AT EXIT DOOR)	X							X													X	X												3			
SPR-8	STORAGE WITH OVERHEAD GARAGE DOORS		X						X			X									X		X												1.2			
SPR-9	COMPUTER ROOM / DATA PROCESSING	X									X	X							X				X															
SPR-11	LOCKER ROOMS	X									X	X							X				X												1			

- GENERAL NOTES: (APPLIES TO ALL AREAS AND SPRINKLER TYPES)**
- SPRINKLER CALLOUT TO BE USED IN THE SHOP DRAWING PROCESS FOR NOTING THE VARIOUS SPRINKLER CONFIGURATIONS.
 - ALL SPRINKLERS TO BE UL AND LISTED.
 - CONTRACTOR TO VERIFY SPRINKLER TEMPERATURE RATING IS ADEQUATE FOR THE AREA TO BE SERVED. THIS INCLUDES AREAS WITH ELEVATED TEMPERATURES DUE TO EQUIPMENT IN THE SPACE.
 - REFER TO THE ARCHITECTURAL REFLECTED CEILING PLAN FOR THE CEILING MATERIAL AND LAYOUT.
- NOTES:**
- INSTALL WIRE GUARDS ON ALL SPRINKLERS INSTALLED BELOW 7' AFF OR AREAS SUBJECT TO FREQUENT DAMAGE.
 - PROVIDE SPRINKLER COVERAGE ABOVE AND BELOW OBSTRUCTIONS.
 - DRY PENDANT HEAD TO SERVE AREAS WITH FREEZE POTENTIAL. USE MODEL DP-1 FROM THE FPM. ALL FIRE PROTECTION PIPING NORMALLY CONTAINING WATER WILL NEED TO BE LOCATED IN A SPACE MAINTAINED ABOVE 40 DEG F.

PIPING APPLICATION SCHEDULE (FIRE PROTECTION)

SYSTEM (NOTE 1)	USAGE	LOCATION	DESIGN WORKING PRESSURE (PSI) (NOTE 2)	MATERIAL	SCHEDULE	JOINTS	USAGE SIZE RANGE	NOTES
WET PIPE SPRINKLER	FIRE PROTECTION MAINS	ABOVE GRADE	STANDARD	BLACK STEEL	10 OR 40	GROOVED ENDS OR WELDED	2" AND SMALLER	3
					40	THREADED OR WELDED		
	FIRE PROTECTION BRANCH PIPING	ABOVE GRADE	STANDARD	BLACK STEEL	10 OR 40	GROOVED ENDS OR WELDED	2-1/2" AND LARGER	3
					7, 10, 40	THREADED OR WELDED		

- NOTES:**
- REFER TO EACH PIPING SPECIFICATION FOR SPECIFIC PIPING REQUIREMENTS.
 - STANDARD PRESSURE IS < 175 PSI / HIGH PRESSURE IS 175 - 350 PSI
 - PAINT EXPOSED PIPING. COORDINATE WITH ARCHITECT.

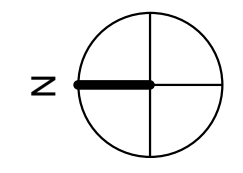
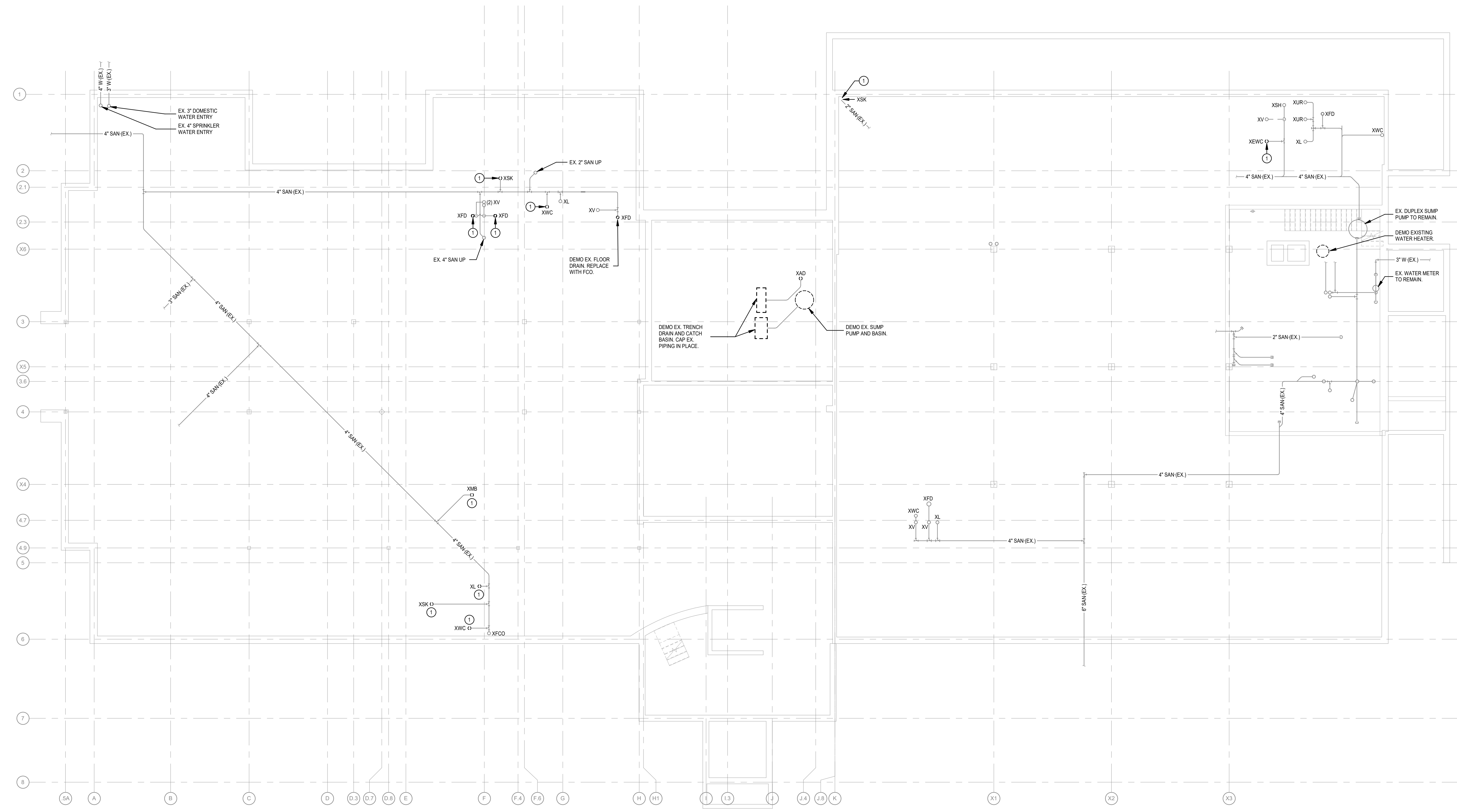
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REMODEL**
CEDAR FALLS, IOWA

GENERAL NOTES:

- CONTRACTOR TO COORDINATE PROJECT PHASING REQUIREMENTS WITH GENERAL CONTRACTOR AND ARCHITECT PRIOR TO STARTING WORK.
- COORDINATE ALL SHUTDOWNS WITH OWNER.
- DEMO PIPING, HANGERS, AND ACCESSORIES BACK TO MAIN AS SHOWN AND CAP. PATCH INSULATION TO MATCH EXISTING.
- ALL EQUIPMENT SHOWN TO BE REMOVED SHALL INCLUDE ALL ASSOCIATED PIPING, INSULATION, HANGERS, SUPPORTS, AND CONCRETE PADS.
- DEMO OF PLUMBING FIXTURES SHALL INCLUDE SUPPLY, VENT AND SANITARY PIPING BACK TO THE MAINS. PATCH INSULATION AT MAINS TO MATCH EXISTING.
- FOR PLUMBING FIXTURES THAT ARE DEMOLISHED IT IS ACCEPTABLE TO CAP AND ABANDON IN PLACE SANITARY WASTE PIPE BELOW EXISTING SLAB UNLESS OTHERWISE NOTED. CAP BELOW SLAB AND COORDINATE CONCRETE PATCHING WITH GENERAL CONTRACTOR.
- CONCRETE DEMO AND PATCHING TO BE BY GENERAL CONTRACTOR.
- PLUMBING CONTRACTOR SHALL PATCH AND REPAIR ALL WALL AND CEILING OPENINGS CREATED DURING DEMOLITION OF PLUMBING FIXTURES AND EQUIPMENT IF THE OPENINGS ARE NOT BEING REUSED. PATCHES AND REPAIRS SHALL MATCH ADJACENT EX FINISHES. THIS APPLIES TO ALL OPENINGS EXCEPT IN THE CONCRETE SLAB AND UNLESS NOTED OTHERWISE.

KEYED NOTES:

- PLUMBING FIXTURE ABOVE TO BE DEMOLISHED. REMOVE VERTICAL SANITARY WASTE PIPE AND ELBOW TO HORIZONTAL. CAP EXISTING OR CONNECT NEW HORIZONTAL PIPE AS SHOWN ON NEW WORK PLAN.



1

LOWER LEVEL UNDERFLOOR PLUMBING DEMOLITION PLAN

1/8" = 1'-0"



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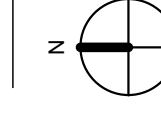
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**LOWER LEVEL UNDERFLOOR
PLUMBING DEMO PLAN**

Project Number: 21004
Date: OCTOBER 5, 2021

PD001



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LOWER LEVEL PLUMBING DEMO PLAN

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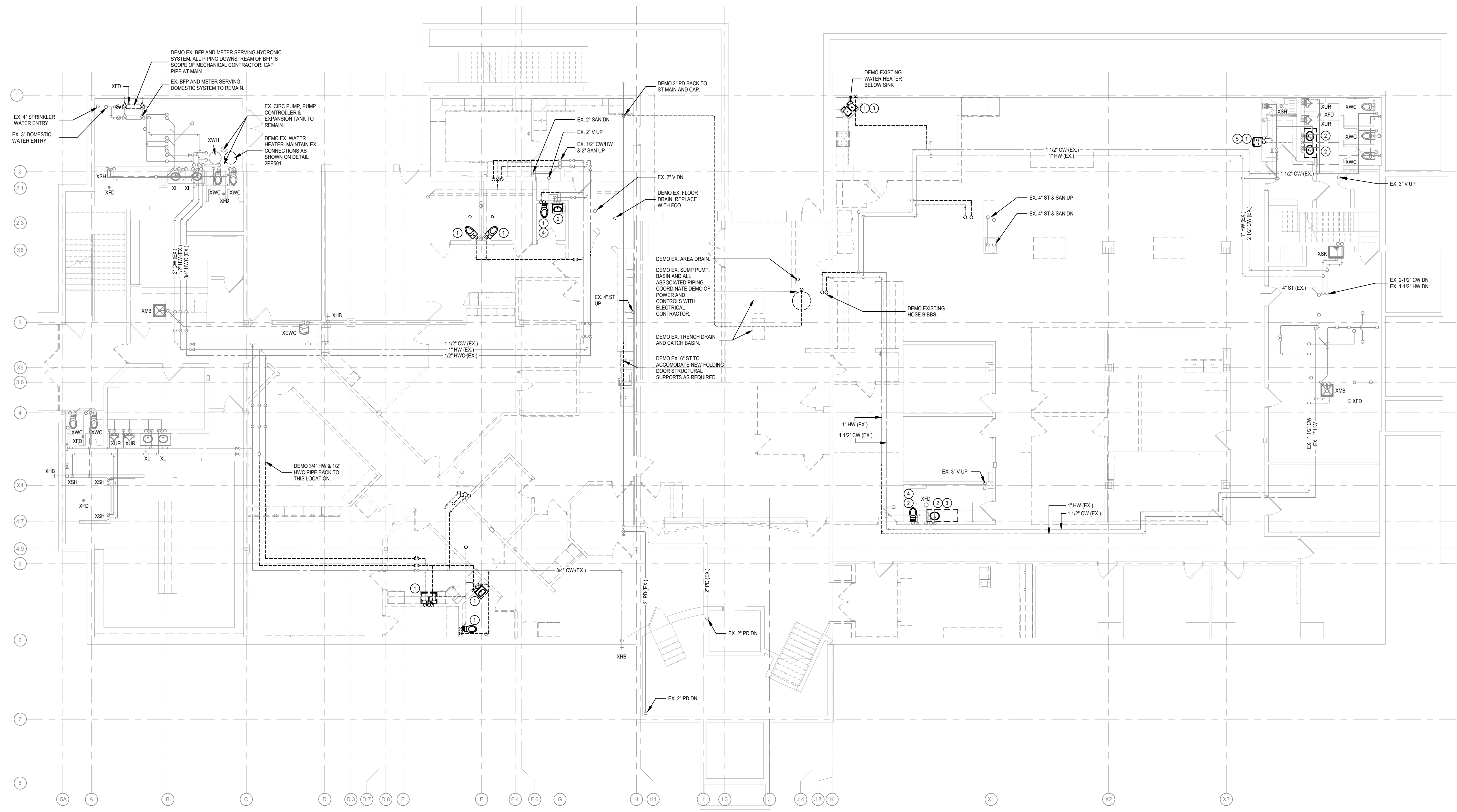
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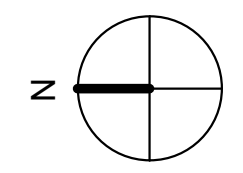
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- ALL EQUIPMENT SHOWN TO BE REMOVED SHALL INCLUDE ALL ASSOCIATED PIPING, INSULATION, HANGERS, SUPPORTS, AND CONCRETE PADS.
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KEYED NOTES:

- DEMO PLUMBING FIXTURE. REMOVE PIPING AS SHOWN INCLUDING HANGERS AND INSULATION.
- DEMO PLUMBING FIXTURE. PREPARE WATER, WASTE AND VENT STUB-OUTS FOR CONNECTION TO NEW SIMILAR FIXTURE.
- DEMO EX. WATER HEATER BELOW COUNTER. COORDINATE DEMO OF POWER AND CONTROLS WITH ELECTRICAL CONTRACTOR.
- SALVAGE EX. SLOAN FLUSH VALVE. PROTECT DURING DEMO AND RETURN TO OWNER.
- SALVAGE EX. DRINKING FOUNTAIN. PROTECT DURING DEMO AND RETURN TO OWNER.



1 LOWER LEVEL PLUMBING DEMOLITION PLAN
1/8" = 1'-0"



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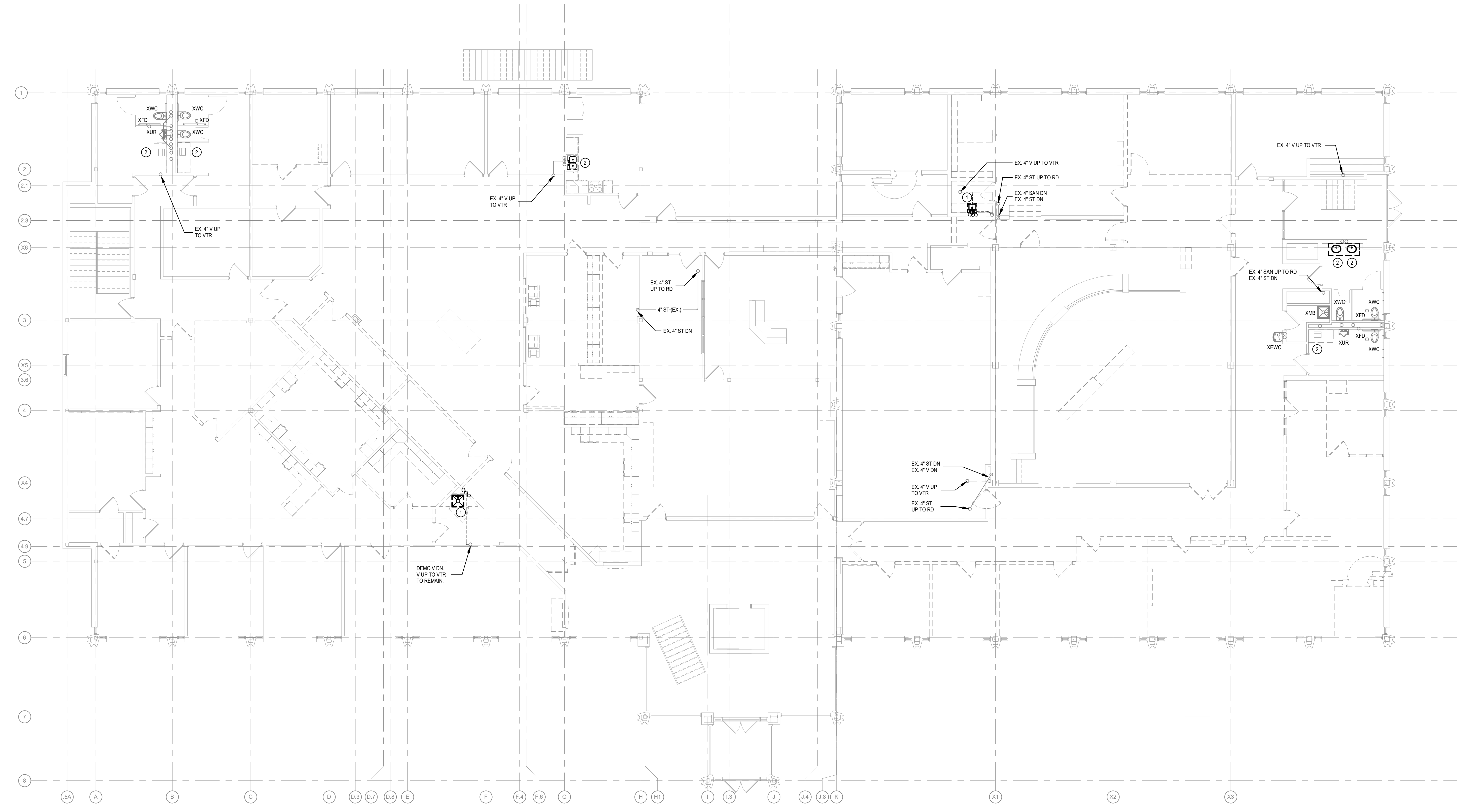
**CEDAR FALLS CITY HALL
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CEDAR FALLS, IOWA

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- COORDINATE ALL SHUTDOWNS WITH OWNER.
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KEYED NOTES:

- DEMO PLUMBING FIXTURE. REMOVE PIPING AS SHOWN INCLUDING HANGERS AND INSULATION.
- DEMO PLUMBING FIXTURE. PREPARE WATER, WASTE AND VENT STUB-OUTS FOR CONNECTION TO NEW SIMILAR FIXTURE.



1 UPPER LEVEL PLUMBING DEMOLITION PLAN
1/8" = 1'-0"

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

UPPER LEVEL PLUMBING DEMO PLAN

Project Number: 21004
Date: OCTOBER 5, 2021

PD101

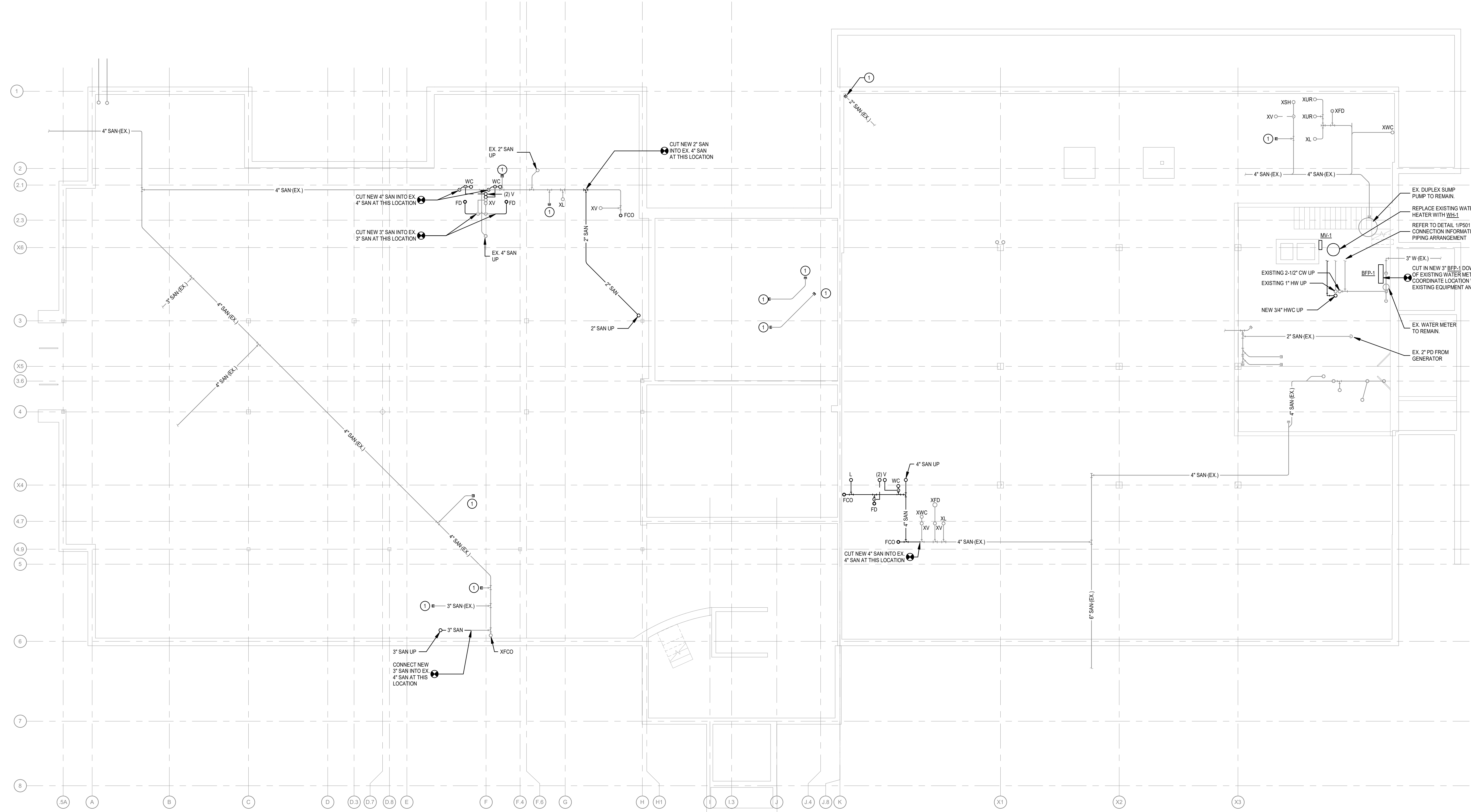
**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

GENERAL NOTES:

- ALL VALVES TO BE LOCATED IN ACCESSIBLE LOCATIONS. COORDINATE WITH ARCHITECTURAL DRAWINGS AND DUCTWORK.
- CONTRACTOR TO COORDINATE PROJECT PHASING REQUIREMENTS WITH GENERAL CONTRACTOR AND ARCHITECT PRIOR TO STARTING WORK.
- COORDINATE ALL SHUTDOWNS WITH OWNER.
- COORDINATE ALL GRAVITY PLUMBING ROUTING IN PLENUM WITH MECHANICAL PLANS.
- CONTRACTOR TO VERIFY ALL FINAL ROUGH IN LOCATIONS WITH EXISTING STRUCTURE PRIOR TO INSTALL.
- REFER SHEET P001 FOR THE FOLLOWING REFERENCED DETAILS:
 - DOMESTIC WATER HEATER AND FLOW DIAGRAM - SOUTH
 - DOMESTIC WATER HEATER AND FLOW DIAGRAM - NORTH
 - HOT WATER CIRC. VALVE ASSEMBLY
 - PIPE HANGERS
 - WALL CLEANOUT
 - WALL BOX INSTALLATION
 - UPPERLEVEL FLOOR DRAIN
 - LOWERLEVEL FLOOR DRAIN
 - FLOOR CLEANOUT

KEYED NOTES:

- CAP HORIZONTAL PIPE THAT IS TO BE ABANDONED IN PLACE. COORDINATE PATCHING OF SLAB WITH GENERAL CONTRACTOR.



1 LOWER LEVEL UNDERFLOOR PLUMBING PLAN
1/8" = 1'-0"

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**LOWER LEVEL UNDERFLOOR
PLUMBING PLAN**

Project Number: 21004
Date: OCTOBER 5, 2021

P001

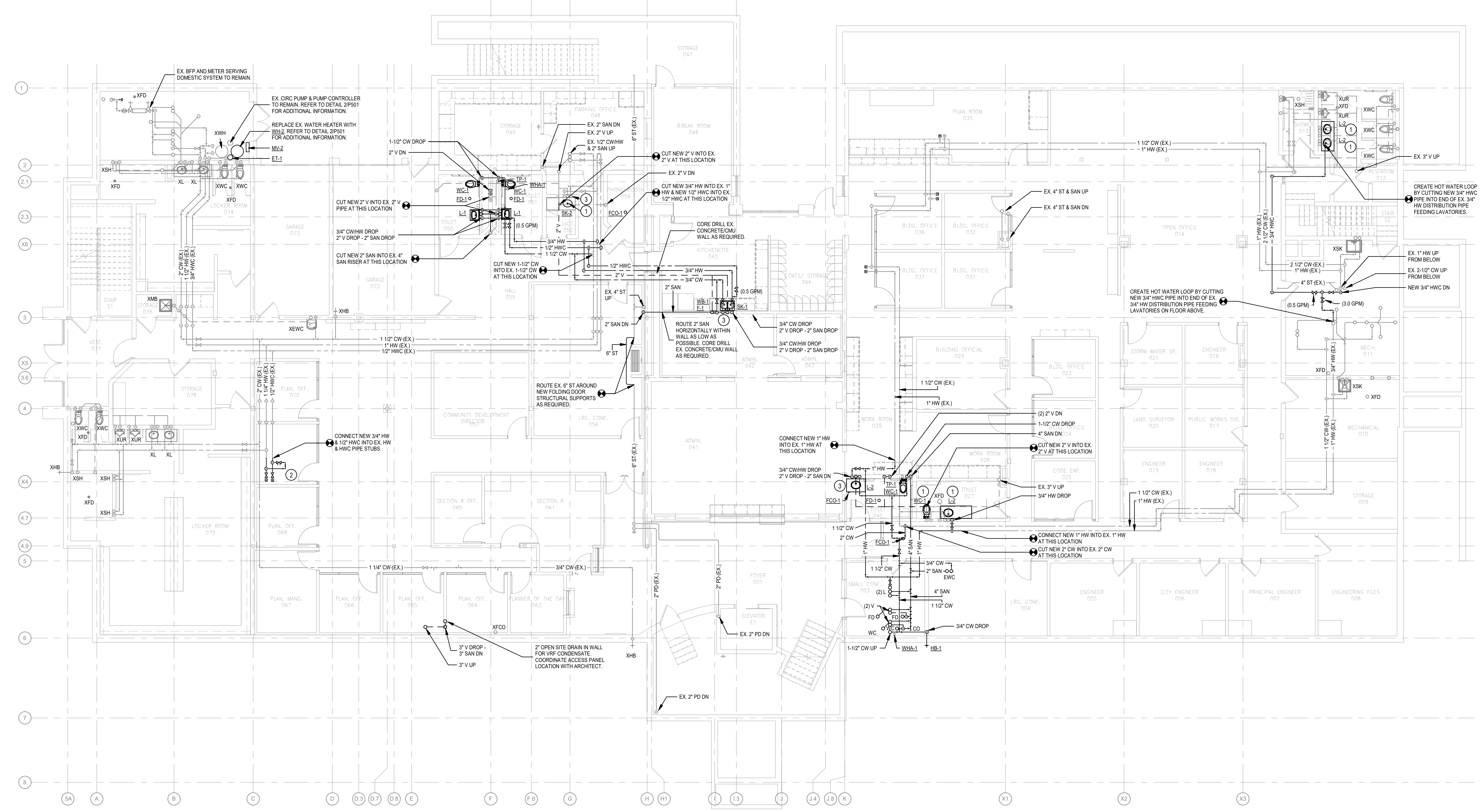
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- COORDINATE ALL SHUTDOWNS WITH OWNER.
- COORDINATE ALL GRAVITY PLUMBING ROUTING IN PLENUM WITH MECHANICAL PLANS.
- CONTRACTOR TO VERIFY ALL FINAL ROUGH IN LOCATIONS WITH EXISTING STRUCTURE PRIOR TO INSTALL.
- REFER SHEET P101 FOR THE FOLLOWING REFERENCED DETAILS:
 - DOMESTIC WATER HEATER AND FLOW DIAGRAM - SOUTH
 - DOMESTIC WATER HEATER AND FLOW DIAGRAM - NORTH
 - HOT WATER CRIC VALVE ASSEMBLY
 - PIPE HANGERS
 - WALL CLEANOUT
 - WALL BOX INSTALLATION
 - UPPER LEVEL FLOOR DRAIN
 - LOWER LEVEL FLOOR DRAIN
 - FLOOR CLEANOUT

GENERAL NOTES:

- MAKE FINAL CONNECTION TO NEW PLUMBING FIXTURE USING EXISTING WATER, WASTE AND VENT STUB-OUTS.
- PROVIDE CAPPED AND VALVED HW & HWC EXTENSIONS FOR FUTURE CONNECTION. LOCATE MANUAL BALANCING VALVE IN BYPASS SO IT CAN BE SHUT DOWN AFTER FUTURE WORK. REFER TO DETAIL 30901 FOR VALVE ARRANGEMENT.
- PROVIDE ADDITIONAL 2" OPEN SITE DRAIN WITHIN WALL FOR CONDENSATE DRAINAGE. TIE INTO SINKLAV WASTE PIPE AND PROVIDE TRAP WITH SEPARATE VENT.



1 LOWER LEVEL PLUMBING PLAN
1/8" = 1'-0"

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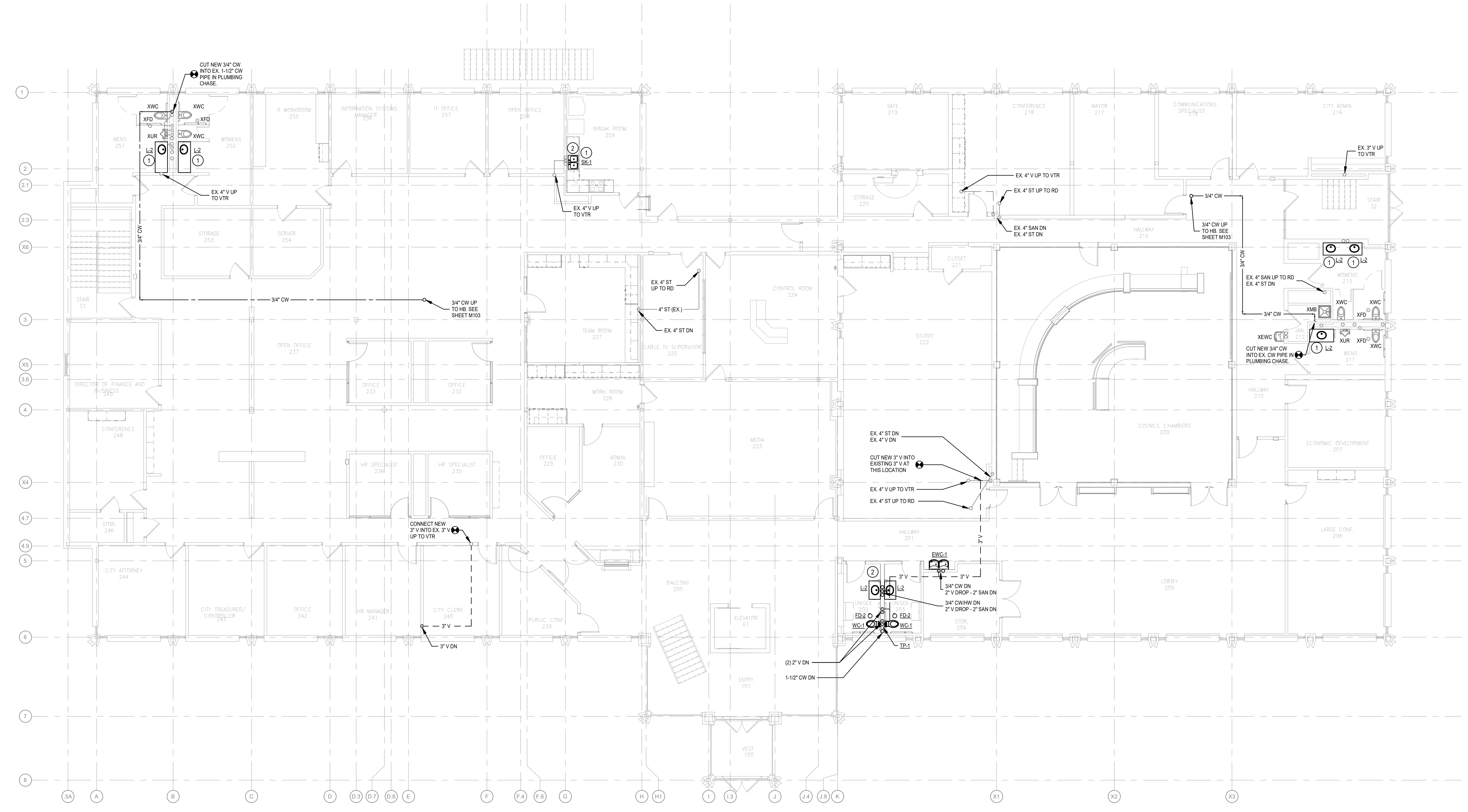
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GENERAL NOTES:

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2. CONTRACTOR TO COORDINATE PROJECT PHASING REQUIREMENTS WITH GENERAL CONTRACTOR AND ARCHITECT PRIOR TO STARTING WORK.
3. COORDINATE ALL SHUTDOWNS WITH OWNER.
4. COORDINATE ALL GRAVITY PLUMBING ROUTING IN PLENUM WITH MECHANICAL PLANS.
5. CONTRACTOR TO VERIFY ALL FINAL ROUGH IN LOCATIONS WITH EXISTING STRUCTURE PRIOR TO INSTALL.
6. REFER SHEET P101 FOR THE FOLLOWING REFERENCED DETAILS:
 - DOMESTIC WATER HEATER AND FLOW DIAGRAM - SOUTH
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 - UPPER LEVEL FLOOR DRAIN
 - LOWER LEVEL FLOOR DRAIN
 - FLOOR CLEANOUT

GENERAL NOTES:

1. MAKE FINAL CONNECTION TO NEW PLUMBING FIXTURE USING EXISTING WATER, WASTE AND VENT STUB-OUTS.
2. PROVIDE ADDITIONAL 2" OPEN SITE DRAIN WITHIN WALL FOR CONDENSATE DRAINAGE. Tie INTO SIMILAR WASTE PIPE AND PROVIDE TRAP WITH SEPARATE VENT.



1 UPPER LEVEL PLUMBING PLAN
1/8" = 1'-0"

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UPPER LEVEL PLUMBING PLAN

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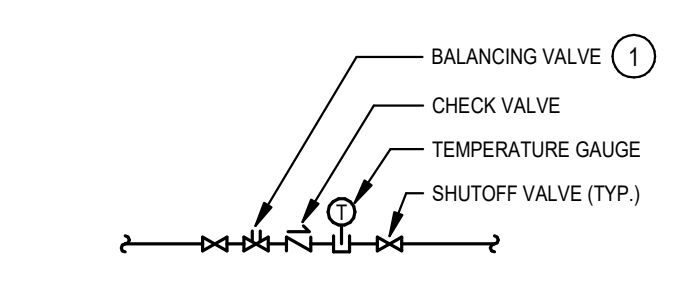
**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

No.	Description	Date
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PLUMBING DETAILS

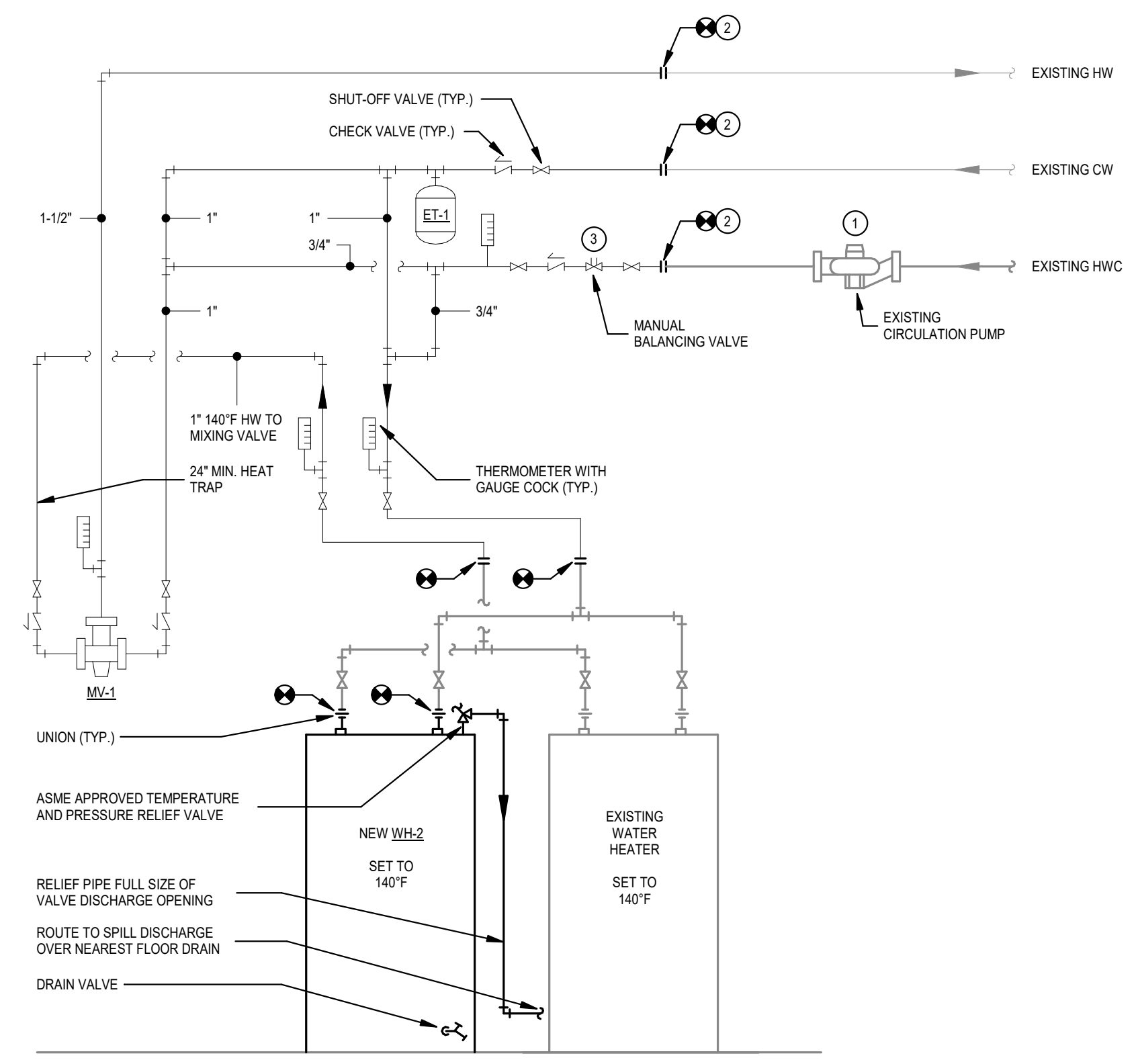
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P501



3 HOT WATER CIRC VALVE ASSEMBLY
N.T.S.

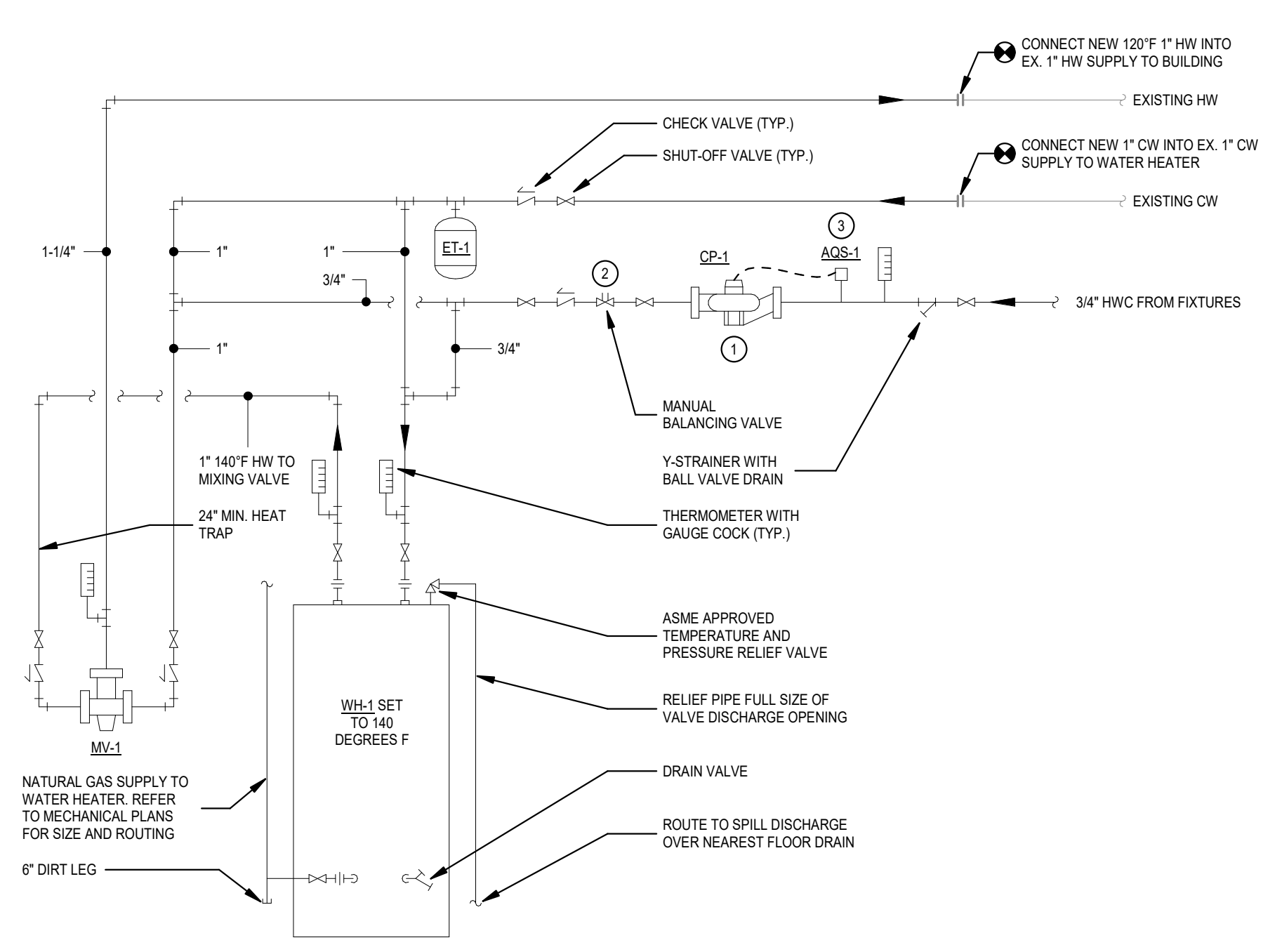
- KEYED NOTES:**
- ADJUST BALANCING VALVE AS NECESSARY TO MAINTAIN A RECIRCULATION WATER TEMPERATURE OF 140°F. BALANCING CONTRACTOR TO PROVIDE A REPORT SHOWING BALANCING VALVE INSTALLATION LOCATIONS, VALVE SETPOINTS, & RECIRCULATION WATER TEMPERATURE AS PART OF THE FINAL TESTING & BALANCING REPORT.



2 DOMESTIC WATER HEATER AND FLOW DIAGRAM - NORTH
N.T.S.

- GENERAL NOTES:**
- VERIFY FLOW DIAGRAM & PIPING ARRANGEMENT WITH ALL EQUIPMENT MANUFACTURERS INFORMATION PRIOR TO INSTALLATION.

- KEYED NOTES:**
- ADJUST THERMOSTATIC CONTROL TO TURN PUMP ON WHEN WATER TEMPERATURE DROPS BELOW 110 DEGREES F. PUMP TO TURN OFF WHEN WATER REACHES 120 DEGREES F.
 - ALL NEW CONNECTIONS TO BE MADE TO MATCH EXISTING PIPE SIZE.
 - REFER TO PLANS FOR FLOW SETPOINT. BALANCING VALVE SHALL INCLUDE INTERNAL VALVED READ-OUT PORTS, MEMORY STOP SCREW AND DRAIN CONNECTION. BALANCING CONTRACTOR TO PROVIDE A REPORT SHOWING BALANCING VALVE INSTALLATION LOCATIONS, VALVE SETPOINTS, & RECIRCULATION WATER TEMPERATURE AS PART OF THE FINAL TESTING & BALANCING REPORT.



1 DOMESTIC WATER HEATER AND FLOW DIAGRAM - SOUTH
N.T.S.

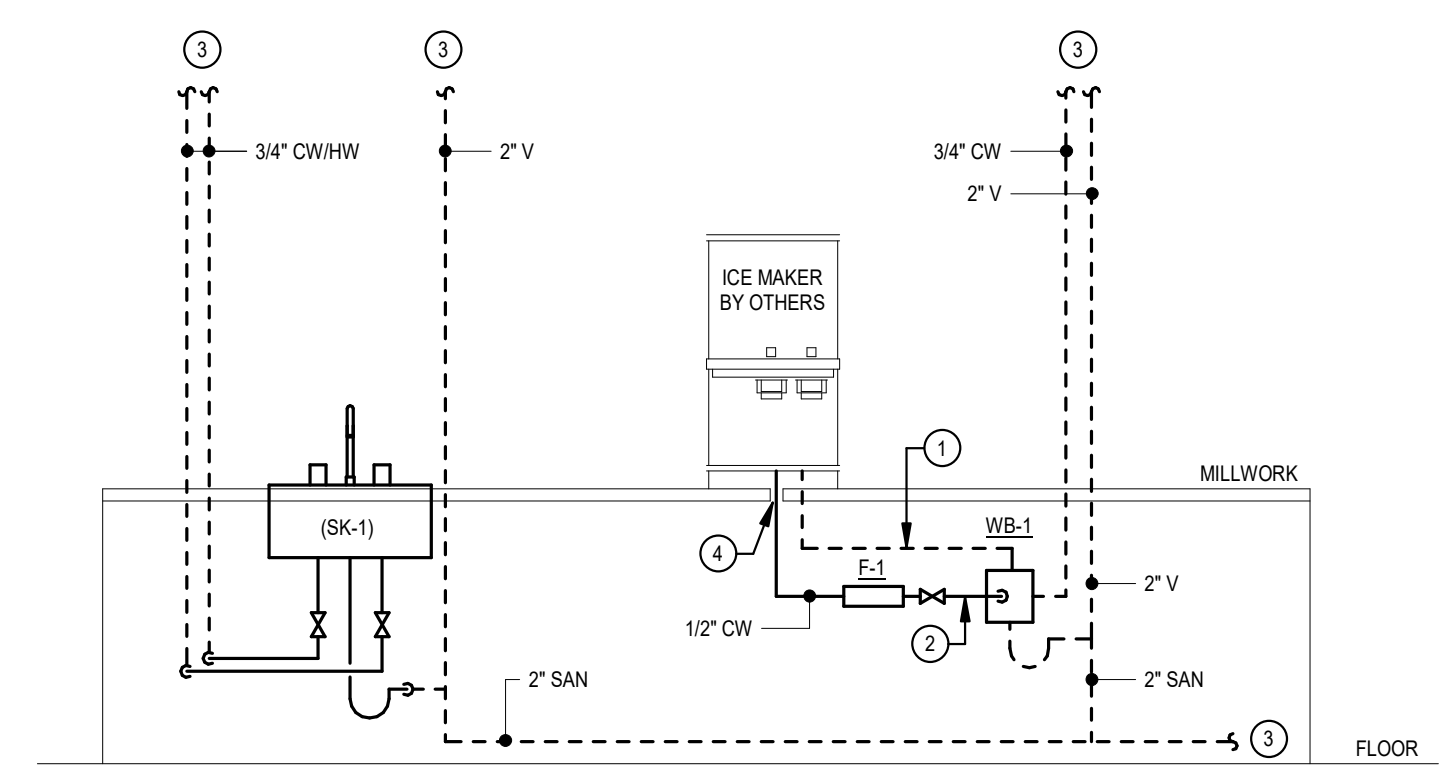
- GENERAL NOTES:**
- VERIFY FLOW DIAGRAM & PIPING ARRANGEMENT WITH ALL EQUIPMENT MANUFACTURERS INFORMATION PRIOR TO INSTALLATION.

- KEYED NOTES:**
- SUPPORT PUMP INDEPENDENTLY OF PIPING ON FROM STRUCTURE OR FLOOR. PIPING MAY BE SUPPORTED FROM SAME FRAME AS PUMP, BUT PIPING MAY NOT BE SUPPORTED BY PUMP ALONE.
 - REFER TO PLANS FOR FLOW SETPOINT. BALANCING VALVE SHALL INCLUDE INTERNAL VALVED READ-OUT PORTS, MEMORY STOP SCREW AND DRAIN CONNECTION. BALANCING CONTRACTOR TO PROVIDE A REPORT SHOWING BALANCING VALVE INSTALLATION LOCATIONS, VALVE SETPOINTS, & RECIRCULATION WATER TEMPERATURE AS PART OF THE FINAL TESTING & BALANCING REPORT.
 - ADJUST THERMOSTATIC CONTROL TO TURN PUMP ON WHEN WATER TEMPERATURE DROPS BELOW 110 DEGREES F. PUMP TO TURN OFF WHEN WATER REACHES 120 DEGREES F.

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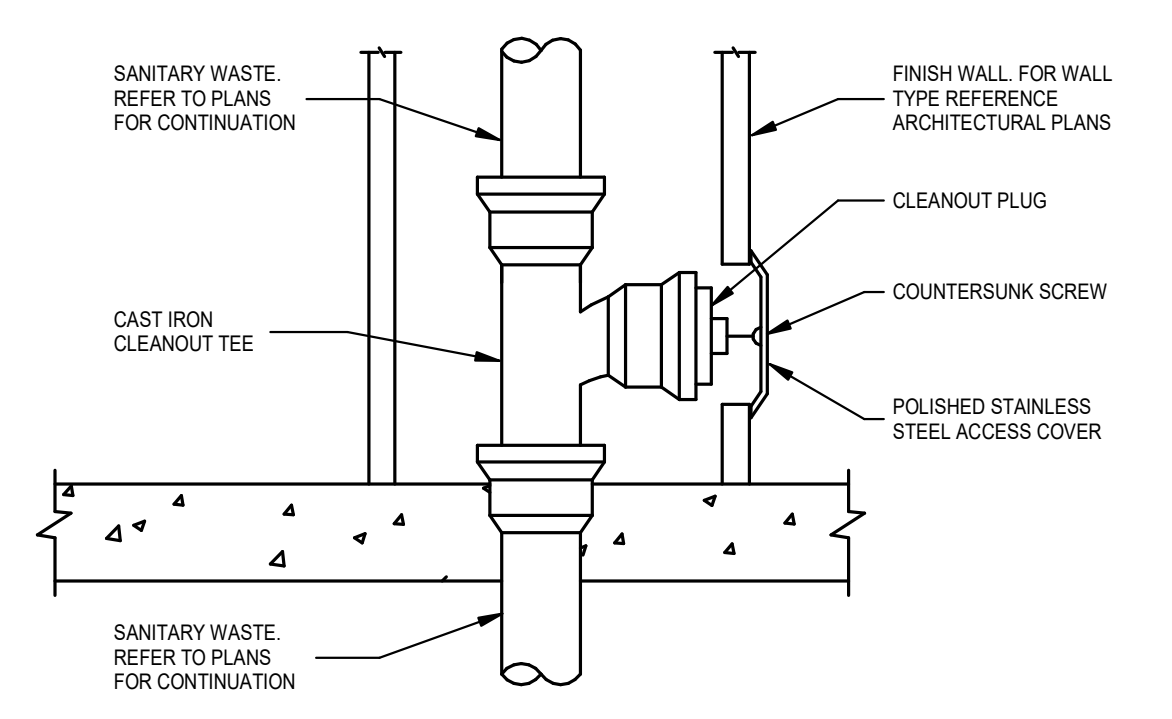
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6 WALL BOX INSTALLATION
N.T.S.

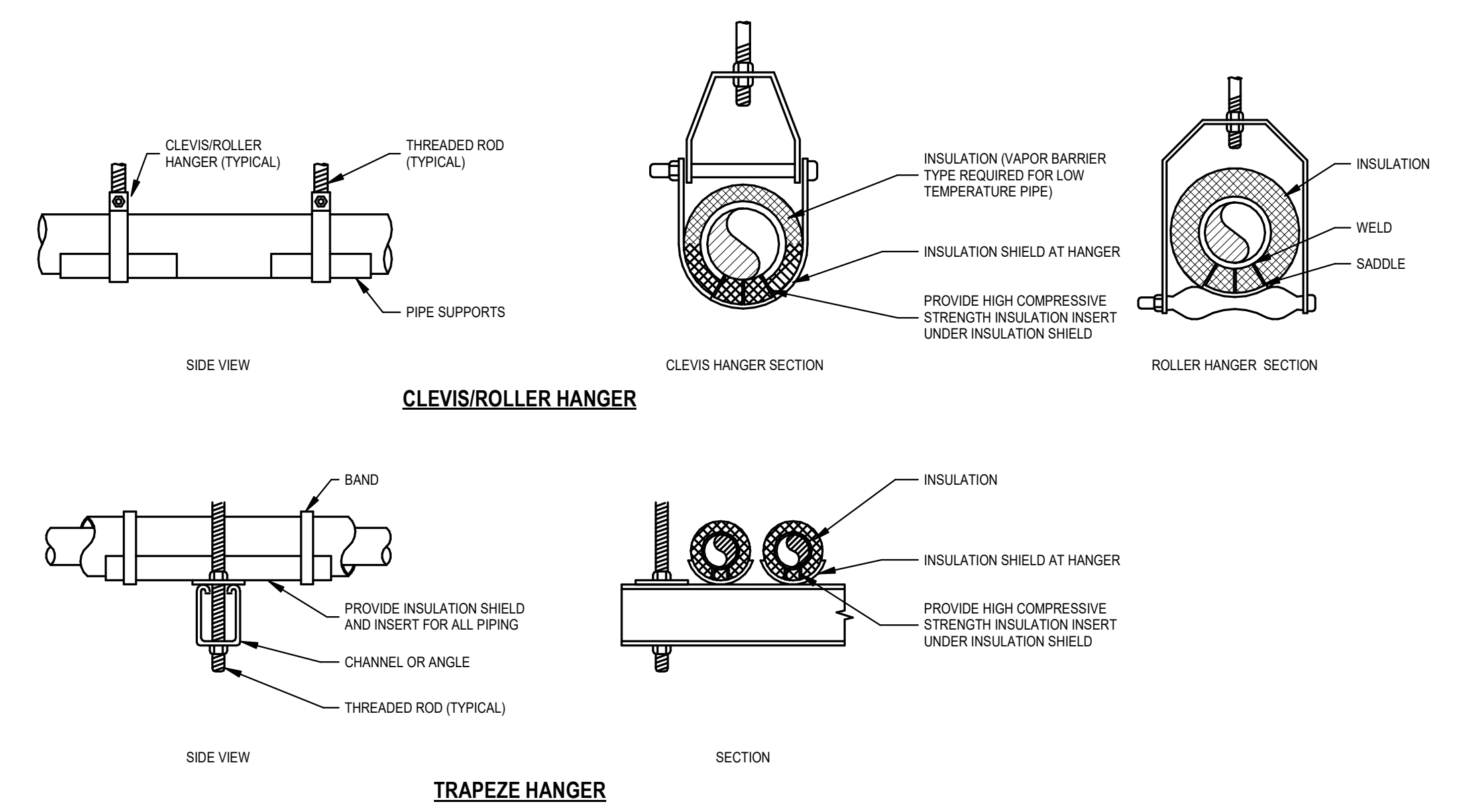
- KEYED NOTES:**
- ROUTE ICE MAKER DRAIN TO WALL BOX CONCEALED IN BACK WALL. TERMINATE WITH AN AIR GAP. INSTALL PER MANUFACTURERS REQUIREMENTS.
 - ROUTE PIPING DOWNSTREAM OF WALL BOX IN MILLWORK. COORDINATE LOCATION OF FILTER WITH ARCHITECT & OWNER.
 - SEE PLUMBING PLAN FOR CONTINUATION.
 - PROVIDE RUBBER GROMMET FOR PENETRATION THRU COUNTERTOP. POSITION HOLE AT REAR OF COUNTERTOP BEHIND/BELTOW EQUIPMENT SERVED.

- GENERAL NOTES:**
- DASHED PIPING TO BE LOCATED WITHIN BACK WALL. SOLID PIPING TO BE LOCATED WITHIN MILLWORK.
 - REFER TO PLANS FOR LOCATION AND QUANTITY OF EQUIPMENT.
 - COORDINATE WALL BOX AND FILTER LOCATIONS WITH ARCHITECTURAL CASEWORK DRAWINGS. COORDINATE ROUGH-INS WITH DRAWER LOCATIONS, ETC.



5 WALL CLEANOUT
N.T.S.

- GENERAL NOTES:**
- REFER TO PIPING APPLICATION SCHEDULE AND SPECIFICATIONS FOR ALLOWED JOINT TYPES.
 - INSTALL WALL CLEANOUTS IN ALL LOCATIONS SHOWN ON THE FLOOR PLANS.
 - COORDINATE ALL WALL CLEANOUT LOCATIONS AND ELEVATIONS WITH ARCHITECTURAL PLANS AND ELEVATIONS PRIOR TO ROUGH IN.
 - INSTALL WALL CLEANOUTS IN DRAIN LINES AND RISERS SERVING ALL OF THE FOLLOWING PLUMBING FIXTURES:
A. SINKS

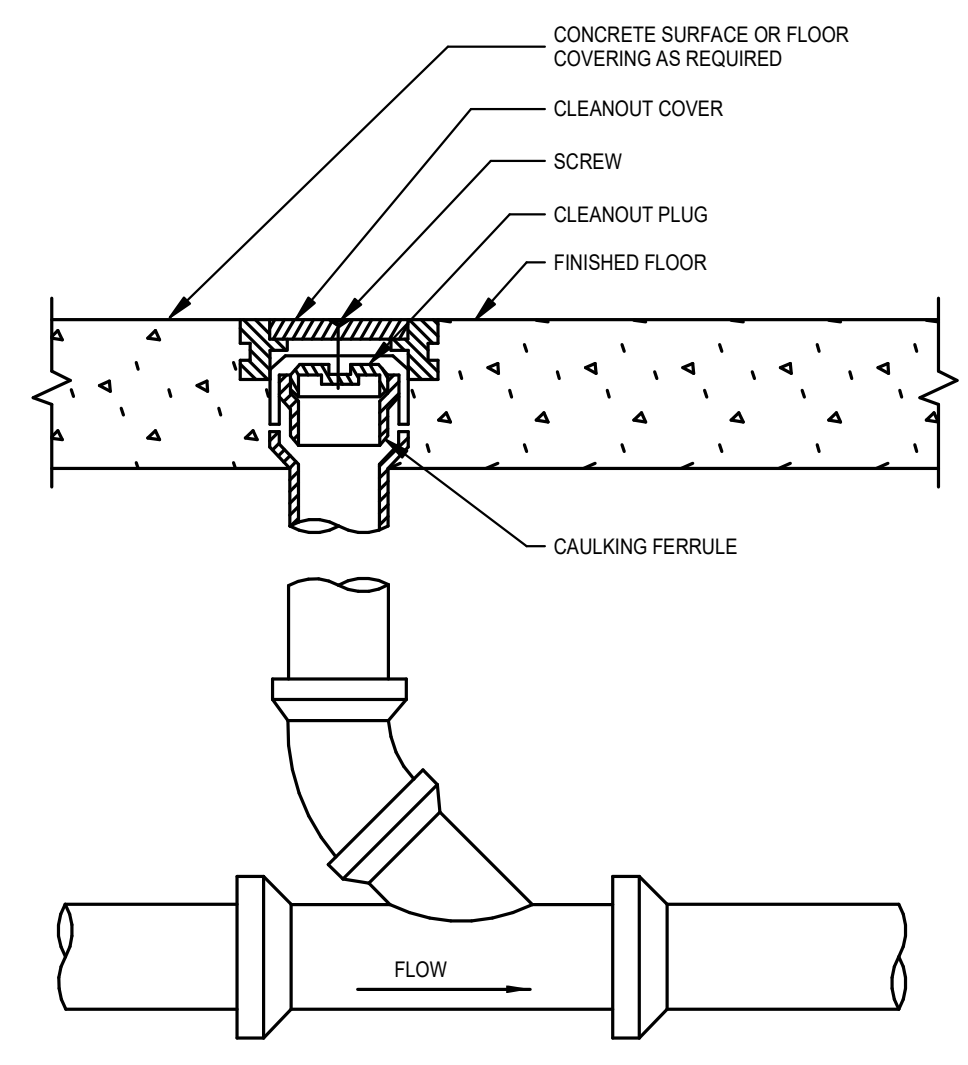


NOM. SIZE	THRU 3/4"	MAXIMUM PIPE/TUBING SUPPORT SPACING, FEET																	
		1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24	
STEEL PIPE - STD. WT.	7 FT.	9	11	12	13	15	16	17	20	20	22	23	24	25	25	25	25	25	25
COPPER TUBING	5 FT.	6	7	8	8	10	10	12	15	15	15	-	-	-	-	-	-	-	-
SCH. 40 PVC, CPVC (73°F)	3 FT.	4	4	5	6	6	6	6	8	8	9	10	11	12	-	-	-	-	-
SCH. 80 PVC, CPVC (73°F)	3 FT.	4	4	5	6	6	7	8	10	10	11	12	13	-	-	-	-	-	-
SCH. 40 CPVC (140°F)	-	-	-	-	5	6	6	6	7	7	7	8	-	-	-	-	-	-	-
SCH. 80 CPVC (140°F)	-	-	-	-	6	6	7	7	8	8	9	10	-	-	-	-	-	-	-
SDR 11 HDPE PIPE (73°F)	-	-	-	-	-	7	8	10	10	11	13	14	15	16	17	18	19	-	-

NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.

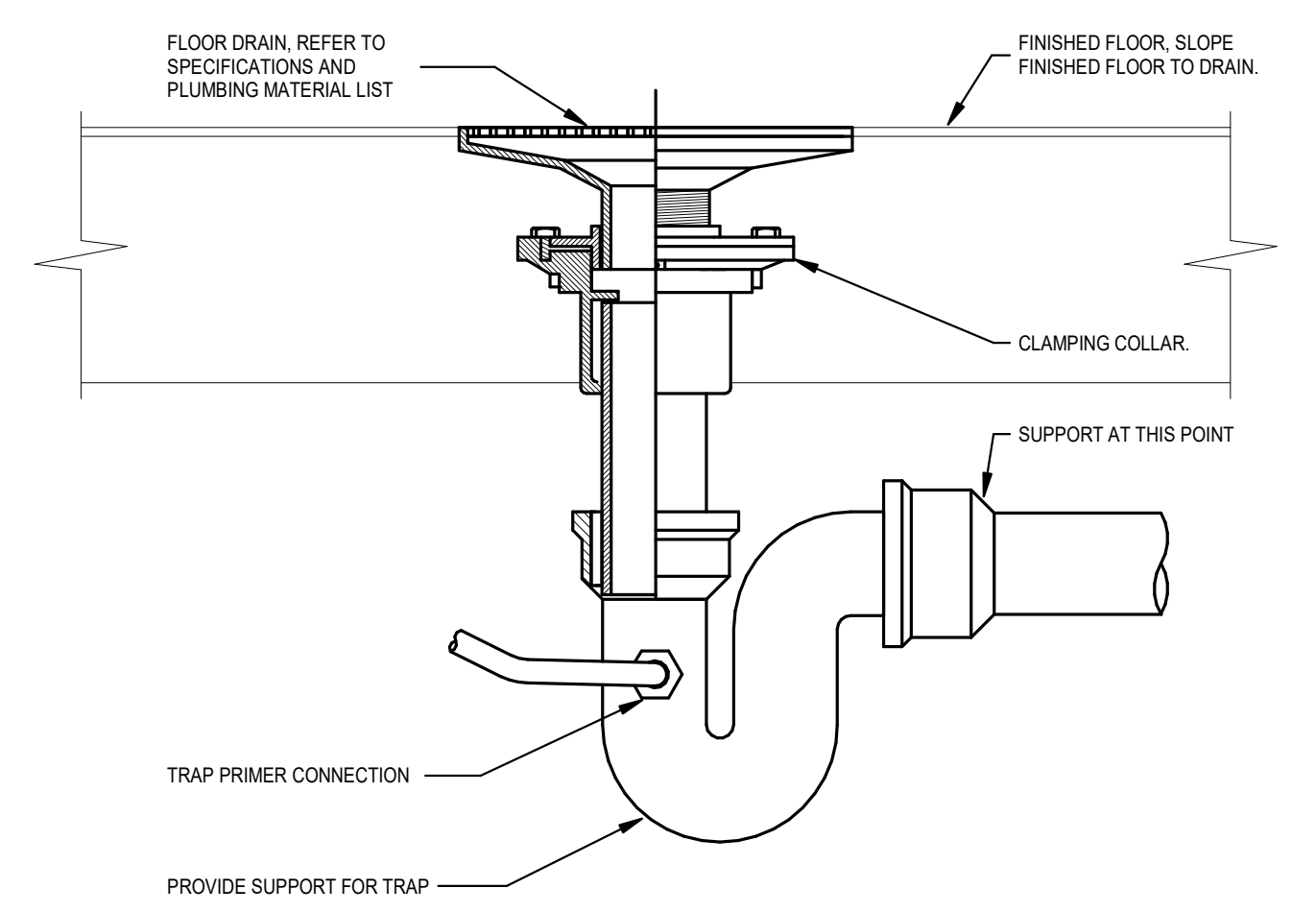
4 PIPE HANGERS
N.T.S.

- GENERAL NOTES:**
- SEE SPECIFICATIONS FOR HANGER AND INSULATION REQUIREMENTS.



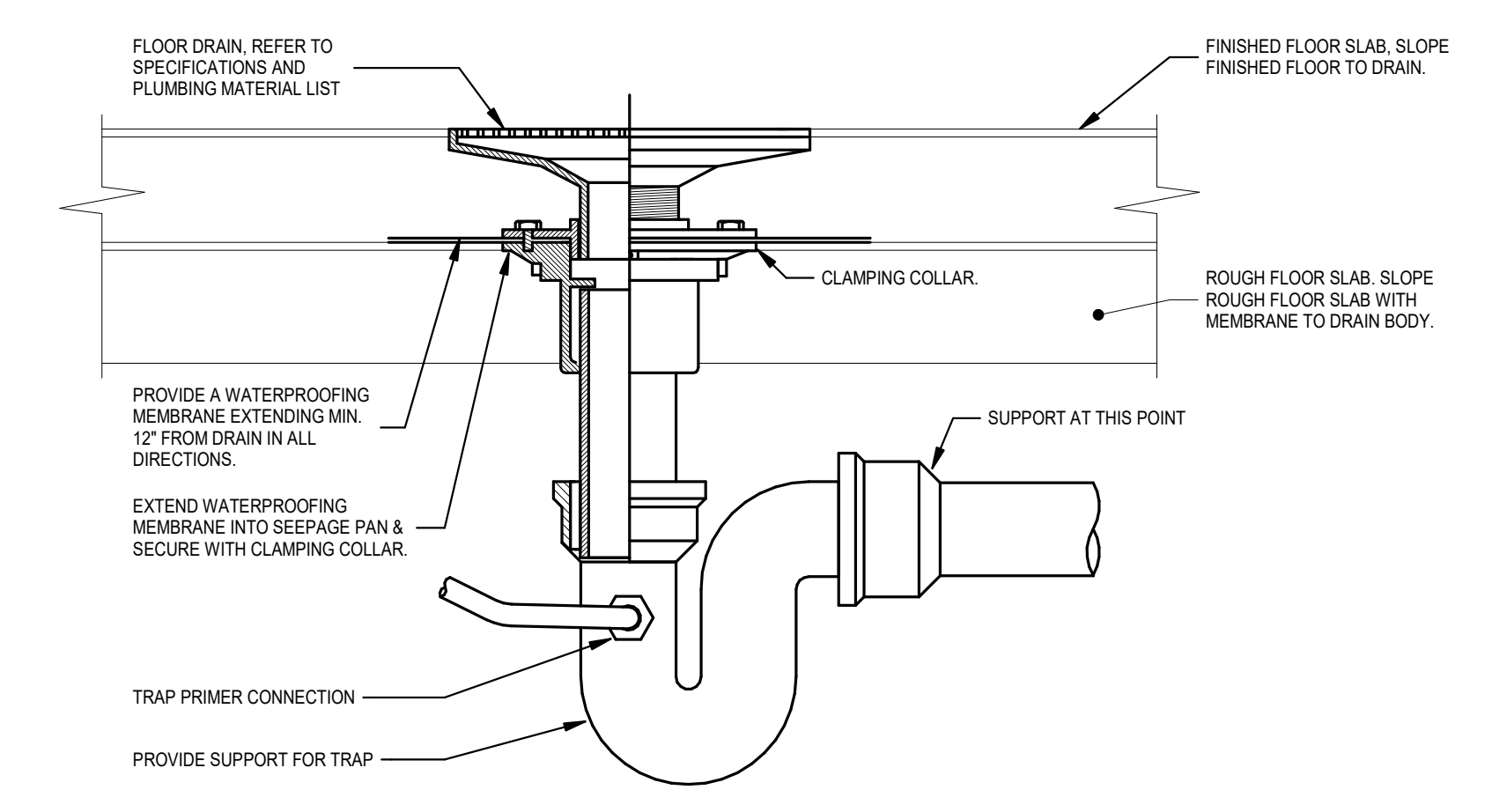
9 FLOOR CLEANOUT
N.T.S.

- GENERAL NOTES:**
- REFER TO PIPING APPLICATION SCHEDULE AND SPECIFICATIONS FOR ALLOWED JOINT TYPES.
 - INSTALL FLOOR CLEANOUTS IN ALL OF THE FOLLOWING LOCATIONS:
A. ALL LOCATIONS SHOWN ON THE FLOOR PLANS
B. IN ALL HORIZONTAL BRANCHES THAT ARE GREATER THAN 9'-0" IN LENGTH
C. EVERY 100' OF DEVELOPED PIPING LENGTH
D. EACH AGGREGATE HORIZONTAL CHANGE IN DIRECTION EXCEEDING 135°



8 LOWER LEVEL FLOOR DRAIN
N.T.S.

- GENERAL NOTES:**
- REFER TO PLUMBING MATERIAL LIST FOR SPECIFIC DRAIN OPTIONS & ACCESSORIES.



7 UPPER LEVEL FLOOR DRAIN
N.T.S.

- GENERAL NOTES:**
- REFER TO PLUMBING MATERIAL LIST FOR SPECIFIC DRAIN OPTIONS & ACCESSORIES.

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SYSTEM (NOTE 1)	LOCATION	DESIGN WORKING PRESSURE (PSI)	MATERIAL	JOINTS	INSULATION APPLICATION			NOTES
					USAGE SIZE RANGE	THICKNESS (IN.)	TYPE (NOTES 2, 3)	
DOMESTIC COLD WATER	ABOVE GRADE	125	TYPE L COPPER	SOLDER OR MECHANICAL PRESS CONNECTION	1-1/4" OR LESS	1/2"	ELASTOMERIC FOAM OR FIBERGLASS	6
			PEX	PEX MECHANICAL CRIMP	1-1/4" OR LESS	1/2"	ELASTOMERIC FOAM OR FIBERGLASS	
DOMESTIC HOT WATER SUPPLY AND RECIRCULATING	ABOVE GRADE	125	TYPE L COPPER	SOLDER OR MECHANICAL PRESS CONNECTION	1-1/4" OR LESS	1/2"	ELASTOMERIC FOAM OR FIBERGLASS	6
			PEX	PEX MECHANICAL CRIMP	1-1/2" & GREATER	1-1/2"	ELASTOMERIC FOAM OR FIBERGLASS	
SANITARY/VENT	BELOW GRADE	N/A	CAST IRON AND/OR SCH 40 PVC	BELL & SPIGOT, NO HUB, OR SOLVENT	ALL	-	-	4
	ABOVE GRADE (RETURN AIR PLENUM)	N/A	CAST IRON, DWV COPPER	BELL & SPIGOT, NO HUB, SOLDER	ALL	1"	FIBERGLASS	
STORM	BELOW GRADE	N/A	CAST IRON AND/OR SCH 40 PVC	BELL & SPIGOT, NO HUB, OR SOLVENT	ALL	-	-	5
	ABOVE GRADE (RETURN AIR PLENUM)	N/A	CAST IRON, DWV COPPER	BELL & SPIGOT, NO HUB, SOLDER	ALL	1"	FIBERGLASS	
EQUIPMENT DRAINS (GRAVITY & PUMPED CONDENSATE)	ABOVE GRADE (EXTERIOR)	N/A	DHW COPPER	SOLDER	ALL	1"	FIBERGLASS	5

- NOTES:
- REFER TO EACH PIPING SPECIFICATION FOR SPECIFIC PIPING REQUIREMENTS.
 - SEE SPECIFICATION SECTION 2907.19 FOR COMPLETE INSULATION AND JACKETING REQUIREMENTS. ALL INSULATION SHALL BE PLENUM RATED MEETING ASTM E84 WHERE INSTALLED IN A RETURN AIR PLENUM.
 - INSTALL RIGID CALCIUM SILICATE INSERTS AT ALL PIPING HANGERS.
 - INSULATE RISERS WITHIN 10' OF VENT THROUGH ROOF CONNECTION.
 - INSULATION ONLY REQUIRED FOR COLD SERVICE PIPING. EQUIPMENT DRAIN PIPING LESS THAN 5' IN LENGTH NEED NOT BE INSULATED.
 - PEX PIPING SHALL ONLY BE ALLOWED FOR INDIVIDUAL FIXTURE DROPS. PEX PIPING SHALL NOT BE INSTALLED IN RATED WALLS.

MARK	MANUFACTURER (NOTE 1)	DESCRIPTION	ELECTRICAL CONNECTION (VOLT / PHASE)	NOTES
LT-1	DELTA 590 SERIES	SENSOR ACTIVATED MIXING FAUCET, SINGLE HOLE, CHROME PLATED, HI-RISE SPOUT WITH VANDAL RESISTANT LAMINAR FLOW OUTLET, PERFORATED DRAIN GRATE, SOLID BRASS SOLENOID WITH BUILT IN FILTER, UL APPROVED TRANSFORMER, 120 VAC INPUT, WITH WATERPROOF CONNECTORS AND 10' LONG CABLE. MOUNT CONTROLS AND TRANSFORMER BELOW LAVATORY IN ACCESSIBLE LOCATION. MAXIMUM FLOW TO BE 0.6 GPM. PROVIDE RESTRICTIVE DEVICE AND ESCUTCHEON PLATE AS REQUIRED.	24V / SINGLE PHASE	-
ST-1	DELTA 470 DST	SINGLE HANDLE CONTROL FAUCET FOR SINGLE HOLE APPLICATIONS. SWIVEL SPOUT WITH 7' REACH, INTEGRAL PULL OUT SPRAY HOSE ON END OF FAUCET WITH INTEGRAL BACKFLOW PREVENTION. HANDLE TO HAVE CERAMIC CARTRIDGE CONTROL MECHANISM & REDIBLUE TEMPERATURE INDICATORS. MAXIMUM FLOW TO BE 1.8 GPM. PROVIDE RESTRICTIVE DEVICE AND ESCUTCHEON PLATE AS REQUIRED.	-	-
ST-2	DELTA 590 SERIES	SENSOR ACTIVATED MIXING FAUCET, SINGLE HOLE, CHROME PLATED, HI-RISE SPOUT WITH VANDAL RESISTANT LAMINAR FLOW OUTLET, PERFORATED DRAIN GRATE, SOLID BRASS SOLENOID WITH BUILT IN FILTER, UL APPROVED TRANSFORMER, 120 VAC INPUT, WITH WATERPROOF CONNECTORS AND 10' LONG CABLE. MOUNT CONTROLS AND TRANSFORMER BELOW SINK IN ACCESSIBLE LOCATION. MAXIMUM FLOW TO BE 1.5 GPM. PROVIDE RESTRICTIVE DEVICE AND ESCUTCHEON PLATE AS REQUIRED.	24V / SINGLE PHASE	-

- NOTES:
- SEE SPECIFICATIONS FOR LIST OF ACCEPTABLE MANUFACTURERS AND INSTALLATION REQUIREMENTS.

MARK	ADA	MANUFACTURER (NOTE 1)	DESCRIPTION				NOTES
			FIXTURE	ACCESSORIES	TRIM	AREA SERVED	
L-1	L-1A	ZURN Z-5320 SERIES	WALL MOUNTED, WHITE VITREOUS CHINA, SINGLE FAUCET HOLE, DRILLED FOR CONCEALED ARM CARRIER. FURNISH FLOOR MOUNTED SUPPORT CARRIER BOLTED SECURELY TO FLOOR.	PRE-MANUFACTURED INSULATION KIT FOR P-TRAP, STOPS, AND SUPPLY LINES. ADA-COMPLIANT, EQUAL TO TRUEBERO LAV GUARD 2. FIELD COORDINATE INSTALLATION LOCATION WITH OWNER PRIOR TO ROUGH IN.	LT-1	RESTROOMS 050, 051	-
L-2	L-2A	-	FIXTURE: INTEGRAL SOLID SURFACE BOWL BY OTHERS. ALL PLUMBING CONNECTIONS BY P.C.	GRID STRAINER, CHROME PLATED TRAP AND TAILPIECE. QUARTER-TURN 3/8" CHROME PLATED HEAVY BRASS ANGLE SUPPLIES. LOOSE KEY STOPS WITH CHROME PLATED SOFT COPPER RISERS OR FLEXIBLE BRAIDED STAINLESS STEEL RISERS. PROVIDE WITH MN-3. INSTALL BELOW FIXTURE IN ACCESSIBLE LOCATION. UNIT TO MIX 120 DEGREE F. HOT WATER SUPPLY AND 40 DEGREE F. COLD WATER SUPPLY FOR 110 DEGREE F. OUTLET. SHALL CONFORM TO THE REQUIREMENTS OF ASSE 1070.	LT-1	TOILET 027, 040 RESTROOMS: 012, 211, 213, 201, 252 UNISEX 202, 203	-
SK-1	SK-1A	JUST DLN-228-A-GR	STAINLESS STEEL DROP-IN SINK, DOUBLE COMPARTMENT WITH FAUCET DECK AND SINGLE HOLE, 18 GAUGE TYPE 304, SELF-RIMMING, COMPLETELY UNDERCUT, 3-1/2" DIAMETER DRAIN OUTLET, 6.5" DEEP BOWL.	REMOVABLE STAINLESS STEEL BASKET STRAINER AND NEOPRENE STOPPER. CHROME PLATED TRAP AND TAILPIECE. QUARTER-TURN 3/8" CHROME PLATED HEAVY BRASS ANGLE SUPPLIES AND LOOSE KEY STOPS WITH CHROME PLATED SOFT COPPER RISERS OR FLEXIBLE BRAIDED STAINLESS STEEL RISERS.	ST-1	KITCHENETTE 045, BREAKROOM 259	2
SK-2	SK-2A	-	FIXTURE: INTEGRAL SOLID SURFACE BOWL BY OTHERS. ALL PLUMBING CONNECTIONS BY P.C.	GRID STRAINER, CHROME PLATED TRAP AND TAILPIECE. QUARTER-TURN 3/8" CHROME PLATED HEAVY BRASS ANGLE SUPPLIES. LOOSE KEY STOPS WITH CHROME PLATED SOFT COPPER RISERS OR FLEXIBLE BRAIDED STAINLESS STEEL RISERS.	ST-2	LACTATION 052	-

- NOTES:
- SEE SPECIFICATIONS FOR LIST OF ACCEPTABLE MANUFACTURERS AND INSTALLATION REQUIREMENTS.
 - VERIFY SINK DIMENSIONS WITH CASEWORK PRIOR TO ORDERING.

MARK	MANUFACTURER	MODEL	FUEL	INPUT (BTUH OR KW)	UEF	GAS PRESSURE (IN. W.C.)	HW SETPOINT	RECOVERY RATE (GPM) (NOTE 1)	WORKING PRESSURE	STORAGE TANK SIZE (GAL)	ASME RATED	ELECTRICAL			NOTES	
			GAS OR ELECTRIC									HP	VOLT	PH		DISCONNECT BY
WH-1	A.O. SMITH	GPVX-50L	GAS	62,000	0.73	7-1/4"	140	69	150 PSI	50	NO	FHP	120	1	EC	-
WH-2	A.O. SMITH	DEH-52	ELEC	3.5	-	-	140	16	150 PSI	50	NO	FHP	208	1	EC	-

- NOTES:
- RECOVERY RATE BASED ON 90 DEGREE TEMPERATURE RISE.

FIXTURE	CW	HW	SAH	VENT	NOTES
ELECTRIC WATER COOLER	1/2"	-	1-1/4"	1-1/4"	-
FLOOR DRAIN	-	-	2"	2"	-
HOSE BIBB/ROOF HYDRANT	3/4"	-	-	-	-
SINK	1/2"	1/2"	1-1/2"	1-1/2"	1
LAVATORY	1/2"	1/2"	1-1/4"	1-1/4"	1, 2
WATER CLOSET	1-1/4"	-	4"	2"	-

- NOTES:
- ALL BELOW GRADE PIPING SHALL BE A MINIMUM OF 2".
 - ALL SUPPLY PIPING SERVING MORE THAN A SINGLE FIXTURE SHALL HAVE A MINIMUM PIPE SIZE OF 3/4".

MARK	MANUFACTURER	MODEL	TYPE	PUMP SPEED	PUMP				PUMP CONTROLLER				NOTES				
					PUMP CONSTRUCTION	FLOWRATE PER PUMP (GPM)	HEAD (FT.)	ELECTRICAL	MARK	ELECTRICAL	DISCONNECT BY	NOTES					
														HOUSING	IMPELLER	HP	VOLT
CR-1	GRUNDFOS	UP	INLINE	SINGLE SPEED	BRONZE	BRONZE	3.5	25	FHP	120	1	E.C.	ASSE-1	120	1	E.C.	1, 2

- NOTES:
- PROVIDE PUMP WITH IMMERSION TYPE AQUASTAT TEMPERATURE SENSOR FOR PUMP OPERATION. REFER TO DOMESTIC WATER FLOW DIAGRAM DETAIL FOR ADDITIONAL INSTALLATION REQUIREMENTS.
 - PROVIDE PUMP WITH FLANGED CONNECTIONS.

FIXTURE	ADA (NOTE 1)	MANUFACTURER (NOTE 2)	DESCRIPTION	ELECTRICAL CONNECTION (VOLT/PHASE/AMPS)	AREA SERVED	NOTES
REP-1	-	WATTS 967	FIXTURE: REDUCED PRESSURE BACKFLOW PREVENTER, (2) INDEPENDENT SPRING LOADED CHECKS WITH A DIFFERENTIAL PRESSURE RELIEF VALVE BETWEEN THE CHECK VALVES. 3/4" STAINLESS STEEL HOUSING AND SLEEVE WITH LEAD FREE CONSTRUCTION. THE WETTED SURFACE OF THE BACKFLOW PREVENTER SHALL CONTAIN LESS THAN 0.25% LEAD BY WEIGHT. UNITS SHALL INCLUDE FOUR TEST COCKS WITH SHUT-OFF VALVES AND SHALL BE BACKFLOW TESTED AT THE FACTORY. RATED FOR 175 PSI AT 33 DEGREES F. TO 140 DEGREES F. MAXIMUM PRESSURE DROP: 10 PSI AT 10 GPM REGARDLESS OF SIZE. FLOW PRESSURE AND REMOVING UNIT FROM LINE. WITH RESILIENT SEATED GATE SHUT-OFF VALVES ON BOTH SIDES OF UNIT AND AIR GAP DRAIN FITTING. PROVIDE AND INSTALL BRONZE OR EPDM COATED STRAINER UPSTREAM FROM UNIT APPROVED BY USC FCC & HR. AWWA C111-92, ASSE 1013, IAPMO AND SBCCI LISTED. UNIT SHALL BE SAME SIZE AS PIPE IF NO SIZE IS SHOWN ON THE DRAWING.	24V / SINGLE PHASE	SOUTH MECHANICAL ROOM	-
ET-1	-	WATTS DETA	FIXTURE: EXPANSION TANK - WELDED STEEL CONSTRUCTION (WITH ASME STAMP), STAINLESS STEEL SYSTEM CONNECTION, HEAVY DUTY BUTYL DIAPHRAGM AND RIGID POLYPROPYLENE LINES MECHANICALLY BONDED TO TANK TO PROVIDE A 100% NON-CORROSIVE WATER RESERVOIR. DIAPHRAGM AND LINER SHALL BE APPROVED FOR USE IN POTABLE WATER SYSTEMS. ALL WETTED COMPONENTS OF FDA APPROVED MATERIALS. TANK SHALL HAVE A WORKING TEMPERATURE OF 200°F AND A WORKING PRESSURE OF 150 PSIG. MINIMUM TANK VOLUME TO BE 3.5 GALLONS. MINIMUM ACCEPTING VOLUME TO BE 2 GALLONS. FACTORY PRE-CHARGED TO 40 PSIG. PROVIDE STANDARD SCHRAEDER AIR VALVE FOR FIELD CHARGING. COORDINATE FIELD CHARGE PRESSURE WITH THE ACTUAL STATIC SYSTEM PRESSURE ADJACENT TO THE EXPANSION TANK CONNECTION.	-	SOUTH MECHANICAL ROOM	-
EW-C-1	EW-C-1A	ELKAY EZ SERIES	FIXTURE: ELECTRIC WATER COOLER WITH INTEGRAL VANDAL RESISTANT BOTTLE FILLER WITH WATER FILTER - WALL HUNG, 8" LEVEL UNITS, PUSH BAR OR LEVER OPERATING CONTROLS ON FRONT AND BOTH SIDES, BUILT-IN FLOW REGULATOR, DRAIN & TRAP ASSEMBLY, GRAY PAINTED CABINET, AND NON-SPLASH BASINS. STREAM PROJECTORS WITH PROTECTIVE HOODS. ADA COMPLIANT WITH APRON INSTALLED UNDER EACH UNIT. 7 GPM OF WATER FROM 40 DEGREES F. TO 50 DEGREES F. AT 80 DEGREES F. ROOM TEMPERATURE. TANK TESTED TO 125 PSIG. ADJUSTABLE THERMOSTAT MOUNTING ACCESSORIES. TANK GRAB AND ANGLE STOPS. CORD AND PLUG. COMPRESSOR TO OPERATE ON HFC-134a REFRIGERANT. EW-C SHALL CONFORM TO ANSI A117.1-1998. WATER SYSTEM SHALL BE OF LEAD FREE CONSTRUCTION.	120V / SINGLE PHASE / 15 AMP	HALLWAY 202	3
ECOL-1	-	ZURN Z-1493	FIXTURE: FLOOR CLEANOUT - CAST IRON THREADED ADJUSTABLE HOUSING, FLANGED FERRULE WITH PLUG AND SECURED NICKEL BRONZE TOP. TOP STYLE SHALL MATCH FLOOR FINISH AS FOLLOWS. UNFINISHED FLOOR - ROUND SOLID SCOURATED TOP. TILE - ROUND RECESSED TOP. CARPET - ROUND TOP WITH CARPET FLANGE.	-	GENERAL	-
ED-1	-	ZURN Z415	FIXTURE: FLOOR DRAIN - 6" DIAMETER NICKEL BRONZE ADJUSTABLE TOP, 2" BOTTOM OUTLET. CAST IRON BODY WITH TRAP PRIMER CONNECTIONS, FLASHING COLLAR, DEEP SEAL TRAP.	-	GROUND FLOOR RESTROOMS	-
ED-2	-	ZURN Z415	FIXTURE: FLOOR DRAIN - 6" DIAMETER NICKEL BRONZE ADJUSTABLE TOP WITH SURFACE MEMBRANE CLAMP, 2" BOTTOM OUTLET. CAST IRON BODY WITH TRAP PRIMER CONNECTIONS, FLASHING COLLAR, DEEP SEAL TRAP.	-	SECOND FLOOR RESTROOMS	-
E-1	-	EVERPURE IN-9CF-S	FIXTURE: INLINE WATER FILTER, 5-MICRON CARBON FILTER DESIGNED TO FILTER WATER TO IMPROVE TASTE, ODOR, AND REMOVE MINERALS. PROVIDE WITH SHUT-OFF VALVE AT INLET AND OUTLET. 0.75 GPM FLOW AT 10 PSIG. ERROR: 1,500 GALLON RATED CAPACITY. NSF & FDA APPROVED MATERIALS. PROVIDE WITH ONE SPARE FILTER PER LOCATION.	-	KITCHENETTE 045	4
HB-1	-	WOODFORD MODEL 67	FIXTURE: FREEZELESS WALL HYDRANT, CONCEALED TYPE WITH FLUSH MOUNTED WALL BOX WITH STANDARD FINISH. AUTOMATIC DRAINING. VACUUM BREAKER, 3/4" MALE HOSE THREAD, BRASS VALVE BODY AND SEAT, NON-FERROUS METAL STEM, STANDARD FINISH. WALL CLAMP. FURNISH TWO LOOSE KEY OPERATORS. ASSE 1019 APPROVED AND LISTED.	-	EXTERIOR	-
HB-2	-	WOODFORD MODEL SRH	FIXTURE: HOSE BIBB - FREEZELESS ROOF HYDRANT, 3/4" MALE HOSE THREAD DUAL CHECK BACKFLOW PREVENTER ON OUTLET WITH INTEGRAL 3/4" NPT INLET. ONE-PIECE PLUNGER, EPDM OR TPO ROOF BOOT. PROVIDE MANUFACTURERS CAST IRON HYDRANT SUPPORT, MOUNTING SYSTEM.	-	ROOF MECHANICAL EQUIPMENT	-
MV-1	-	POWERS LFLM490 SERIES	FIXTURE: THERMOSTATIC MIXING VALVE - FIXTURE GROUP MIXING VALVE FOR TEMPERED WATER CONTROL. ALL BRONZE/BRASS CONSTRUCTION. UNION THREADED INLETS WITH CHECK STOPS/STRAINERS. RATED FOR 23 GPM OUTPUT MAXIMUM AT 10 PSI DIFFERENTIAL AND 0.5 GPM OUTPUT MINIMUM UNIT TO MIX 140 DEGREE F. HOT WATER SUPPLY AND 40 DEGREE F. COLD WATER SUPPLY FOR 120 DEGREE F. OUTLET. SHALL CONFORM TO THE REQUIREMENTS OF ASSE 1017.	-	SOUTH MECHANICAL ROOM	-
MV-2	-	POWERS LFLM490 SERIES	FIXTURE: THERMOSTATIC MIXING VALVE - FIXTURE GROUP MIXING VALVE FOR TEMPERED WATER CONTROL. ALL BRONZE/BRASS CONSTRUCTION. UNION THREADED INLETS WITH CHECK STOPS/STRAINERS. RATED FOR 23 GPM OUTPUT MAXIMUM AT 10 PSI DIFFERENTIAL AND 0.5 GPM OUTPUT MINIMUM UNIT TO MIX 140 DEGREE F. HOT WATER SUPPLY AND 40 DEGREE F. COLD WATER SUPPLY FOR 120 DEGREE F. OUTLET. SHALL CONFORM TO THE REQUIREMENTS OF ASSE 1017.	-	NORTH MECHANICAL ROOM	-
MV-3	-	POWERS LFL480 SERIES	FIXTURE: UNDER-COUNTER THERMOSTATIC MIXING VALVE FOR TEMPERED WATER CONTROL. ALL LEAD FREE BRONZE/BRASS CONSTRUCTION. TAMPER RESISTANT ADJUSTABLE TEMPERATURE CONTROL, INTEGRAL CHECKS AND STRAINERS. UNIT TO MIX 120 DEGREE F. HOT WATER SUPPLY AND 40 DEGREE F. COLD WATER SUPPLY FOR 110 DEGREE F. OUTLET AT 0.5 GPM MINIMUM SHALL CONFORM TO THE REQUIREMENTS OF ASSE 1070.	-	RESTROOM LAVATORIES	-
TP-1	-	ZURN Z1022	FIXTURE: AUTOMATIC TRAP PRIMER, ALL BRONZE BODY, INTEGRAL VACUUM BREAKER, NON-LIMING INTERNAL OPERATING ASSEMBLY AND GASKETED BRONZE COVER. ZURN Z1022 OR APPROVED EQUAL.	-	GENERAL	-
WH-A#	-	ZURN 1260L	FIXTURE: WATER HAMMER ARRESTOR, COPPER BODY, BRASS CONNECTIONS. SWEAT OR WPT. ACETAL OR BRASS PISTON WITH Buna-N/ITRIL O-RINGS AND LEAD FREE SOLDER. PRE-CHARGED AT FACTORY. SIZE AS FOLLOWS (# -FIXTURE UNITS RANGES): 1 (1-11 SFU), 2 (13-32 SFU), 3 (33-50 SFU), 4 (61-113 SFU), 5 (114-154), 6 (155-300). NUMBER ON PLAN DENOTES SIZE.	-	GENERAL	-
WB-1	-	GLY GRAY MB SERIES	FIXTURE: WALL BOX - WHITE POWDER COATED 20 GA STEEL ENCLOSURE, ONE QUARTER-TURN ANGLE VALVE, COORDINATE OUTLET TYPE AND SIZE WITH EQUIPMENT.	-	KITCHENETTE 045	-
WC-1	WC-1A	ZURN Z-5665 SERIES	FIXTURE: WATER CLOSET - FLOOR MOUNTED, WHITE VITREOUS CHINA, SIPHON JET, ELONGATED BOWL, 1-1/2" TOP SPUD. TRIM: FLUSH VALVE - EXPOSED, SENSOR OPERATED, WITH OVER-RIDE, BATTERY POWERED, LOW BATTERY INDICATOR LIGHT. RANGE ADJUSTMENT SCREW CHROME PLATED 1" IP. S. SCREWDRIVER STOP-CHECK VALVE. VACUUM BREAKER, WALL AND SPUD FLANGES. 1.6 GALLONS PER FLUSH. 3 YEAR WARRANTY. EQUAL TO ZURN 26200 (AUTOMATIC) SERIES. ACCESSORIES: WHITE, EXTRA HEAVY, OPEN FRONT, INJECTION MOLDED, SOLID ANTIMICROBIAL PLASTIC SELF-SUSTAINING SEAT WITH CHECK RING AND STAINLESS STEEL OR PLATED STEEL POSTS AND NUTS. DRAINAGE FITTINGS AND ACCESSORIES TO MATCH INSTALLATION REQUIREMENTS.	-	RESTROOMS	-
WCO-1	-	ZURN Z-1441	FIXTURE: WALL CLEANOUTS SHALL HAVE CAST IRON ACCESS BODY. GAS AND WATERTIGHT THREADED PLUG. ROUND STAINLESS STEEL ACCESS COVER AND EXTENDED MACHINE SCREW.	-	GENERAL	-

- NOTES:
- FIXTURE TO BE ADA COMPLIANT AND INSTALLED AT ADA HEIGHT. COORDINATE REQUIRED LOCATIONS WITH ARCHITECTURAL DRAWINGS.
 - SEE SPECIFICATIONS FOR LIST OF ACCEPTABLE MANUFACTURERS AND INSTALLATION REQUIREMENTS.
 - CORD & PLUG DISCONNECT BY MFR.
 - INSTALL F-1 UPSTREAM OF ICE MAKER. REFER TO WALL BOX DETAIL.

**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

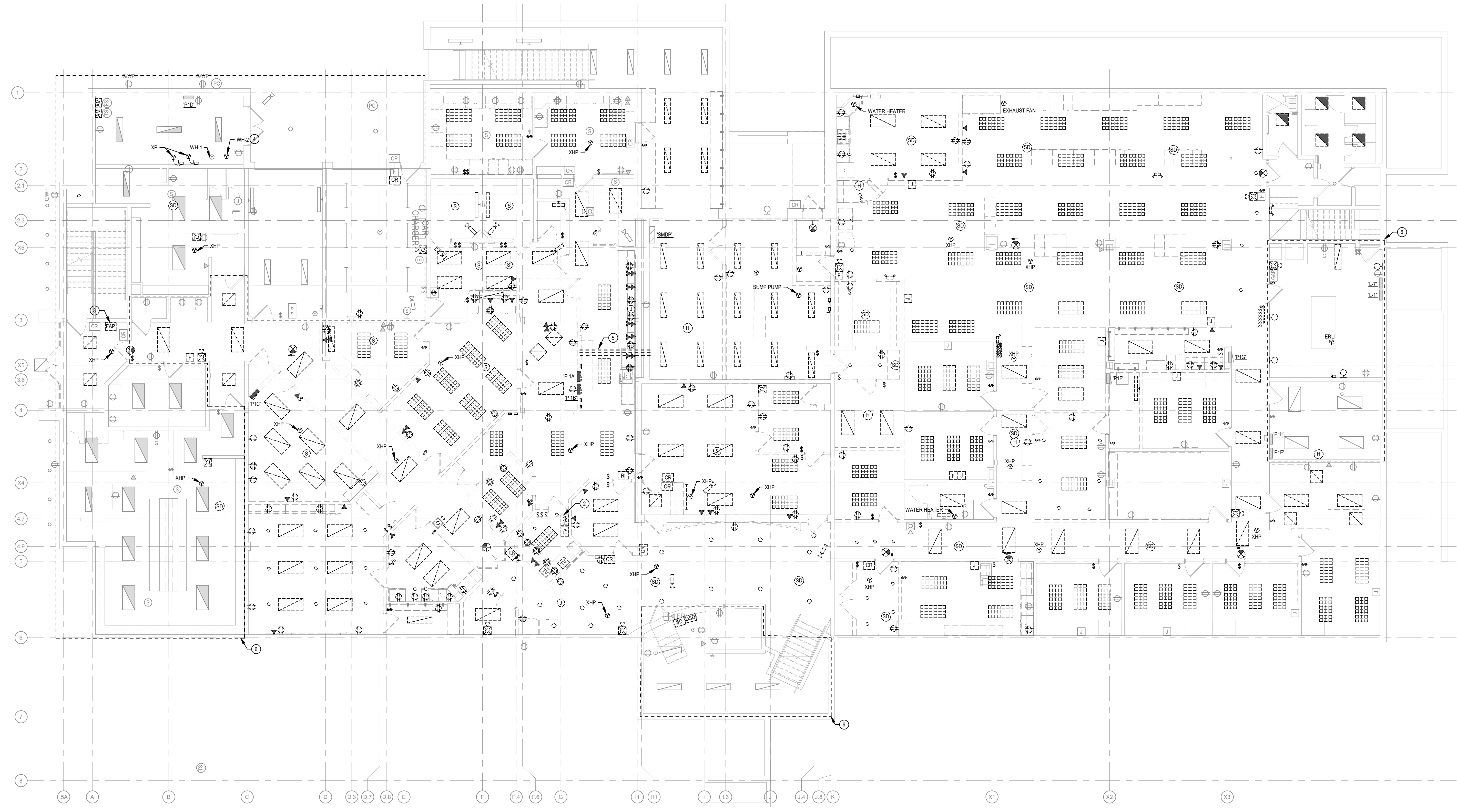
LOWER LEVEL ELECTRICAL DEMO

Project Number 21004
Date OCTOBER 5, 2021

ED100

GENERAL NOTES:

- BASE BID: FIRE ALARM DEVICES AS SHOWN ALTERNATE #3 REPLACE ALL FIRE DEVICES THROUGHOUT ENTIRE BUILDING.
 - E.C. SHALL PATCH AND REPAIR ALL FLOOR, WALL, AND CEILING OPENING CREATED DURING DEMOLITION OF ELECTRICAL DEVICES IF THE OPENINGS ARE NOT BEING REUSED. PATCHES AND REPAIRS SHALL MATCH ADJACENT FINISHES. THIS APPLIES TO ALL OPENINGS UNLESS SPECIFICALLY NOTED OTHERWISE.
- KEYED NOTES:**
- DEMO ABANDONED SUB PANEL, DISCONNECT SWITCH, AND ASSOCIATED CONDUIT AND CONDUCTORS.
 - REMOVE AND RELOCATE EXISTING FIRE ALARM ANNUNCIATOR. REFER TO SHEET ES100 FOR NEW LOCATION.
 - BASE BID: FIRE ALARM CONTROL PANEL TO REMAIN. ALTERNATE #3: REPLACE FIRE ALARM CONTROL PANEL AND ALL NECESSARY COMPONENTS TO SUPPLY A COMPLETE FIRE ALARM SYSTEM.
 - DISCONNECT EXISTING WATER HEATER AND MAINTAIN CIRCUIT FOR CONNECTION TO NEW WATER HEATER.
 - APPROXIMATE LOCATION OF THREE (3) 2" AV CONDUITS THAT ARE ROUTED OVERHEAD AND TRANSITION DOWN WALL TO UNDERSLAB. REMOVE SLAB AS NEEDED TO REDIRECT CONDUITS DOWN NEW WALL AND TIE INTO EXISTING UNDERSLAB RACEWAYS. CABLES ARE TO BE REMOVED AND REPULED BY OWNER. COORDINATE CUTTING AND PATCHING OF SLAB WITH G.C.
 - BASE BID: EXISTING FIRE ALARM DEVICES ARE TO REMAIN IN OUTLINED AREAS. ALTERNATE #3: REPLACE EXISTING FIRE ALARM DEVICES AND ADD NEW DEVICES AS SHOWN ON PLANS.



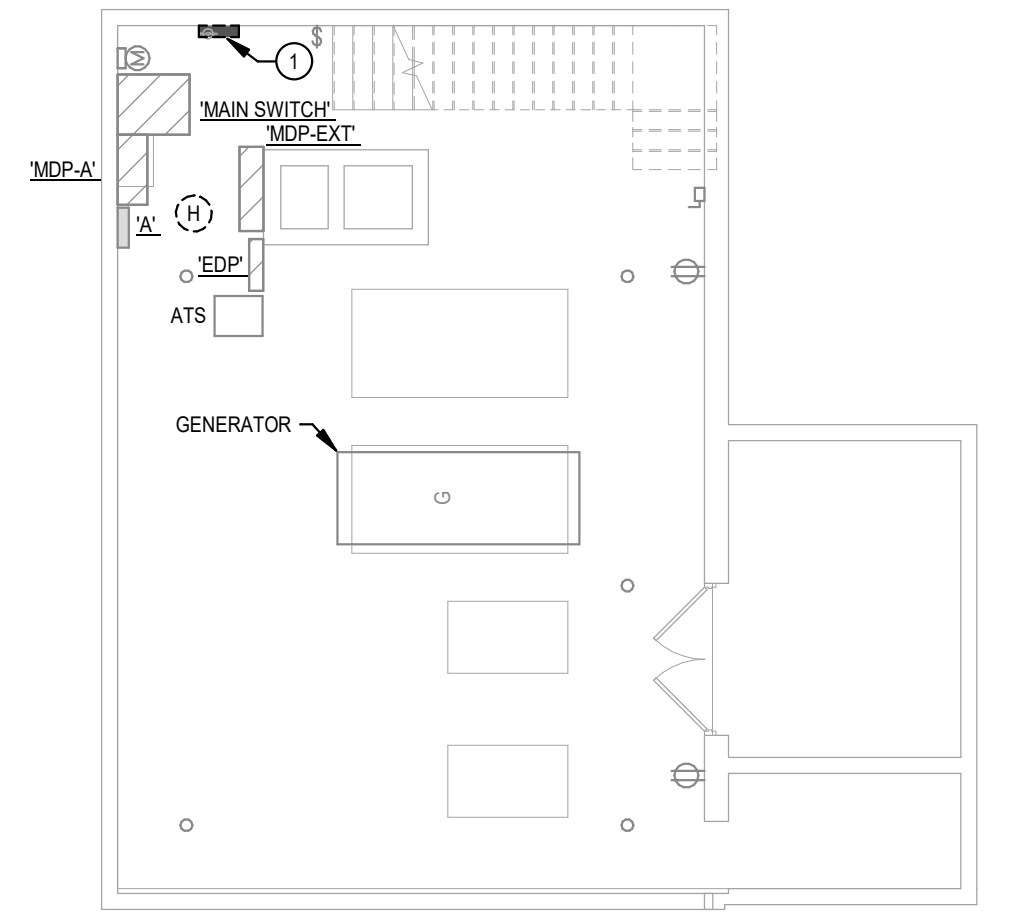
1 LOWER LEVEL ELECTRICAL DEMO PLAN
1/8" = 1'-0"

DEMOLITION NOTES

- REFER TO SPECIFICATION SECTION 260502 FOR ADDITIONAL DEMOLITION INFORMATION.
- REMOVE POWER, LIGHTING, CONTROL, FIRE ALARM, AND COMMUNICATIONS DEVICES SHOWN, UNLESS NOTED OTHERWISE. REMOVE ALL UNUSED CONDUIT, RACEWAYS, WIRING, JUNCTION BOXES, DISCONNECTS, HANGERS AND ACCESSORIES COMPLETELY BACK TO THE SOURCE.
- MAKE PROVISIONS AND BACK-FEED OR RE-CIRCUIT ANY ITEMS THAT ARE EXISTING TO REMAIN WHICH ARE AFFECTED BY DEMOLITION.
- RELOCATE CONDUITS ABOVE CEILING AS REQUIRED TO ACCOMMODATE PLUMBING AND HVAC MODIFICATIONS ASSOCIATED WITH THE REMODELING.
- INVESTIGATION OF EXISTING POWER LIGHTING AND SYSTEMS WILL BE REQUIRED BY THE E.C. AS PART OF THE BIDDING PROCESS TO DETERMINE THE FULL EXTENT OF DEMOLITION WORK REQUIRED. THE E.C. SHALL BE RESPONSIBLE FOR REMOVAL OF SOME PORTIONS OF POWER AND LIGHTING SYSTEMS NOT EXPLICITLY SHOWN ON THESE DRAWINGS, BUT ARE REQUIRED FOR COMPLETION OF THE PROJECT.
- E.C. SHALL FIELD VERIFY ACTUAL LOCATION AND SIZES OF EXISTING CONDUIT, WIRING, AND EQUIPMENT.
- E.C. SHALL PATCH AND REPAIR ALL FLOOR, WALL, AND CEILING OPENINGS CREATED DURING DEMOLITION OF ELECTRICAL DEVICES IF THE OPENINGS ARE NOT BEING REUSED. PATCHES AND REPAIRS SHALL MATCH ADJACENT EXISTING FINISHES. THIS APPLIES TO ALL OPENINGS UNLESS SPECIFICALLY NOTED OTHERWISE.
- PROTECT ALL WALLS, CEILINGS, FLOORS, LIGHTS, AND OTHER FINISHED SURFACES THAT ARE NOT SCHEDULED FOR DEMOLITION. IF DAMAGED, THE RESPONSIBLE CONTRACTOR SHALL REPAIR TO MATCH EXISTING CONDITIONS AT NO ADDITIONAL COST TO THE OWNER.
- ALL SALVAGE SHALL REMAIN THE PROPERTY OF THE OWNER. DELIVER TO A LOCATION ON SITE AS DESIGNATED BY THE OWNER. IN THE EVENT THE OWNER DOES NOT WANT TO RETAIN THE SALVAGE MATERIAL, THE MATERIAL BECOMES THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OR RECYCLED BY THE CONTRACTOR.

ELECTRICAL DEMOLITION SYMBOLS LIST			
	TOGGLE SWITCH		DUPLEX RECEPTACLE
	THREE WAY SWITCH		QUADPLEX RECEPTACLE
	2X2' LIGHT FIXTURE		GFCI DUPLEX RECEPTACLE
	2X4' LIGHT FIXTURE		EQUIPMENT CONNECTION
	1X4' RECESSED LIGHT FIXTURE		DATA OUTLET
	2X4' PARABOLIC LIGHT FIXTURE		FIRE ALARM SMOKE DETECTOR
	1X4' WRAP LIGHT FIXTURE		FIRE ALARM HEAT DETECTOR
	DOWN LIGHT		FIRE ALARM AUDIO/VISUAL DEVICE
	WALL MOUNT VANITY LIGHT FIXTURE		FIRE ALARM MANUAL PULL STATION
	1X4' WRAP LIGHT FIXTURE		GENERATOR ANNUNCIATOR PANEL
	SINGLE FACE EXIT SIGN		FIRE ALARM PANEL
	WALL MOUNTED EMERGENCY LIGHT		FIRE ALARM ANNUNCIATOR
	SPEAKER		FIRE ALARM REMOTE INDICATOR
	NON-FUSED DISCONNECT SWITCH		TV OUTLET
	OCCUPANCY SENSOR		JUNCTION BOX
	4' OPEN STRIP LIGHT FIXTURE		WALL MOUNTED LIGHT
	WALL MOUNTED LIGHT FIXTURE		TELECOMMUNICATIONS OUTLET
	PANELBOARD		CABLE TRAY
	SPECIALTY RECEPTACLE		SECURITY CARD READER
			WIRELESS ACCESS POINT
			SECURITY CAMERA

LINE TYPE KEY	
	NEW WORK BY THE E.C. (DARK SOLID LINE)
	WORK BY OTHERS AND/OR EXISTING LIGHT (LIGHT SOLID LINE)
	DEMOLITION WORK BY THE E.C. (DARK DASHED LINE)



2 SOUTH MECH.-ELECTRICAL DEMO PLAN
1/8" = 1'-0"

bluestone
engineering

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Project #: 121-011

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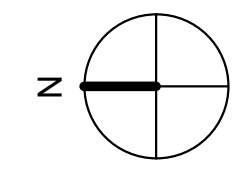
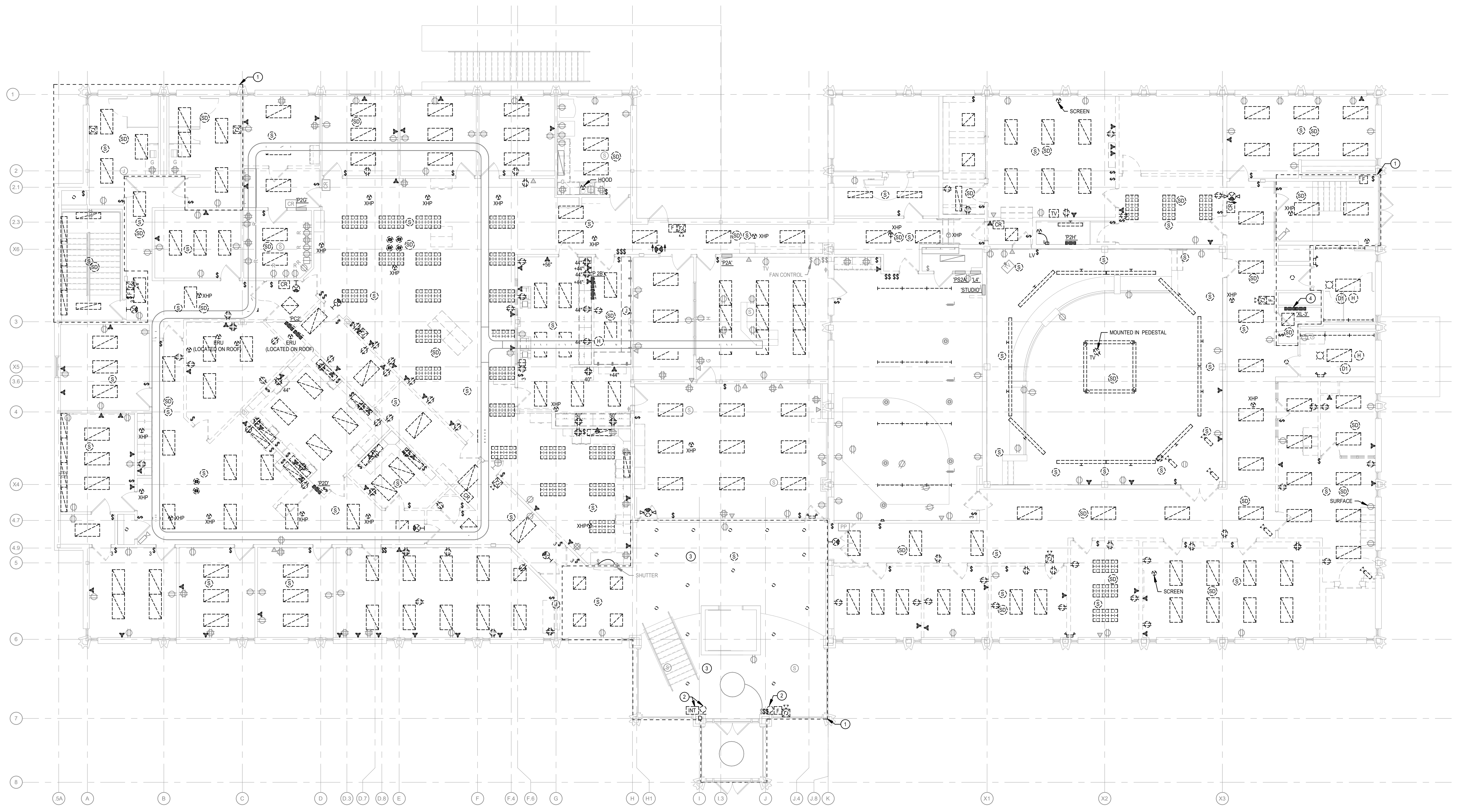
No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

UPPER LEVEL ELECTRICAL DEMO

Project Number
21004
Date
OCTOBER 5, 2021

ED101

- GENERAL NOTES:**
1. BASE BID: FIRE ALARM DEVICES AS SHOWN ALTERNATE #3 REPLACE ALL FIRE DEVICES THROUGHOUT ENTIRE BUILDING.
 2. E.C. SHALL PATCH AND REPAIR ALL FLOOR, WALL, AND CEILING OPENING CREATED DURING DEMOLITION OF ELECTRICAL DEVICES IF THE OPENINGS ARE NOT BEING REUSED. PATCHES AND REPAIRS SHALL MATCH ADJACENT FINISHES. THIS APPLIES TO ALL OPENINGS UNLESS SPECIFICALLY NOTED OTHERWISE.
- KEYED NOTES:**
1. BASE BID: EXISTING FIRE ALARM DEVICES ARE TO REMAIN IN OUTLINED AREAS. ALTERNATE #3: REPLACE EXISTING FIRE ALARM DEVICES AND ADD NEW DEVICES AS SHOWN ON PLANS.
 2. PATCH OPENINGS FROM REMOVED INTERCOM AND WALL SCORES.
 3. DEMO CAN LIGHTN INTERIORS IN ENTRY LOBBY SPACE. MAINTAIN CAN LIGHT HOUSING FOR USE WITH NEW RETROFIT DOWNLIGHTS. REFER TO SHEET EL101 FOR ADDITIONAL INFORMATION.
 4. DOUBLE TUB PANEL 70L-7 IS TO BE REPLACED WITH NEW PANEL IN SAME LOCATION. UTILIZE EXISTING FEEDER TO NEW PANEL. RECONNECT ALL EXISTING CIRCUITS NOT SCHEDULED FOR DEMOLITION TO NEW PANEL.



1 UPPER LEVEL ELECTRICAL DEMO PLAN
1/8" = 1'-0"

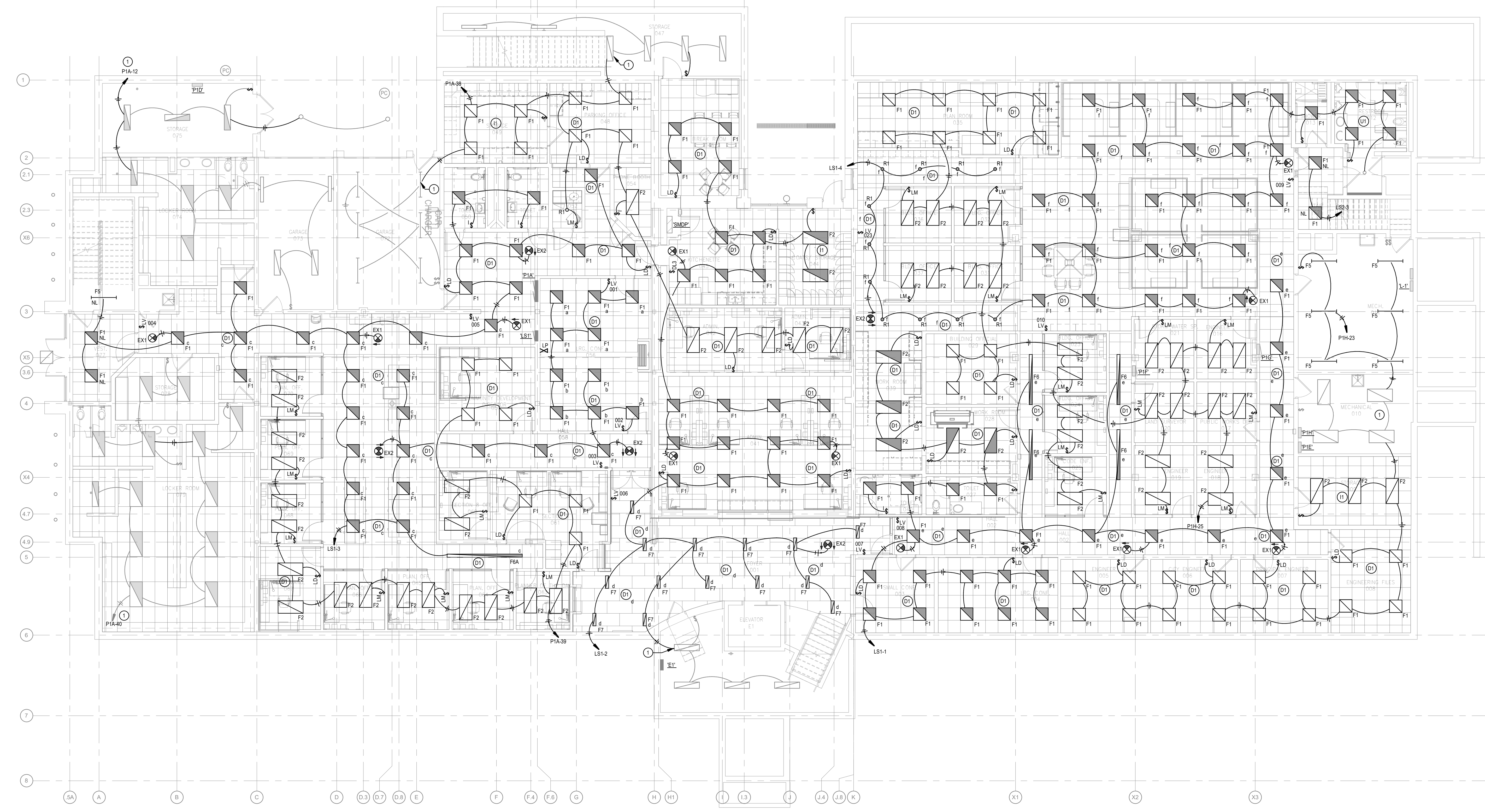


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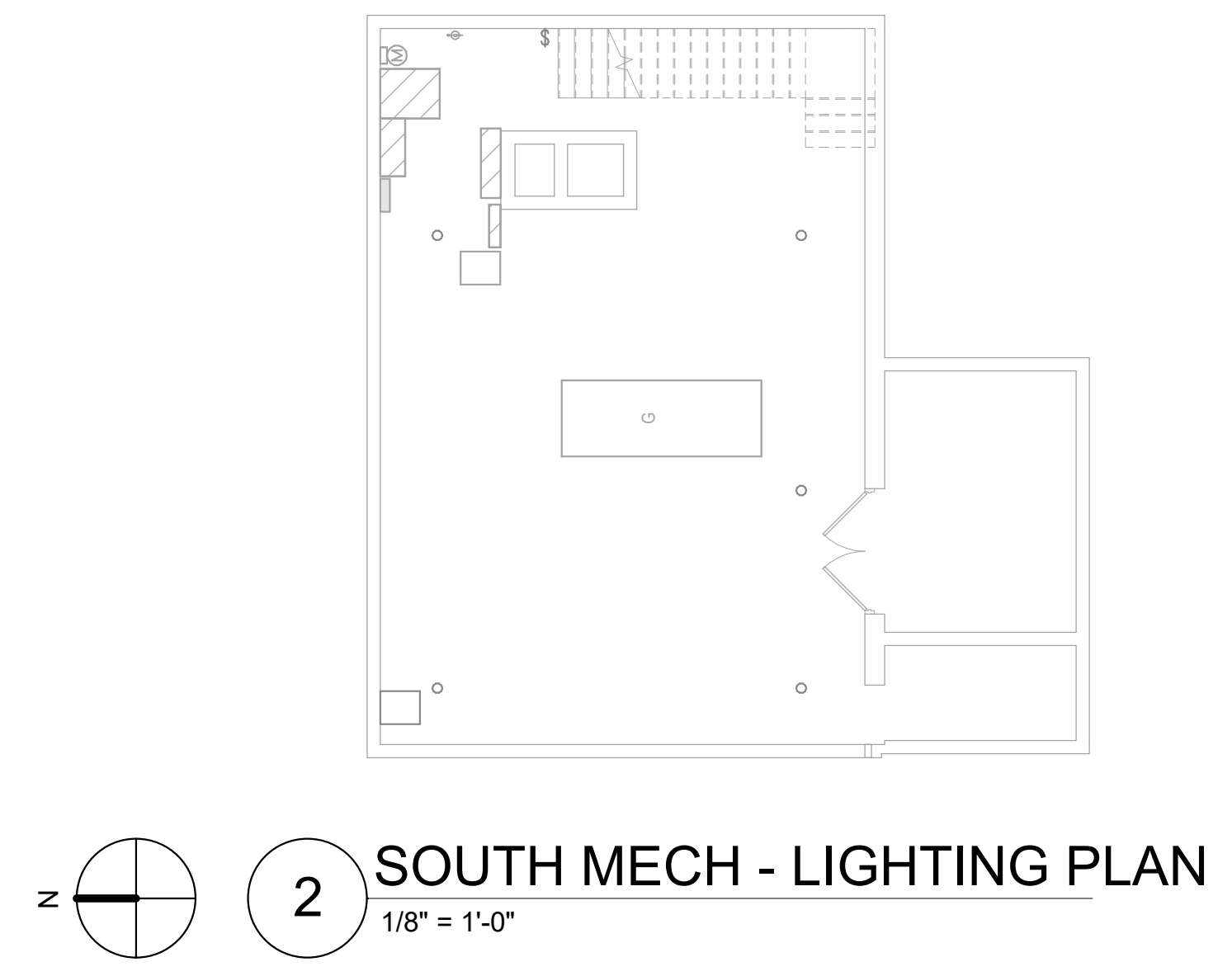
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**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

- GENERAL NOTES:**
- BACKBOXES FOR DEVICES MOUNTED IN COMMON WALLS IN ADJACENT ROOMS SHALL BE OFFSET A MINIMUM OF ONE STUD CAVITY. BACK-TO-BACK BOXES IN COMMON WALLS WILL NOT BE ALLOWED.
 - ADJUST BACKBOX DEPTH TO ACCOUNT FOR 1/2" SOUND CHANNEL. REFER TO ARCHITECTURAL PLANS FOR WALLS WITH SOUND CHANNEL TREATMENT.
 - EXISTING EXTERIOR LIGHTING TO REMAIN. MAINTAIN EXISTING CIRCUITING AND CONTROLS UNLESS NOTED OTHERWISE.
 - LIGHTING ON LIFE SAFETY CIRCUITS ARE SHOWN WITH HALF SHADING. PROVIDE CIRCUIT TYPE GENERATOR TRANSFER DEVICES (GTD) FOR EACH ZONE OF CONTROL TO OVERRIDE LOCAL CONTROLS DURING A POWER OUTAGE AND TURN LIGHTS FULL ON. GTD WILL REQUIRE A NORMAL POWER CIRCUIT IN THE AREA FOR VOLTAGE SENSING. GTDS ARE NOT SHOWN ON DRAWINGS.
- KEYED NOTES:**
- THE EXISTING LIGHTING TO NEW CIRCUIT. MAINTAIN EXISTING CONTROLS.
 - CIRCUIT EXTENDS TO FIXTURES ON UPPER LEVEL. REFER TO SHEET EL107 FOR CONTINUATION.



1 LOWER LEVEL - LIGHTING PLAN
1/8" = 1'-0"



2 SOUTH MECH - LIGHTING PLAN
1/8" = 1'-0"

GENERAL ELECTRICAL NOTES							
1.	ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH N.E.C., LOCAL, AND ALL OTHER APPLICABLE CODES.						
2.	INSTALLATION OF EQUIPMENT SHALL BE IN ACCORDANCE WITH CURRENT STANDARDS AND SPECIFICATIONS APPROVED BY THE AUTHORITY HAVING JURISDICTION (AHJ). PLACE ALL CABLE WIRING IN CONDUIT OR RACEWAY UNLESS NOTED OTHERWISE. DO NOT LIE ON, OR SUPPORT CABLE FROM, CEILING DEVICES, PIPING OR DUCTWORK. PROVIDE NEW WIRING FOR ALL BRANCH CIRCUITS AND FEEDERS.						
3.	FEEDERS ON DRAWINGS ARE SCHEMATIC ONLY. CONDUIT RUNS SHALL COMPLY WITH CONDUIT SPECIFICATIONS AND CONTAIN BENDS THAT ARE NOT GREATER THAN 90 DEGREES. CONDUITS ABOVE GRADE SHALL BE RUN PARALLEL TO OR PERPENDICULAR WITH BUILDING LINES AND STRUCTURE.						
4.	CIRCUIT WIRING FOR THE EMERGENCY SYSTEM SHALL BE INSTALLED IN SEPARATE CONDUIT/RACEWAY AND BE KEPT ENTIRELY INDEPENDENT OF ALL OTHER WIRING AND EQUIPMENT PER THE N.E.C.						
5.	ALL FEEDER AND BRANCH CIRCUITS TO PANELS, MOTORS, LIGHTS, RECEPTACLES, GENERAL DISTRIBUTION, ETC. SHALL CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR SIZED ACCORDING TO THE N.E.C. THE CONDUIT SYSTEM SHALL NOT BE CONSIDERED AN ACCEPTABLE GROUND.						
6.	REFER TO MECHANICAL EQUIPMENT SCHEDULES FOR DETAILED INFORMATION ON EQUIPMENT, DISCONNECTS, AND CONTROLS. E.C. SHALL PROVIDE ITEMS AS NOTED ON THE MECHANICAL SCHEDULES.						
7.	SURFACE-MOUNTED CONDUITS AND/OR RACEWAYS IN NEW CONSTRUCTION OF FINISHED AREAS ARE NOT ACCEPTABLE. CONDUIT MUST BE INSTALLED CONCEALED AND ROUGH-IN'S MOUNTED FLUSH IN THESE AREAS.						
8.	ALL WIRING AND FEEDER SIZES ON DRAWINGS ARE SIZED FOR COPPER WIRING UNLESS SPECIFICALLY NOTED OTHERWISE.						
9.	SEE BELOW FOR DEFINITION OF ABBREVIATIONS:						
10.1.	"C.M." INDICATES CONSTRUCTION MANAGER						
10.2.	"M.C." INDICATES MECHANICAL CONTRACTOR						
10.3.	"P.C." INDICATES PLUMBING/PIPING CONTRACTOR						
10.4.	"E.C." INDICATES ELECTRICAL CONTRACTOR						
10.5.	"T.C." TECHNOLOGY CONTRACTOR						
EQUIPMENT/DEVICE HOME RUN KEY							
1.	BRANCH CIRCUIT WIRING SHALL BE #12AWG UNLESS NOTED OTHERWISE ON THE PLAN OR IN THE SCHEDULES.						
2.	AS A MINIMUM USE 10 AWG CONDUCTOR FOR 20 AMPERE, 120 VOLT BRANCH CIRCUIT HOME RUNS LONGER THAN 100 FEET.						
3.	REFER TO SPECIFICATION SECTION 260519 FOR ADDITIONAL REQUIREMENTS.						
<table border="0"> <tr> <td>EQUIPMENT GROUNDING CONDUCTOR</td> <td></td> </tr> <tr> <td>PHASE CONDUCTOR (SHORT LINE)</td> <td></td> </tr> <tr> <td>NEUTRAL CONDUCTOR (LONG LINE)</td> <td></td> </tr> </table>		EQUIPMENT GROUNDING CONDUCTOR		PHASE CONDUCTOR (SHORT LINE)		NEUTRAL CONDUCTOR (LONG LINE)	
EQUIPMENT GROUNDING CONDUCTOR							
PHASE CONDUCTOR (SHORT LINE)							
NEUTRAL CONDUCTOR (LONG LINE)							
LINE TYPE KEY							
	NEW WORK BY THE E.C. (DARK SOLID LINE)						
	WORK BY OTHERS AND/OR EXISTING (LIGHT SOLID LINE)						
	DEMO WORK BY THE E.C. (DARK DASHED LINE)						

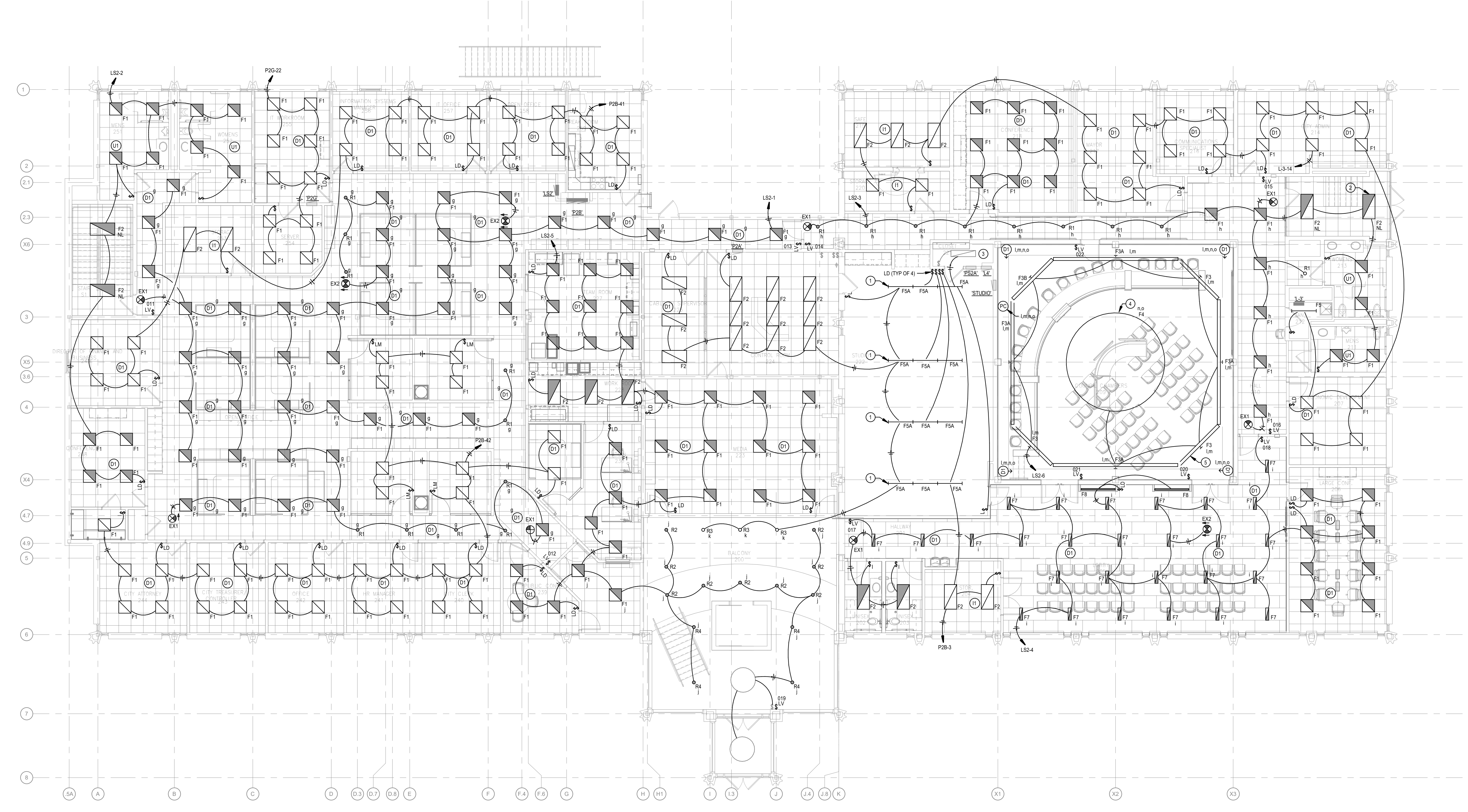
**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

GENERAL NOTES:

- BACKBOXES FOR DEVICES MOUNTED IN COMMON WALLS IN ADJACENT ROOMS SHALL BE OFFSET A MINIMUM OF ONE STUD CAVITY. BACK-TO-BACK BOXES IN COMMON WALLS WILL NOT BE ALLOWED.
- ADJUST BACKBOX DEPTH TO ACCOUNT FOR 1/2" SOUND CHANNEL. REFER TO ARCHITECTURAL PLANS FOR WALLS WITH SOUND CHANNEL TREATMENT.
- EXISTING EXTERIOR LIGHTING TO REMAIN. MAINTAIN EXISTING CIRCUITING AND CONTROLS UNLESS NOTED OTHERWISE.
- LIGHTING ON LIFE SAFETY CIRCUITS ARE SHOWN WITH HALF SHADING. PROVIDE CIRCUIT TYPE GENERATOR TRANSFER DEVICES (GTD) FOR EACH ZONE OF CONTROL TO OVERRIDE LOCAL CONTROLS DURING A POWER OUTAGE AND TURN LIGHTS FULL ON. GTD WILL REQUIRE A NORMAL POWER CIRCUIT IN THE AREA FOR VOLTAGE SENSING. GTDS ARE NOT SHOWN ON DRAWINGS.
- REFER TO SHEET E600 FOR LIGHTING CONTROL ZONES. DESCRIPTIONS NOTED WITH LOWER CASE SUBSCRIPTS ON PLANS FOR COMPLEX SPACES. ALL PRIVATE OFFICES AND STORAGE ROOMS ARE TO BE VACUANCY TYPE SENSOR CONTROL (MANUAL ON / AUTO OFF). ALL RESTROOMS, BREAKROOMS, AND TRANSITION SPACES NOT NOTED BY A SPECIFIC CONTROL SUBSCRIPT ARE TO BE OCCUPANCY SENSOR TYPE (AUTO ON / AUTO OFF).

KEYED NOTES:

- MATCH LOCATIONS FROM REMOVED STRIP LIGHTING WITHIN THE STUDIO SPACE ABOVE STUDIO AV / SPECIALTY LIGHTING RACKINGS.
- CIRCUIT EXTEND TO LOWER LEVEL STARWELL. REFER TO DRAWING 14E100 FOR CIRCUIT CONTINUATION.
- THE EXISTING LIGHTING INTO NEW CIRCUIT. MAINTAIN EXISTING CONTROLS.
- CENTER LARGE CIRCULAR PENDANT WITH DOME CEILING. UTILIZE EXISTING POWER FEED LOCATION FROM PREVIOUSLY REMOVED LIGHT TO NEW FIXTURE.
- PERIMETER LIGHTING TO RUN ALONG BOTTOM EDGE OF UPPER BULKHEAD SIMILAR TO THE REMOVED EXISTING LIGHTING. UTILIZE EXISTING RACES WHEN ABLE.



1 UPPER LEVEL - LIGHTING PLAN
1/8" = 1'-0"

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

UPPER LEVEL LIGHTING PLAN

Project Number 21004
Date OCTOBER 5, 2021

EL101



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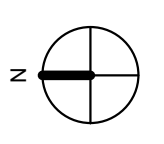
**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

UPPER LEVEL POWER PLAN

Project Number 21004
Date OCTOBER 5, 2021

EP101

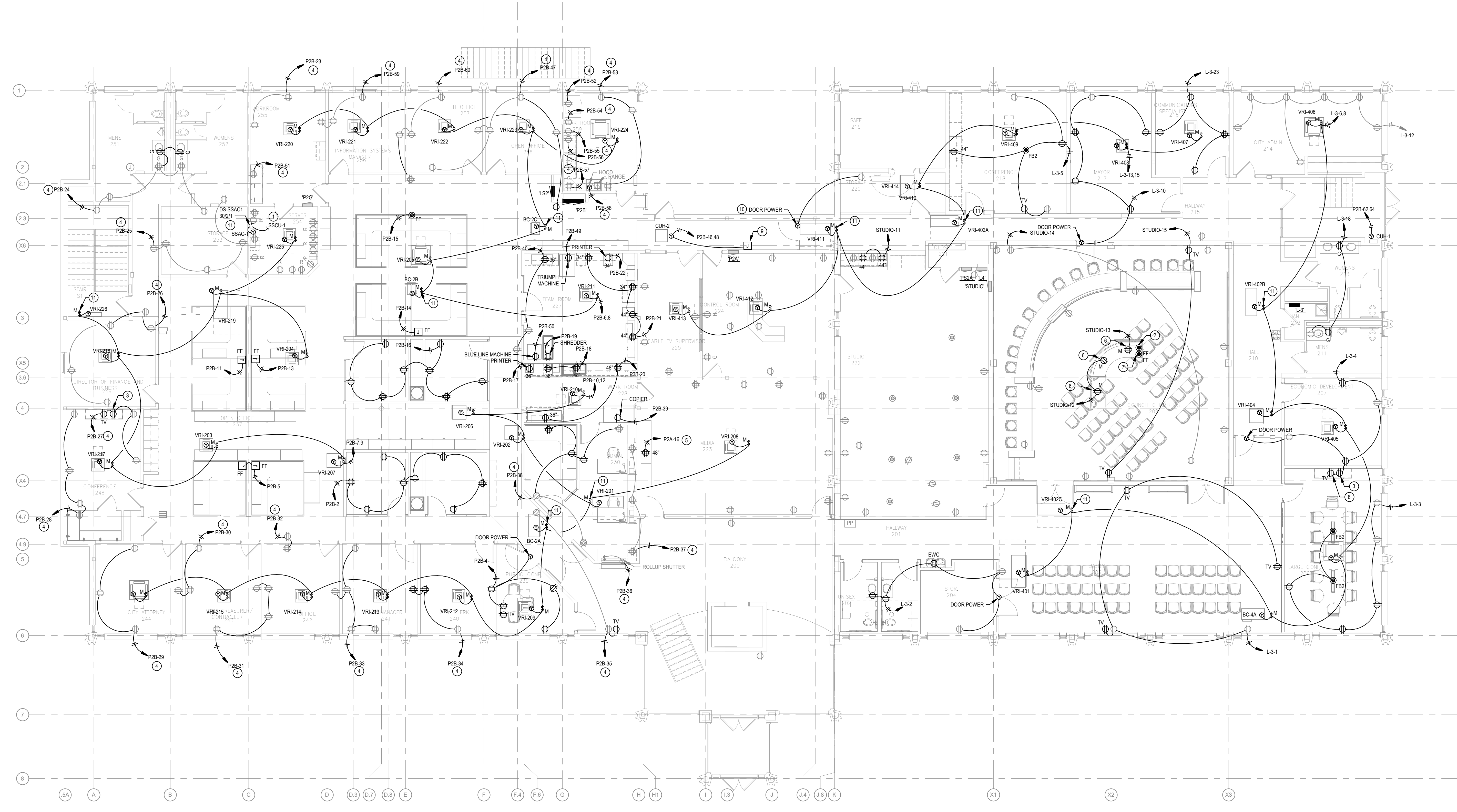


GENERAL NOTES:

- BACKBOXES FOR DEVICES MOUNTED IN COMMON WALLS IN ADJACENT ROOMS SHALL BE OFFSET A MINIMUM OF ONE STUD CAVITY BACK TO BACK BOXES IN COMMON WALLS WILL NOT BE ALLOWED.
- ADJUST BACKBOX DEPTH TO ACCOUNT FOR 1/2" SOUND CHANNEL REFER TO ARCHITECTURAL PLANS FOR WALLS WITH SOUND CHANNEL TREATMENT.
- EXISTING LOADS TO REMAIN ARE TO BE REROUTED TO NEW PANELS. NOT ALL CIRCUITS MAY BE SHOWN AND FIELD VERIFICATION WILL BE REQUIRED TO LOCATE AND REFEED EXISTING LOADS.
- COORDINATE ALL FLOOR PENETRATIONS WITH WAFFLE SLAB STRUCTURE.

KEYED NOTES:

- EXTEND CIRCUIT TO SSCU-1 ON THE ROOF (SEE 1-EP201)
- POKE THROUGH FLOOR BOX TO BE INSTALLED WITHIN CABINET PORTION OF MILLWORK FOR LV CABLING. PROVIDE 2" CONDUIT TO FLOOR BOX. REFER TO SHEET T101 FOR CONDUIT ROUTING TO ACCESSIBLE LOCATION.
- DEVICE MOUNTED IN MILLWORK.
- REFEED EXISTING CIRCUIT FROM NEW PANEL INDICATED ON DRAWINGS.
- UTILIZE EXISTING SPARE 20A-1P BREAKER IN PANEL FOR NEW DEVICE.
- DEVICES MOUNTED WITHIN MILLWORK. COORDINATE EXACT LOCATIONS WITH OWNER AND ARCHITECT. REFER TO ARCHITECTURAL SHEET A423 FOR ADDITIONAL INFORMATION.
- POKE THROUGH FLOOR BOX TO BE INSTALLED WITHIN CABINET PORTION OF MILLWORK FOR RECEPTACLE POWER. PROVIDE TWO 3/4" CONDUITS FOR POWER. USE FLEX CONDUIT FROM FLOOR BOX AND TRANSITION TO EMT CONDUIT FOR ROUTING OF CONDUIT TO RECEPTACLES WITHIN CASEWORK.
- PROVIDE 4" SQUARE JUNCTION BOX AT 18" AFF WITH A 1.25" CONDUIT TO TV BACK BOX FOR LV CABLING. COORDINATE WITH MILLWORK.
- LINE VOLTAGE THERMOSTAT PROVIDED BY OTHERS. RACEWAY AND WIRING BY E.C.
- UTILIZE EXISTING RECEPTACLE CIRCUIT IN AREA AND INDICATE CIRCUIT ON AS BUILT DRAWINGS.
- UNIT REQUIRES SEPERATE CONNECTION TO CONDENSATE PUMP. UTILIZE SAME CIRCUIT TO UNIT AND CONDENSATE PUMP. PROVIDE SEPERATE DISCONNECT SWITCHES TO UNIT AND PUMP.
- DOUBLE TUB PANEL L-3 IS TO BE REPLACED WITH NEW PANEL L-3 IN SAME LOCATION. UTILIZE EXISTING FEEDER TO NEW PANEL. RECONNECT ALL EXISTING CIRCUITS NOT SCHEDULED FOR DEMOLITION TO NEW PANEL.

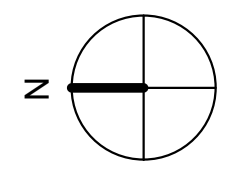
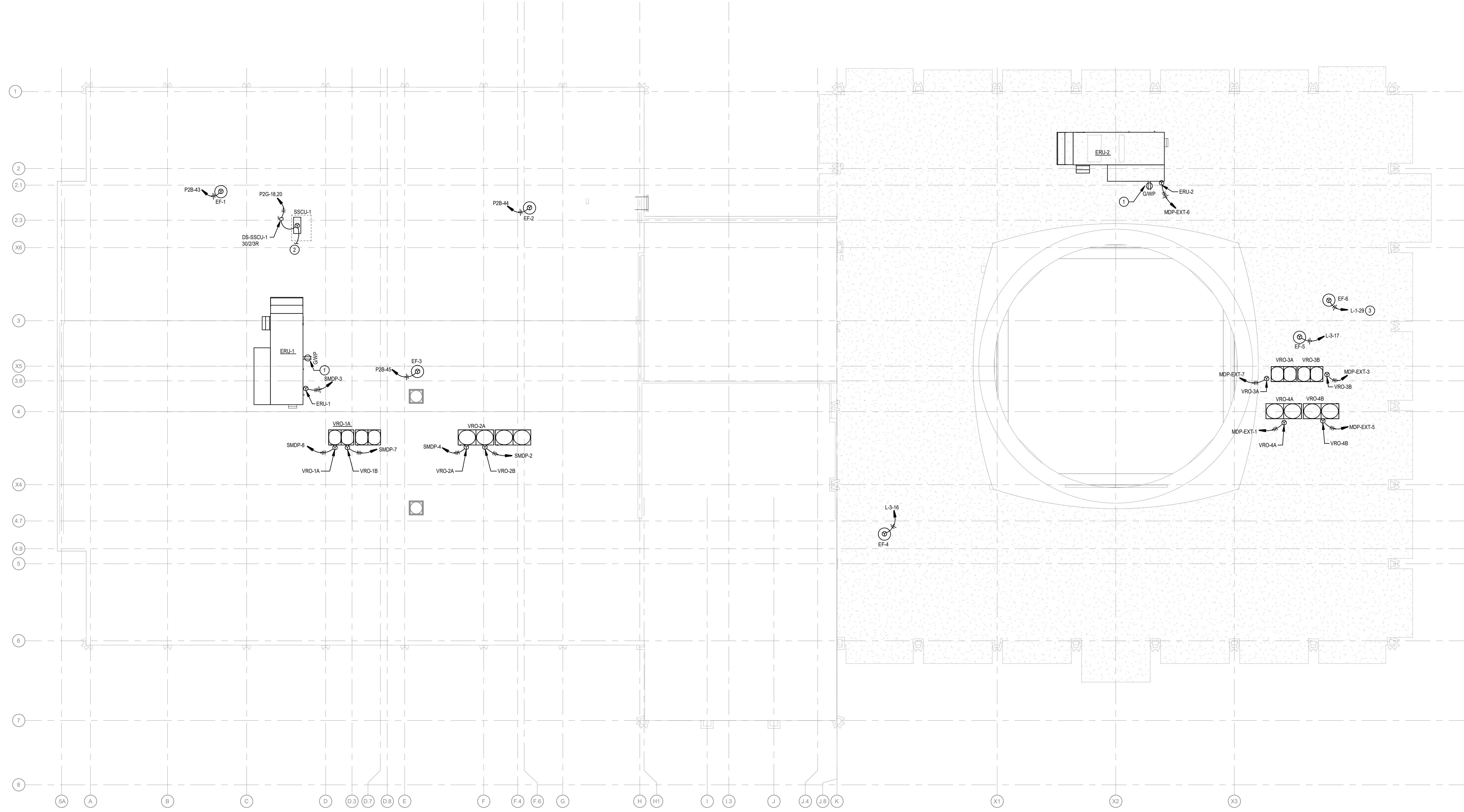


1 UPPER LEVEL - POWER PLAN
1/8" = 1'-0"

**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

KEYED NOTES:

1. UNIT MOUNTED RECEPTACLE PROVIDED BY THE EQUIPMENT MANUFACTURER AND FED FROM ERU SINGLE POINT POWER CONNECTION. COORDINATE WITH I.C. DURING SUBMITTALS.
2. INTERIOR COIL SPLIT SYSTEM IS FED THROUGH POWER CONNECTION FOR EXTERIOR CONDENSING UNIT. COORDINATE REQUIREMENTS WITH SYSTEM MANUFACTURER. SEE 18P-101 FOR LOCATION OF INTERIOR UNIT SSAC-1. PROVIDE NEW 25A/2P BREAKER IN EXISTING PANEL P2G FOR NEW LOAD.
3. UTILIZE EXISTING SPARE 20A/1P BREAKER IN EXISTING PANEL FOR NEW FAN.



1 ROOF ELECTRICAL PLAN
1/8" = 1'-0"

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Project #: 121-011

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ELECTRICAL ROOF PLAN
Project Number: 21004
Date: OCTOBER 5, 2021

EP201

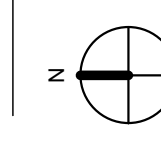
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CEDAR FALLS, IOWA

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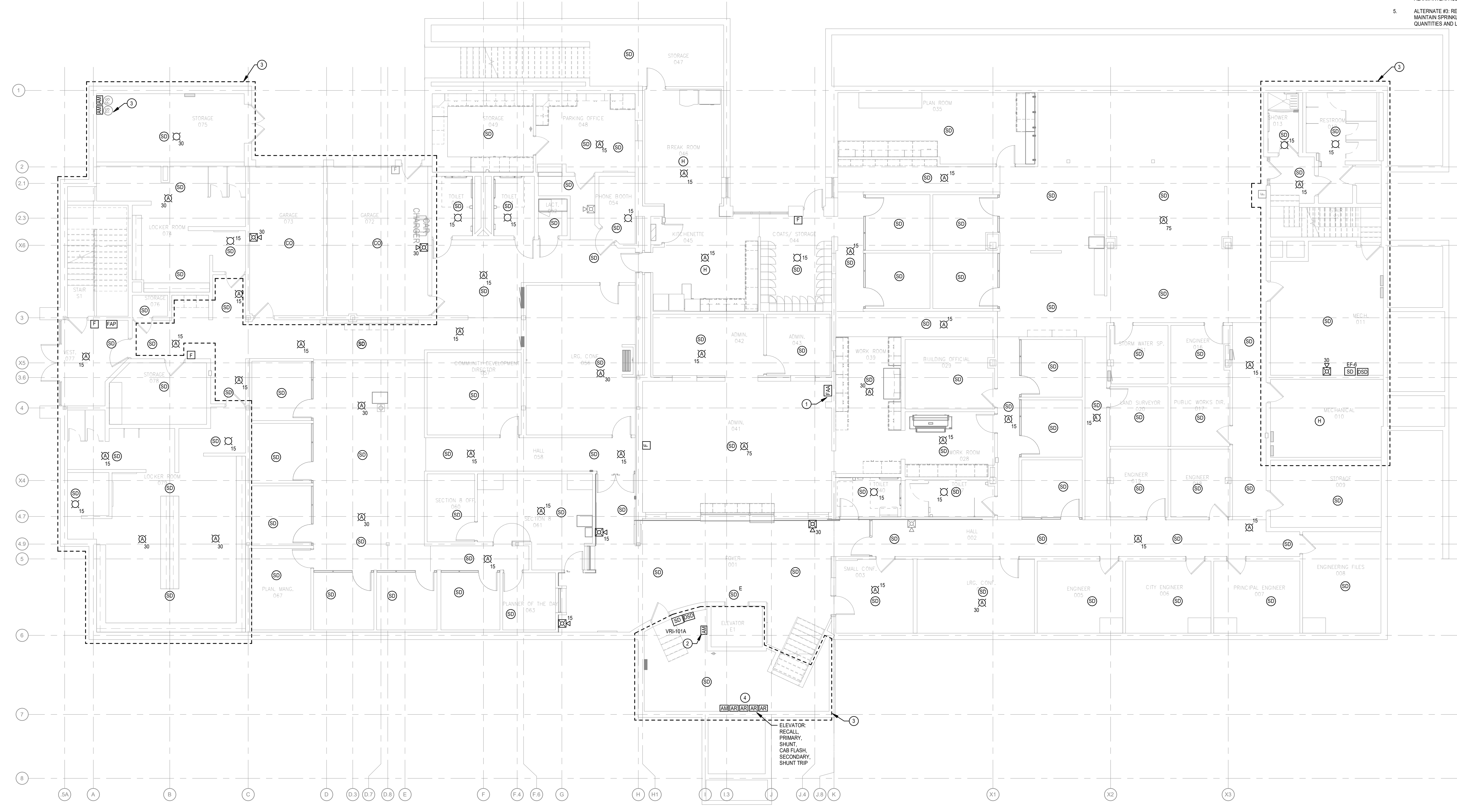
LOWER LEVEL SYSTEMS PLAN

Project Number 21004
Date OCTOBER 5, 2021

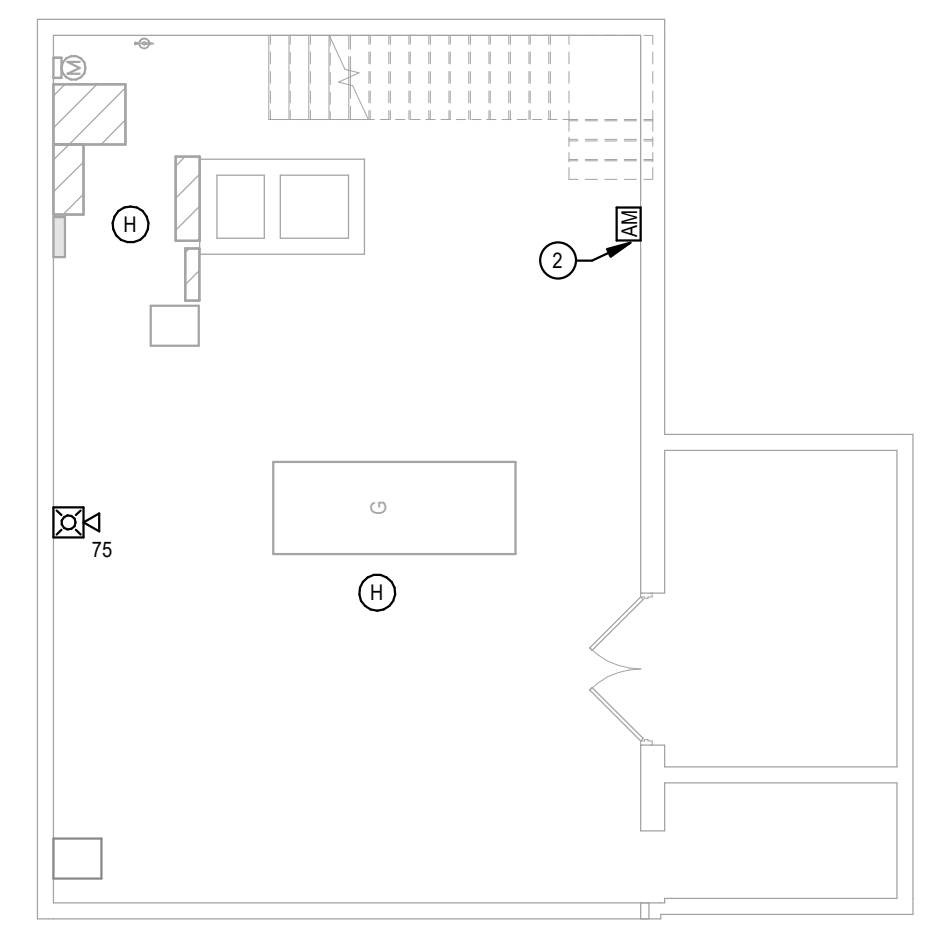
ES100



- GENERAL NOTES:**
- BASE BID: EXISTING FIRE ALARM SYSTEM TO BE UTILIZED. ALTERNATE #3: PROVIDE NEW FIRE ALARM SYSTEM PER SPECIFICATIONS.
 - BACKBOXES FOR DEVICES MOUNTED IN COMMON WALLS IN ADJACENT ROOMS SHALL BE OFFSET A MINIMUM OF ONE STUD CAVITY. BACK-TO-BACK BOXES IN COMMON WALLS WILL NOT BE ALLOWED.
 - ADJUST BACKBOX DEPTH TO ACCOUNT FOR 1/2" SOUND CHANNEL. REFER TO ARCHITECTURAL PLANS FOR WALLS WITH SOUND CHANNEL TREATMENT.
- KEYED NOTES:**
- BASE BID: RELOCATED FIRE ALARM ANNUNCIATOR. ALTERNATE #3: PROVIDE NEW FIRE ALARM ANNUNCIATOR. COORDINATE LOCATION WITH OWNER, ARCHITECT AND FIRE MARSHAL.
 - PROVIDE ACCESSIBLE MONITOR TO MONITOR SLUMP PUMP OVERFLOW ALARM FROM THE FIRE ALARM SYSTEM.
 - BASE BID: EXISTING FIRE ALARM DEVICES ARE TO REMAIN IN OUTLINED AREAS. ALTERNATE #3: REPLACE EXISTING FIRE ALARM DEVICES AND ADD NEW DEVICES AS SHOWN ON PLANS.
 - ALTERNATE #3: FIELD VERIFY CURRENT ELEVATOR FIRE ALARM ADDRESSIBLE RELAYS AND MONITORS QUANTITIES IN ROOM PRIOR TO BEING. MAINTAIN FIRE ALARM INTERFACE TO NEW SYSTEM.
 - ALTERNATE #3: REPLACE ADDRESSIBLE MONITOR MODULES AS NEEDED TO MAINTAIN SPRINKLER SYSTEM MONITORING AND ALARMS. FIELD VERIFY ACTUAL QUANTITIES AND LOCATIONS.



1 LOWER LEVEL - SYSTEMS PLAN
1/8" = 1'-0"



2 SOUTH MECH - SYSTEMS PLAN
1/8" = 1'-0"



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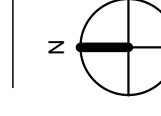
**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

No.	Description	Date
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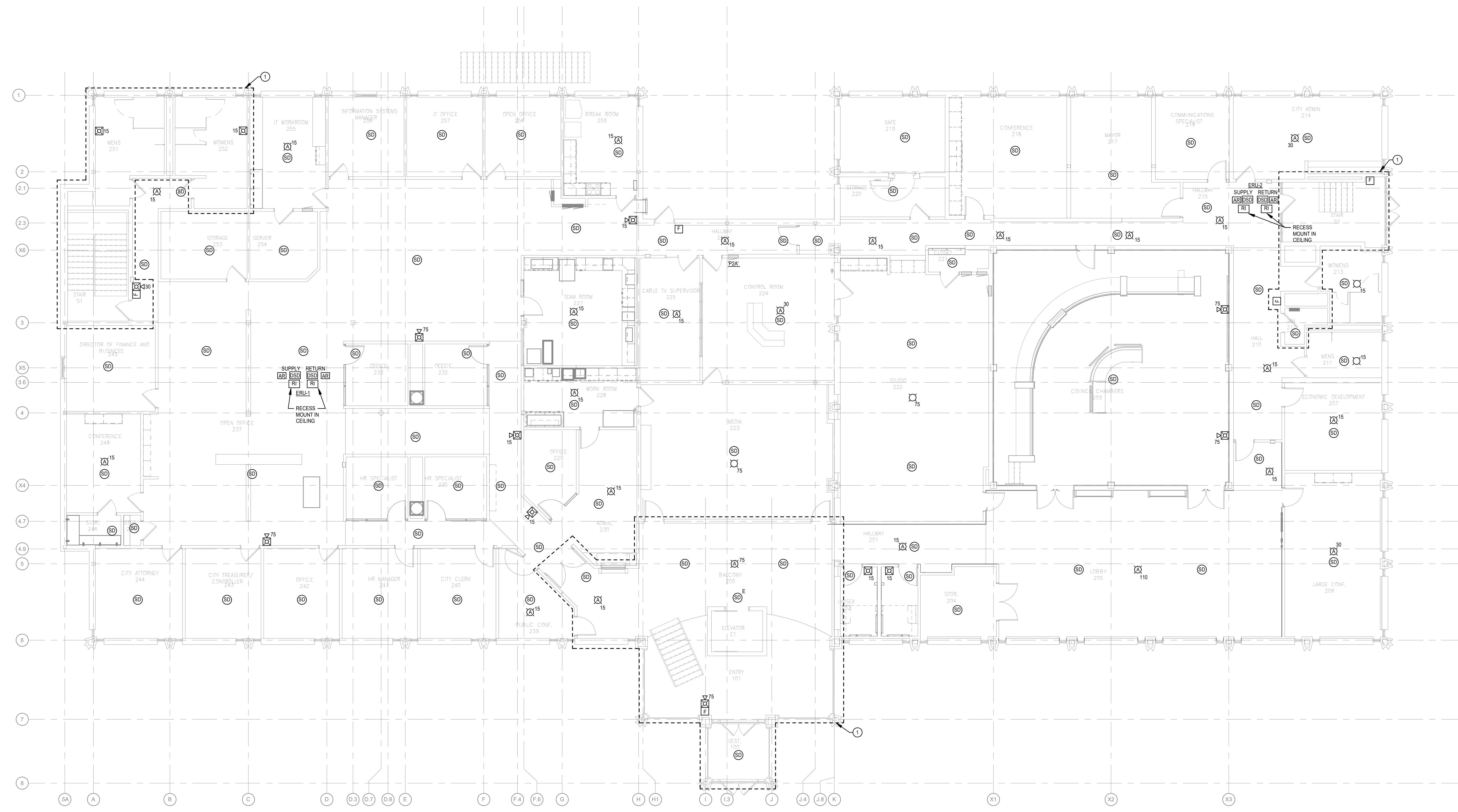
UPPER LEVEL SYSTEMS PLAN

Project Number: 21004
Date: OCTOBER 5, 2021

ES101



- GENERAL NOTES:**
- BASE BID EXISTING FIRE ALARM SYSTEM TO BE UTILIZED. ALTERNATE #3: PROVIDE NEW FIRE ALARM SYSTEM PER SPECIFICATION.
 - BACKBOXES FOR DEVICES MOUNTED IN COMMON WALLS IN ADJACENT ROOMS SHALL BE OFFSET A MINIMUM OF ONE STUD CAVITY. BACK-TO-BACK BOXES IN COMMON WALLS WILL NOT BE ALLOWED.
 - ADJUST BACKBOX DEPTHS TO ACCOUNT FOR 1/2" SOUND CHANNEL. REFER TO ARCHITECTURAL PLANS FOR WALLS WITH SOUND CHANNEL TREATMENT.
- KEYED NOTES:**
- BASE BID EXISTING FIRE ALARM DEVICES ARE TO REMAIN IN OUTLINED AREAS. ALTERNATE #3: REPLACE EXISTING FIRE ALARM DEVICES AND ADD NEW DEVICES AS SHOWN ON PLANS.



1 UPPER LEVEL - SYSTEMS PLAN
1/8" = 1'-0"

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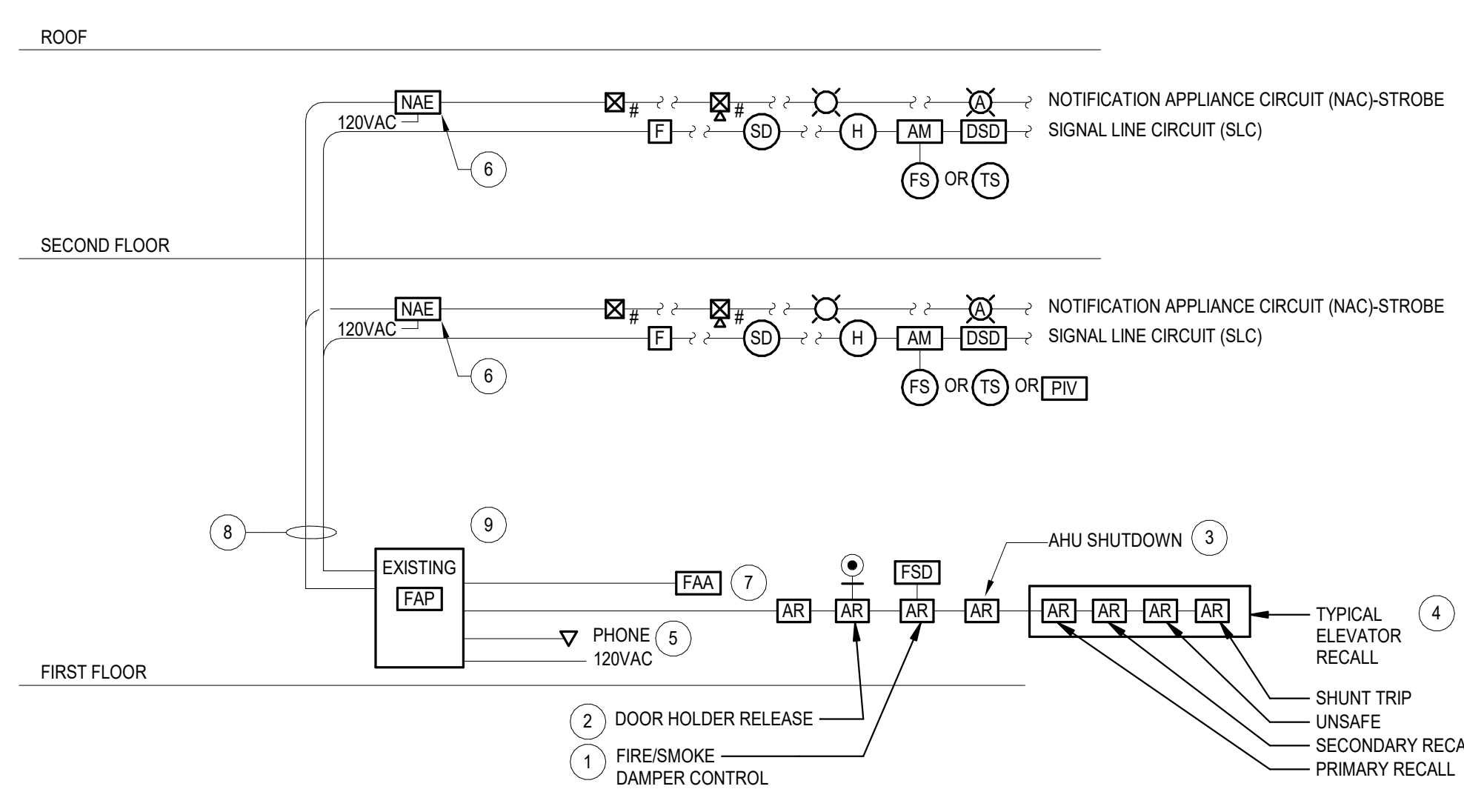
**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

No.	Description	Date
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ELECTRICAL DETAILS

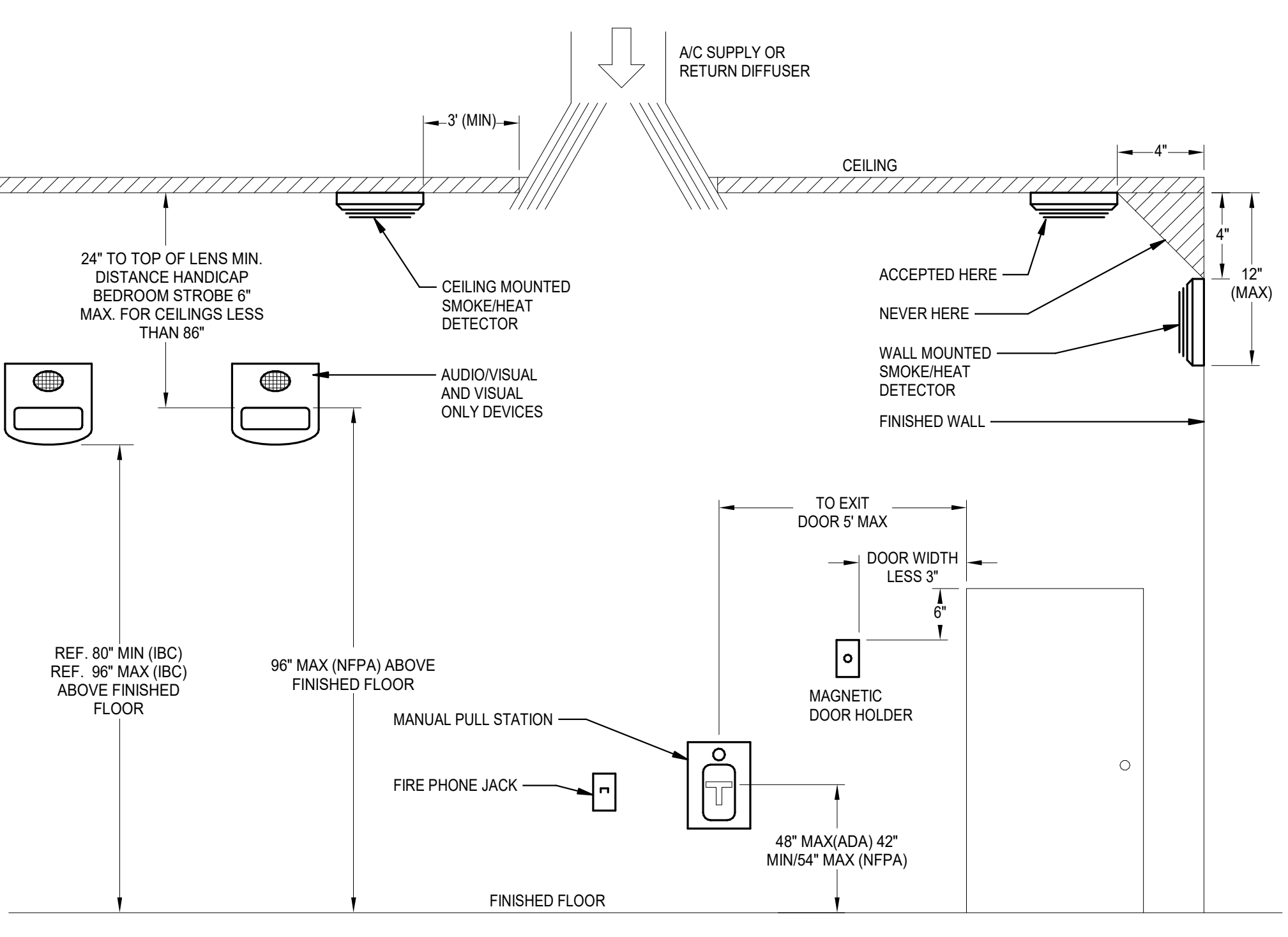
Project Number: 21004
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E500

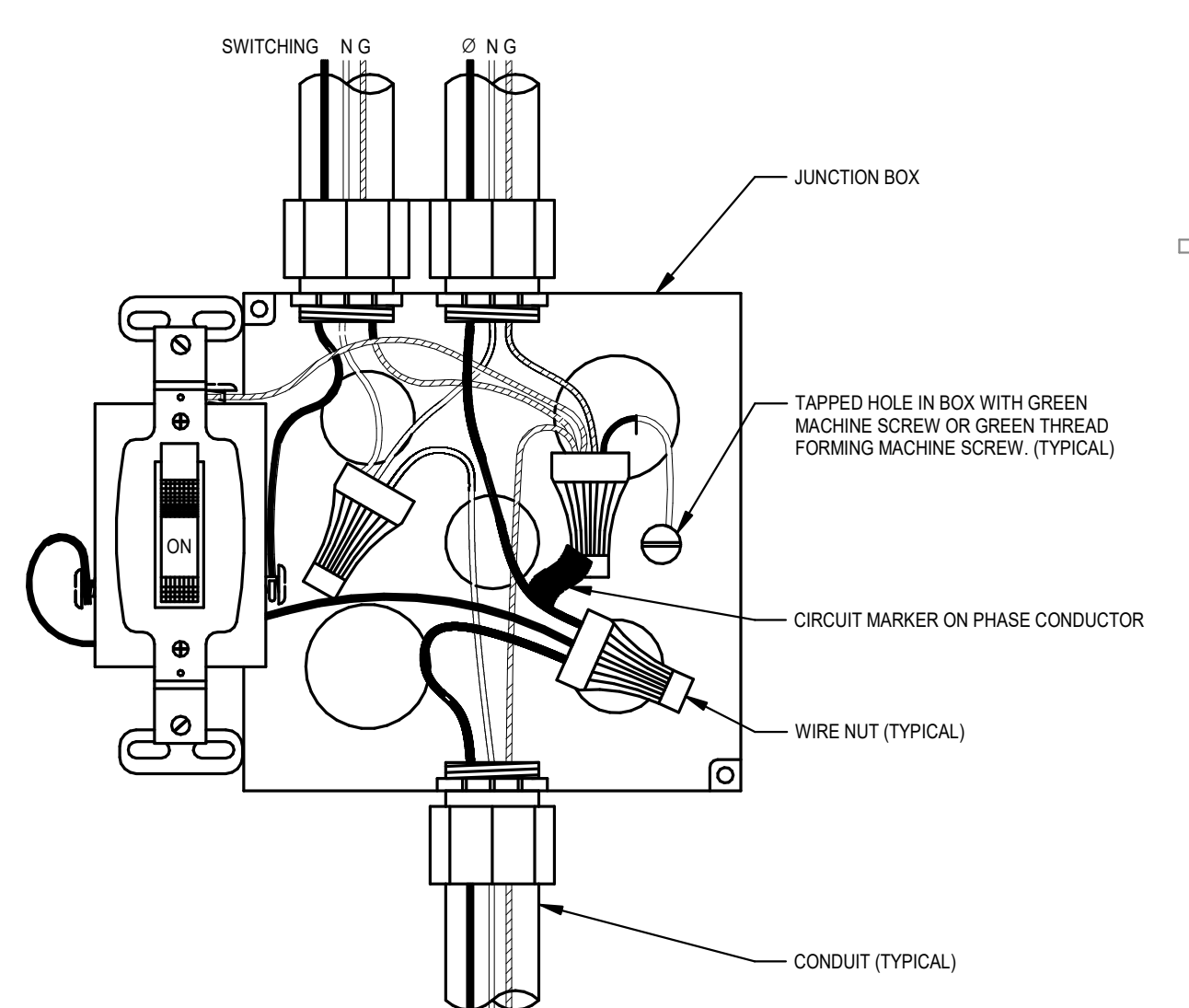


5 ADDRESSABLE FIRE ALARM SYSTEM RISER
N.T.S.

SYSTEM INPUTS	SYSTEM OUTPUTS																			
	FACP ANNUNCIATION				NOTIFICATION				REQUIRED FIRE SAFETY CONTROL											
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1 FIRE ALARM SYSTEM AC POWER FAILURE																				
2 FIRE ALARM SYSTEM LOW BATTERY																				
3 OPEN CIRCUIT																				
4 GROUND FAULT																				
5 NOTIFICATION APPLIANCE CIRCUIT SHORT																				
6 BUILDING MANUAL PULL STATIONS	X	X					X	X	X	X										X
7 CORRIDOR SMOKE DETECTORS	X	X					X	X	X	X										X
8 AREA SMOKE DETECTORS	X	X					X	X	X	X										X
9 IN-RAIL AIR DUCT SMOKE DETECTORS			X	X							X									X
10 AREA HEAT DETECTORS	X	X					X	X	X	X										X
11 HOOD OR ROOM FIRE SUPPRESSION SYSTEM ALARM	X	X					X	X	X	X										X
12 SPRINKLER TAMPER SWITCH	X	X	X	X			X	X	X	X										X
13 SPRINKLER WATER FLOW SWITCH	X	X	X	X			X	X	X	X										X
14 SPRINKLER AIR PRESSURE SWITCH	X	X	X	X			X	X	X	X										X
15 ELEV EQUIP RM AREA SMOKE DETECTOR	X	X					X	X	X	X						X	X			
16 ELEV SHUNT AND ELEV EQUIP RM HEAT DETECTORS	X	X					X	X	X	X						X	X	X		
17 ELEV LOBBY SMOKE DETECTORS - UPPER FLOORS	X	X					X	X	X	X						X	X	X		
18 ELEV LOBBY SMOKE DETECTOR - RECALL FLOOR	X	X					X	X	X	X						X	X	X		
19 ELEV CONTROLLER POWER SHUNT TRIP STATUS	X	X	X	X			X	X	X	X										X
20 AREA CO DETECTORS	X	X					X	X	X	X										X



4 DEVICE MOUNTING HEIGHTS DETAIL
N.T.S.



3 RECEPTACLE-SWITCH WIRING DETAIL
N.T.S.

- NOTES:**
- GREEN GROUND CONDUCTOR SHALL BE CONTINUOUS SO THAT REMOVAL OF DEVICE WILL NOT INTERFERE WITH GROUND CONTINUITY PER 250.146 (B).
 - INSTALL AN EQUIPMENT BONDING JUMPER TO THE METALLIC BOX USING A LISTED GROUNDING SCREW PER 250.146. THE BONDING JUMPER MAY BE OMITTED ON SURFACE MOUNTED BOXES.
 - PROVIDE SEPARATE NEUTRAL FOR EACH CIRCUIT.

NOTES:

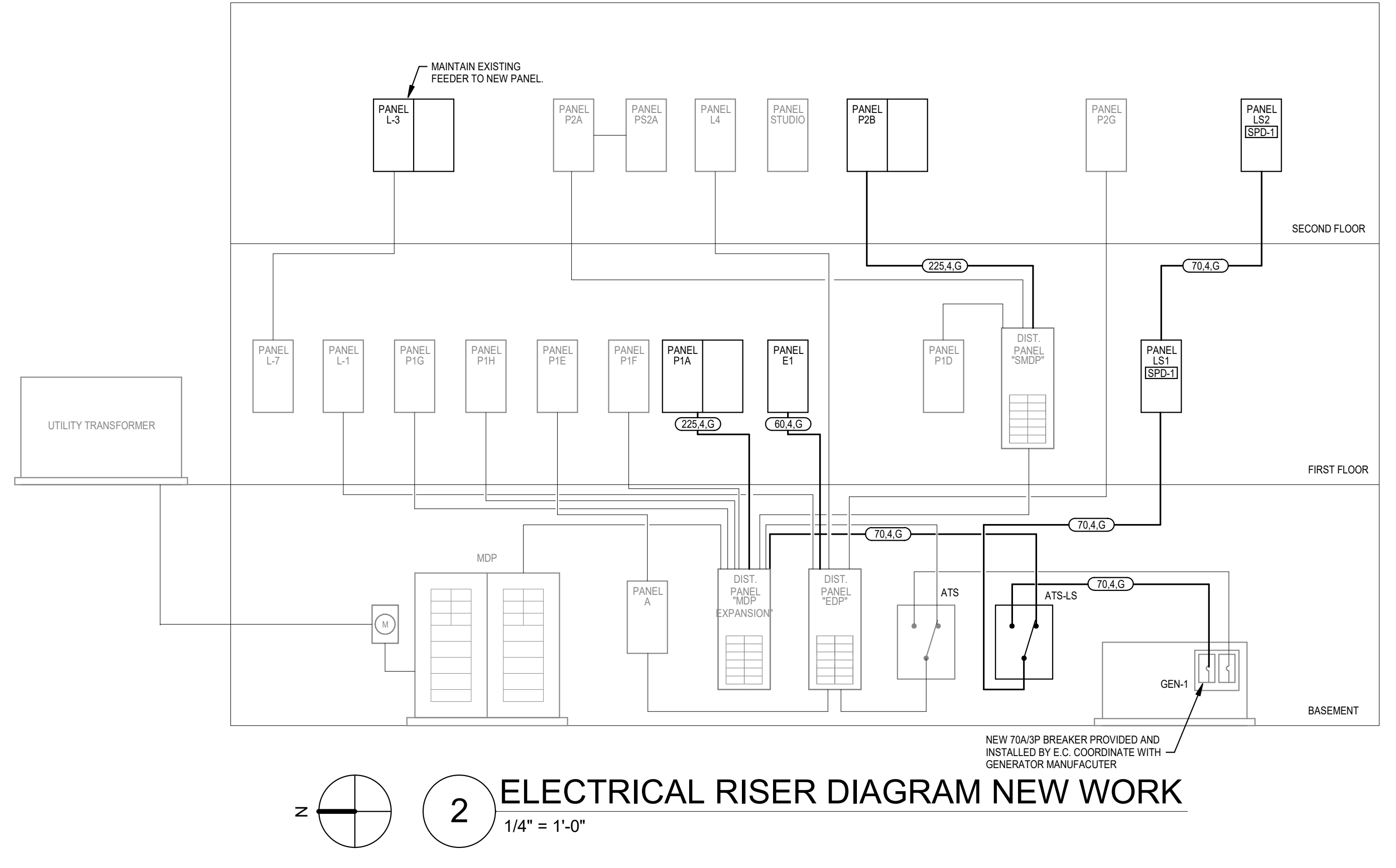
- THE FIRE ALARM RISER DIAGRAM IS MEANT TO CONVEY THE GENERAL SCOPE OF WORK AND SHOULD NOT BE USED AS A DETAILED WIRING SCHEMATIC. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING QUANTITIES OF DEVICES AND CONTROL MONITORING INTERFACES WITH OTHER BUILDING SYSTEMS (I.E. FIRE/SMOKE DAMPERS, AHU SHUT-DOWN, ELEVATOR CONTROLS, ETC.).
- THE COMPLETE FIRE ALARM SYSTEM SHALL MEET ALL APPLICABLE CODES AS WELL AS THE FIRE ALARM SYSTEM MANUFACTURER'S RECOMMENDATIONS.
- THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL 120VAC CIRCUITS REQUIRED FOR A COMPLETE AND FUNCTIONAL SYSTEM. THIS INCLUDES THE MAIN FIRE ALARM PANEL AS WELL AS ANY NOTIFICATION APPLIANCE CIRCUIT EXTENDER PANELS. ALL 120VAC CIRCUIT BREAKERS SERVING FIRE ALARM EQUIPMENT SHALL BE PROVIDED WITH HANDLE LOCKS.
- ALL FIRE ALARM WIRING SHALL BE INSTALLED EITHER IN EXISTING RACEWAY (WHERE AVAILABLE) OR FLOWN ABOVE THE FINISHED CEILING. ALL FLOWN CABLES SHALL BE PLENUM RATED AND SHALL BE SUPPORTED INDEPENDENT OF THE CEILING SYSTEM USING J-HOOKS AND OTHER APPROPRIATE SUPPORTS. COORDINATE CABLE TYPE REQUIREMENTS WITH THE FIRE ALARM SYSTEM MANUFACTURER.
- MAINTAIN 3'-0" SEPARATION BETWEEN SMOKE DETECTORS AND HVAC DIFFUSERS.
- ALL DEVICES SHALL BE FLUSH MOUNTED WHERE WALL AND CEILING CONSTRUCTION ALLOWS. IF FLUSH MOUNTING OF DEVICES IS NOT POSSIBLE, SURFACE MOUNT USING SURFACE BOXES AND WIREMOLD 700 SERIES METALLIC RACEWAY (OR EQUAL), PAINTED TO MATCH EXISTING FINISHES.

KEYED NOTES:

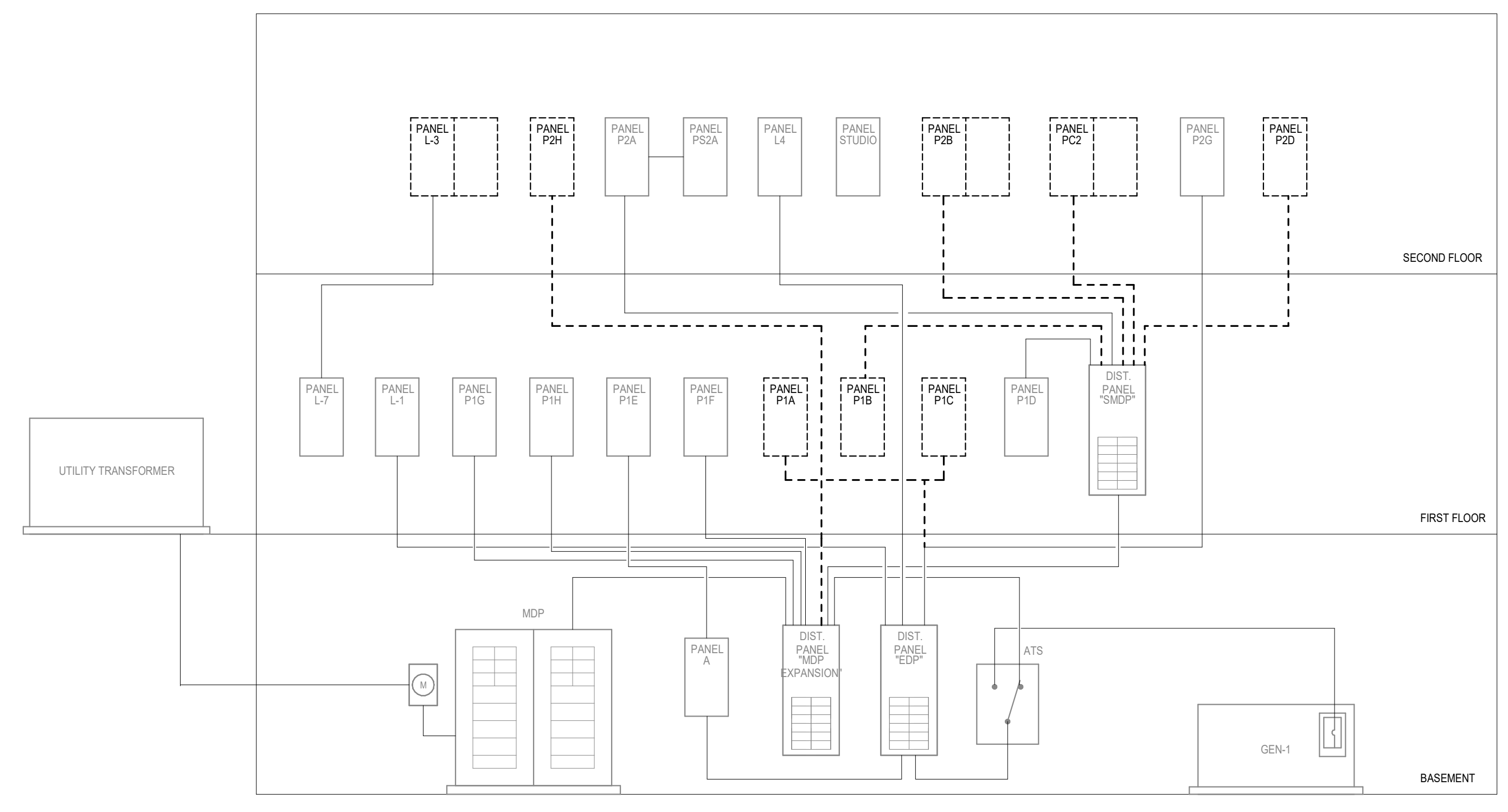
- THE ELECTRICAL CONTRACTOR SHALL CONNECT TO EXISTING FIRE/SMOKE DAMPER CIRCUITS. EC SHALL FIELD VERIFY QUANTITY AND LOCATION OF NEW ADDRESSABLE RELAYS REQUIRED FOR FIRE/SMOKE DAMPER CONTROL.
- THE ELECTRICAL CONTRACTOR SHALL CONNECT TO EXISTING DOOR RELEASE CIRCUITS. EC SHALL FIELD VERIFY QUANTITY AND LOCATION OF NEW ADDRESSABLE RELAYS REQUIRED FOR DOOR RELEASE CONTROL.
- THE ELECTRICAL CONTRACTOR SHALL CONNECT FIRE ALARM RELAYS TO EXISTING AIR HANDLING UNIT CONTROLS FOR SHUT-DOWN PURPOSES. EC SHALL FIELD VERIFY QUANTITY AND LOCATION OF ADDRESSABLE RELAYS REQUIRED FOR AHU SHUT-DOWN CONTROL.
- BASE BID MAINTAIN EXISTING ELEVATOR ALARM INTERFACE. ALTERNATE #5 REPLACE ADDRESSABLE MONITOR MODULES AS NEEDED TO MAINTAIN ELEVATOR ALARM INTERFACE.
- ALTERNATE #3 REUSE THE EXISTING PHONE LINE FOR THE NEW FIRE ALARM PANEL.
- PROVIDE NOTIFICATION APPLIANCE CIRCUIT EXTENDER PANELS AS REQUIRED. IT IS THE FIRE ALARM SYSTEM MANUFACTURER'S RESPONSIBILITY TO DETERMINE QUANTITY OF PANELS NEEDED TO MEET THE SPECIFICATIONS. PANELS TO BE INSTALLED IN LOCATIONS APPROVED BY THE OWNER. ACCEPTABLE LOCATIONS INCLUDE: ELECTRICAL ROOMS, JANITOR'S CLOSETS, MECHANICAL ROOMS.
- REFER TO 1ES100 FOR LOCATION OF FIRST FLOOR ANNUNCIATOR PANEL.
- REFER TO SPECIFICATIONS FOR SIGNAL AND NOTIFICATION LOOP REQUIREMENTS.
- BASE BID UTILIZE EXISTING SIMPLEX 4010 FIRE ALARM CONTROL PANEL. ALTERNATE #1 REPLACE EXISTING FIRE ALARM CONTROL PANEL AND ANY NECESSARY ACCESSORIES TO PROVIDE A COMPLETE FIRE ALARM SYSTEM.

PANEL FEEDER SCHEDULE - COPPER

CALL OUT	OCPD RATING	PARALLEL SETS	PHASE	NEUTRAL	GRD	CONDUIT
60,4,G	60	1	#6	#6	#10	1"
70,4,G	70	1	#4	#4	#8	1-1/4"
80,4,G	80	1	#4	#4	#8	1-1/4"
90,4,G	90	1	#3	#3	#8	1-1/4"
100,4,G	100	1	#3	#3	#8	1-1/4"
125,4,G	125	1	#1	#1	#6	1-1/2"
150,4,G	150	1	#1/0	#1/0	#6	2"
175,4,G	175	1	#2/0	#2/0	#6	2"
200,4,G	200	1	#3/0	#3/0	#6	2"
225,4,G	225	1	#4/0	#4/0	#4	2-1/2"
250,4,G	250	1	250KCM	250KCM	#4	2-1/2"
300,4,G	300	1	350KCM	350KCM	#4	3"
350,4,G	350	1	500KCM	500KCM	#3	3-1/2"
400,4,G	400	1	600KCM	600KCM	#3	4"
500,4,G	500	2	250KCM	250KCM	#2	2-1/2"
600,4,G	600	2	350KCM	350KCM	#1	3"
700,4,G	700	2	500KCM	500KCM	#1/0	3-1/2"
800,4,G	800	2	600KCM	600KCM	#1/0	4"
1000,4,G	1000	3	400KCM	400KCM	#2/0	3"
1200,4,G	1200	3	600KCM	600KCM	#3/0	4"



2 ELECTRICAL RISER DIAGRAM NEW WORK
1/4" = 1'-0"



1 ELECTRICAL RISER DIAGRAM
N.T.S.

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GENERAL ELECTRICAL SCHEDULE table with columns: SYMBOL, DESCRIPTION, MANUFACTURER. Includes items like connection to mechanical equipment, electrical connection to misc. equipment, surge protection device, disconnect switch, and automatic transfer switch.

DIGITAL SWITCH SCHEDULE (CONT.) table with columns: SYMBOL, DESCRIPTION, MODEL #. Includes items like digital low voltage wall station, digital occupancy sensor, digital interior photo sensor, and lighting control system.

RECEPTACLE SCHEDULE table with columns: SYMBOL, DESCRIPTION, MODEL #. Includes items like duplex receptacle, duplex ground fault receptacle, square recessed floor box, and round poke-thru floor box.

FIRE ALARM SCHEDULE table with columns: SYMBOL, DESCRIPTION, MODEL #. Includes items like fire alarm control panel, notification appliance circuit, fire alarm remote annunciator panel, duct smoke detector, and fire alarm visual notification appliance.

LOW VOLTAGE WALL STATION SCHEDULE table with columns: WALL STATION ID #, CONTROL TYPE, ZONE(S) CONTROLLED, BUTTON LABEL. Lists various wall station configurations and their associated zones.

LIGHTING CONTROL SCHEDULE table with columns: ZONE SUBSCRIPT, CONTROL DESCRIPTION. Details manual and automatic control settings for various zones.

LUMINAIRE SCHEDULE table with columns: TYPE, DESCRIPTION, MANUFACTURER, MODEL, WATTS, LIGHT SOURCE, POWER SUPPLY, MOUNTING, VOLT, ACCEPTABLE MANUFACTURERS. Lists various lighting fixtures and their specifications.

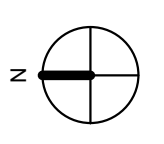
Table with columns: No., Description, Date. Contains project review and issue dates.



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SWITCHBOARD: MDP-EXT

LOCATION: SURFACE / PHASE: 3 / WIRE: 4
 VOLTAGE: 208/120 Wye
 MAIN DEVICE: 1200 A - MCB
 BUS RATING: 1200
 NEUTRAL RATING: 100%
 A.I.C. RATING: 22000

CKT	RATIN G	PL	TRIP UNIT	LOAD DESCRIPTION	LOAD (KVA)	WIRE SIZE/CONDUIT SIZE
1	80 A	3		(N) VRO-4A	17.65	(3) #3, #8G, 1.25" C
2	800 A	3		(E) SMDP	185.41	
3	45 A	3		(N) VRO-3B	11.17	(3) #8, #8G, 1" C
4	--	--	--	SPACE	0.00	--
5	80 A	3		(N) VRO-4B	17.65	(3) #3, #8G, 1.25" C
6	80 A	3		(N) ERU-2	21.00	(3) #3, #8G, 1.25" C
7	45 A	3		(N) VRO-3A	11.17	(3) #8, #8G, 1" C
8	100 A	3		(E) PANEL P1H	18.67	
9	35 A	3		(E) BASEMENT HEATER	0.00	
10	100 A	3		(E) ELEVATOR	0.00	
11	60 A	3		(N) PANEL LS1 VIA ATS-LS	11.10	REFER TO RISER
12	150 A	3		(E) PANEL P1F	0.00	
13	--	--	--	SPACE	0.00	--
14	225 A	3		(N) PANEL P1A	33.31	REFER TO RISER
15	--	--	--	SPACE	0.00	--
16	125 A	3		(E) PANEL P1G	9.36	
17	--	--	--	SPACE	0.00	--
18	70 A	3		(E) SPARE	0.00	
19	--	--	--	SPACE	0.00	--
20	400 A	3		(E) EDP (VIA ATS)	6.60	
21	--	--	--	SPACE	0.00	--
22	--	--	--	SPACE	0.00	--
23	--	--	--	SPACE	0.00	--
24	--	--	--	SPACE	0.00	--
					343.1 KVA	
					952 A	

Notes:

SWITCHBOARD: SMDP

LOCATION: MDP-EXT / PHASE: 3 / WIRE: 4
 VOLTAGE: 208/120 Wye
 MAIN DEVICE: 800 A - MCB
 BUS RATING: 800
 NEUTRAL RATING: 100%
 A.I.C. RATING:

CKT	RATIN G	PL	TRIP UNIT	LOAD DESCRIPTION	LOAD (KVA)	WIRE SIZE/CONDUIT SIZE
1	225 A	3		(N) PANEL P2B	41.43	REFER TO RISER
2	125 A	3		(N) VRO-2B	26.30	(3) #1, #6G, 1.5" C
3	100 A	3		(EN) ERU-1	26.00	(3) #3, #3N, #8G, 1.25" C
4	125 A	3		(N) VRO-2A	26.30	(3) #1, #6G, 1.5" C
5	100 A	3		(E) PANEL P2A	0.18	
6	100 A	3		(E) PANEL P1D	4.90	
7	80 A	3		(N) VRO-1B	17.65	(3) #3, #8G, 1.25" C
8	80 A	3		(EN) VRO-1A	17.65	(3) #3, #8G, 1.25" C
9	35 A	3		(E) SALLYPORT HEATER	10.00	
10	--	--	--			
11	50 A	2		(E) RANGE	5.00	
12	35 A	3		(E) CABLE GARAGE HEATER	10.00	
13	--	--	--	SPACE	0.00	--
14	--	--	--	SPACE	0.00	--
15	--	--	--	SPACE	0.00	--
16	--	--	--	SPACE	0.00	--
17	--	--	--	SPACE	0.00	--
18	--	--	--	SPACE	0.00	--
19	--	--	--	SPACE	0.00	--
20	--	--	--	SPACE	0.00	--
21	--	--	--	SPACE	0.00	--
22	--	--	--	SPACE	0.00	--
23	--	--	--	SPACE	0.00	--
24	--	--	--	SPACE	0.00	--
					185.4 KVA	
					515 A	

Notes:

SWITCHBOARD: EDP

LOCATION: MDP-EXT / PHASE: 3 / WIRE: 4
 VOLTAGE: 208/120 Wye
 MAIN DEVICE: 600 A - MCB
 BUS RATING: 600
 NEUTRAL RATING: 100%
 A.I.C. RATING:

CKT	RATIN G	PL	TRIP UNIT	LOAD DESCRIPTION	LOAD (KVA)	WIRE SIZE/CONDUIT SIZE
1	200 A	3		(E) PANEL A	0.00	
2	200 A	3		(E) PANEL P2G	4.26	
3	150 A	3		(E) PANEL L-1	0.72	
4	150 A	3		(E) PANEL L4	0.00	
5	60 A	3		(N) PANEL E1	1.62	REFER TO RISER
6	--	--	--	SPACE	0.00	--
7	--	--	--	SPACE	0.00	--
8	--	--	--	SPACE	0.00	--
9	--	--	--	SPACE	0.00	--
10	--	--	--	SPACE	0.00	--
11	--	--	--	SPACE	0.00	--
12	--	--	--	SPACE	0.00	--
13	--	--	--	SPACE	0.00	--
14	--	--	--	SPACE	0.00	--
15	--	--	--	SPACE	0.00	--
16	--	--	--	SPACE	0.00	--
					6.6 KVA	
					18 A	

Notes:

PANELBOARD: P1A

LOCATION: HALL 055 / PHASE: 3 / WIRE: 4
 VOLTAGE: 208/120 Wye
 MAIN DEVICE: 225 A - MLO
 BUS RATING: 225
 NEUTRAL RATING: 100%
 A.I.C. RATING: 10000

LOAD DESCRIPTION	BKR	PL	CKT	A (KVA)	B (KVA)	C (KVA)	CKT PL BKR	LOAD DESCRIPTION	
VR1 UNITS	20 A	2	1	1.1	1.0		2	20 A VR1 UNITS	
			3		1.1	1.0	4	1 20 A VR1 UNITS	
VR1 UNITS	20 A	2	5			0.4	1.2	6	2 20 A VR1 UNITS
			7	0.4	1.2			8	
RECEPTACLE	20 A	1	9		1.3	1.1	10	1 20 A RECEPTACLE	
PRINTER	20 A	1	11			0.5	0.2	12	1 20 A LIGHTING
MICROWAVE	20 A	1	13	0.2	0.2			14	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	15		1.6	1.4		16	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	17			1.3	0.5	18	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	19	1.4	0.9			20	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	21		0.4	0.2		22	1 20 A MICROWAVE
FURNITURE FEED	20 A	1	23			0.2	0.2	24	1 20 A FURNITURE FEED
RECEPTACLE	20 A	1	25	0.2	0.2			26	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	27		0.9	1.4		28	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	29			1.6	0.4	30	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	31	0.5	0.7			32	1 20 A RECEPTACLE
EWV	20 A	1	33		0.2	0.2		34	1 20 A VENDING MACHINE
VENDING MACHINE	20 A	1	35			0.2	1.1	36	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	37	0.7	0.5			38	1 20 A LIGHTING
LIGHTING	20 A	1	39		0.9	0.8		40	1 20 A LIGHTING
VRCP-1	15 A	1	41			0.5	0.9	42	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	43	0.4	0.2			44	1 20 A (G) VENDING MACHINE
(G) VENDING MACHINE	20 A	1	45		0.2	0.9		46	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	47			0.9	0.2	48	1 20 A RECEPTACLE
SPARE	20 A	1	49	0.0	0.0			50	1 20 A SPARE
SPARE	20 A	1	51		0.0	0.0		52	1 20 A SPARE
SPARE	20 A	1	53			0.0	0.0	54	1 20 A SPARE
SPARE	20 A	1	55	0.0	0.0			56	1 20 A SPARE
SPARE	20 A	1	57		0.0	0.0		58	1 20 A SPARE
SPARE	20 A	1	59			0.0	0.0	60	1 20 A SPARE
SPARE	20 A	1	61	0.0	0.0			62	1 20 A SPARE
SPARE	20 A	1	63		0.0	0.0		64	1 20 A SPARE
SPARE	20 A	1	65			0.0	0.0	66	1 20 A SPARE
SPARE	20 A	1	67	0.0	0.0			68	1 20 A SPARE
SPARE	20 A	1	69		0.0	0.0		70	1 20 A SPARE
SPARE	20 A	1	71			0.0	0.0	72	1 20 A SPARE
SPACE	--	--	73	0.0	0.0			74	-- SPARE
SPACE	--	--	75		0.0	0.0		76	-- SPARE
SPACE	--	--	77			0.0	0.0	78	-- SPARE
SPACE	--	--	79	0.0	0.0			80	-- SPARE
SPACE	--	--	81		0.0	0.0		82	-- SPARE
SPACE	--	--	83			0.0	0.0	84	-- SPARE
TOTAL LOAD:				9722 VA	13451 VA	10138 VA			
TOTAL AMPS:				81 A	113 A	85 A			

Load Classification: Connected Load Demand Factor Estimated Demand Panel Totals:
 LIGHTING 2337 VA 100% 2337 VA
 POWER 7920 VA 100% 7920 VA
 Other 7831 VA 100% 7831 VA
 KITCHEN 360 VA 100% 360 VA
 Receptacle 14860 VA 84% 12430 VA

CONNECTED LOAD: 33308 VA
 ESTIMATED DEMAND: 30678 VA
 CONNECTED CURRENT: 92 A
 EST. DEMAND CURRENT: 86 A

NOTES:

PANELBOARD: LS1

LOCATION: HALL 071 / PHASE: 3 / WIRE: 4
 VOLTAGE: 208/120 Wye
 MAIN DEVICE: 70 A - MCB
 BUS RATING: 100
 NEUTRAL RATING: 100%
 A.I.C. RATING: 10000

LOAD DESCRIPTION	BKR	PL	CKT	A (KVA)	B (KVA)	C (KVA)	CKT PL BKR	LOAD DESCRIPTION	
LIGHTING	20 A	1	1	1.1	0.9		2	1 20 A LIGHTING	
LIGHTING	20 A	1	3		1.4	1.0	4	1 20 A LIGHTING	
(HL) FACP	20 A	1	5			0.2	0.0	6	1 20 A SPARE
SPARE	20 A	1	7	0.0	0.0			8	1 20 A SPARE
SPARE	20 A	1	9		0.0	0.0		10	1 20 A SPARE
SPARE	--	--	11			0.0	0.0	12	-- SPARE
SPARE	--	--	13	0.0	0.0			14	-- SPARE
SPACE	--	--	15		0.0	0.0		16	-- SPARE
SPACE	--	--	17			0.0	0.0	18	-- SPARE
SPACE	--	--	19	0.0	0.0			20	-- SPARE
SPACE	--	--	21		0.0	0.0		22	-- SPARE
SPACE	--	--	23			0.0	0.0	24	-- SPARE
SPD	30 A	3	27	25	0.0	0.0		28	-- SPARE
			29		0.0	0.0		30	-- SPARE
TOTAL LOAD:				3834 VA	3846 VA	3419 VA			
TOTAL AMPS:				32 A	33 A	28 A			

Load Classification: Connected Load Demand Factor Estimated Demand Panel Totals:
 LIGHTING 10919 VA 100% 10919 VA
 Other 180 VA 100% 180 VA

CONNECTED LOAD: 11099 VA
 ESTIMATED DEMAND: 11099 VA
 CONNECTED CURRENT: 31 A
 EST. DEMAND CURRENT: 31 A

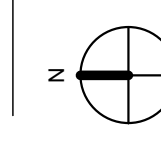
NOTES:

BREAKER PREFIX KEY:
 (G) - GROUND FAULT BREAKER
 (H) - HANDLE LOCK
 (N) - NEW BREAKER IN EXISTING PANEL
 (E) - EXISTING BREAKER
 (EN) - EXISTING BREAKER WITH NEW LOAD

PANELBOARD: P2B

LOCATION: OPEN OFFICE 237 / PHASE: 3 / WIRE: 4
 VOLTAGE: 208/120 Wye
 MAIN DEVICE: 225 A - MLO
 BUS RATING: 225
 NEUTRAL RATING: 100%
 A.I.C. RATING: 10000

LOAD DESCRIPTION	BKR	PL	CKT	A (KVA)	B (KVA)	C (KVA)	CKT PL BKR	LOAD DESCRIPTION	
LIGHTING	20 A	1	1	0.4	1.8		2	1 20 A RECEPTACLE	
LIGHTING	20 A	1	3		1.3	0.9		4	1 20 A RECEPTACLE
FURNITURE FEED	20 A	1	5			0.4	0.4	6	2 20 A VR1 UNITS
VR1 UNITS	20 A	2	7	0.6	0.4			8	
			9		0.6	1.0		10	2 20 A VR1 UNITS
FURNITURE FEED	20 A	1	11			0.2	1.0	12	1 20 A RECEPTACLE
FURNITURE FEED	20 A	1	13	0.2	0.2			14	1 20 A RECEPTACLE
FURNITURE FEED	20 A	1	15		0.0	1.8		16	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	17			0.2	0.4	18	1 20 A PRINTER
SHREDDER	20 A	1	19	0.2	0.4			20	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	21		0.7	0.2		22	1 20 A RECEPTACLE
POWER	20 A	1	23			0.4	1.6	24	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	25	0.9	0.9			26	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	27		0.7	0.7		28	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	29			0.5	0.5	30	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	31	0.7	0.4			32	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	33		0.9	0.5		34	1 20 A RECEPTACLE
RECEPTACLE	20 A	1	35			0.5	0.0	36	1 20 A ROLL UP COUNTER DOOR
RECEPTACLE	20 A	1	37	0.5	1.1			38	1 20 A RECEPTACLE
COPIER	20 A	1	39		0.2	0.5		40	1 20 A RECEPTACLE
LIGHTING	20 A	1	41			0.7	1.0	42	1 20 A LIGHTING
EF-1	20 A	1	43	0.5	0.5			44	1 20 A EF-2
EF-3	20 A	1	45		0.5	1.5		46	2 30 A CUH-2
RECEPTACLE	20 A	1	47			1.1	1.5		



PANELBOARD: P1H

LOCATION: MECHANICAL 010
MOUNTING TYPE: SURFACE / TYPE 1
FED FROM: MDP-EXT
NOTES: EXISTING PANEL

VOLTAGE: 208/120 Wye
PHASE: 3
WIRE: 4

MAIN DEVICE: 100 A - MLO
BUS RATING: 225
NEUTRAL RATING: 100%
A.I.C. RATING:

LOAD DESCRIPTION	BKR	PL	CKT	A (KVA)	B (KVA)	C (KVA)	CKT	PL	BKR	LOAD DESCRIPTION
(E) 009 RECEPT	20 A	1	1	0.5	0.7		2	1	20 A	(E) RECEPT 003
(E) RECEPT 004	20 A	1	3		1.1	0.2	4	1	20 A	(E) 006 STATION
(E) RECEPT 027.040	20 A	1	5			0.7	6	1	20 A	(E) 005 STATION
(E) 007 STATION	20 A	1	7	0.2	0.5		8	1	20 A	(E) RECEPT 028, 029
(E) RM 005,6,7,8 RECEPT	20 A	1	9		0.7	0.7	10	1	20 A	(E) RECEPT 039
(E) 008 STATION	20 A	1	11			0.2	12	1	20 A	(E) RECEPT 019,020
(E) PLOTTER 028	20 A	1	13	0.2	1.1		14	1	20 A	(E) RECEPT 028
(E) PRINTER 039	20 A	1	15		0.2	1.4	16	1	20 A	(E) RECEPT
(E) RECEPT 020,021	20 A	1	17			1.4	18	1	20 A	(E) RECEPT 017,018
(E) RECEPT	20 A	1	19	0.7	0.7		20	1	20 A	(E) RECEPT 039
(E) RECEPT 016,017	20 A	1	21		1.4	0.0	22	1	20 A	(E) SPARE
(E) LIGHTING	20 A	1	23			1.1	24	1	20 A	(E) SPARE
(E) LIGHTING	20 A	1	25	1.4	0.0		26	1	20 A	(E) SPARE
(E) 029 STATION	20 A	1	27		0.2	0.0	28	1	20 A	(E) SPARE
(E) SPARE	20 A	1	29			0.0	30	1	20 A	(E) SPARE
(E) EXISTING LOAD	20 A	1	31	0.0	0.0		32	1	20 A	(E) SPARE
(E) EXISTING LOAD	20 A	1	33		0.0	0.0	34	2	30 A	(E) EXISTING LOAD
(E) EXISTING LOAD	20 A	1	35			0.0	36	--	SPACE	
SPACE	--	--	37	0.0	0.0		38	--	SPACE	
SPACE	--	--	39		0.0	0.0	40	--	SPACE	
SPACE	--	--	41			0.0	42	--	SPACE	
TOTAL LOAD:				6040 VA	5040 VA	6692 VA				
TOTAL AMPS:				50 A	50 A	56 A				

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals:
LIGHTING	2472 VA	100%	2472 VA	
POWER	6480 VA	100%	6480 VA	CONNECTED LOAD: 18672 VA
Other	0 VA	0%	0 VA	ESTIMATED DEMAND: 18672 VA
Receptacle	9720 VA	100%	9720 VA	CONNECTED CURRENT: 52 A
				EST. DEMAND CURRENT: 52 A

NOTES:

PANELBOARD: P1G

LOCATION: HALL 015
MOUNTING TYPE: RECESSED / TYPE 1
FED FROM: MDP-EXT
NOTES: EXISTING PANEL

VOLTAGE: 208/120 Wye
PHASE: 3
WIRE: 4

MAIN DEVICE: 100 A - MLO
BUS RATING: 100
NEUTRAL RATING: 100%
A.I.C. RATING:

LOAD DESCRIPTION	BKR	PL	CKT	A (KVA)	B (KVA)	C (KVA)	CKT	PL	BKR	LOAD DESCRIPTION
(E) WH-1	20 A	1	1	0.2	0.2		2	1	20 A	(E) FURN FEED
(E) FURNITURE FEED	20 A	1	3		0.2	1.4	4	1	20 A	(E) RECEPTACLE
(E) RECEPTACLE	20 A	1	5			1.4	6	1	20 A	(E) PRINTER
(E) RECEPTACLE	20 A	1	7	0.2	1.4		8	1	20 A	(E) CHARGING RECEPTS
(E) CHARGING RECEPTS	20 A	1	9		1.4	0.9	10	1	20 A	(E) RECEPT 035
(E) FURN FEED	20 A	1	11			0.2	12	1	20 A	(E) FURNITURE FEED
(E) RECEPTACLE	20 A	1	13	1.1	0.0		14	1	20 A	(E) SPARE
(E) SPARE	20 A	1	15		0.0	0.0	16	1	20 A	(E) SPARE
(E) SPARE	20 A	1	17			0.0	18	1	20 A	(E) SPARE
(E) SPARE	20 A	1	19	0.0	0.0		20	1	20 A	(E) SPARE
(E) SPARE	20 A	1	21		0.0	0.0	22	1	20 A	(E) SPARE
(E) SPARE	20 A	1	23			0.0	24	1	20 A	(E) SPARE
(E) SPARE	20 A	1	25	0.0	0.0		26	1	20 A	(E) SPARE
(E) SPARE	20 A	1	27		0.0	0.0	28	1	20 A	(E) SPARE
(E) SPARE	20 A	1	29			0.0	30	1	20 A	(E) SPARE
(E) SPARE	20 A	1	31	0.0	0.0		32	1	20 A	(E) SPARE
(E) SPARE	30 A	3	33		0.0	0.0	34	1	20 A	(E) SPARE
SPACE	--	--	37	0.0	0.0		38	--	SPACE	
SPACE	--	--	39		0.0	0.0	40	--	SPACE	
SPACE	--	--	41			0.0	42	--	SPACE	
TOTAL LOAD:				3060 VA	3960 VA	2340 VA				
TOTAL AMPS:				26 A	34 A	20 A				

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals:
LIGHTING	0 VA	0%	0 VA	
POWER	2520 VA	100%	2520 VA	CONNECTED LOAD: 9360 VA
Other	0 VA	0%	0 VA	ESTIMATED DEMAND: 9360 VA
Receptacle	6840 VA	100%	6840 VA	CONNECTED CURRENT: 26 A
				EST. DEMAND CURRENT: 26 A

NOTES:

PANELBOARD: STUDIO

LOCATION: STUDIO 222
MOUNTING TYPE: RECESSED / TYPE 1
FED FROM:
NOTES:

VOLTAGE: 208/120 Wye
PHASE: 3
WIRE: 4

MAIN DEVICE: 100 A - MLO
BUS RATING: 100
NEUTRAL RATING: 100%
A.I.C. RATING:

LOAD DESCRIPTION	BKR	PL	CKT	A (KVA)	B (KVA)	C (KVA)	CKT	PL	BKR	LOAD DESCRIPTION
(E) RECEPTACLES	20 A	1	1	0.0	0.0		2	1	20 A	(E) RECEPTACLES
(E) RECEPTACLES	20 A	1	3		0.0	0.0	4	1	20 A	(E) RECEPTACLES
(E) RECEPTACLES	20 A	1	5			0.0	6	1	20 A	(E) LIGHTS
(E) LIGHTS	20 A	1	7	0.0	0.0		8	1	20 A	(E) LIGHTS
(E) LIGHTS	20 A	1	9		0.0	0.0	10	1	20 A	(E) LIGHTS
(N) RECEPTACLES	20 A	1	11			0.7	12	1	20 A	(N) PODIUM TVS
(N) PODIUM CABINET	20 A	1	13	0.4	0.4		14	1	20 A	(N) TV RECEPTACLES
(N) TV RECEPTACLES	20 A	1	15		0.2		16			
			17				18			
			19				20			
			21				22			
			23				24			
			25				26			
			27				28			
			29				30			
TOTAL LOAD:				720 VA	180 VA	1080 VA				
TOTAL AMPS:				7 A	2 A	10 A				

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals:
POWER	1080 VA	100%	1080 VA	CONNECTED LOAD: 1980 VA
Receptacle	900 VA	100%	900 VA	ESTIMATED DEMAND: 1980 VA
				CONNECTED CURRENT: 5 A
				EST. DEMAND CURRENT: 5 A

NOTES:

PANELBOARD: L-3

LOCATION: JAN 212
MOUNTING TYPE: SURFACE / TYPE 1
FED FROM:
NOTES:

VOLTAGE: 208/120 Wye
PHASE: 3
WIRE: 4

MAIN DEVICE: 225 A - MLO
BUS RATING: 225
NEUTRAL RATING: 100%
A.I.C. RATING: 10000

LOAD DESCRIPTION	BKR	PL	CKT	A	B	C	CKT	PL	BKR	LOAD DESCRIPTION
LOBBY MONITORS	20 A	1	1	0.9	0.9		2	1	20 A	(G) RECEPTACLE
RECEPTACLE	20 A	1	3		0.9	1.1	4	1	20 A	RECEPTACLE
RECEPTACLE	20 A	1	5			1.1	6	2	20 A	VRI UNITS
HAND DRYER WOMENS DOWN	15 A	1	7	0.0	1.6		8	1	20 A	RECEPTACLE
HAND DRYER WOMENS DOWN	15 A	1	9		0.0	0.9	10	1	20 A	RECEPTACLE
HAND DRYER WOMENS RR	15 A	1	11			0.0	12	1	15 A	RECEPTACLE
VRI UNITS	20 A	2	13	1.3	0.8		14	1	20 A	LIGHTING
EF-5	20 A	1	15		1.3	0.5	16	1	20 A	EF-4
EF-5	20 A	1	17			0.5	18	1	20 A	RECEPTACLE
TCP-1	15 A	1	19	0.5	0.0		20	2	30 A	PANEL L-7
VRCP-1	15 A	1	21		0.5	0.0	22	2	30 A	RECEPTACLE
RECEPTACLE	20 A	1	23			0.7	24	--	--	SPACE
SPARE	20 A	1	25	0.0	0.0		26	1	15 A	HAND DRYER MENS RR
SPARE	20 A	1	27		0.0	0.0	28	1	15 A	UNIT HEATER MENS RR
SPARE	20 A	1	29			0.0	30	1	15 A	SPARE
SPARE	20 A	1	31	0.0	0.0		32	1	15 A	SPARE
SPARE	20 A	1	33		0.0	0.0	34	1	15 A	WATER COOLER
SPARE	20 A	1	35			0.0	36	1	15 A	REC N HW WALL
SPARE	20 A	1	37	0.0	0.0		38	1	20 A	SPARE
SPARE	20 A	1	39		0.0	0.0	40	1	20 A	SPARE
SPARE	20 A	1	41			0.0	42	1	20 A	SPARE
SPARE	20 A	1	43	0.0	0.0		44	1	20 A	SPARE
SPARE	20 A	1	45		0.0	0.0	46	1	20 A	SPARE
SPARE	20 A	1	47			0.0	48	1	20 A	SPARE
SPARE	20 A	1	49	0.0	0.0		50	1	20 A	SPARE
SPARE	20 A	1	51		0.0	0.0	52	1	20 A	SPARE
SPARE	20 A	1	53			0.0	54	1	20 A	SPARE
SPACE	--	--	55	0.0	0.0		56	--	--	SPACE
SPACE	--	--	57		0.0	0.0	58	--	--	SPACE
SPACE	--	--	59			0.0	60	--	--	SPACE
TOTAL LOAD:				6102 VA	5207 VA	5739 VA				
TOTAL AMPS:				52 A	43 A	49 A				

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals:
LIGHTING	837 VA	100%	837 VA	
POWER	360 VA	100%	360 VA	CONNECTED LOAD: 17047 VA
Other	7930 VA	100%	7930 VA	ESTIMATED DEMAND: 17047 VA
Receptacle	7920 VA	100%	7920 VA	CONNECTED CURRENT: 47 A
				EST. DEMAND CURRENT: 47 A

NOTES:

PANELBOARD: E1

LOCATION: EMR 080
MOUNTING TYPE: SURFACE / TYPE 1
FED FROM: EDP
NOTES: GENERATOR BRANCH

VOLTAGE: 208/120 Wye
PHASE: 3
WIRE: 4

MAIN DEVICE: 100 A - MLO
BUS RATING: 100
NEUTRAL RATING: 100%
A.I.C. RATING: 10000

LOAD DESCRIPTION	BKR	PL	CKT	A (KVA)	B (KVA)	C (KVA)	CKT	PL	BKR	LOAD DESCRIPTION
SUMP PUMP	20 A	1	1	0.2	0.2		2	1	20 A	RECEPTACLE
ELEVATOR SUMP PUMP	20 A	1	3		0.2	0.0	4	1	20 A	ELEVATOR CAB LIGHTS
RECEPTACLE	20 A	1	5			0.7	6	1	20 A	FRIDGE
FRIDGE	20 A	1	7	0.2	0.0		8	1	20 A	SPARE
SPARE	20 A	1	9		0.0	0.0	10	1	20 A	SPARE
SPARE	20 A	1	11			0.0	12	1	20 A	SPARE
SPARE	20 A	1	13	0.0	0.0		14	1	20 A	SPARE
SPARE	20 A	1	15		0.0	0.0	16	1	20 A	SPARE
SPARE	20 A	1	17			0.0	18	1	20 A	SPARE
SPACE	--	--	19	0.0	0.0		20	--	--	SPACE
SPACE	--	--	21		0.0	0.0	22	--	--	SPACE
SPACE	--	--	23			0.0	24	--	--	SPACE
SPACE	--	--	25	0.0	0.0		26	--	--	SPACE
SPACE	--	--	27		0.0	0.0	28	--	--	SPACE
SPACE	--	--	29			0.0	30	--	--	SPACE
TOTAL LOAD:				540 VA	180 VA	900 VA				
TOTAL AMPS:				5 A	2 A	8 A				

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals:
POWER	0 VA	0%	0 VA	
KITCHEN	360 VA	100%	360 VA	CONNECTED LOAD: 1620 VA
Receptacle	1260 VA	100%	1260 VA	ESTIMATED DEMAND: 1620 VA
				CONNECTED CURRENT: 4 A
				EST. DEMAND CURRENT: 4 A

NOTES:

BREAKER PREFIX KEY:

- (G) - GROUND FAULT BREAKER
- (H) - HANDLE LOCK
- (N) - NEW BREAKER IN EXISTING PANEL
- (E) - EXISTING

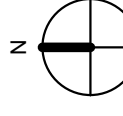
**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

LOWER LEVEL TECHNOLOGY PLAN

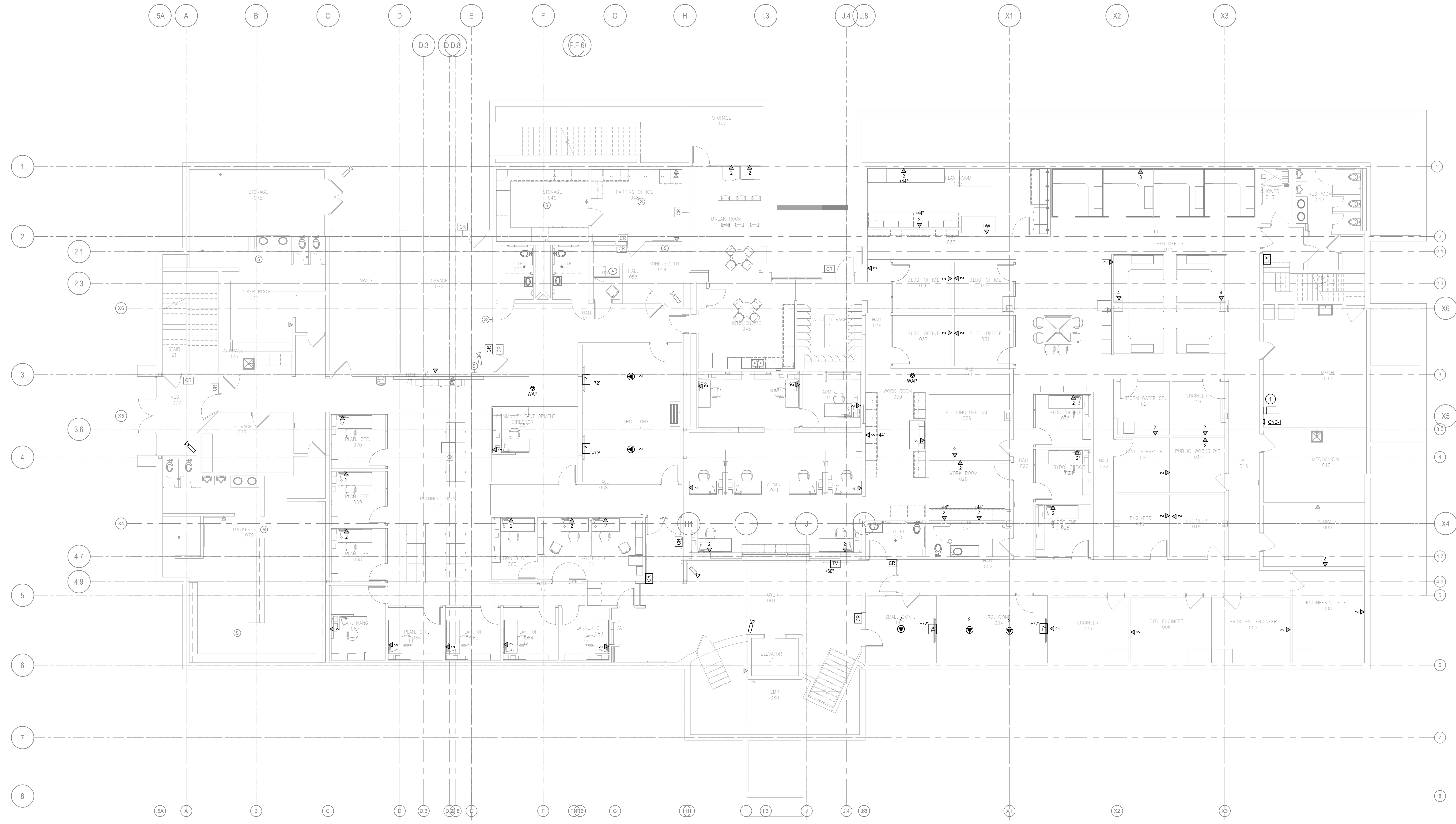
Project Number 21004
Date OCTOBER 5, 2021

T101



- GENERAL NOTES:**
- SEE DETAIL 07100 FOR INTERIOR CAMERA ROUGH-IN DETAIL.
 - SEE DETAIL 07100 FOR DOUBLE DOOR ROUGH-IN DETAIL.
 - SEE DETAIL 71700 FOR SINGLE DOOR ROUGH-IN DETAIL.

- KEYED NOTES:**
- ALL NEW CATEGORY 6 CABLING SOUTH OF COLUMN LINE J-8 TO BE ROUTED TO BE FED FROM NEW RACK ON IN MECHANICAL ROOM. SEE DETAIL 17800 FOR RACK ELEVATION DETAIL. ALL NEW CATEGORY 6 OUTLETS NORTH OF COLUMN LINE J-8 ARE TO BE SERVED FROM THE EXISTING SERVER ROOM ON UPPER LEVEL.



1 LOWER LEVEL TECHNOLOGY PLAN
1/8" = 1'-0"



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**CEDAR FALLS CITY HALL
REMODEL**
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No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

UPPER LEVEL TECHNOLOGY PLAN

Project Number 21004
Date OCTOBER 5, 2021

T102

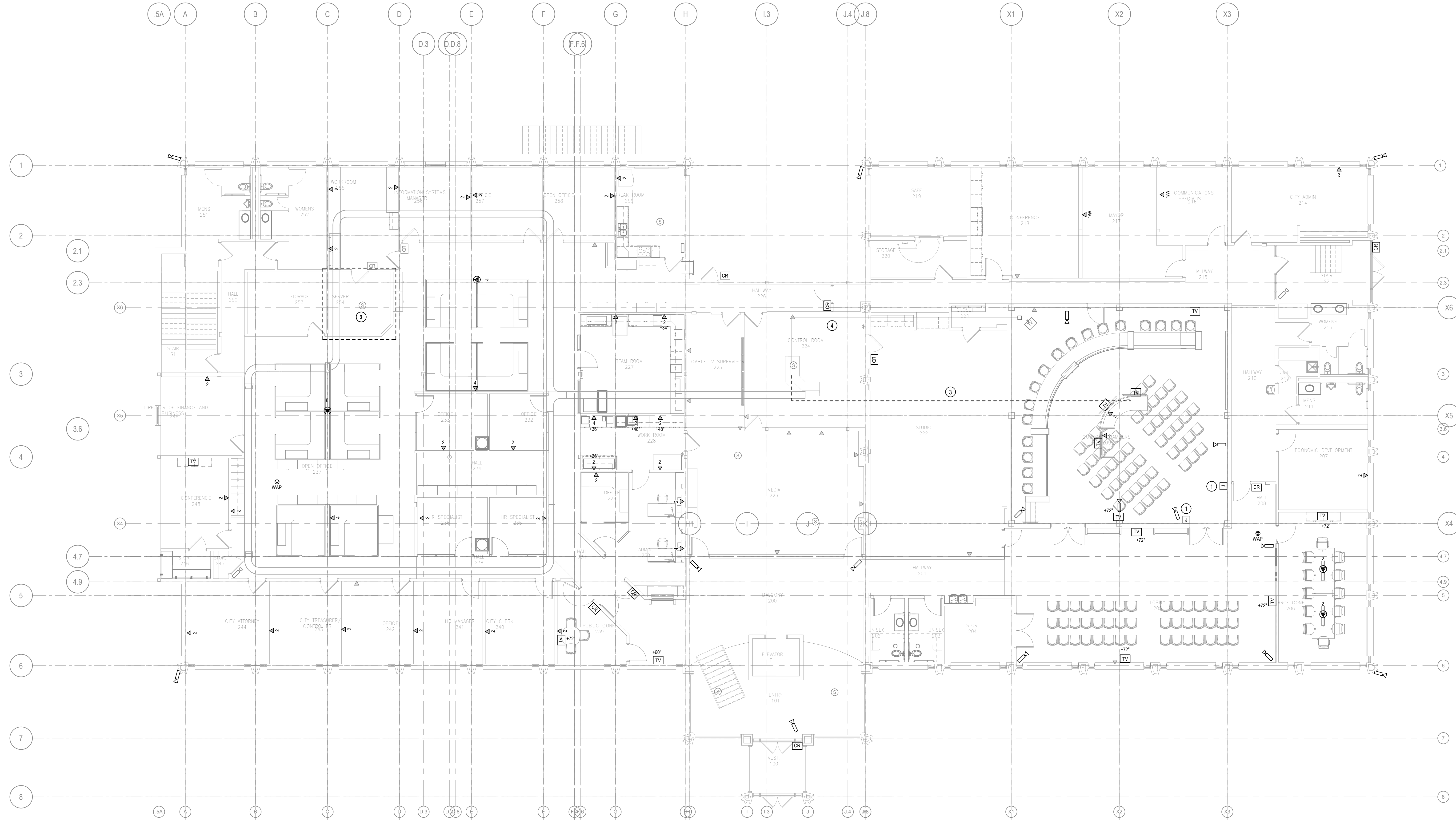


GENERAL NOTES:

- COORDINATE HEIGHT OF EXTERIOR CAMERAS WITH OWNER PRIOR TO ROUGH-IN. SEE DETAIL 47500 FOR EXTERIOR CAMERA ROUGH-IN DETAIL.
- SEE DETAIL 57500 FOR INTERIOR CAMERA ROUGH-IN DETAIL.
- SEE DETAIL 67500 FOR DOUBLE DOOR ROUGH-IN DETAIL.
- SEE DETAIL 717500 FOR SINGLE DOOR ROUGH-IN DETAIL.

KEYED NOTES:

- PROVIDE 4" SQUARE BACKBOX WITH SINGLE GANG PLASTER RING FOR AUDIO INPUT BY OTHERS. ROUTE 1" CONDUIT FROM BACKBOX TO ABOVE ACCESSIBLE CEILING FOR FUTURE MICROPHONE CABLING BY OTHERS.
- ALL NEW CATEGORY 6 CABLING TO BE ROUTED TO EXISTING SERVER ROOM SHOWN ON THIS PLAN.
- PROVIDE NEW 4" CONDUIT ROUTED IN CEILING OF LOWER LEVEL. CONDUIT TO STUB UP AT POULIN IN COUNCIL CHAMBERS AND CONTROL ROOM DESK FOR FUTURE AV CABLING BY OTHERS.
- EXISTING CONDUIT FROM CONTROL ROOM DESK TO ACCESS PANEL IN COUNCIL CHAMBERS AS SHOWN.



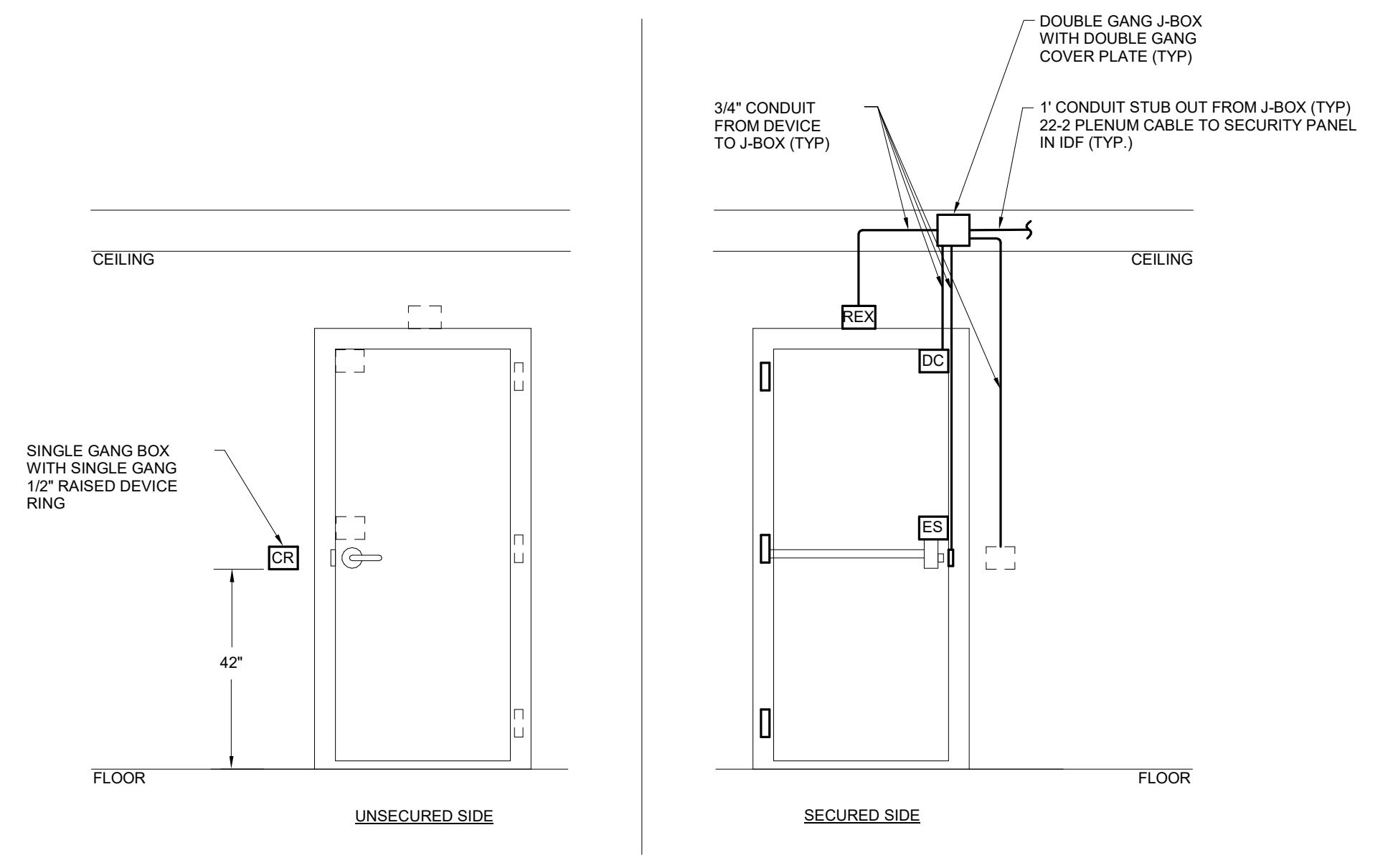
1 UPPER LEVEL TECHNOLOGY PLAN
1/8" = 1'-0"

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

TECHNOLOGY DETAILS

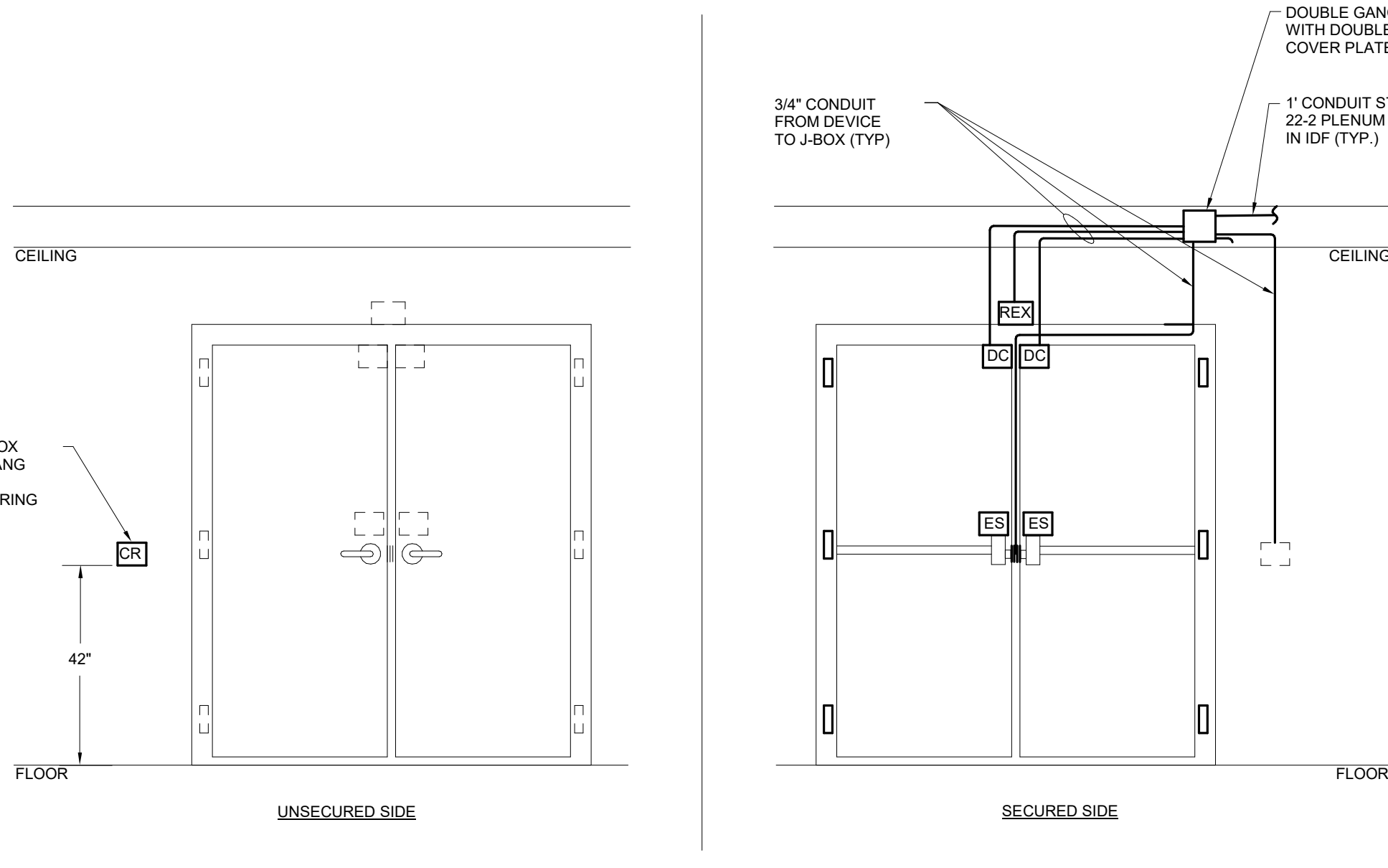
Project Number 21004
Date OCTOBER 5, 2021

T500



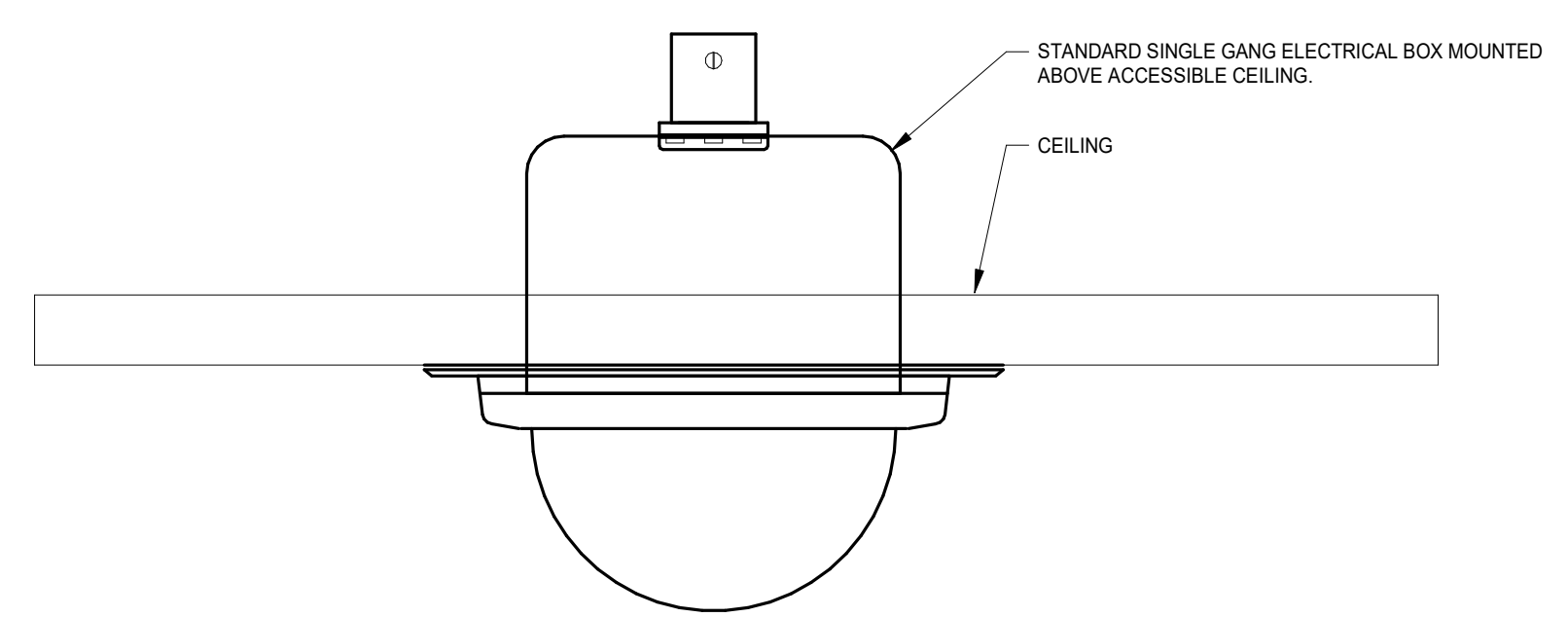
7 SINGLE DOOR WITH CARD ACCESS ROUGH-IN DETAIL
N.T.S.

- NOTES:**
1. PROVIDE AND INSTALL ACCESS CONTROL & DOOR HARDWARE POWER SUPPLY WITH 24V DC. DOOR HARDWARE CONTRACTOR SHALL PROVIDE AND INSTALL 24V FOR DOOR HARDWARE. ELECTRICAL CONTRACTOR SHALL PROVIDE 120V TO POWER SUPPLIES.



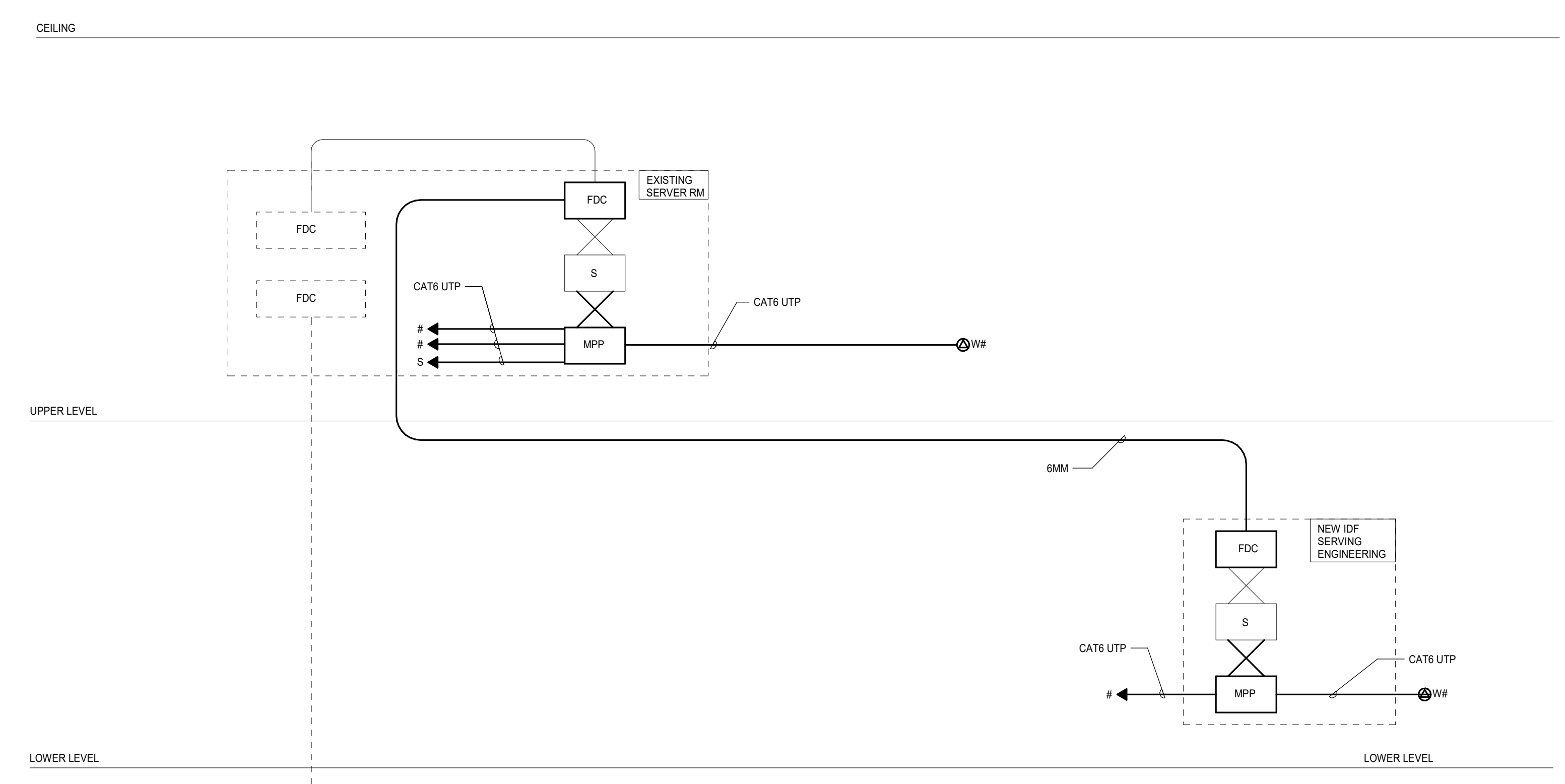
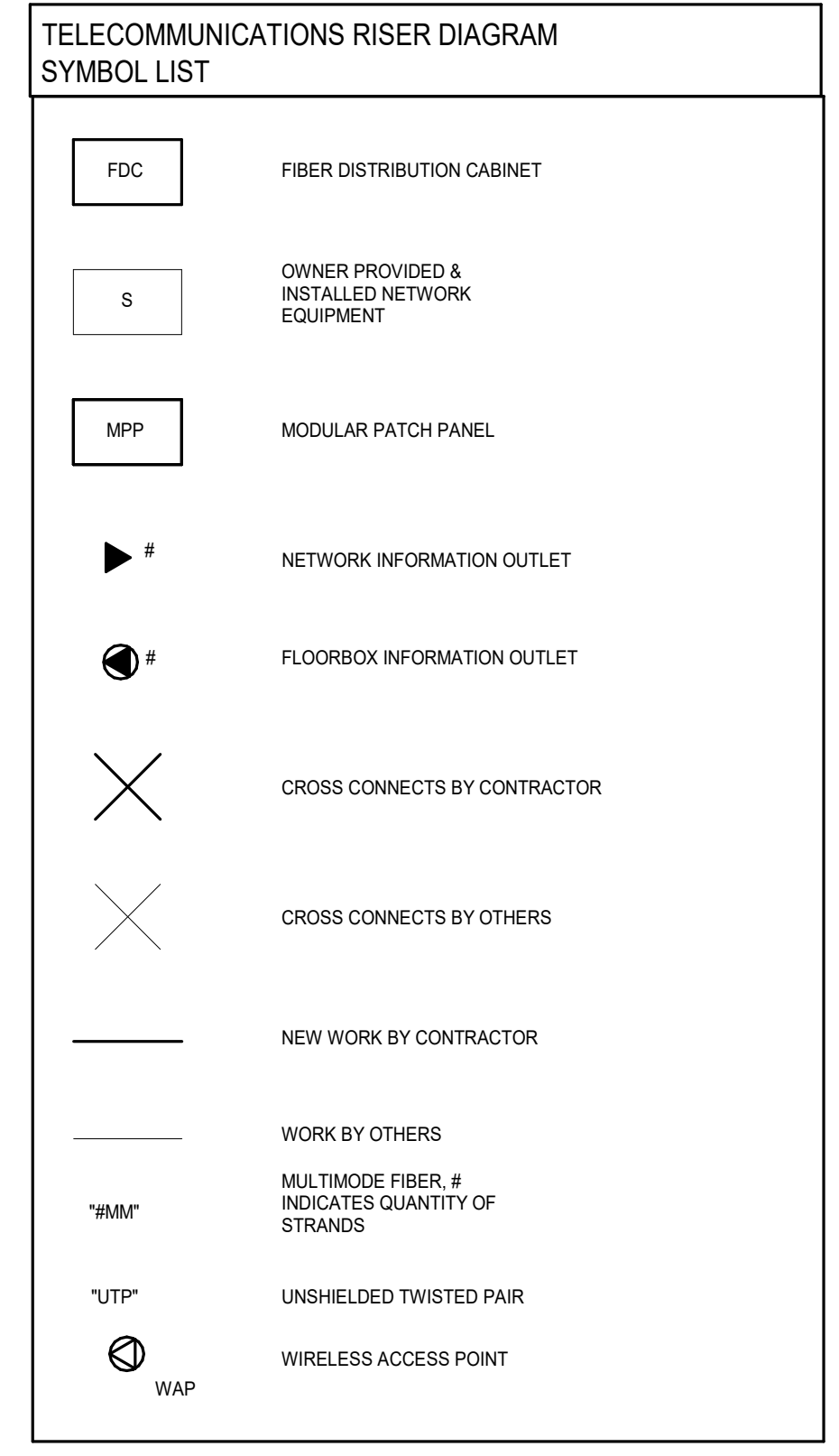
6 DOUBLE DOOR WITH CARD ACCESS ROUGH-IN DETAIL
N.T.S.

- NOTES:**
1. SECURITY CONTRACTOR SHALL PROVIDE AND INSTALL ACCESS CONTROL & DOOR HARDWARE POWER SUPPLY WITH 24V DC. DOOR HARDWARE CONTRACTOR SHALL PROVIDE AND INSTALL 24V FOR DOOR HARDWARE. ELECTRICAL CONTRACTOR SHALL PROVIDE 120V TO POWER SUPPLIES.



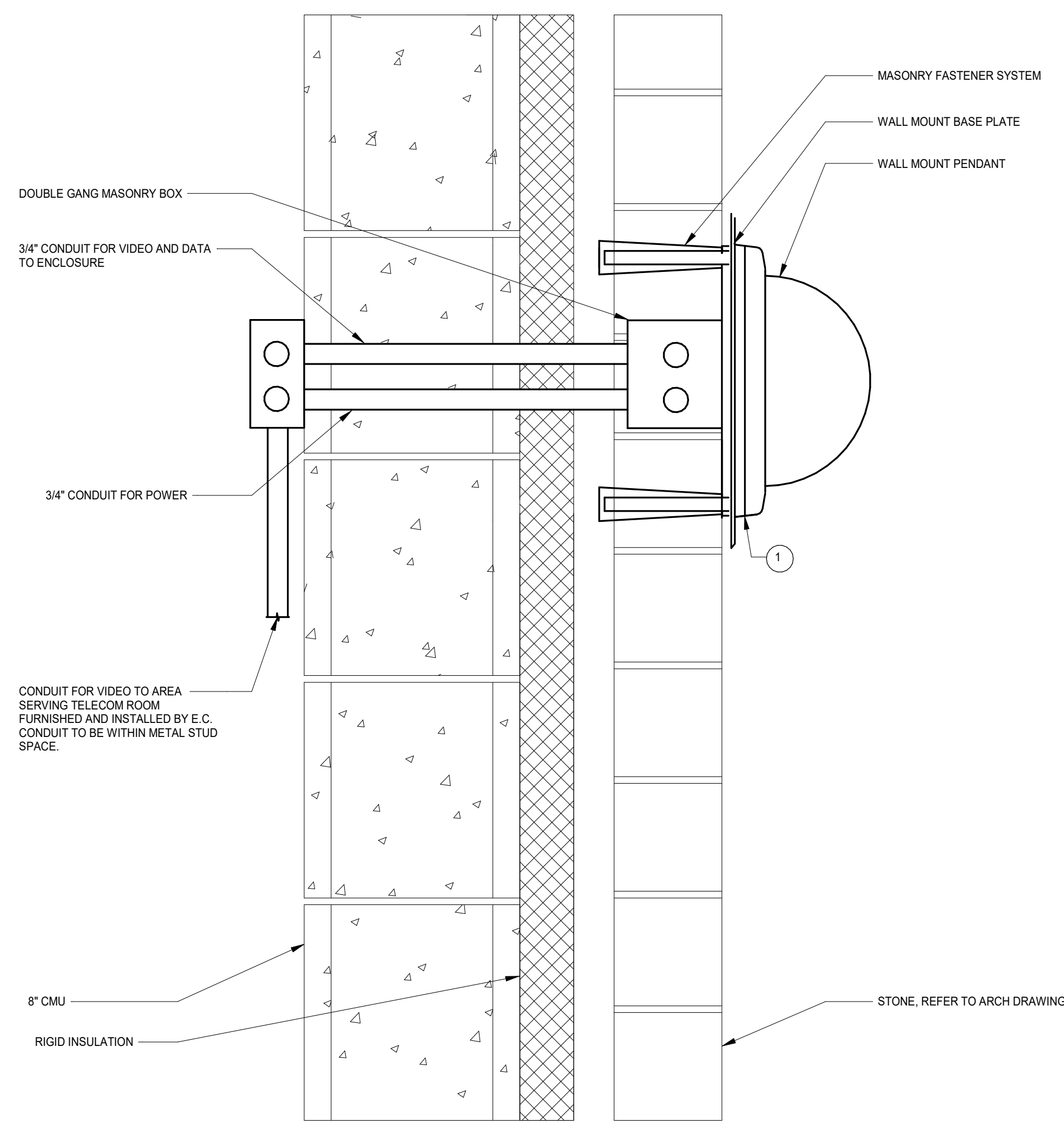
5 CEILING CAMERA MOUNTING DETAIL
N.T.S.

- NOTES:**
1. TYPICAL FOR ALL INTERIOR CAMERAS ON SHEETS T101 AND T102. E.C. SHALL PROVIDE STANDARD SINGLE GANG ELECTRICAL BOX MOUNTED ABOVE ACCESSIBLE CEILING. PROVIDE CAT6 UTP AND WHIP THROUGH THE CEILING TO EXISTING SERVER ROOM.



3 DATA RISER DIAGRAM
N.T.S.

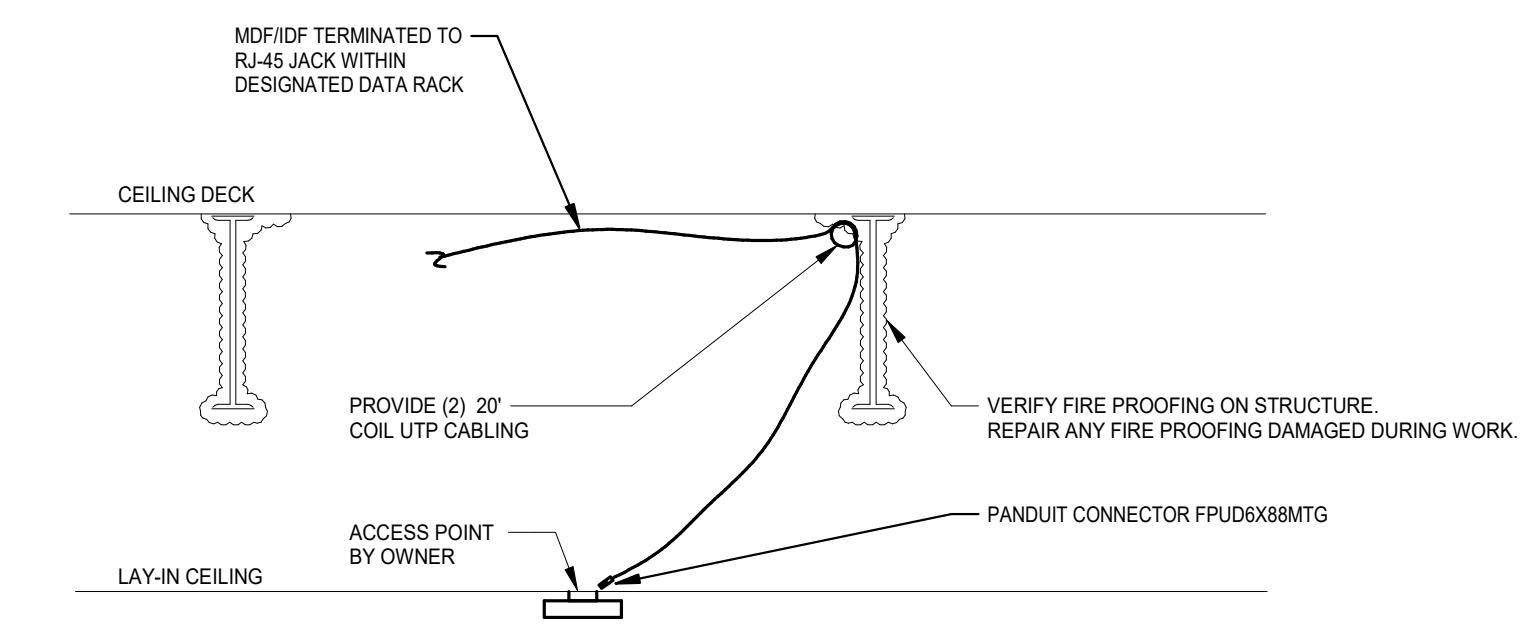
- NOTES:**
1. PROVIDE LADDER RACK WITHIN MDF. THIS LADDER RACK WILL BE SUPPORTED FROM CEILING AND/OR WALLS.
 2. CABLING WITHIN THE MDF AND IDF WILL BE ROUTER OVERHEAD IN CONDUIT, LADDER RACKS AND J-HOOKS.



4 EXTERIOR CAMERA MOUNTING DETAIL
N.T.S.

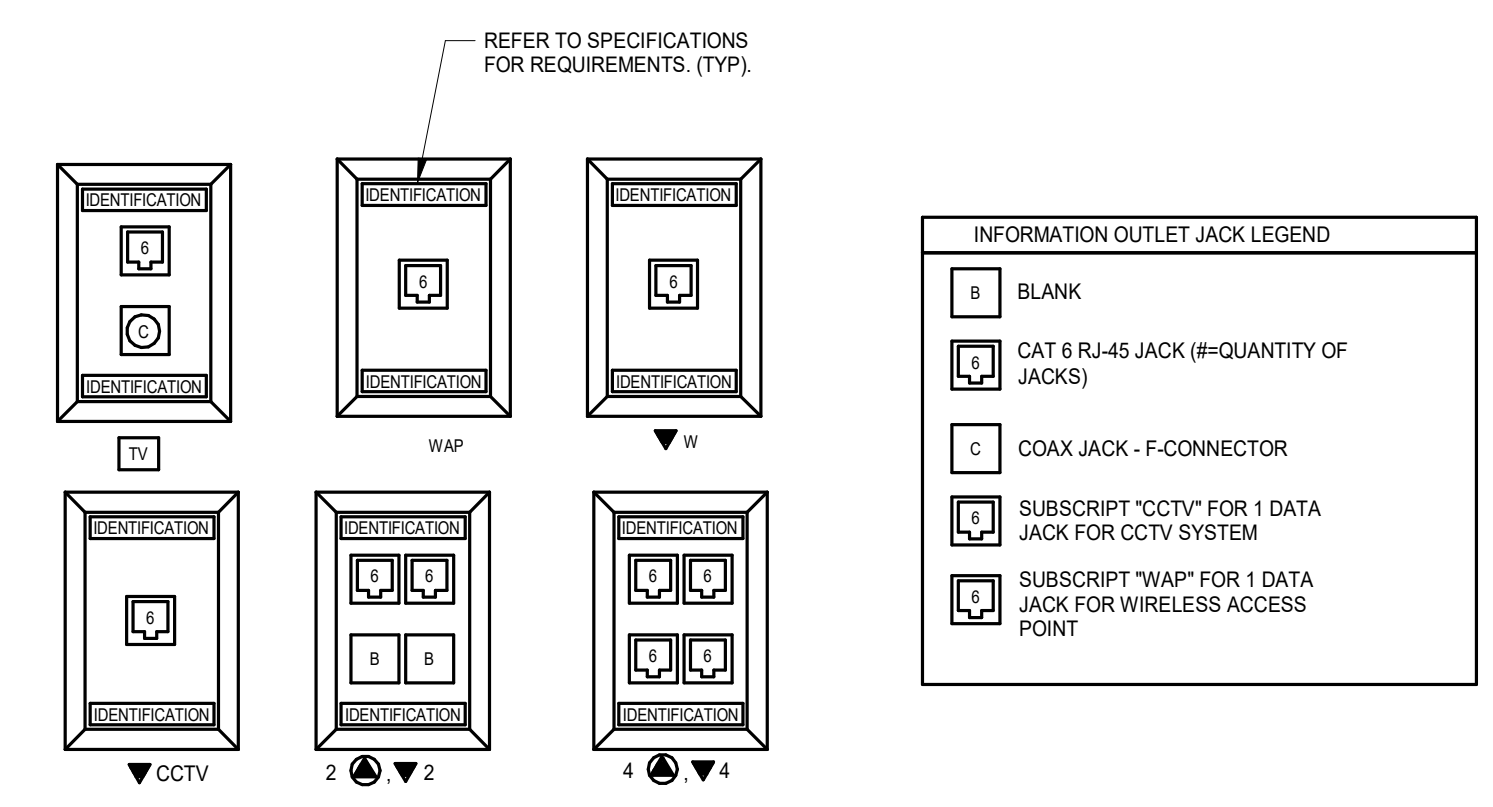
- NOTES:**
1. SECURE WALL MOUNT BASE PLATE TO METAL STUDS WITH FASTENERS. DO NOT SECURE TO METAL PANEL.
 2. SEAL WALL MOUNT BASE PLATE TO METAL PANEL TO PREVENT WATER INFILTRATION.
 3. IF A COMMON BACKBOX IS USED PROVIDE BOX DIVIDER FOR POWER AND VIDEO/DATA.
 4. COORDINATE ALL WORK ON THE EXTERIOR WITH G.C. FINAL INSTALLATION SHALL NOT VIOLATE THE WARRANTY WALL OR COMPROMISE WATER AND AIR SEAL OF THE SYSTEM.

- KEYNOTES:**
1. SECURITY CONTRACTOR SHALL FURNISH AND INSTALL BLACK COVER PLATE FOR ROUGH-IN LOCATIONS. SECURITY CAMERA HOUSING SHALL BE PAINTED TO MATCH EXTERIOR.



2 WIRELESS ACCESS POINT DETAIL
N.T.S.

- NOTES:**
1. REFER TO SHEETS T101 AND T102 FOR LOCATIONS AND QUANTITIES OF INFORMATION OUTLETS. WIRELESS ACCESS POINTS ARE PROVIDED BY THE OWNER. T.C. SHALL INSTALL THE WIRELESS ACCESS POINTS.



1 INFORMATION OUTLET DETAIL
N.T.S.

- NOTES:**
1. REFER TO SHEETS T101 AND T102 FOR LOCATIONS AND QUANTITIES OF INFORMATION OUTLETS.
 2. WIRELESS ACCESS POINTS "DATA" CABLING. REFER TO 21000 FOR WIRELESS ACCESS POINT ROUGH-IN DETAIL.

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**CEDAR FALLS CITY HALL
REMODEL**
CEDAR FALLS, IOWA

No.	Description	Date
	OWNER REVIEW	9-24-2021
	ISSUED FOR BID	10-5-2021

TECHNOLOGY SCHEDULES

Project Number 21004
Date OCTOBER 5, 2021

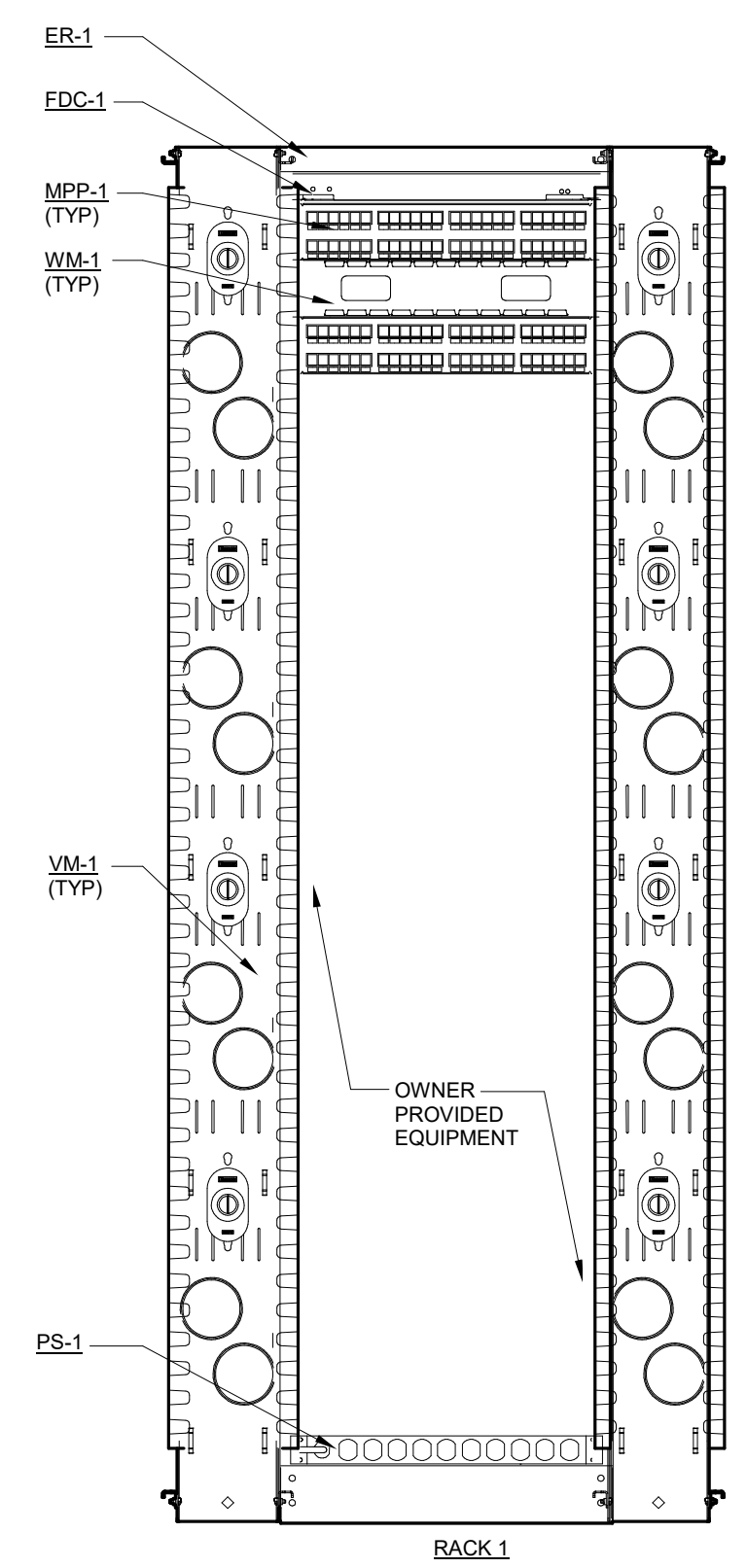
T600

ACCESS CONTROL		
SYMBOL	DESCRIPTION	MODEL #
DC #	DOOR CONTACT - PROVIDE 1" DIAMETER HOLE IN THE FRAME. SNAP LOCK INSULATION BUSHING FOR TIGHT FIT.	ROUGH-IN ONLY HARDWARE TO PROVIDED AND INSTALLED BY OTHERS.
CR #	CARD READER - PROVIDE FLUSH SINGLE GANG JUNCTION BOX FOR CARD READER. FROM DEVICE TO JUNCTION BOX TO ABOVE ACCESSIBLE SPACE. MOUNT AT 42" A.F.F.	ROUGH-IN ONLY HARDWARE TO PROVIDED AND INSTALLED BY OTHERS.
REX	REQUEST TO EXIT - PROVIDE A FLUSH MOUNTED SINGLE GANG JUNCTION BOX CENTERED 12" ABOVE DOOR FRAME. CONNECTED TO THE DOUBLE GANG J-BOX ABOVE THE CEILING.	ROUGH-IN ONLY HARDWARE TO PROVIDED AND INSTALLED BY OTHERS.

CATV SCHEDULE		
SYMBOL	DESCRIPTION	MODEL #
TV	CATV OUTLET, WALL MOUNT CATV COVERPLATE. REFER TO 11500 FOR OUTLET TYPES	FACEPLATE: PANDUIT CFFE1GTY JACK: CPMW COAX COUPLER

CCTV SCHEDULE		
SYMBOL	DESCRIPTION	MODEL #
□-3	CCTV CAMERA. PROVIDE FLUSH FOUR SQUARE JUNCTION BOX FOR CAMERA WITH 3/4" C. FROM DEVICE TO JUNCTION BOX LOCATED ABOVE ACCESSIBLE SPACE. PROVIDE AND INSTALL (1) CATEGORY 6 CABLE TO NEAREST DATA CLOSET. SEE SHEET 1500 FOR INTERIOR AND EXTERIOR CAMERA ROUGH-IN DETAILS.	ROUGH-IN ONLY HARDWARE TO PROVIDED AND INSTALLED BY OTHERS.

NETWORK SCHEDULE		
SYMBOL	DESCRIPTION	MODEL #
ER-1	EQUIPMENT RACK, 4 POST, 84"X 23"X 30"D, BLACK	PANDUIT R4P
EDC-1	OPTICAL FIBER DISTRIBUTION CABINET, [MULTIMODE OR SINGLEMODE] FIBER COMBINATION SHELF FOR 24 LC2 TERMINATIONS.	PANDUIT FCE1U
GND-1	PRE-ASSEMBLED BUS COPPER GROUND BAR.	PANDUIT GE2B1312TP-1 NEWTON INSTRUMENTS ERCC2 STORM COPPER COMPONENTS GEORGIA COPPER OR AN APPROVED EQUAL
▲	INFORMATION OUTLET (1) 1/4" SQUARE BOX. SINGLE GANG PLASTER RING, FLUSH MOUNT ON WALL OR AS NOTED ON PLANS. SUBSCRIPT "N" QUANTITY OF CAT5 DATA CABLES. SUBSCRIPT "W" WALL MOUNTED PHONE. REFER TO 117500 FOR INFORMATION OUTLET TYPES.	INFORMATION OUTLET- WALL COVERPLATE: PANDUIT CFFSL2GTY - OFFICE FURNITURE PANDUIT CFFS4AW - WALL CAT5 JACK: PANDUIT C688TGG - DATA
◀	INFORMATION OUTLET MOUNTED IN FLOORBOX PROVIDED BY OTHERS. SUBSCRIPT # QUANTITY OF CAT5 DATA CABLES, (AV) QUANTITY OF DATA DATA RESERVED FOR AV IN FLOORBOX. REFER TO 117500 FOR INFORMATION OUTLET TYPES.	CAT5 JACK - FLOOR BOX: PANDUIT NK688MBL FACEPLATE FOR RFB2 FLOOR BOX: PANDUIT NK4R4FBL
MP-1	ANGLED MODULAR PATCH PANEL 48 PORT	PANDUIT CPPLA68WBLY ANGLED
PS-1	POWER STRIP 20A, 5-15P, MOUNTED HORIZONTAL IN RACK	TRIPPLITE PDU4M420
VM-1	VERTICAL WIRE MANAGEMENT 6" WIDE, SLACK LOOPS, WITH HINGED DOORS.	PANDUIT VMPP4CASE
⊙ WAP	WIRELESS INFORMATION OUTLET. SURFACE MOUNT BOX SHALL BE SECURELY SUPPORTED ABOVE CEILING. PROVIDE 2" ADDITIONAL SLACK COILED ABOVE ACCESSIBLE SPACE. REFER TO 117500 FOR INFORMATION OUTLET TYPES.	FACEPLATE: PANDUIT CBKZ2WVA JACK: PANDUIT C688TGY
WM-1	WIRE MANAGEMENT HORIZONTAL 2 RACK UNITS.	PANDUIT VMPP1E



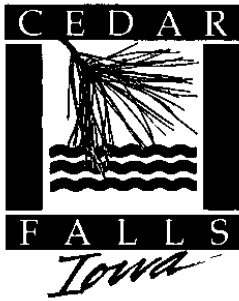
1 RACK ELEVATION DETAIL
N.T.S.

- NOTES:**
1. AVAILABLE SPACE IN RACK IS FOR OWNER PROVIDED SWITCHES AND EQUIPMENT. EQUIPMENT PROVIDED BY OWNERS TELECOM CONTRACTOR

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DEPARTMENT OF COMMUNITY DEVELOPMENT

City of Cedar Falls
 220 Clay Street
 Cedar Falls, Iowa 50613
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 Fax: 319-268-5197
 www.cedarfalls.com

MEMORANDUM

Inspection Services Division

TO: Honorable Mayor Robert Green & City Council

FROM: Jamie Castle, AIA
 Building Official

DATE: October 11, 2021

SUBJECT: Public Hearing for Model Code adoption and ordinance amendments

Every 6 years the City of Cedar Falls adopts the most recent versions of the model building codes. This year we are proposing to continue this standard by adopting the following codes:

- 2021 International Building Code (IBC)
- 2021 International Residential Code (IRC)
- 2021 International Mechanical Code (IMC)
- 2021 Uniform Plumbing Code (UPC)
- 2021 National Fuel Gas Code (NFGC)
- 2020 National Electrical Code (NEC)

By adopting these codes we ensure that our city is being developed to be as safe as possible in regards to life safety. Life safety includes elements of the built environment such as egress, fire separation, and structural stability. These codes are created by architects, engineers, builders, code officials, fire officials, attorneys, and more, which means many entities review them in the context of safety, ease of use, and cost implications. Therefore when we adopt them we are taking advantage of the knowledge of experts in the fields of design and construction. We also ensure that we are referencing the same codes as other local jurisdictions (Waterloo) and the state.

As part of this code adoption we also reviewed Chapter 7 of the City Code of Ordinances. We discovered there were some inconsistencies between the administration provisions between each code type. (Building, Residential, Mechanical, Electrical, and Plumbing) In order to align these codes to match our current processes we have made a significant number of amendments. These amendments do not

change the processes we have in place they simply clarify them and make them easier to follow. For example the Commercial amendments and Residential amendments were previously intermingled. We have pulled them apart and now have a section devoted to each of code. In addition, there are changes in all the codes to provide consistency between each code type. For example the sections regarding fees, working without a permit, refunds, and other administrative items are identical between the codes.

ORDINANCE NO. _____

AN ORDINANCE AMENDING THE INCORPORATION OF OUTSIDE CODES INTO CHAPTER 7, BUILDINGS AND BUILDING REGULATIONS, OF THE CODE OF ORDINANCES OF THE CITY OF CEDAR FALLS. BY: **(1)**. AMENDING SECTION 7-19, ADOPTION, OF ARTICLE II, BUILDING CODE, BY REPEALING SAID SECTION AND ENACTING IN LIEU THEREOF A NEW SECTION 7-19, ADOPTION ; **(2)**. AMENDING SECTION 7-20, AMENDMENTS, OF ARTICLE II, BUILDING CODE, BY REPEALING SAID SECTION AND ENACTING IN LIEU THEREOF A NEW SECTION 7-20, AMENDMENTS; **(3)**. AMENDING SECTION 7-21, MISCELLANEOUS PROVISIONS, OF ARTICLE II, BUILDING CODE, BY REPEALING SAID SECTION AND ENACTING IN LIEU THEREOF A NEW SECTION 7-21, MISCELLANEOUS PROVISIONS; **(4)**. AMENDING SECTION 7-47, PURPOSE, OF ARTICLE III, ELECTRICAL REGULATIONS, BY REPEALING SAID SECTION AND ENACTING IN LIEU THEREOF A NEW SECTION 7-47, PURPOSE; **(5)**. DELETING IN ITS ENTIRETY SECTION 7-48, RULES OF CONSTRUCTION, OF ARTICLE III, ELECTRICAL REGULATIONS; **(6)**. AMENDING SECTION 7-49, NATIONAL ELECTRICAL CODE ADOPTION, OF ARTICLE III, ELECTRICAL REGULATIONS, BY REPEALING SAID SECTION AND ENACTING IN LIEU THEREOF A NEW SECTION 7-49, NATIONAL ELECTRICAL CODE ADOPTION; **(7)**. AMENDING SECTION 7-50, NATIONAL ELECTRICAL CODE AMENDMENTS, OF ARTICLE III, ELECTRICAL REGULATIONS, BY REPEALING SAID SECTION AND ENACTING IN LIEU THEREOF A NEW SECTION 7-50, NATIONAL ELECTRICAL CODE AMENDMENTS; **(8)**. DELETING IN ITS ENTIRETY SECTION 7-55, ALTERATION OF IDENTIFICATION OR RATING MARKINGS, OF ARTICLE III, ELECTRICAL REGULATIONS; **(9)**. DELETING IN ITS ENTIRETY SECTION 7-56, SUPERVISION BY BUILDING OFFICIAL, OF ARTICLE III, ELECTRICAL REGULATIONS; **(10)**. AMENDING SECTION 7-169, TITLE; UNIFORM PLUMBING CODE; ADOPTION; PURPOSE AND SCOPE; CONFLICTING PROVISIONS, OF DIVISION 1, GENERALLY, OF ARTICLE V. PLUMBING REGULATIONS, BY REPEALING SAID SECTION AND ENACTING IN LIEU THEREOF A NEW SECTION 7-169, TITLE; UNIFORM PLUMBING CODE; ADOPTION; PURPOSE AND SCOPE; CONFLICTING PROVISIONS ; **(11)**. AMENDING SECTION 7-170, UNIFORM PLUMBING CODE; AMENDMENTS, OF DIVISION 1, GENERALLY, OF ARTICLE V, PLUMBING REGULATIONS, BY REPEALING SAID SECTION AND ENACTING IN LIEU THEREOF A NEW SECTION 7-170, UNIFORM PLUMBING CODE; AMENDMENTS; **(12)**. AMENDING SECTION 7-413, INTERNATIONAL MECHANICAL CODE ADOPTION, OF ARTICLE VIII, MECHANICAL CODE, BY REPEALING SAID SECTION AND ENACTING IN LIEU THEREOF A NEW SECTION 7-413, INTERNATIONAL MECHANICAL CODE ADOPTION; **(13)**. AMENDING SECTION 7-414, AMENDMENTS TO INTERNATIONAL MECHANICAL CODE, OF ARTICLE VIII, MECHANICAL CODE, BY REPEALING SAID SECTION AND ENACTING IN LIEU

THEREOF A NEW SECTION 7-414, AMENDMENTS TO INTERNATIONAL MECHANICAL CODE.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CEDAR FALLS, IOWA:

Section 1. Section 7-19, Adoption, of Article II, Building Code, of Chapter 7, Buildings and Building Regulations, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety and a new Section 7-19, Adoption, is enacted in lieu thereof, as follows:

Sec. 7-19. Adoption.

- (a) Except as provided in this article by specific changes, the ~~2012~~2015 Edition of the International Residential Code for One- and Two-Family Dwellings published by the International Code Council, Inc., which hereinafter may be referred to as the "IRC", and the ~~2012~~2015 Edition of the International Building Code, published by the International Code Council, Inc., which hereinafter may be referred to as called the "IBC" "building code" in this article, are hereby adopted by reference and are effective as if fully set forth in this article. The IRC and IBC collectively may be referred to as the "building code" in this article.
- (b) The 2009 American National Standard of Accessible and Usable Buildings and Facilities published by the International Code Council, Inc., which hereinafter may be referred to as "ICC A117.1-2009," is hereby adopted by reference and is effective as if fully set forth in this article.
- (c) An official copy of the code adopted by this article, including a certificate by the clerk as to its adoption and effective date, is on file in the office of the clerk, ~~in either a hardbound or electronic version,~~ available for public inspection.

(Code 2017, § 7-26; Ord. No. 2868, § 1, 7-5-2016)

Section 2. Section 7-20, Amendments, of Article II, Building Code, of Chapter 7, Buildings and Building Regulations, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety and a new Section 7-20, Amendments, is enacted in lieu thereof, as follows:

Sec. 7-20. Amendments.

The ~~2012~~2015 Edition of the International Residential Code for One- and Two-Family Dwellings ("IRC") and the ~~2012~~2015 Edition of the International Building Code ("IBC"), ~~published by the International Code Council, Inc.,~~ as adopted in section 7-19, ~~are~~ is hereby amended in the following respects:

(A) International Residential Code for One- and Two-Family Dwellings ("IRC") amendments.

(1) Subsection R101.1, Title, is amended by deleting "[NAME OF JURISDICTION]" and substituting in lieu thereof "City of Cedar Falls."

(24) Subsections ~~IBC103.1 and R103.1, Creation of Enforcement Agency,~~ ~~is~~are amended by deleting "department of building safety" and substituting in lieu thereof "Inspection Services Division" to read as follows:

~~IBC103.1 and R103.1 Creation of Enforcement Agency. There is hereby established in the city an inspection services division, which shall be under the administrative and operational control of the building official.~~

(32) Subsections ~~IBC104.2 and R104.2, Applications and Permits,~~ ~~is~~are amended by adding the following subparagraphs thereto read as follows:

~~IBC104.2 and R104.2 Applications and Permits. The building official shall receive applications, review construction documents and issue permits for the erection and alteration of buildings and structures, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this Code.~~

~~To obtain a permit the applicant shall first file:~~

- (a) To obtain a permit aAn applicant shall show proof of registration with the state and shall execute and file with the city *building official* (or a specified inter-governmental agency if so designated by the *building official*) a certificate of insurance written by a company authorized to transact business in the state, in limits of not less than \$300,000.00 combined single limit to any person and \$100,000.00 property damage; said certificate to be written on a standard form ~~and carrying an endorsement naming the city and its employees (or the inter-governmental agency designated by the *building official*) as additional insured as its interest may appear~~ and conditioned upon the faithful performance of all duties required of such contractor by any ordinances, rules and regulations of the city. It shall be a further condition of said certificate of insurance that the obligator will hold the city (through the specified inter-governmental agency if so designated) harmless from any and all damages sustained by reason of neglect or incompetence on the part of such contractor, his agents or employees in the performance of the work done under a license or *permit* issued upon the filing of said certificate.

Said certificate of insurance shall be issued by December 31 of each year, and shall be re-filed on or before said date for each subsequent year and shall be in continuous full force and effect. That is the intent and purpose of said certificate of insurance to also bind the individual, company, firm, association or partnership, whether it be trade name, corporation or other business association or arrangement with which the principal is associated.

Homeowners working on their principal property shall be exempt from filing said certificate.

- (b) Where a person desires to remodel or repair a building or structure of which they are the owner or owners of record, such work may be done by a member of their household without requiring the certificate of insurance otherwise required by this section.
- (1) Required permits shall be necessary for all remodel or *repair* work.
 - (2) No owner or owner of record shall replace, remodel or *repair* any electrical, plumbing or mechanical heating on any property that they are not the owner/occupant with a homestead exemption and valid *permit*.

- (43) Subsections IBC104.8 and R104.8, Liability, isare amended- deleted in its entirety and a new Subsection R104.8, Liability, is substituted in lieu thereof to read as follows:

~~IBC104.8 and~~R104.8 Liability. The *building official*, or ~~his~~ authorized representative of the *building official* charged with the enforcement of this Code, acting in good faith and without malice in the discharge of ~~his~~ duties for the city, shall not thereby render himself or herself personally liable for any damage that may accrue to persons or property as a result of any act or by reason of any act or omission in the discharge of ~~his~~ duties. Any suit brought against the city or the *building official*

or employee because of such act or omission performed by him or her in the enforcement of any provisions of such Codes or other pertinent laws or ordinances implemented through the enforcement of this Code or enforced by the inspection services division shall be defended by the city until the final termination of such proceedings, any judgment resulting therefrom shall be assumed by the city. This Code shall not be construed to relieve from or lessen the responsibility of any *person* owning, operating or controlling any building or structure for any damages to persons or property caused by defects, nor shall the inspection services division of the city be held as assuming any such liability by reason of the inspections authorized by this Code or any certificates of inspection issued under this Code.

~~(4) Subsections IBC104.8 and R104.8.1, Affirmation, are added, to read as follows:~~

~~IBC104.8.1 and R104.8.1 Affirmation. If any section, subsection, sentence, clause or phrase of this Code is for any reason held to be invalid, such decision shall not affect the validity of the remaining portions. The city council hereby declares that it would have passed this ordinance and Code and each section, subsection, sentence, clause or phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases be declared invalid.~~

(5) A new sSubsections IBC104.8.2 and R104.8.2, Conflict of Interest, isare added, to read as follows:

~~IBC104.8.2 and R104.8.2~~ Conflict of Interest. No official or representative of the inspection services division shall be engaged directly or indirectly with the furnishing of labor, materials or *appliances* for the construction, *alteration* or maintenance of a building or the preparation of plans or specifications therefor, unless the official or representative is the *owner* of such building; nor shall such official or representative engage in any work which conflicts with the official duties or with the interests of the inspection services division.

(6) Subsection R104.10.1, Flood hazard areas, is deleted in its entirety.

~~(7) Subsection R105.2, Work Exempt From Permit, is deletedamended- in its entirety and a new subsection R105.2, Work exempt from permit, is substituted in lieu thereof to read as follows:~~

R105.2 Work ~~e~~Exempt ~~f~~From ~~p~~Permit. Permits shall not be required for the following. Exemption from the *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

Building:

1. One-story detached accessory structures provided the floor area does not exceed 120 square feet.
2. Fences ~~not over six feet (1829 mm) high.~~
3. Retaining walls that are not over four feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge.
4. Water tanks supported directly upon grade if the capacity does not exceed 5,000 gallons (18927 L) and the ratio of height to diameter or width does not exceed two to one.
5. Sidewalks and driveways not more than 30 inches (762 mm) above adjacent grade and not over any basement or story below.

Exception: Wooden decks are not, for the purpose of this article, to be considered as a sidewalk or driveway, and section R105.1 shall apply to such.

6. Painting, papering, tiling not adjacent to or part of a shower, and carpeting.

7. Swimming pools that are accessory to one- or two-family dwellings.
8. Swings or other playground equipment accessory to a one- or two-family dwelling.
9. Window awnings supported by an exterior wall which do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.

Delete references to Electrical, Gas, Mechanical and Plumbing. A land use and/or right-of-way permit may still be required.

~~(7) Subsection IBC105.2, Work Exempt From Permit, is amended to read as follows:~~

~~IBC105.2 Work Exempt From Permit. Exemptions from permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction. Permits shall not be required for the following:~~

~~Building:~~

- ~~1. Fences not over seven feet (2134 mm) high.~~
- ~~2. Oil derricks.~~
- ~~3. Retaining walls that are not over four feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge or impounding Class I, II, IIIA liquids.~~
- ~~4. Water tanks supported directly on grade if the capacity is not greater than 5,000 gallons (18 925 L) and the ratio of the height to diameter or width is not greater than 2:1.~~
- ~~5. Sidewalks and driveways not more than 30 inches (762 mm) above adjacent grade, and not over any basement or story below and are not part of an accessible route.~~
- ~~6. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.~~
- ~~7. Temporary motion picture, television and theater stage sets and scenery.~~
- ~~8. Prefabricated swimming pools accessory to a Group R-3 occupancy.~~
- ~~9. Shade cloth structures constructed for nursery or agricultural purposes, not including service systems.~~
- ~~10. Swings and other playground equipment accessory to detached one- and two-family dwellings.~~
- ~~11. Window awnings in Group R-3 and U occupancies, supported by an exterior wall that do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.~~
- ~~12. Non-fixed and movable fixtures, cases, racks, counters and partitions not over five feet nine inches (1753 mm) in height.~~

~~Delete all references to Electrical, Gas, Mechanical and Plumbing in subsection 105.2.~~

~~—R105.2.2, Repairs, is deleted.~~

~~(8) Subsection R105.3.1.1, Determination of Substantially Improved or Substantially Damaged Existing Buildings In Flood Hazard Areas, is deleted in its entirety.~~

~~(98) Subsections IBC105.5 and R105.5, Expiration, is deleted amended in its entirety and a new subsection 105.5, Expiration, is substituted in lieu thereof, to read as follows:~~

~~IBC105.5 and R105.5 Expiration. Every permit issued under the provisions of this Code shall expire 180 days from date of issue if the work has not been commenced, and 365 days 12 months from the~~

date of issue if the work has not been completed, unless the application is accompanied by a construction schedule of specific longer duration, in which instance the *permit* may be issued for the time period of the construction schedule, with the approval of the *building official*. If the work has not been commenced or completed, as the case may be, including all required inspections, by the expiration date of the *permit*, no further work shall be done until the *permit* has been renewed by the *owner*, or the *owner's* agent, and payment of the renewal fee has been received. The *building official* is authorized to grant one or more extensions of time, for periods of not more than six months each, without payment of the renewal fee. Extensions shall be requested by the *owner*, or the *owner's* agent, and justifiable cause demonstrated by the *owner*.

~~(109) Subsections IBC109 and R108.5, Refunds Fees, isare amended by deleted the in its entirety and a new subsection R108.5, Refunds, is substituted in lieu thereof, as follows adding the following new subsections:~~

R108.5, Refunds. Refunds may be available only when work under the permit has not been commenced. Refunds may be available only for permit fees that exceed \$100.00. If granted, the refund shall be eighty percent of the permit fee.

~~(11) A new subsection, R108.7, Reinspections, is added as follows:~~

R108.7, Reinspections. A reinspection fee shall be permitted to be assessed for each inspection or reinspection where such portion of work for which inspection is called is not complete or where required corrections have not been made.

This provision shall not be interpreted as requiring reinspection fees the first time a job is rejected for failure to be in accordance with the requirements of this code, but as controlling the practice of calling for inspection before the job is ready for inspection or reinspection.

Reinspection fees shall be permitted to be assessed where the approved plans are not readily available to the inspector, for failure to provide safe access on the date for which the inspection is requested, or deviating from plans requiring approval of the City.

~~IBC109.7 and R108.7, Investigation. Whenever any work for which a permit is required by this Code has been commenced without first obtaining said permit, a special investigation shall be made before a permit may be issued for such work.~~

~~IBC109.7.1 and R108.7.1 Fee. An investigation fee, in addition to the permit fee, shall be collected whether or not a permit is then or subsequently issued. The investigation fee shall be equal to the amount of the permit fee required by this Code. The payment of such investigation fee shall not exempt any person from compliance with all other provisions of this Code nor from any penalty prescribed by law.~~

~~(10) Subsection IBC110.3.5, Lath, Gypsum Board and Gypsum Panel Product Inspection, is amended by deleting the exception.~~

~~(124) Sections IBC113 and R112, Board of Appeals, isare amended by deleting that section in its entirety and a new Section, R112 Board of Appeals, is substituted in lieu thereof, to read as follows:~~

~~Section IBC113 and R112. Board of Appeals.~~

~~IBC113.1 and R112.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the building official or fire official relative to the application and interpretation of this Code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the governing body and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant, with a duplicate copy to the building official and fire official.~~

In so far as reasonably practicable, appointees for membership on the board shall be residents of the city, or, if that is not reasonably practicable, shall have a place of employment in the city. Appointees who are neither residents of the city nor who have a place of employment in the city may be eligible for appointment to the board upon a finding of the unavailability of qualified applicants, as determined by the mayor. Any person who is a member of the board on the date of adoption of this ordinance who does not meet the qualifications for membership set forth herein shall continue to be eligible to serve as a member of the board until both the expiration of ~~the member's~~ current term and the member's nonreappointment by the mayor to an additional term.

~~IBC113.2 and~~ R112.2 Limitation of ~~a~~Authority. The board of appeals shall have no authority relative to interpretation of the administration provisions of this Code; nor shall the board be empowered to waive requirements of this Code.

~~IBC113.3 and~~ R112.3 Qualifications. The board shall consist of members who are qualified by experience and training to pass upon matters pertaining to building construction or experience and training to pass upon matters pertaining to hazards of fire, explosions, hazardous conditions or fire protection systems, and who are not employed by the city, ~~except that one member of the city council may serve on the board.~~ At no time shall there be more than two members of the board selected from the same ~~company profession or business.~~

~~IBC113.4 and~~ R112.4 Appointment of ~~m~~Members; Terms. The board of appeals shall consist of ~~five~~seven members who are appointed by the mayor with city council approval ~~and who shall hold office at the mayor's pleasure.~~ The terms of current members of the board of appeals shall expire on December 31, 2021. Three members shall then be appointed for five year terms expiring on December 31, 2026, and two members shall be appointed for four year terms expiring on December 31, 2025. Thereafter, all appointments shall be for a term of five years (except for vacancies), so as to stagger the terms of the members. The members of the board of appeals shall serve without compensation.

~~IBC113.5 and~~ R112.5 Chairman ~~s~~Selection; Secretary. The board of appeals shall select one of its members to serve as chair~~man~~. The *building official* and *fire official* shall be ex-officio members, one of whom shall act as the secretary to the board, keeping records of all proceedings.

~~IBC113.6 and~~ R112.6 Conflict of ~~i~~nterest. No member of the board of appeals shall pass on any action or appeal in which ~~the member~~~~he~~ is engaged as a contractor or material dealer, or in preparation of specifications or plans, or in which he ~~or she~~ has any personal interest.

~~IBC113.7 and~~ R112.7 Meetings. The board of appeals shall meet upon notice of the chair~~man~~, within ten days of the filing of an appeal, or at stated periodic meetings if warranted by the volume of work. The meetings or hearings of the board shall be public. When four qualified members of the board are not present to consider any specific appeal, either the appellant or the authorized representatives of the *building official* or *fire official* may request a postponement of the hearing.

~~IBC113.8 and~~ R112.8 Appeals. Any person, firm or corporation may exercise the right to file an appeal for the purpose of new construction methods or materials, or for the true intent of the building code or fire code as interpreted by the *building official* or *fire official*.

~~IBC113.9 and~~ R112.9 Procedure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant, with a duplicate copy to the *building official* and *fire official*.

~~IBC113.10 and~~ R112.10 Votes ~~r~~Required. Failure to secure ~~three~~four concurring votes of the members of the board of appeals shall be deemed a confirmation of the decision of the *building official* or *fire official*.

~~IBC113.11 and~~ R112.11 Enforcement. The *building official* or *fire official* shall take immediate action in accordance with the decisions of the board of appeals.

(132) ~~Sections IBC114, and R113, Violations, isare amended- deleted in its entirety and a new Section, R113, Violations, is substituted in lieu thereof, to read as follows:~~

R113. Violations.

~~IBC114.1 and~~ R113.1 Unlawful aActs. It shall be unlawful for any person, firm or corporation to erect, construct, enlarge, alter, extend, repair, move, ~~improve~~, remove, ~~convert or~~ demolish, ~~equip, use, or occupy or maintain~~ any building, ~~or~~ structure or equipment regulated by this code, or cause same to be done, in conflict within the city, or cause or permit such work to be done, contrary to or in violation of any of the provisions of the cCode.

~~IBC114.2 and~~ R113.2 Notice of vViolations. The *building official* is authorized to serve a notice of violation or order on the *owner* and *person* responsible for the erection, construction, enlargement, *alteration*, extension, repair, movement, ~~improvement~~, removal, ~~conversion~~, demolition, ~~equipment, usage, or~~ occupation ~~or maintenance~~ of any building or structure in violation of the provisions of this Code, or in violation of a detail statement or a plan *approved* thereunder, or in violation of a *permit* or certificate issued under the provisions of this Code. Such order shall direct the discontinuance of the illegal action or condition and the abatement of the violation.

~~IBC114.3 and~~ R113.3 Prosecution of vViolation. If the notice of violation is not complied with in the time prescribed by such notice, the *building official* is authorized to request the city attorney to institute the appropriate proceeding at law or in equity to restrain, correct or abate such violation, or to require the removal or termination of the unlawful occupancy of the building or structure in violation of the provisions of this Code or of the order or direction made pursuant thereto.

~~IBC114.4 and~~ R113.4 Violation pPenalties. Any person who violates a provision of this code or fails to comply with any of the requirements thereof or who erects, constructs, alters or repairs a building or structure in violation of the approved construction documents or directive of the building official, or of a permit or certificate issued under the provisions of this codeA person, firm or corporation violating any of the provisions of this Code or such amendments shall be deemed guilty of a municipal infraction punishable as providedoutlined in section 1-9 of the Code of Ordinances of the city.

(143) ~~SubsSections IBC115and R114.4, Failure to ComplyStop Work Orders, isare amended by striking that subsection in its entirety, and a new subsection R114.5, Failure to comply, is substituted in lieu thereof, to read as follows:~~

R114.4 Failure to comply. Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be deemed guilty of a municipal infraction punishable as provided in section 1-9 of the Code of Ordinances of the city.~~IBC115.1 and R114.1 Stop Work Orders. Whenever any work is being done contrary to the provisions of this Code, the building official may order the work stopped by notice in writing served on any persons engaged in doing or causing such work to be done, and any such persons shall forthwith stop such work until authorized by the building official to proceed with the work. When a stop work order has been issued, the person responsible for such work being done shall make application to obtain a permit as required by chapter 1 of this Code. The permit for such work shall be obtained within 30 days from receipt of the stop work notice. A violation of this subsection shall be deemed a municipal infraction and punished as provided in chapter 1 of the Code of Ordinances of the city.~~

~~IBC115.2, Issuance, IBC115.3, Unlawful Continuance, and R114.2, Unlawful Continuance, are deleted.~~

(154) ~~A new Section IBC116, Unsafe Structures and Equipment, is amended to read as follows, and insert Section R115, Unsafe Structures and Equipment, is added to read as follows:~~

R115. Unsafe Structures and Equipment.

~~IBC116.1 and~~ R115.1 Unsafe ~~conditions-Buildings or Structures~~. All buildings or structures regulated by this Code that are or hereafter become structurally unsafe, insanitary or deficient because of inadequate means of egress facilities, inadequate light and ventilation, or which constitute a fire hazard, or are otherwise dangerous to human life or the public welfare, or that involve illegal or improper occupancy or inadequate maintenance, shall be deemed, for the purpose of this section, unsafe. Any use of buildings or structures constituting a hazard to safety, health or public welfare by reason of inadequate maintenance, dilapidation, obsolescence, fire hazard, disaster, damage or abandonment is, for the purpose of this section, an unsafe use. Parapet walls, cornices, spires, towers, tanks, statuary and other appendages or structural members, that are supported by, attached to, or a part of a building and that are in deteriorating condition or otherwise unable to sustain the design loads that are specified in this Code are hereby designated as unsafe building appendages. Structures or existing equipment that are or hereafter become unsafe, insanitary or deficient because of inadequate means of egress facilities, inadequate light and ventilation, or that constitute a fire hazard, or are otherwise dangerous to human life or the public welfare or that involve illegal or improper occupancy or inadequate maintenance, shall be deemed an unsafe condition. Unsafe structures shall be taken down and removed or made safe, as the building official deems necessary and as provided for in this section. A vacant structure that is not secured against unauthorized entry shall be deemed unsafe.

~~IBC116.2 and~~ R115.2 Declaration of uUnsafe sStructures. All such unsafe ~~buildings~~, structures or ~~equipment~~appendages are hereby declared to be public nuisances and shall be abated by repair, rehabilitation, demolition or removal in accordance with procedures set forth in chapter 15, article I of the Code of Ordinances of the city, entitled, "Nuisances". As an alternative, the ~~building official, or other employee or official of this jurisdiction as designated by the city council,~~ may institute the appropriate action within the procedures specified in section R115.3 ~~or~~ ~~IBC116.3~~ to abate the violation.

~~IBC116.3 and~~ R115.3 Procedure for cCondemnation and rRemoval. It shall be the duty of the ~~building official or a designated representative~~ to report to the city council any ~~buildings or~~ structures or equipment within the corporate limits of the city which may be deemed ~~unsafe~~dangerous. Whenever it is reported to or comes to the attention of the city council that a building is unsafe ~~or dangerous~~ as set forth in the preceding subsection, the mayor shall appoint a committee of three councilmembers who, together with the building official, fire chief and county health officer, shall inspect such premises and report their findings to the city council. If that committee reports that such building or structure is unsafe ~~or dangerous~~ and shall recommend its destruction as a nuisance, the matter shall be set down for hearing at the next regular meeting of the city council, and at least ten days' written notice of the hearing shall be served on the holder of the legal title of the premises and on the person in possession thereof; provided, however, that, if the owner of such building is a nonresident to the state or is not found within the state and has no agent within the state upon whom service can be made, service shall be made by mailing the written notice to the last known address of the owner of record and by two publications in a newspaper in general circulation in the city, the last publication thereof to be at least ten days before the date set for the hearing.

At the hearing, the owner and person in possession of the premises shall be given opportunity to show cause why such building or structure should not be declared to be a nuisance and destroyed. If the city council shall decide that the building is unsafe as provided in this section~~dangerous, is liable to fall, is a fire hazard, or is unfit for human habitation or is dangerous to life and health~~, then it may declare the building to be a nuisance and order it to be abated within the time fixed by it. Written notice of such finding shall be given the owner and person in possession, and they shall be given time to destroy the building as the council may fix; provided, however, that, if the owner of such building or structure is a nonresident of the state or is not

found within the state and has no agent within the state upon whom service can be made, service of the written notice shall be made by mailing the notice to the last known address and by two publications in a newspaper of general circulation in the city, the last publication thereof to be at least ten days before the date set for the destruction of the building or structure.

~~(15) Subsections IBC116.4, Method of Service, and IBC116.5, Restoration, are deleted.~~

~~(16) Subsections R302.1, Exterior Walls, through R302.4.2, Membrane Penetrations, are deleted in their entirety, and replaced with the following:~~

~~Section R302.1 Two-Family Dwellings. Dwelling units in two-family dwellings shall be separated from each other by wall and/or floor assemblies having not less than 1-hour fire-resistance rating when testing in accordance with ASTM E 119. Fire-resistance-rated floor-ceiling and wall assemblies shall extend to and be tight against the exterior wall and wall assemblies shall extend to the underside of the roof sheathing.~~

~~Exception: A fire-resistant rating of one-half hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13.~~

~~R302.1.1 Supporting Construction. When floor assemblies are required to be fire-resistance-rated by section R302.1, the supporting construction of such assemblies shall have an equal or greater fire-resistive rating.~~

~~R302.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance-rated wall assemblies meeting the requirements of section R302 for exterior walls.~~

~~Exception: A common two-hour fire-resistance-rated wall is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. Electrical installations shall be installed in accordance with chapters 33 through 42. Penetrations of electrical outlet boxes shall be in accordance with section R302.3.~~

~~R302.2.1 Continuity. The common wall for townhouses shall be continuous from the foundation to the underside of the roof sheathing, deck or slab and shall extend the full length of the common wall including walls extending through and separating attached accessory structures.~~

~~R302.2.2 Parapets. Parapets constructed in accordance with section R302.2.3 shall be provided for townhouses as an extension of common exterior walls in accordance with the following:~~

- ~~1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.~~
- ~~2. Where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is not more than 30 inches (762 mm) above the lower roof, the parapet shall extend not less than 30 inches (762 mm) above the lower roof surface.~~

~~Exception: A parapet is not required in the two cases above when the roof is covered with a minimum class C roof covering, and the roof decking or sheathing is of noncombustible materials or approved fire-retardant treated wood for a distance of four feet (1219 mm) on each side of the wall or walls, or one layer of 5/8-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking or sheathing for a distance of four feet (1219 mm) on each side of the wall or walls.~~

- ~~3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher roof is more than 30 inches (762 mm) above the lower roof. The common wall construction from the lower roof to the underside of the higher roof deck shall not have less than a one-hour fire-resistive rating. The wall shall be rated for exposure from both sides.~~

~~R302.2.3 Parapet Construction.~~ Parapets shall have the same fire-resistance rating as that required for the supporting wall or wall. On any side adjacent to a roof surface, the parapet shall have noncombustible faces for the uppermost 18 inches (457 mm), to include counter flashing and coping materials. Where the roof slopes toward a parapet at slopes greater than two units vertical in 12 units horizontal (16.7 percent per slope), the parapet shall extend to the same height as any portion of the roof within a distance of three feet (914 mm), but in no case shall the height be less than 30 inches (762 mm).

~~R302.2.4 Structural Independence.~~ Each individual townhouse shall be structurally independent.

Exceptions:

- ~~1.—Foundations supporting exterior walls or common walls.~~
- ~~2.—Structural roof and wall sheathing from each unit may fasten to the common wall framing.~~
- ~~3.—Nonstructural wall coverings.~~
- ~~4.—Flashing at termination of roof covering over common wall.~~
- ~~5.—Townhouses separated by a common 2-hour fire-resistance-rated wall as provided in section R302.2.~~

~~R302.3 Rated Penetrations.~~ Penetrations of wall or floor/ceiling assemblies required to be fire-resistance rated in accordance with section R302.1 or R302.2 shall be protected in accordance with this section.

~~R302.3.1 Through Penetrations.~~ Through penetrations of fire-resistance-rated wall or floor assemblies shall comply with section R302.3.1.1 or R302.3.1.2.

Exception: Where the penetrating items are steel, ferrous or copper pipes or steel conduits, the annular space shall be permitted to be protected as follows:

- ~~1.—In concrete or masonry wall or floor assemblies where the penetrating item is a maximum six inches (152 mm) nominal diameter and the opening is a maximum 144 square inches (92 900 mm²), concrete, grout or mortar shall be permitted where installed to the full thickness of the wall or floor assembly or the thickness required to maintain the fire-resistance rating.~~
- ~~2.—The material used to fill the annular space shall prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 time temperature fire conditions under a minimum positive pressure differential of 0.01 inch of water (3 Pa) at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.~~

~~R302.3.1.1 Fire-Resistance-Rated Assembly.~~ Penetrations shall be installed as tested in the approved fire-resistance-rated assembly.

~~R302.3.1.2 Penetration Firestop System.~~ Penetrations shall be protected by an approved penetration firestop system installed as tested in accordance with ASTM E 814 or UL 1479, with a minimum positive pressure differential of 0.01 inch of water (3 Pa) and shall have an F rating of not less than the required fire-resistance rating of the wall or floor/ceiling assembly penetrated.

~~R302.3.2 Membrane Penetrations.~~ Membrane penetrations shall comply with section 302.3.1. Where walls are required to have a minimum one-hour fire-resistance rating, recessed light fixtures shall be so installed such that the required fire-resistance will not be reduced.

Exceptions:

1. ~~Steel electrical boxes that do not exceed 16 square inches (0.0103 m²) in area provided the total area of such openings does not exceed 100 square inches (0.0645 m²) for any 100 square feet (9.29 m²) of wall area. Outlet boxes on opposite sides of the wall shall be separated as follows:~~

- ~~1.1. By a horizontal distance of not less than 24 inches (610 mm);~~
- ~~1.2. By a horizontal distance of not less than the depth of the wall cavity when the wall cavity is filled with cellulose loose-fill, rock wool or slag mineral wool insulation;~~
- ~~1.3. By solid fire blocking in accordance with section R602.8.1;~~
- ~~1.4. By protecting both outlet boxes by listed putty pads; or~~
- ~~1.5. By other listed materials and methods.~~

2. ~~Membrane penetrations for listed electrical outlet boxes of any materials are permitted provided such boxes have been tested for use in fire resistance-rated assemblies and are installed in accordance with the instructions included in the listing. Outlet boxes on the opposite sides of the wall shall be separated as follows:~~

- ~~2.1. By a horizontal distance of not less than 24 inches (610 mm);~~
- ~~2.2. By solid fire blocking in accordance with section R602.8;~~
- ~~2.3. By protecting both outlet boxes by listed putty pads; or~~
- ~~2.4. By other listed materials and methods.~~

3. ~~The annular space created by the penetration of a fire sprinkler provided it is covered by a metal escutcheon plate.~~

~~(17) Section IBC310, Residential Group R, is amended to delete all references to "congregate living facilities."~~

~~(16) Subsection R301.1.4, Intermodal shipping containers, is deleted in its entirety.~~

~~(178) Subsection R302.13, Fire Protection of Floors, is deleted in its entirety.~~

~~(189) Subsection R308.4.6, Glazing Adjacent to Stairs and Ramps, is deleted in its entirety and a new subsection R308.4.6, Glazing adjacent to stairways and ramps, is substituted in lieu thereof, as follows: amended to read the same as IBC 2406.4.6 Glazing adjacent to stairways and ramps.~~

R308.4.6 Glazing adjacent to stairways and ramps. Glazing where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) above the plane of the adjacent walking surface of stairways, landings between flights of stairs and ramps shall be considered to be a hazardous location.

Exceptions:

1. The side of a stairway, landing or ramp that has a guard complying with the provisions of Sections 1015 and 1607.9 of the IBC, and the plane of the glass is greater than 18 inches (457 mm) from the railing.
2. Glazing 36 inches (914 mm) or more measured horizontally from the walking surface.

~~(1920)~~ Subsection R308.4.7, Glazing Adjacent to the Bottom Stair Landing, is deleted in its entirety and a new subsection R308.4.7, Glazing adjacent to the bottom stairway landing, is substituted in lieu thereof, as follows:~~amended to read the same as IBC 2406.4.7 Glazing adjacent to the bottom stairway landing.~~

R308.4.7 Glazing adjacent to the bottom stairway landing. Glazing adjacent to the landing at the bottom of a stairway where the glazing is less than 60 inches (1524 mm) above the landing and within a 60-inch (1524 mm) horizontal arc that is less than 180 degrees (3.14 rad) from the bottom tread nosing shall be considered to be a hazardous location.

~~(20)~~ Subsection R310.6, Dwelling additions, is amended by deleting subparagraph 3 under "Exceptions" in its entirety.

~~(2124)~~ Section R313, Automatic Fire Sprinkler Systems, is deleted in its entirety.

~~(22)~~ Subsection R317.1.4, Wood Columns, is amended to delete item #3.

~~(22)~~ Subsection R314.4, Interconnection, is amended by adding the following:

Exception: Interconnection of smoke alarms in existing areas shall not be required where alteration or repair does not result in removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available that could provide access for interconnection without removal of interior finishes.

~~(23)~~ Subsection R403.1, General, is amended—deleted in its entirety and a new subsection R403.1, General, is substituted in lieu thereof, as follows~~to add these exceptions:~~

R403.1. General. All exterior walls shall be supported on continuous solid or fully grouted masonry or concrete footings, or other approved structural systems that shall be of sufficient design to accommodate all loads according to Section R301 and to transmit the resulting loads to the soil within the limitations as determined from the character of the soil. Footings shall be supported on undisturbed natural soils or engineered fill. Concrete footings shall be designed and constructed in accordance with the provisions of Section R403 or in accordance with ACI 332.

Exceptions:

1. A one-story wood or metal-framed building (unattached from other principal structures) not used for human occupancy nor exceeding 850 square feet in floor area, supporting roof loads only, may be supported by a slab-on-grade with turned-down footing which provides a minimum perimeter bearing edge of eight inches in width and 12 inches in depth. The slab shall be reinforced with 6 x 6-10 gauge weld wire mesh or No. 4 reinforcement rebar spaced 2'-0" o.c. each way and one No. 4 bar placed within the perimeter of the slab at the top and bottom.
2. Alternate foundation methods may be used for structures when, in the opinion of the building official, site and location will not warrant standard means of construction. In no case shall such foundations be less than extending to the prescribed frost line.
3. Unenclosed carports and patio covers not more than one story in height may be supported by isolated post footings, provided there are no wall sections or enclosures between supporting posts. The diameter of such footings shall be no less than 12 inches and extend to the established frost line.
4. Wood decks not more than one story in height may be supported by isolated post footings, provided there are no wall sections or roof enclosures. The diameter of such

post footings shall be no less than eight inches in width and eight inches in depth and extend to the established frost line.

5. Additions or attachments by any means between existing principal structures and accessory structures, as described in exception 1 of this section, shall not be allowed without first providing a continuous foundation around the entire perimeter of all structures involved and extending to the established frost line.

(24) Figures R403.1(2) and R403.1(3) are deleted in their entirety.

(254) Subsection R403.1.4.1, Frost Protection, is amended by deleting Items #2 and #3, and by deleting Exceptions #1, and #2, and #3.

(265) Subsection R403.2, Footings For Wood Foundations, is ~~deleted~~amended- in its entirety to read as follows:

~~R403.2.1 Footing Requirements. All footings shall be cast-in-place concrete having a minimum compressive strength of 2,500 pounds per square inch at 28 days and shall be reinforced longitudinally with not less than two No. 4 reinforcing bars. Reinforcement shall be symmetrically placed and so located as to ensure no less than three inches of concrete cover on all sides. See table R403.1(1) and R403.1(2) for size requirements.~~

(276) ~~Subs~~Section R403.3, Frost-~~p~~Protected ~~s~~Shallow ~~f~~Foundations, including subparagraphs R403.3.1, Foundations adjoining frost-protected shallow foundations, R403.3.1.1, Attachment to unheated slab-on-ground structure, R403.3.1.2, Attachment to heated structure, R403.3.2, Protection of horizontal insulation below ground, R403.3.3, Drainage, R403.3.4, Termite protection, and R403.4.1, Crushed stone footings is deleted in its entirety~~including subsections R403.3.1 through R403.3.4 and R403.4.1, Crushed stone footings, is deleted in its entirety. R403.4, Footings for precast concrete foundations, and R403.4.2, Concrete footings, remain as written in the 2015 International Residential Code.~~

(28) Figure R403.3(1), Figure R403.3(4), and Table R403.4 are all deleted in their entirety.

(29) Subsection R404.2, Wood foundation walls, including subparagraphs R404.2.1, Identification, R404.2.2, Stud size, R404.2.3, Height of backfill, R404.2.4, Backfilling, R404.2.5, Drainage and dampproofing, and R404.2.6, Fastening, is deleted in its entirety.

(30) Table R404.2.3 is deleted in its entirety.

(3127) Subsection R405.2.3, Drainage System, is ~~deleted in its entirety~~ amended to read as follows:

~~R405.2.3 Drainage System. Sump pump systems shall meet the requirements of chapter 11 of the 2015 Uniform Plumbing Code.~~

(28) Subsection R408.3, Unvented Crawl Space, is amended to read as follows:

~~R408.3 Unvented Crawl Space. The minimum net area of ventilation openings shall not be less than 1 square foot for each 150 square feet of under-floor space area. One such ventilating opening shall be within three feet of each corner of the building. Ventilation openings shall be covered for their height and width with approved materials provided that the least dimension of the covering shall not exceed ¼ inch. Floor area and ground surface shall be covered with an approved vapor retarder material.~~

~~Exception: Ventilation of a crawl space in new or existing buildings may be eliminated if all of the following requirements are provided:~~

- ~~A. The under-floor ground surface area is covered with an approved vapor retarder and capped with a concrete slab having a minimum thickness of two inches;~~

- B. ~~An opening as required for accessibility in section R408.4 is maintained without a cover; and~~
- C. ~~The main foundation portion is capable of providing adequate ventilation to handle the additional area.~~

(32) Subsection R406.3, Damp proofing for wood foundations, including subparagraphs R406.3.1, Panel joint sealed, R403.2, Below-grade moisture barrier, R406.3.3, Porous fill, and R406.3.4, Backfill, is deleted in its entirety.

~~(29) Subsection R703.2, Water-Resistive Barrier, is amended by deleting the last sentence, which reads: The water-resistive barrier is not required for detached accessory buildings.~~

(B) International Building Code ("IBC") amendments.

(1) Subsection 101.1, Title, is amended by deleting "[NAME OF JURISDICTION]" and substituting in lieu thereof "City of Cedar Falls."

(2) Subsection 101.4.1, Gas, is amended by deleting "International Fuel Gas Code" and substituting in lieu thereof "National Fuel Gas Code NFPA 54."

(3) Subsection 101.4.3, Plumbing, is amended by deleting "International Plumbing Code" and substituting in lieu thereof "Uniform Plumbing Code."

(4) Subsection 101.4.4, Property Maintenance, is deleted in its entirety.

(5) Subsection 101.4.7, Existing Buildings, is deleted in its entirety.

(6) Subsection 103.1, Creation of Enforcement Agency, is amended by deleting "department of building safety" and substituting in lieu thereof "Inspection Services Division."

(7) Subsection 104.2, Applications and Permits, is amended by adding the following subparagraphs thereto:

- (a) To obtain a permit an applicant shall show proof of registration with the state and shall execute and file with the city building official (or a specified inter-governmental agency if so designated by the building official) a certificate of insurance written by a company authorized to transact business in the state, in limits of not less than \$300,000.00 combined single limit to any person and \$100,000.00 property damage; said certificate to be written on a standard form and conditioned upon the faithful performance of all duties required of such contractor by any ordinances, rules and regulations of the city. It shall be a further condition of said certificate of insurance that the obligator will hold the city (through the specified inter-governmental agency if so designated) harmless from any and all damages sustained by reason of neglect or incompetence on the part of such contractor, his agents or employees in the performance of the work done under a license or permit issued upon the filing of said certificate.

Said certificate of insurance shall be issued by December 31 of each year, and shall be re-filed on or before said date for each subsequent year and shall be in continuous full force and effect. That is the intent and purpose of said certificate of insurance to also bind the individual, company, firm, association or partnership, whether it be trade name, corporation or other business association or arrangement with which the principal is associated.

(8) Subsection 104.8, Liability, is amended by deleting the subsection in its entirety and substituting a new subsection 104.8, Liability, in lieu thereof as follows:

104.8. Liability. The *building official*, or his or her authorized representative charged with the enforcement of this code, acting in good faith and without malice in the discharge of his or her duties for the city, shall not thereby render himself or herself personally liable for any damage that may accrue to persons or property as a result of any act or by reason of any act or omission in the discharge of his or her duties. Any suit brought against the city or the *building official* or employee because of such act or omission performed by him or her in the enforcement of any provisions of such codes or other pertinent laws or ordinances implemented through the enforcement of this code or enforced by the inspection services division shall be defended by the city until the final termination of such proceedings, and any judgment resulting therefrom shall be assumed by the city. This code shall not be construed to relieve from or lessen the responsibility of any *person* owning, operating or controlling any building or structure for any damages to persons or property caused by defects, nor shall the inspection services division of the city be held as assuming any such liability by reason of the inspections authorized by this code or any certificates of inspection issued under this code.

(9) *Subsection 104.8, Liability, is amended by adding a new subparagraph, 104.8.2, Conflict of Interest, thereto, as follows:*

104.8.2. Conflict of Interest. No official or representative of the inspection services division shall be engaged directly or indirectly with the furnishing of labor, materials or *appliances* for the construction, *alteration* or maintenance of a building or the preparation of plans or specifications therefor, unless the official or representative is the *owner* of such building; nor shall such official or representative engage in any work which conflicts with the official duties or with the interests of the inspection services division.

(10) *Subsection 104.10.1, Flood hazard areas, is deleted in its entirety.*

(11) *Subsection 105.2, Work Exempt From Permit, is amended by deleting that subsection in its entirety and substituting a new Subsection 105.2, Work exempt from permit, in lieu thereof, as follows:*

105.2 Work exempt from permit. Exemptions from *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction. *Permits* shall not be required for the following:

Building:

1. *Fences.*
2. *Oil derricks.*
3. *Retaining walls that are not over four feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge or impounding Class I, II, IIIA liquids.*
4. *Water tanks supported directly on grade if the capacity is not greater than 5,000 gallons (18 925 L) and the ratio of the height to diameter or width is not greater than 2:1.*
5. *Sidewalks and driveways not more than 30 inches (762 mm) above adjacent grade, and not over any basement or story below and are not part of an accessible route.*
6. *Painting, papering, tiling not adjacent to or part of a shower, carpeting, cabinets, counter tops and similar finish work.*
7. *Temporary motion picture, television and theater stage sets and scenery.*
8. *Prefabricated swimming pools accessory to a Group R-3 occupancy.*
9. *Shade cloth structures constructed for nursery or agricultural purposes, not including service systems.*

10. Swings and other playground equipment accessory to detached one- and two-family dwellings.
11. Window awnings in Group R-3 and U occupancies, supported by an exterior wall that do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.
12. Non-fixed and movable fixtures, cases, racks, counters and partitions not over five feet nine inches (1753 mm) in height.

A land use and/or right-of-way permit may still be required.

(12) Subsection 105.5, Expiration, is amended by deleting the subsection in its entirety and substituting a new subsection 105.5, Expiration, in lieu thereof, as follows:

105.5. Expiration. Every permit issued under the provisions of this Code shall expire 180 days from the date of issue if the work has not been commenced, and 365 days from the date of issue if the work has not been completed, unless the application is accompanied by a construction schedule of specific longer duration, in which instance the permit may be issued for the time period of the construction schedule, with the approval of the building official. If the work has not been commenced or completed, as the case may be, including all required inspections, by the expiration date of the permit, no further work shall be done until the permit has been renewed by the owner, or the owner's agent, and payment of the renewal fee has been received. The building official is authorized to grant one or more extensions of time, for periods of not more than six months each, without payment of the renewal fee. Extensions shall be requested by the owner, or the owner's agent, and justifiable cause demonstrated by the owner.

(13) Subsection 109.6, Refunds, is amended by deleting the subsection in its entirety and substituting a new subsection 109.6, Refunds, in lieu thereof, as follows:

109.6. Refunds. Refunds may be available only when work under the permit has not been commenced. Refunds may be available only for permit fees that exceed \$100.00. If granted, the refund shall be eighty percent of the permit fee.

(14) Section 109, Fees, is amended by adding a new subsection, 109.7, Reinspections, thereto as follows:

109.7, Reinspections. A reinspection fee shall be permitted to be assessed for each inspection or reinspection where such portion of work for which inspection is called is not complete or where required corrections have not been made.

This provision shall not be interpreted as requiring reinspection fees the first time a job is rejected for failure to be in accordance with the requirements of this code, but as controlling the practice of calling for inspection before the job is ready for inspection or reinspection.

Reinspection fees shall be permitted to be assessed where the approved plans are not readily available to the inspector, for failure to provide access on the date for which the inspection is requested, or deviating from plans requiring approval of the City.

(15) Subsection 110.3.6, Lath, gypsum board and gypsum panel product inspection is amended by deleting the Exception, and substituting in lieu thereof the following:

Exception: Gypsum board and gypsum panel products in remodels less than 200 square feet of gypsum board replacement and not part of a fire-resistance-rated assembly or shear assembly.

(16) Section 113, Means of Appeals, is amended by striking that section in its entirety and substituting a new Section 113, Means of Appeals, in lieu thereof, as follows:

113. Means of Appeals.

113.1 General. The board of appeals created in section 7-20(A)(12) shall be authorized to hear and decide appeals of orders, decisions or determinations made by the building official or fire official relative to the application and interpretation of this Code, and all procedures and other provisions contained in said section shall apply.

(17) Section 114, Violations, is amended by deleting the section in its entirety and substituting a new Section 114, Violations, in lieu thereof, as follows:

114. Violations.

114.1 Unlawful acts. It shall be unlawful for any person, firm or corporation to erect, construct, enlarge, alter, extend, repair, move, remove, demolish or occupy any building, structure or equipment regulated by this code, or cause same to be done, in conflict with or in violation of any of the provisions of the code.

114.2 Notice of violations. The building official is authorized to serve a notice of violation or order on the owner and person responsible for the erection, construction, enlargement, alteration, extension, repair, movement, removal, demolition, or occupation of any building or structure in violation of the provisions of this Code, or in violation of a detail statement or a plan approved thereunder, or in violation of a permit or certificate issued under the provisions of this Code. Such order shall direct the discontinuance of the illegal action or condition and the abatement of the violation.

114.3 Prosecution of violation. If the notice of violation is not complied with in the time prescribed by such notice, the building official is authorized to request the city attorney to institute the appropriate proceeding at law or in equity to restrain, correct or abate such violation, or to require the removal or termination of the unlawful occupancy of the building or structure in violation of the provisions of this Code or of the order or direction made pursuant thereto.

114.4 Violation penalties. Any person who violates a provision of this code or fails to comply with any of the requirements thereof or who erects, constructs, alters or repairs a building or structure in violation of the approved construction documents or directive of the building official, or of a permit or certificate issued under the provisions of this code shall be deemed guilty of a municipal infraction punishable as provided in section 1-9 of the Code of Ordinances of the city.

(18) Subsection 115.4, Failure to Comply, is amended by striking that subsection in its entirety, and substituting a new subsection 115.4, Failure to comply, in lieu thereof as follows:

115.4 Failure to comply. Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be deemed guilty of a municipal infraction punishable as provided in section 1-9 of the Code of Ordinances of the city.

(19) Section, 116, Unsafe Structures and Equipment, is deleted in its entirety and a new Section 116, Unsafe Structures and Equipment is substituted in lieu thereof, as follows:

116. Unsafe Structures and Equipment.

116.1 Unsafe conditions. Structures or existing equipment that are or hereafter become unsafe, insanitary or deficient because of inadequate means of egress facilities, inadequate light and ventilation, or that constitute a fire hazard, or are otherwise dangerous to human life or the public welfare or that involve illegal or improper occupancy or inadequate maintenance, shall be deemed an unsafe condition. Unsafe structures shall be taken down and removed or made safe, as the building official deems necessary and as provided for in this section. A vacant structure that is not secured against unauthorized entry shall be deemed unsafe.

116.2 Declaration of unsafe structures. All such unsafe structures or equipment are hereby declared to be public nuisances and shall be abated by repair, rehabilitation, demolition or removal in accordance with procedures set forth in chapter 15, article I of the Code of Ordinances of the city, entitled, "Nuisances". As an alternative, the *building official* may institute the appropriate action within the procedures specified in section R115.3 to abate the violation.

116.3 Procedure for condemnation and removal. It shall be the duty of the *building official* to report to the city council any structures or equipment within the corporate limits of the city which may be deemed unsafe. Whenever it is reported to or comes to the attention of the city council that a building is unsafe as set forth in the preceding subsection, the mayor shall appoint a committee of three councilmembers who, together with the building official, fire chief and county health officer, shall inspect such premises and report their findings to the city council. If that committee reports that such building or structure is unsafe and shall recommend its destruction as a nuisance, the matter shall be set down for hearing at the next regular meeting of the city council, and at least ten days' written notice of the hearing shall be served on the holder of the legal title of the premises and on the person in possession thereof; provided, however, that, if the owner of such building is a nonresident to the state or is not found within the state and has no agent within the state upon whom service can be made, service shall be made by mailing the written notice to the last known address of the owner of record and by two publications in a newspaper in general circulation in the city, the last publication thereof to be at least ten days before the date set for the hearing.

At the hearing, the owner and person in possession of the premises shall be given opportunity to show cause why such building or structure should not be declared to be a nuisance and destroyed. If the city council shall decide that the building is unsafe as provided in this section, then it may declare the building to be a nuisance and order it to be abated within the time fixed by it. Written notice of such finding shall be given the owner and person in possession, and they shall be given time to destroy the building as the council may fix; provided, however, that, if the owner of such building or structure is a nonresident of the state or is not found within the state and has no agent within the state upon whom service can be made, service of the written notice shall be made by mailing the notice to the last known address and by two publications in a newspaper of general circulation in the city, the last publication thereof to be at least ten days before the date set for the destruction of the building or structure.

(20) Subsection 2902.2, *Separate facilities*, is amended by deleting subparagraph (6) in its entirety and substituting a new subparagraph (6) in lieu thereof, as follows:

6. Separate facilities shall not be required where rooms having both water closets and lavatory fixtures are designed for use by both sexes and privacy for water closets are installed which meet the following requirements:

a. Typical toilet partitions are not allowed.

b. Framed walls are required at each side and at the door jamb.

c. Door heights are at least six feet, eight inches.

d. Doors must be a standard slab and frame construction with lever handle and privacy set hardware.

e. Doors may have a maximum six inch undercut.

(21) Section 3115, *Intermodal Shipping Containers*, is deleted in its entirety.

Section 3. Section 7-21, Miscellaneous Provisions, of Article II, Building Code, of Chapter 7, Buildings and Building Regulations, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety and a new Section 7-21, Miscellaneous Provisions, is enacted in lieu thereof, as follows:

Sec. 7-21. Miscellaneous provisions.

- (a) Chapters 11, ~~20, and 24~~ through 44 and all appendix chapters of the International Residential Code for One- and Two-Family Dwellings and all appendix chapters are hereby deleted in their entirety.
- (b) ~~Chapters 27, 28 and 29 and all appendix chapters~~ The following are hereby deleted in their entirety from of the International Building Code: ~~are hereby deleted in their entirety.~~
- (1) Chapters 27 and 28.
- (2) Section 2901, General, and Section 2903, Installation of Fixtures.
- (3) All appendix chapters.
- (c) Any references to the International Plumbing Code and the International Electrical Code are hereby deleted, and in their place are substituted references to the Uniform Plumbing Code and the National Electrical Code, respectively.

(Code 2017, § 7-28; Ord. No. 2868, § 1, 7-5-2016)

Section 4. Section 7-47, Purpose, of Article III, Electrical Regulations, of Chapter 7, Buildings and Building Regulations, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety and a new Section 7-47, Purpose, is enacted in lieu thereof, as follows:

Sec. 7-47. Purpose.

It is the purpose of this article to adopt an electrical code by reference, ~~and to provide for the examination, qualification and licensing of electrical contractors, master electricians, and journeyman electricians.~~ Also included are provisions for the inspection and regulation of electrical installations, issuance of permits, the collection of fees, and to provide penalties for violations of this article in order to protect the public health, safety and welfare.

(Code 2017, § 7-47; Ord. No. 2765, § 1, 5-29-2012)

Section 5. Section 7-48, Rules of Construction, of Article III, Electrical Regulations, of Chapter 7, Buildings and Building Regulations, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety, as follows:

~~Sec. 7-48. Rules of construction.~~

~~In this article, certain terms shall be construed as follows:~~

- ~~(1) Electrical terms are definitions relating to electrical equipment, wiring methods and special wiring locations and conditions shall be those accepted by the trade and listed in the National Electrical Code or other recognized safe wiring manuals or tests.~~
- ~~(2) Building classification and occupancy shall be determined from the city building code and the zoning chapter.~~

~~(Code 2017, § 7-48; Ord. No. 2765, § 1, 5-29-2012)~~

Section 6. Section 7-49, National Electrical Code Adoption, of Article III, Electrical Regulations, of Chapter 7, Buildings and Building Regulations, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety and a new Section 7-49, National Electrical Code Adoption, is enacted in lieu thereof, as follows:

Sec. 7-49. National Electrical Code adoption.

- (a) The 20~~2017~~ Edition of the National Electrical Code, including article 90, chapters 1 through 9, and annex A, B, C, D and H, inclusive, as published by the National Electrical Code committee, which hereinafter may be referred to as the "NEC", and adopted by the National Fire Protection Association, is hereby adopted as well as any amendments to same that are adopted by the State of Iowa from time to time, is hereby adopted by reference and is effective as if fully set forth in this article. Where, in any specific case, different sections of this article specify different materials, methods of construction or requirements, the most restrictive shall govern.
- (b) An official copy of the code adopted by this article, including a certificate by the city clerk as to its adoption and effective date, is on file in the office of the city clerk, ~~in either hardbound or electronic version,~~ available for public inspection.

(Ord. No. 2921, § 1, 4-16-2018)

Section 7. Section 7-50, National Electrical Code Amendments, of Article III, Electrical Regulations, of Chapter 7, Buildings and Building Regulations, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety and a new Section 7-50, National Electrical Code Amendments, is enacted in lieu thereof, as follows:

Sec. 7-50. National Electrical Code amendments.

The provisions of this section specify certain amendments, by deletion, addition or substitution of the 20~~2017~~ edition of the National Electrical Code ("~~NEC~~"). ~~Where this section states that an article, subsection, enumeration or exception is deleted, only the specific article, subsection, enumeration or exception is deleted. Where this section states that an article or subsection is deleted in its entirety, all references listed thereafter associated with this specific article (with subsections, enumerations and exceptions) or subsection (with enumerations and exceptions) are deleted.~~

~~2017 NEC Chapter 2 Amendments~~

- ~~(a) Section 210.12 (D) is deleted in its entirety.~~
- ~~(b) Section 230.50(A) Underground Service Entrance Conductors, is deleted in its entirety and the following sentence is substituted therefor:
"Underground service entrance conductors shall be installed in a raceway not less than two feet underground."~~

~~2017 NEC Chapter 3 Amendments~~

- ~~(c) Section 300.13(B), Device Removal, is deleted in its entirety and the following is substituted therefor:
"(B) Device removal. In all circuits, the continuity of conductors shall not be dependent upon device connections where the removal of such devices would interrupt continuity."~~

~~2017 NEC Chapter 4 Amendments~~

~~(d) Section 406.4 (D)(4) is deleted in its entirety.~~

2017 NEC Annex H Amendments

~~(e) Section 80.9(C), Additions, Alterations or Repairs, is amended by adding the following:~~

- ~~(1) It is prohibited by this ordinance to perform any repair to, add to, or revamp any residential services less~~

2020 NEC Annex H Amendments

~~(af) Section 80.13, Authority, is amended as follows:~~

~~(1) Subparagraph (213), is amended by deleting the words "as established by the Board." inserting a period after the words "ready for inspection," and deleting the words, "and shall conduct the inspection within ___/___/___ days."~~

~~(2) Subparagraph (13) is amended by deleting the words "and shall conduct the inspection within ___ days."~~

~~(bg) Section 80.15, Electrical Board, is deleted in its entirety and new Section 80.15, Board of Electrical Appeals, is substituted in lieu thereof, as followsthe following is substituted therefor:~~

80.15 BOARD OF ELECTRICAL APPEALS.

(A) Membership; appointment of members; term of office.

- (1) The board of electrical appeals shall consist of five members: ~~one member of the city council, appointed each year,~~ two members from the electrical contractors of the city, ~~two~~ one journeyman electrician~~s,~~ and one public member, each appointed for a period of four years. The electrical inspector shall serve as secretary to the board but is non-voting. Appointments are made by the mayor with the approval of the city council. Should a vacancy in the board occur, it shall be the duty of the secretary of the board to notify the mayor of the vacancy, and the mayor and city council shall, at a regular meeting, as soon as possible thereafter, appoint a new member to the board to fill the vacancy for the unexpired term.
- (2) Expiration of appointments, ~~except for the city council member,~~ shall be staggered so that one member is appointed or reappointed each year. Terms of appointment shall expire on December 31. If the mayor and city council fail to appoint at the scheduled time, the expired term member will be held over until re-appointment or replacement.
- (3) The members of the board of electrical appeals shall serve without compensation.
- (4) In so far as reasonably practicable, appointees for membership on the board shall be residents of the city, or, if that is not reasonably practicable, shall have a place of employment in the city. Appointees who are neither residents of the city nor who have a place of employment in the city may be eligible for appointment to the board upon a finding of the unavailability of qualified applicants, as determined by the mayor. Any person who is a member of the board on the date of adoption of the ordinance from which this section is derived who does not meet the qualifications for membership set forth herein shall continue to be eligible to serve as a member of the board until both the expiration of his or her current term and the member's nonreappointment by the mayor to an additional term.

(B) Meetings; records.

- (1) All meetings of the board of electrical appeals are open to the public and shall be held in the council chambers or other location indicated in a public notice posted at least 24 hours prior to any meeting.
- (2) Three members of the board shall constitute a quorum for the transacting of all business, but any action taken by the board shall require a majority vote of all members of the board.
- (3) The board shall annually elect one of its members as chairperson of the board.

(4) The secretary of the board shall keep a record of the board meetings.

(C) Appeals.

- (1) Any person shall have the right to ~~file~~~~register~~ an appeal with the board of electrical appeals for a review of any decision of the electrical inspector, provided that such appeal is made in writing within ten days after having been notified of such decision by the electrical inspector. Upon receipt of such appeal, the board of appeals shall proceed to determine whether the action of the electrical inspector complies with this article, and shall ~~issue~~~~make~~ a decision in accordance with its findings within ten days of receiving the appeal. No appeal shall be considered unless the appeal is filed within ~~the~~ period of ten days. The board of appeals shall have no authority to waive requirements of this code.
- (2) An appeal to the city council of any ruling of the board shall be made by filing a written notice of such appeal with the city clerk within ten days from the date of the ruling being appealed. The council shall give the appellant and the board a minimum of five days written notice by certified mail of the date, time and location of hearing of said appeal. All interested persons shall be given the opportunity to be heard at such hearing and the city council may affirm, modify or overrule the action of the board based upon the evidence submitted before the city council.

~~(c)(4) Subsection 80.19(D) Annual Permits, is deleted in its entirety.~~

~~(d)(5) Subsection ——— 80.19(F) Inspection and Approvals, *subparagraph (3)*, is amended as follows: by deleting the words "or until _____ days have elapsed from the time of such notification".~~

~~(1) Subparagraph (1) is amended by deleting the words "other than an annual permit.".~~

~~(2) Subparagraph (3) is amended by deleting the words "or until _____ days have elapsed from the time of such notification".~~

~~(3) Subparagraph (4) is deleted in its entirety.~~

~~(e) Subsection 80.19(H), *Applications and Extensions*, is deleted in its entirety and a new Subsection 80.19(H), *Application for Permit; Validity; Expiration*, is substituted in lieu thereof, as follows:~~

~~(H) Application for Permit; Validity; Expiration.~~

~~(1) Application for permit. To obtain a permit, the applicant shall first file an application therefore in writing on a form furnished by the inspection services division for that purpose. Such application shall:~~

~~(i) Identify and describe the work to be covered by the permit for which the application is made.~~

~~(ii) Describe the land on which the proposed work is to be done by legal description, street address or similar description that will readily identify and definitely locate the proposed building and work.~~

~~(iii) Indicate the use and occupancy for which the proposed work is intended.~~

~~(iv) Be accompanied by construction documents.~~

~~(v) State the valuation of the proposed work.~~

~~(vi) Be signed by the applicant, or the applicant's authorized agent.~~

~~(vii) Give such other data and information as required by the building official.~~

~~(2) Action on application. The building official shall examine or cause to be examined applications for permits and amendments thereto within a reasonable time after filing. If the application or construction documents do not conform to the requirements of pertinent laws, the building official shall reject such application in writing, stating the reasons therefore. If the~~

building official is satisfied that the proposed work conforms to the requirements of this code and laws and ordinances applicable thereto, the building official shall issue a permit therefore as soon as practicable.

(3) Time limit of application. An application for a permit for any proposed work shall be deemed to have been abandoned 180 days after the date of filing, unless such application has been pursued in good faith or a permit has been issued; except that the building official is authorized to grant one or more extensions of time for additional periods not exceeding 90 days each. The extension shall be requested in writing and justifiable cause demonstrated.

(4) Validity of permit.. The issuance or granting of a permit shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or of any other ordinance of the city. Permits presuming to give authority to violate or cancel the provisions of this code or other ordinances of the city shall not be valid. The issuance of a *permit* based on construction documents and other data shall not prevent the building official from requiring the correction of errors in the construction documents or other data. The building official is authorized to prevent occupancy or use of a structure where in violation of this code or of any other ordinance of the city.

(5) Expiration of permit. Every permit issued under the provisions of this Code shall expire 12 months from the date of issue, unless the application is accompanied by a construction schedule of specific longer duration, in which instance the permit may be issued for the time period of the construction schedule, with the approval of the building official. If the work has not been completed, including all required inspections, by the expiration date of the permit, no further work shall be done until the permit has been renewed by the owner, or the owner's agent, and payment of the renewal fee has been received. The building official is authorized to grant one or more extensions of time, for periods of not more than six months each, without payment of the renewal fee. Extensions shall be requested by the owner, or the owner's agent, and justifiable cause demonstrated by the owner.

(f)(6) ~~Section 80.23(B) Notice of Violations, Penalties, subparagraph (3), is deleted in its entirety, and a new Section 80.23, Violations, is substituted in lieu thereof, as follows~~ replaced with the following:

~~80.23(B)(3) Investigation. Whenever any work for which a permit is required by this code has been commenced without first obtaining said permit, a special investigation shall be made before a permit may be issued for such work.~~

~~80.23(B)(4) Fee. An investigation fee, in addition to the permit fee, shall be collected whether or not a permit is then or subsequently issued. The investigation fee shall be equal to the amount of the permit fee required by this code. The payment of such investigation fee shall not exempt any person from compliance with all other provisions of this code nor from any penalty prescribed by law.~~

80.23 Violations.

(A) Unlawful acts. It shall be unlawful for any person, firm or corporation to erect, construct, enlarge, alter, extend, repair, move, remove, demolish or occupy any building, structure or equipment regulated by this code, or cause same to be done, in conflict with or in violation of any of the provisions of the code.

(B) Notice of Violations. The building official is authorized to serve a notice of violation or order on the owner and person responsible for the erection, construction, enlargement, alteration, extension, repair, movement, removal, demolition, or occupation of any building or structure in violation of the provisions of this Code, or in violation of a detail statement or a plan approved thereunder, or in violation of a permit or certificate issued under the provisions of this Code.

Such order shall direct the discontinuance of the illegal action or condition and the abatement of the violation.

(C) Prosecution of Violation. If the notice of violation is not complied with in the time prescribed by such notice, the building official is authorized to request the city attorney to institute the appropriate proceeding at law or in equity to restrain, correct or abate such violation, or to require the removal or termination of the unlawful occupancy of the building or structure in violation of the provisions of this Code or of the order or direction made pursuant thereto.

(D) Violation Penalties. Any person who violates a provision of this code or fails to comply with any of the requirements thereof or who erects, constructs, alters or repairs a building or structure in violation of the approved construction documents or directive of the building official, or of a permit or certificate issued under the provisions of this code shall be deemed guilty of a municipal infraction punishable as provided in section 1-9 of the Code of Ordinances of the city.

(g) A new Section, 80.24, Stop Work Order, is added as follows:

80.24 Stop work order.

(A) Authority. Where the building official finds any work regulated by this code being performed in a manner contrary to the provisions of this code or in a dangerous or unsafe manner, the building official is authorized to issue a stop work order.

(B) Issuance. The stop work order shall be in writing and shall be given to the owner of the property, the owner's authorized agent or the person performing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order and the conditions under which the cited work is authorized to resume.

(C) Emergencies. Where an emergency exists, the building official shall not be required to give a written notice prior to stopping the work.

(D) Failure to comply. Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be deemed guilty of a municipal infraction punishable as provided in section 1-9 of the Code of Ordinances of the city.

~~(h7)~~ Subsection 80.25 (C), Notification, is deleted in its entirety.

~~(i8)~~ Section 80.27 Inspector's Qualifications, is amended by deleting said section in its entirety, and substituting the following therefor: 80.27 Inspector's qualifications.

~~(A) The office of the electrical inspector, within the inspection services division of the department of community development of the city, is hereby created, and such inspector is hereby authorized, directed and empowered to inspect any and all buildings, tents and other structures, public and private, and, as provided in this article, to condemn and order removed or remodeled and put into proper and safe condition for the prevention of fire and for safety to life and property, all electrical equipment installations and connections of electrical current for light, heat and power purposes, and to control the disposition and arrangement of such equipment so that persons and property shall not be in danger therefrom.~~

~~(B) The electrical inspector shall be appointed by the director of community development, after recommendation of the building official, and shall be directly responsible to the building official.~~

~~(C) The appointee shall be qualified as an electrical inspector, as determined by any state requirements, the job classification and the civil service commission.~~

~~(j9)~~ ~~_____~~ A nNew Section 80.28, Licensing, is added as follows:

80.28 Licensing.

(A) Licenses required.

(1) Unless otherwise specified, any reference to licenses in this article shall mean a license issued by the State of Iowa board of electrical examiners and appeals.

(2) No person or business entity shall engage in any business involving installation, maintenance, alteration or repair of electrical systems or equipment within the scope of this article unless such person has obtained a master electrical contractor's business license issued by the state.

(B) Master electrical business registration.

(1) Any person who desires to apply for an electrical permit shall make written application therefor to the electrical inspector on forms obtained from the electrical inspector.

(2) New master electrical contractors will be required to pay a one-time registration fee to be entered into the permit system. Fees shall be set by the city council.

(C) State license; insurance. An electrical contracting business shall show proof of a state issued master contractor license with the State of Iowa and shall execute and file with the city building official a certificate of insurance written by a company authorized to transact business in the state, in limits established by state law.

Said certificate of insurance shall be issued by December 31 of each year and shall be refiled on or before said date for each subsequent year, and shall be in continuous full force and effect. It is the intent and purpose of said certificate of insurance to also bind the individual, company, firm, association or partnership, whether it be trade name, corporation, or other business association or arrangement with which the principal is associated.

~~(A) Licenses required.~~

~~(1) Electrical licenses shall be governed by Iowa Code ch. 103.~~

~~(2) All electrical contractors not currently registered with the city shall pay a registration fee as set by the city council.~~

~~(3) Any electrical license issued by the city, as allowed by state law, shall be required to pay a fee as set by city council annually.~~

~~(k10)~~ ~~_____~~ Section 80.29, Liability for Damages, is amended by adding the word "city," in the blank.

~~(l11)~~ ~~_____~~ Section 80.35, Effective date, is deleted in its entirety.

~~(m)~~ ~~_____~~ A new Section, 80.36, Alternative materials, design, and methods of construction and equipment, is added, as follows:

80.36 Alternative materials, design, and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed alternative meets all of the following:

(A) The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code.

(B) The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code as it pertains to the following:

(1) Quality.

(2) Strength.

(3) Effectiveness.

(4) Fire resistance.

(5) Durability.

(6) Safety.

Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved.

(C) Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

(D) Tests. Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the building official shall have the authority to require tests as evidence of compliance to be made without expense to the city. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the building official shall approve the testing procedures. Tests shall be performed by an approved agency. Reports of such tests shall be retained by the building official for the period required for retention of public records.

(n) A new Section, 80.37, Liability, is added as follows:

80.37 Liability. The building official, or his or her authorized representative charged with the enforcement of this code, acting in good faith and without malice in the discharge of his or her duties for the city, shall not thereby render himself or herself personally liable for any damage that may accrue to persons or property as a result of any act or by reason of any act or omission in the discharge of his or her duties. Any suit brought against the city or the building official or employee because of such act or omission performed by him or her in the enforcement of any provisions of such codes or other pertinent laws or ordinances implemented through the enforcement of this code or enforced by the inspection services division shall be defended by the city until the final termination of such proceedings, and any judgment resulting therefrom shall be assumed by the city. This code shall not be construed to relieve from or lessen the responsibility of any person owning, operating or controlling any building or structure for any damages to persons or property caused by defects, nor shall the inspection services division of the city be held as assuming any such liability by reason of the inspections authorized by this code or any certificates of inspection issued under this code.

(o) A new Section, 80.38, Fees, is added as follows:

80.38 Fees.

(A) Payment of fees. A permit shall not be valid until the fees prescribed by law have been paid, nor shall an amendment to a permit be released until the additional fee, if any, has been paid.

- (B) Schedule of permit fees. Where a permit is required, a fee for each permit shall be paid as required, in accordance with the schedule as established by the city.
- (C) Permit valuations. The applicant for a permit shall provide an estimated permit value at time of application. Permit valuations shall reflect the total value of work, including materials and labor, for which the permit is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. If, in the opinion of the building official, the valuation is underestimated on the application, the permit shall be denied, unless the applicant can show detailed estimates to meet the approval of the building official. Final permit valuation shall be set by the building official.
- (D) Work commencing before permit issuance. Any person who commences any work before obtaining the necessary permits shall be subject to a fee established by the building official that shall be in addition to the required permit fees.
- (E) Related fees. The payment of the fee for the construction, alteration, removal or demolition for work done in connection to or concurrently with the work authorized by a building permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law.
- (F) Refunds. Refunds may be available only when work under the permit has not been commenced. Refunds may be available only for permit fees that exceed \$100.00. If granted, the refund shall be eighty percent of the permit fee.
- (G) Reinspections. A reinspection fee shall be permitted to be assessed for each inspection or reinspection where such portion of work for which inspection is called is not complete or where required corrections have not been made.
- This provision shall not be interpreted as requiring reinspection fees the first time a job is rejected for failure to be in accordance with the requirements of this code, but as controlling the practice of calling for inspection before the job is ready for inspection or reinspection.
- Reinspection fees shall be permitted to be assessed where the approved plans are not readily available to the inspector, for failure to provide safe access on the date for which the inspection is requested, or deviating from plans requiring approval of the City.

(Ord. No. 2921, § 2, 4-16-2018)

Section 8. Section 7-55, Alteration of Identification or Rating Markings, of Article III, Electrical Regulations, of Chapter 7, Buildings and Building Regulations, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety, as follows:

~~Sec. 7-55. Alteration of identification or rating markings.~~

~~It shall be unlawful to cover, remove, alter, change or deface the maker's name or identification mark or any of the rating markings on electrical equipment.~~

~~(Code 2017, § 7-56; Ord. No. 2765, § 1, 5-29-2012)~~

Section 9. Section 7-56, Supervision by Building Official, of Article III, Electrical Regulations, of Chapter 7, Buildings and Building Regulations, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety, as follows.

Sec. 7-56. Supervision by building official.

~~The electrical inspector shall work fully under the supervision and jurisdiction of the building official and take all orders and perform any duties or services that may be designated by the building official pertaining to electrical inspections or other related duties.~~

~~(Code 2017, § 7-57; Ord. No. 2765, § 1, 5-29-2012)~~

Section 10. Section 7-169, Title; Uniform Plumbing Code; Adoption; Purpose and Scope; Conflicting Provisions, of Division 1, Generally, of Article V, Plumbing Regulations, of Chapter 7, Buildings and Building Regulations, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety and a new Section 7-169 is enacted in lieu thereof, as follows:

Sec. 7-169. Title; Uniform Plumbing Code; adoption; purpose and scope; conflicting provisions.

- (a) This article shall be known as the Cedar Falls Plumbing Code, and may be so cited and may be referred to hereinafter as the "code".
- (b) The ~~2021~~2015 Edition of the Uniform Plumbing Code, including chapters 1 through 17, all inclusive, as published by the International Association of Plumbing and Mechanical Officials, which hereinafter may be referred to as the "UPC", as well as any amendments to same that are adopted by the State of Iowa from time to time except as such codes are amended in this article; is hereby adopted by reference and is effective as if fully set forth in this article.
- (c) The purpose of this section and section 7-170 is to establish local installation standards modifying and superseding certain articles, paragraphs and subsections of the ~~2021~~2015 Edition of the Uniform Plumbing Code. Any and all plumbing systems shall be installed in conformity with the rules and regulations set forth in this article and the code adopted in this article. Where, in any specific case, different sections of this article specify different materials, methods of installation or other requirements, the most restrictive shall govern.
- (d) An official copy of the code adopted by this article, including a certificate by the city clerk as to its adoption and effective date, is on file in the office of the city clerk, ~~in either hardbound or electronic version;~~ available for public inspection.

(Code 2017, § 7-256; Ord. No. 2870, § 1, 7-5-2016)

Section 11. Section 7-170, Title; Uniform Plumbing Code; Amendments, of Division 1, Generally, of Article V, Plumbing Regulations, of Chapter 7, Buildings and Building Regulations, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety and a new Section 7-170, Uniform Plumbing Code; Amendments, is enacted in lieu thereof, as follows:

Sec. 7-170. Uniform Plumbing Code; amendments.

- (a) The provisions of this section specify certain amendments, by deletion, addition or substitution, of the ~~2021~~2015 Edition of the Uniform Plumbing Code ("UPC"). Where this section states that a section,

subsection, enumeration or exception is deleted, only the specific section, subsection, enumeration or exception is deleted. Where this section states that a part, section or subsection is deleted in its entirety, all references listed thereafter associated with this specific part of section (with subsections, enumerations and exceptions) or subsection (with enumerations and exceptions) are deleted.

202115 UPC Chapter 1 Amendments

- (1) ~~Subs~~Section 102.2, *Existing Construction*, is amended by adding the following at the end of the subsection after the last sentence:

If an existing building is damaged by fire or otherwise or altered in such a manner as to require the replacement of 50 percent or more of the plumbing equipment, the entire building shall be made to conform to the requirements of this article for new buildings. If the type of occupancy of an existing building is partially or entirely changed, the plumbing system shall be made to conform to the requirements of this article for the new type of occupancy.

- ~~(2) Section 103.0, *Duties and Powers of the Authority Having Jurisdiction*, is amended by adding the following after the last sentence:~~

- ~~(a) The office of the plumbing inspector for the city is hereby created, and such inspector is hereby authorized, directed and empowered to inspect any and all buildings or structures, public or private, and as provided in this article, to condemn and order removed or remodeled and put into proper and safe condition all plumbing and plumbing related structures for the protection of the public health, safety and welfare.~~
- ~~(b) The plumbing inspector shall be appointed by the director of community development after recommendation of the building official, and such inspector shall be directly responsible to the building official.~~
- ~~(c) The appointee shall be a qualified plumber and shall have at least ten years of practical experience in the plumbing trade or five years as a plumbing inspector, or, in lieu of such experience, a combination of trade school, practical experience and inspection experience considered by the building official as being suitable for minimum requirements, shall be possessed of such executive ability as requisite for the performance of required duties, shall have thorough knowledge of the standard materials and methods used in the installation and maintenance of plumbing equipment, and shall be well versed in improved methods of construction for safety to persons and property, the statutes of the state relating to sanitation and plumbing and any orders, rules and regulations issued by authority thereof and in the Uniform Plumbing Code.~~
- ~~(d) The plumbing inspector shall hold a current journeyman plumber's license with the State of Iowa, or shall be required to pass an examination for journeyman prior to appointment.~~

- (3) Section 103.1 is amended by adding the following new subsections:

~~103.1.1 *Supervision of Building Official*. The plumbing inspector shall work fully under the supervision and jurisdiction of the building official and take all orders and perform any duties or services that may be assigned by the building official pertaining to plumbing inspections or other related duties.~~

103.1.12 Conflict of Interest. It shall be unlawful for the plumbing inspector to engage in the business of the sales, installation or maintenance of plumbing equipment, either directly or indirectly, and the inspector shall have no financial interest in any concern engaged in such business in the city, at any time, while holding the office provided for in this division.

103.1.23 Records. The plumbing inspector shall keep records of sewer connections from city mains to the property line and from the property line to each building connected to city services.

- ~~(a) The plumbing inspector shall keep records of applications for plumbing permits and of all inspections. The records shall be available to the public.~~
- ~~(b) The plumbing inspector shall keep an accounting record for the collection of permit fees.~~
- ~~(c) The plumbing inspector shall keep records of sewer connections from city mains to the property line and from the property line to each building connected to city services.~~

103.1.34 Interpretation of Regulations. The plumbing inspector shall have full power to exercise judgment in a reasonable and proper manner and rule accordingly on all special cases in regard to any matters in this article or not specifically covered thereby, subject to section 107.0 pertaining to appeals.

- (34) Subsection 103.2, Liability, is deleted in its entirety and a new subsection 103.2, Liability, is substituted in lieu thereof, as follows:

103.2 Liability The building official, or his or her authorized representative charged with the enforcement of this code, acting in good faith and without malice in the discharge of his or her duties for the city, shall not thereby render himself or herself personally liable for any damage that may accrue to persons or property as a result of any act or by reason of any act or omission in the discharge of his or her duties. Any suit brought against the city or the building official or employee because of such act or omission performed by him or her in the enforcement of any provisions of such codes or other pertinent laws or ordinances implemented through the enforcement of this code or enforced by the inspection services division shall be defended by the city until the final termination of such proceedings, and any judgment resulting therefrom shall be assumed by the city. This code shall not be construed to relieve from or lessen the responsibility of any person owning, operating or controlling any building or structure for any damages to persons or property caused by defects, nor shall the inspection services division of the city be held as assuming any such liability by reason of the inspections authorized by this code or any certificates of inspection issued under this code.

- (4) SubSection 103.3.1, Licensing, is deleted in its entirety and a new subsection 103.3.1, Licenses Required, is substituted in lieu thereof, as follows~~the following is substituted therefor:~~

103.3.1 Licenses Required.

- (a) No person shall engage in the business of installing, maintaining, altering or repairing any plumbing system within the scope of this article unless such person has obtained from the State of Iowa board of plumbing examiners and appeals, a master plumber's business license, nor shall any such business or dealer employ any but licensed master plumbers, journeyman plumbers or apprentice plumbers employed by and working under the direction of a holder of the license for one of the classes of licenses prescribed by this article.
- (b) All plumbing contractors not currently registered by the city shall pay a one-time registration fee as set by the city council.
- (c) A plumbing business, other than pipe layers, shall show proof of a state issued master plumbing contractor license and shall execute and file with the city building official (or a specified inter-governmental agency if so designated by the building official) a certificate of insurance written by a company authorized to transact business in the

state, in limits established ~~by Iowa law annually by resolution by the city council; said certificate to be written on a standard form and carrying an endorsement naming the city, and its employees (or the inter-governmental agency designated by the building official) as additional insureds as its interest may appear and conditioned upon the faithful performance of all duties required of such contract by any ordinances, rules and regulations of the city. It shall be a further condition of said certificate of insurance that the obligator will hold the city (through the specified intergovernmental agency if so designated) harmless from any and all damages sustained by reason of neglect or incompetency on the part of such contractor, his agents or employees in the performance of the work done under a license or permit issued upon the filing of said certificate.~~

- (d) Upon payment of the annual license fee set by city council, a pipe layer's license may be issued to a company that meets the insurance requirements of subsection (b) of this section set by the city and may be required to take an exam approved by the plumbing inspector.
- (e) Said certificate of insurance shall be issued by December 31 of each year, and shall be refiled on or before said date for each subsequent year and shall be in continuous full force and effect. That it is the intent and purpose of said certificate of insurance to also bind the individual, company, firm, association or partnership, whether it be trade name, corporation, or other business association or arrangement with which the principal is associated.
- (5) Subsection 104.3.2, Plan review fees, is deleted in its entirety.
- (7) Subsection 104.4.1, Approved plans or construction documents, is deleted in its entirety, and a new subsection 104.4.1, Approval of construction documents, is substituted in lieu thereof, as follows:
- 104.4.1 Approval of Construction documents. When the building official issues a permit, the construction documents shall be approved, in writing or by stamp, as "Reviewed for Code Compliance." One set of construction documents so reviewed shall be retained by the building official. The other set shall be returned to the applicant, shall be kept at the site of the work and shall be open to inspection by the building official or a duly authorized representative.
- (8) SubsectionSection 104.4.3 Expiration, is deleted in its entirety and a new subsection 104.4.3, Expiration, is substituted in lieu thereof, as followsamended by deleting subsections 104.4.3 and 104.4.4 in their entirety and substituting the following therefor:
- 104.4.3 Expiration. Every permit issued under the provisions of this code shall expire 12 months from the date of issue, unless the application is accompanied by a construction schedule of specific longer duration, in which instance the permit may be issued for the time period of the construction schedule, with the approval of the building official. If the work has not been completed, including all required inspections, by the expiration date of the permit, no further work shall be done until the permit has been renewed by the owner, or the owner's agent, and payment of the renewal fee has been received. The building official is authorized to grant one or more extensions of time, for periods of not more than six months each, without payment of the renewal fee. Extensions shall be requested by the owner or the owner's agent and justifiable cause demonstrated by the owner.
- (69) Subsection 104.4.4, Extensions, is deleted in its entirety.

(10) SubSection 104.5, Permit Fees, is amended by deleting it in its entirety and a new subsection 104.5, Fees, is substituted in lieu thereof, as follows substituting the following new subsection 104.5:

104.5.1 Permit Fees.

- ~~(a) Fees will be charged for new installations, replacement of old installations with new installations, or change of location, and, in the case of plumbing fixtures, for the removal of fixtures.~~
- ~~(b) The schedule of permit fees shall be as established annually by resolution by the city council.~~
- ~~(c) Payment of fees for permits shall be made on or before the tenth day of the month following the date of the statement from the plumbing inspector. All fees shall be paid to the plumbing inspector, and be payable to the city. The plumbing inspector shall receipt for the fees in duplicate, and one of the receipts shall be given to the applicant.~~
- ~~(d) Failure to comply with subsection (c) of this section will automatically cause the person to cease work.~~

104.5 Fees.

104.5.1 Payment of fees. A permit shall not be valid until the fees prescribed by law have been paid, nor shall an amendment to a permit be released until the additional fee, if any, has been paid.

104.5.2 Schedule of permit fees. Where a permit is required, a fee for each permit shall be paid as required, in accordance with the schedule as established by the city .

104.5.3 Permit valuations. The applicant for a permit shall provide an estimated permit value at time of application. Permit valuations shall reflect the total value of work, including materials and labor, for which the permit is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. If, in the opinion of the building official, the valuation is underestimated on the application, the permit shall be denied, unless the applicant can show detailed estimates to meet the approval of the building official. Final permit valuation shall be set by the building official.

104.5.4 Work commencing before permit issuance. Any person who commences any work before obtaining the necessary permits shall be subject to a fee established by the building official that shall be in addition to the required permit fees.

104.5.5 Related fees. The payment of the fee for the construction, alteration, removal or demolition for work done in connection to or concurrently with the work authorized by a building permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law.

104.5.6 Refunds. Refunds may be available only when work under the permit has not been commenced. Refunds may be available only for permit fees that exceed \$100.00. If granted, the refund shall be eighty percent of the permit fee.

104.5.7 Reinspections. A reinspection fee shall be permitted to be assessed for each inspection or reinspection where such portion of work for which inspection is called is not complete or where required corrections have not been made.

This provision shall not be interpreted as requiring reinspection fees the first time a job is rejected for failure to be in accordance with the requirements of this code, but as controlling the practice of calling for inspection before the job is ready for inspection or reinspection.

Reinspection fees shall be permitted to be assessed where the approved plans are not readily available to the inspector, for failure to provide safe access on the date for which the inspection is requested, or deviating from plans requiring approval of the City.

(11) Subsection 105.2.6, Reinspections, is deleted in its entirety.

(117) Section 106.0, Violation and Penalties, is deleted in its entirety and a new Section 106.0, Violations, is substituted in lieu thereof, as follows amended by deleting subsection 106.3 and substituting the following in its place:

106.3 Any person violating any provision of this article shall be deemed guilty of a municipal infraction punishable as provided in section 1-9.

106.3.1 If any plumbing work, including construction or repair, is being performed within the city contrary to the provisions of the code adopted by this article, it shall be deemed a municipal infraction and, in addition to the penalties described in this section, shall be corrected in accordance with the code adopted by this article.

106.3.2 The doing of any act prohibited or declared to be unlawful or an offense by this article or the code adopted by this article, or the omission or failure to perform any act or duty required by this article or the code adopted by this article is, unless otherwise specified, a municipal infraction, punishable as provided in section 1-9.

106.3.3 Any person violating any provision of this article may be subject to an additional civil penalty and possible denial, revocation or suspension of license pursuant to Iowa Code ch. 105.

106.0 Violations.

106.1 Unlawful acts. It shall be unlawful for any person, firm or corporation to erect, construct, enlarge, alter, extend, repair, move, remove, demolish or occupy any building, structure or equipment regulated by this code, or cause same to be done, in conflict with or in violation of any of the provisions of the code.

106.2 Notice of Violations. The building official is authorized to serve a notice of violation or order on the owner and person responsible for the erection, construction, enlargement, alteration, extension, repair, movement, removal, demolition, or occupation of any building or structure in violation of the provisions of this Code, or in violation of a detail statement or a plan approved thereunder, or in violation of a permit or certificate issued under the provisions of this Code. Such order shall direct the discontinuance of the illegal action or condition and the abatement of the violation.

106.3 Prosecution of Violation. If the notice of violation is not complied with in the time prescribed by such notice, the building official is authorized to request the city attorney to institute the appropriate proceeding at law or in equity to restrain, correct or abate such violation, or to require the removal or termination of the unlawful occupancy of the building or structure in violation of the provisions of this Code or of the order or direction made pursuant thereto.

106.4 Violation Penalties. Any person who violates a provision of this code or fails to comply with any of the requirements thereof or who erects, constructs, alters or repairs a building or structure in violation of the approved construction documents or directive of the building official, or of a permit or certificate issued under the provisions of this code shall be deemed guilty of a municipal infraction punishable as provided in section 1-9 of the Code of Ordinances of the city.

(12) A new Section, 106A.0, Stop work order, is added as follows:

106A.0 Stop work order.

106A.1 Authority. Where the building official finds any work regulated by this code being performed in a manner contrary to the provisions of this code or in a dangerous or unsafe manner, the building official is authorized to issue a stop work order.

106A.2 Issuance. The stop work order shall be in writing and shall be given to the owner of the property, the owner's authorized agent or the person performing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order and the conditions under which the cited work is authorized to resume.

106A.3 Emergencies. Where an emergency exists, the building official shall not be required to give a written notice prior to stopping the work.

106A.4 Failure to Comply. Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be deemed guilty of a municipal infraction punishable as provided in section 1-9 of the Code of Ordinances of the city.

(138) Section 107.0, Board of Appeals, is deleted in its entirety and a new Section 107.0, Board of Appeals, is substituted in lieu thereof, as follows~~the following is substituted therefor:~~

107.0 Board of Appeals.

107.1 Membership; Appointment of Members; Term of Office.

- (a) The board of plumbing appeals shall consist of five members,~~one member of the city council,~~ appointed each year, one owner, officer, director, shareholder or employee of a plumbing company, one master plumber, ~~two~~one journeyman plumber and one public member, each appointed for a period of four years. The plumbing inspector shall serve as secretary to the board but is nonvoting. Appointments shall be made by the mayor, with the approval of the city council. Should a vacancy ~~o~~n the board occur, it shall be the duty of the secretary of the board to notify the mayor of the vacancy, and the mayor and city council shall, at a regular meeting, as soon possible thereafter, appoint a new member to the board to fill the vacancy for the unexpired term.
- (b) Expiration of appointments,~~except for the city council member,~~ shall be staggered, so that one member is appointed or reappointed each year. Terms of appointment shall expire on December 31. If the mayor and city council fail to appoint at the scheduled time, the expired term member will be held over until re-appointment or replacement.
- (c) In so far as reasonably practicable, appointees for membership on the board shall be residents of the city, or, if that is not reasonably practicable, shall have a place of employment in the city. Appointees who are neither residents of the city nor who have a place of employment in the city may be eligible for appointment to the board upon a finding of the unavailability of qualified applicants, as determined by the mayor. Any person who is a member of the board on the date of adoption of this ordinance who does not meet the qualifications for membership set forth herein shall continue to be eligible to serve as a member of the board until both the expiration of his current term and the member's nonreappointment by the mayor to an additional term.

107.2 Meetings; Records.

- (a) All meetings of the plumbing appeals board shall be held in the council chambers, or other location indicated in a public notice posted at least 24 hours prior to any meeting.
- (b) Three members of the board shall constitute a quorum for the transacting of all business, but any action taken by the board shall require a majority vote of all members of the board.
- (c) The board shall annually elect one of its members as the chair~~man~~ of the board.
- (d) The secretary of the board shall keep a record of the board meetings.

107.3 Compensation of Members. The members of the plumbing board of appeals shall serve without compensation.

107.4 Appeals.

- (a) Any person shall have the right to file/register an appeal with the plumbing board of appeals for a review of any decision of the plumbing inspector, provided that such appeal is made in writing within ten days after having been notified of such decision by the plumbing inspector. Upon receipt of such appeal, the board of appeals shall proceed to determine whether the action of the plumbing inspector complies with this article and shall make a decision in accordance with its findings within ten days of receiving the appeal. No appeal shall be considered unless the appeal is filed within the period of ten days. The board of appeals shall have no authority to waive requirements of this code.
- (b) An appeal to the city council of any ruling of the board may be made by filing a written notice of such appeal with the city clerk within ten days from the date of the ruling being appealed. The city council shall give the appellant and the board a minimum of five days written notice by certified mail of the date, time and location of hearing of said appeal. All interested persons shall be given the opportunity to be heard at such hearing and the city council may affirm, modify or overrule the action of the board based upon the evidence submitted before the city council.

2021~~15~~ UPC Chapter 2 Amendments

(~~149~~) *Section 218.0* is amended by adding the following definition:

Pipe layer: A person approved by the city to install the building sewer.

2021~~15~~ UPC Chapter 3 Amendments

(~~150~~) *Section 306.0, Industrial Wastes*, is amended by adding a new subsection 306.3 ~~to read~~ as follows:

306.3 Any industrial or commercial property connecting to the city sanitary sewage system shall only do so after the installation of an inspection manhole on said property. This manhole shall be readily accessible for inspection and/or testing by city or state personnel at all times. Minimum size of the manhole shall be 36 inches.

An exception to this provision may be made only in the judgment of the authority having jurisdiction.

(~~164~~) *Subsection 312.13, Exposed ABS Piping, is deleted in its entirety. 312.6, Freezing Protection, is amended by adding the following sentence at the end of the subsection:*

Prior written approval from the Inspection Services Division is required prior to installation of piping above 42" frost depth.

~~(12) Subsection 312.14, Exposed PVC Piping, is deleted in its entirety.~~

(173) Subsection 314.2, Tunneling and Driving, is amended by adding the following last sentence at the end of the subsection:

Boring shall only be allowed with prior approval of the authority having jurisdiction.

2021 UPC Chapter 4 Amendments

(184) Subsection 402.6.1, Closet Rings (Closet Flanges), is deleted in its entirety and a new subsection 402.6.1, Closet Rings (Closet Flanges), the following is substituted in lieu thereof, as followsits place:

402.6.1 Closet Rings (Closet Flanges).

Closet rings (closet flanges) for water closets or similar fixtures shall be of an approved type and shall be bronze, copper, hard lead, cast-iron, galvanized malleable iron, ABS, PVC, or other approved materials. Each such closet ring (closet flange) shall be approximately seven inches (178 mm) in diameter and, where installed, shall, together with the soil pipe, present a 1½ inch (38 mm) wide flange or face to receive the fixture gasket or closet seal. Caulked-on closet rings (closet flanges) shall be not less than one-quarter of an inch (6.4 mm) thick and not less than two inches (51 mm) in overall depth. Closet rings (closet flanges) shall be burned or soldered to lead bends or stubs, shall be caulked to cast-iron soil pipe, shall be solvent cemented to ABS and PVC, and shall be screwed or fastened in an approved manner to other materials with the top surface ¼ inch above the finished floor. Closet bends or stubs shall be cut off so as to present a smooth surface even with the top of the closet ring before rough inspection is called. Closet rings (closet flanges) shall be adequately designed and secured to support fixtures connected thereto.

(19) Subsection 408.5, Finished Curb or Threshold, is amended by adding the following at the end of the subsection:

Zero entry or curbless showers require submission of design and approval by the Inspection Services Division prior to a permit being issued. Curbless showers require a 2'0" wet zone at the perimeter of the shower and requires waterproofing.

(20) Table 422.1, Minimum Plumbing Facilities, is deleted in its entirety, and the following Table 2902.1, Minimum Number of Required Plumbing Fixtures, is substituted in lieu thereof, as follows:

(P) TABLE 2902.1									
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES^a (See Sections 2902.1.1 and 2902.2)									
No.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 424.2 OF THE INTERNATIONAL PLUMBING CODE)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAINS (SEE SECTION 410 OF THE INTERNATIONAL PLUMBING CODE)	OTHER
			Male	Female	Male	Female			
1	Assembly	Theaters and other buildings for the performing arts and motion pictures ^d	1 per 125	1 per 65	1 per 200		---	1 per 500	1 service sink
		Nightclubs, bars, taverns,	1 per 40	1 per 40	1 per 75		---	1 per 500	1 service sink

		dance halls and buildings for similar purposes ^d							
		Restaurants, banquet halls and food courts ^d	1 per 75	1 per 75	1 per 200	---	1 per 500	1 service sink	
		Casino gaming areas	1 per 100 for the first 400 and 1 per 250 for the remainder exceeding 400	1 per 50 for the first 400 and 1 per 150 for the remainder exceeding 400	1 per 250 for the first 750 and 1 per 500 for the remainder exceeding 750	---	1 per 1,000	1 service sink	
		Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades and gymnasiums ^d	1 per 125	1 per 65	1 per 200	---	1 per 500	1 service sink	
		Passenger terminals and transportation facilities ^d	1 per 500	1 per 500	1 per 750	---	1 per 1,000	1 service sink	
		Places of worship and other religious services ^d	1 per 150	1 per 75	1 per 200	---	1 per 1,000	1 service sink	
		Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	---	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities ^f	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	---	1 per 1,000	1 service sink
2	Business	Buildings for the transaction of business, professional	1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50		1 per 40 for the first 80 and 1 per 80 for the		---	1 per 100	1 service sink ^e

		services, other services involving merchandise, office buildings, banks, light industrial, ambulatory care and similar uses		remainder exceeding 80			
3	Educational	Educational facilities	1 per 50	1 per 50	---	1 per 100	1 service sink
4	Factory and industrial	Structures in which occupants are engaged in work fabricating, assembly or processing of products or materials	1 per 100	1 per 100	---	1 per 400	1 service sink
5	Institutional	Custodial care facilities	1 per 10	1 per 10	1 per 8	1 per 100	1 service sink
		Medical care recipients in hospitals and nursing homes ^b	1 per room ^c	1 per room ^c	1 per 15	1 per 100	1 service sink
		Employees in hospitals and nursing homes ^b	1 per 25	1 per 35	---	1 per 100	---
		Visitors in hospitals and nursing homes	1 per 75	1 per 100	---	1 per 500	---
		Prisons ^b	1 per cell	1 per cell	1 per 15	1 per 100	1 service sink
		Reformatories, detention centers and correctional centers ^b	1 per 15	1 per 15	1 per 15	1 per 100	1 service sink
		Employees in reformatories, detention centers, and correctional centers ^b	1 per 25	1 per 35	---	1 per 100	---
Adult day care and child day care	1 per 15	1 per 15	1	1 per 100	1 service sink		
6	Mercantile	Retail stores, service stations, shops, salesrooms, markets and shopping centers	1 per 500	1 per 750	---	1 per 1,000	1 service sink ^e

7	Residential	Hotels, motels, boarding houses (transient)	1 per sleeping unit	1 per sleeping unit	1 per sleeping unit	---	1 service sink
		Dormitories, fraternities, sororities and boarding houses (not transient)	1 per 10	1 per 10	1 per 8	1 per 100	1 service sink
		Apartment house	1 per dwelling unit	1 per dwelling unit	1 per dwelling unit	---	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
		One- and two-family dwellings and lodging houses with five or fewer guestrooms	1 per dwelling unit	1 per 10	1 per dwelling unit	---	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit
		Congregate living facilities with 16 or fewer persons	1 per 10	1 per 10	1 per 8	1 per 100	1 service sink
8	Storage	Structures for the storage of goods, warehouses, storehouses and freight depots, low and moderate hazard	1 per 100	1 per 100	---	1 per 1,000	1 service sink
<p>a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by this code.</p> <p>b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.</p> <p>c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient sleeping units shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.</p> <p>d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.</p> <p>e. For business and mercantile classifications with an occupant load of 15 or fewer, a service sink shall not be required.</p> <p>f. The required number and type of plumbing fixtures for outdoor swimming pools shall be in accordance with section 609 of the <i>International Swimming Pool and Spa Code</i>.</p>							

2021~~15~~ UPC Chapter 7 Amendments

~~(2145)~~—~~Subsection 713.4, Public Sewer Availability,4~~ is deleted in its entirety and a new Subsection 713.4, Public Sewer Availability, is substituted in lieu thereof, as follows~~the following is substituted in its place:~~

713.4 Public Sewer Availability. The public sewer may be considered as not being available when such public sewer is more than 200 feet away. Said distance shall be construed as being measured from the public sewer to the nearest property line. The 200 feet distance shall also apply to residences and buildings erected prior to the passage of this chapter. This distance will be considered reasonable for the connection of sewer and water when so ordered by the plumbing inspector or authorized by the building official.

~~(2246)~~—~~Section 714.0, Damage to Public Sewer or Private Sewage Disposal System,~~ is amended by adding a new subsection 714.6, Contamination, as follows ~~thereto:~~

714.6 Contamination. Any sewer taps, tie-ins and/or sanitary sewer service which is damaged in any way that would allow any subsurface contamination, pollution damage, hazardous or nuisance condition to the public sewer system, shall be the sole responsibility of the property owner to repair and/or maintain and keep in good operating condition. Written notification will be sent to said property owner stating the condition and/or repairs necessary to correct the damage or nuisance condition. If the property owner does not repair the damage or nuisance, the city may contact a plumbing contractor to repair said damage and will assess the property owner for all repairs, or legal action may be taken to correct the condition.

2021~~15~~ UPC Chapter 11 Amendments

~~(2347)~~—~~Subsection~~~~Section 1101.6.1, Discharge,~~ is deleted in its entirety and a replaced with the following new subsection 1101.6.1, Discharge, is substituted in lieu thereof, as follows:

1101.6.1 Discharge. There shall be no cross-connection to the sanitary sewer and in no instance shall the discharge be to city right-of-way or city streets. Where possible the discharge of said sump shall be by gravity where the city has provided a relief tile behind the city curb or the sump may be connected to the storm sewer or discharged to a drainage ditch except as otherwise approved by the Authority Having Jurisdiction.

~~(18) Subsection 1101.6.5(3), Open Area, is deleted in its entirety.~~

2015-UPC Chapter 12 Amendments

Chapter 12, Fuel Piping:

~~The Authority Having Jurisdiction for chapter 12 shall be the Cedar Falls Utilities and the Inspection Services Division of the community development Department of the city.~~

~~(19) Section 1212.0, Appliance Connections to Building Piping, is amended by deleting subsection 1212.1(5) in its entirety.~~

(Code 2017, § 7-257; Ord. No. 2870, § 1, 7-5-2016)

Section 12. Section 7-413, International Mechanical Code Adoption, of Article VIII, Mechanical Code, of Chapter 7, Buildings and Building Regulations, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety and a new Section 7-413, International Mechanical Code Adoption, is enacted in lieu thereof, as follows:

Sec. 7-413. International Mechanical Code adoption.

- (a) The International Mechanical Code, 20~~17~~¹⁵ Edition, including chapters 1 through 15, published by the International Code Council, Inc., which hereinafter may be referred to as the "IMC", as well as any amendments to same that are adopted by the State of Iowa from time to time, is hereby adopted by reference and is effective as if fully set forth in this article.
- (b) An official copy of the mechanical code as adopted, including a certificate by the city clerk as to its adoption and the effective date, is on file in the office of the city clerk, ~~in either hardbound or electronic version,~~ available for public inspection.

(Code 2017, § 7-552; Ord. No. 2869, § 1, 7-5-2016)

Section 13. Section 7-414, Amendments to International Mechanical Code, of Article VIII, Mechanical Code, of Chapter 7, Buildings and Building Regulations, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety and a new Section 7-414, Amendments to International Mechanical Code, is enacted in lieu thereof, as follows:

Sec. 7-414. Amendments to International Mechanical Code.

The provisions of this section specify certain amendments by addition, deletion or substitution, of the 20~~17~~¹⁵ Edition of the International Mechanical Code (~~hereinafter the~~ "IMC"). Where this section states that a section, subsection, enumeration or exception is deleted, only the specific section, subsection, enumeration or exception is deleted. Where this section states that a part, section or subsection is deleted in its entirety, all references listed thereafter associated with the specific part of section (with subsections, enumerations and exceptions) or subsection (with enumerations and exceptions) are deleted.

General IMC Amendments

- (1) All references in the IMC to the International Fuel Gas Code are hereby deleted, and are replaced with a reference to National Fire Protection Association Standard 54 (~~hereinafter~~ "NFPA 54"), which is hereby adopted by this reference into this Code.
- (2) All references in the IMC to the International Plumbing Code are hereby deleted, and are replaced with a reference to the Uniform Plumbing Code, which is adopted by reference in section 7-169.
- (3) The administrative authority for NFPA 54 shall be Cedar Falls Utilities and the inspection services division of the department of community development of the city.

20~~17~~¹⁵ IMC Chapter 1 Amendments

(4) Subsection 101.1, Title, is amended by deleting "[NAME OF JURISDICTION]" and substituting "City of Cedar Falls, Iowa" in lieu thereof.

(5) Subsection 101.2, Scope, is amended by deleting the Exception in its entirety.

(64) SubSection 102.2, Existing Installations, is amended by adding the following at the end of the subsection~~there~~:

If an existing building is damaged by fire or is otherwise altered in such a manner as to require the replacement of 50 percent or more of the mechanical equipment, the entire building shall be made to conform to the requirements of this article for new buildings. If the type of occupancy of an existing building is partially or entirely changed, the mechanical system shall be made to conform to the requirements of this article for the new type of occupancy.

(7) Subsection 103.1, Creation of agency, is amended by deleting “[NAME OF DEPARTMENT]” and substituting “Inspection Services Division” in lieu thereof.

(8) Subsection 104.8, Liability, including Subparagraph 104.8.1, Legal defense, is deleted in its entirety and a new Subsection 104.8, Liability, is substituted in lieu thereof, as follows:

104.8 Liability.

The building official, or his or her authorized representative charged with the enforcement of this code, acting in good faith and without malice in the discharge of his or her duties for the city, shall not thereby render himself or herself personally liable for any damage that may accrue to persons or property as a result of any act or by reason of any act or omission in the discharge of his or her duties. Any suit brought against the city or the building official or employee because of such act or omission performed by him or her in the enforcement of any provisions of such codes or other pertinent laws or ordinances implemented through the enforcement of this code or enforced by the inspection services division shall be defended by the city until the final termination of such proceedings, and any judgment resulting therefrom shall be assumed by the city. This code shall not be construed to relieve from or lessen the responsibility of any person owning, operating or controlling any building or structure for any damages to persons or property caused by defects, nor shall the inspection services division of the city be held as assuming any such liability by reason of the inspections authorized by this code or any certificates of inspection issued under this code.

(9) Subsection 105.2, Alternative materials, design and methods of construction and equipment is deleted in its entirety and a new Subsection 105.2, Alternative materials, design and methods of construction and equipment is substituted therefore, as follows:

105.2 Alternative materials, design and methods of construction and equipment.

105.2.1 Alternative materials, design, and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed alternative meets all of the following:

(A) The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code.

(B) The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code as it pertains to the following:

(1) Quality.

(2) Strength.

(3) Effectiveness.

(4) Fire resistance.

(5) Durability.

(6) Safety.

Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved.

105.2.2 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

105.2.3 Tests. Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the building official shall have the authority to require tests as evidence of compliance to be made without expense to the city. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the building official shall approve the testing procedures. Tests shall be performed by an approved agency. Reports of such tests shall be retained by the building official for the period required for retention of public records.

(10) Subsections 106.1.1, Annual permit, and 106.1.2, Annual permit records, are deleted in their entirety.

(11) Subsection 106.4.1, Approved construction documents, is deleted in its entirety and a new Subsection 106.4.1, Approval of construction documents is substituted in lieu thereof, as follows:

106.4.1 Approval of Construction documents. When the building official issues a permit, the construction documents shall be approved, in writing or by stamp, as "Reviewed for Code Compliance." One set of construction documents so reviewed shall be retained by the building official. The other set shall be returned to the applicant, shall be kept at the site of work and shall be open to inspection by the building official or a duly authorized representative.

(125) Subsection 106.4.3, Expiration, is deleted in its entirety and a new subsection the following section 106.4.3, Expiration, is substituted in lieu thereof, as follows in its place:

106.4.3 Expiration. Every permit issued under the provisions of this Code shall expire 12 months from the date of issue, unless the application is accompanied by a construction schedule of specific longer duration, in which instance the permit may be issued for the time period of the construction schedule, with the approval of the building official. If the work has not been completed, including all required inspections, by the expiration date of the permit, no further work shall be done until the permit has been renewed by the owner, or the owner's agent, and payment of the renewal fee has been received. The building official is authorized to grant one or more extensions of time, for periods of not more than six months each, without payment of the renewal fee. Extensions shall be requested by the owner, or owner's agent, and justifiable cause demonstrated by the owner.

(136) Subsection 106.4.4 is deleted in its entirety.

(147) Section 1096.5, Fees, is deleted in its entirety, and a new Section 109, Fees, is substituted in lieu thereof, as follows replaced with the following new section 106.5 Fees:

Section-1096.5 Fees.

106.5.1 General Fees. Fees will be charged for new mechanical installations, replacement of old mechanical installations with new installations, or change of location of mechanical systems, and for the removal of mechanical fixtures.

106.5.2 The schedule of permit fees shall be as established annually by resolution of the city council.

106.5.3 Payment of fees for permits shall be made on or before the tenth day of the month following the date of the statement from the mechanical inspector. All fees shall be delivered to the

~~mechanical inspector, and be payable to the city. The mechanical inspector shall receipt for the fees in duplicate, and one of the copies shall be given to the applicant.~~

~~106.5.4 Failure to comply with subsection 106.5.3 of this section will automatically require the person to cease work.~~

109.1 Payment of fees. A permit shall not be valid until the fees prescribed by law have been paid, nor shall an amendment to a permit be released until the additional fee, if any, has been paid.

109.2 Schedule of permit fees. Where a permit is required, a fee for each permit shall be paid as required, in accordance with the schedule as established by the city .

109.3 Permit valuations. The applicant for a permit shall provide an estimated permit value at time of application. Permit valuations shall reflect the total value of work, including materials and labor, for which the permit is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. If, in the opinion of the building official, the valuation is underestimated on the application, the permit shall be denied, unless the applicant can show detailed estimates to meet the approval of the building official. Final permit valuation shall be set by the building official.

109.4 Work commencing before permit issuance. Any person who commences any work before obtaining the necessary permits shall be subject to a fee established by the building official that shall be in addition to the required permit fees.

109.5 Related fees. The payment of the fee for the construction, alteration, removal or demolition for work done in connection to or concurrently with the work authorized by a building permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law.

109.6 Refunds. Refunds may be available only when work under the permit has not been commenced. Refunds may be available only for permit fees that exceed \$100.00. If granted, the refund shall be eighty percent of the permit fee.

109.7 Reinspections. A reinspection fee shall be permitted to be assessed for each inspection or reinspection where such portion of work for which inspection is called is not complete or where required corrections have not been made.

This provision shall not be interpreted as requiring reinspection fees the first time a job is rejected for failure to be in accordance with the requirements of this code, but as controlling the practice of calling for inspection before the job is ready for inspection or reinspection.

Reinspection fees shall be permitted to be assessed where the approved plans are not readily available to the inspector, for failure to provide a safe access on the date for which the inspection is requested, or deviating from plans requiring approval of the City.

(15) Section 113, Stop Work Order, is deleted in its entirety, and a new Section 113, Stop Work Order, is substituted in lieu thereof, as follows:

113 Stop Work Order.

113.1 Authority. Where the building official finds any work regulated by this code being performed in a manner contrary to the provisions of this code or in a dangerous or unsafe manner, the building official is authorized to issue a stop work order.

113.2 Issuance. The stop work order shall be in writing and shall be given to the owner of the property, the owner's authorized agent or the person performing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall

state the reason for the order and the conditions under which the cited work is authorized to resume.

113.3 Emergencies. Where an emergency exists, the building official shall not be required to give a written notice prior to stopping the work.

113.4 Failure to Comply. Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be deemed guilty of a municipal infraction punishable as provided in section 1-9 of the Code of Ordinances of the city.

(8) Subsections 108.1, Unlawful Acts, through 108.4, Violation Penalties, are hereby deleted in their entirety and the following new subsections 108.1 through 108.4.3 are substituted therefor:

108.1 It shall be unlawful for a person, firm or corporation to erect, construct, enlarge, alter, remove, convert or demolish, equip, use or maintain any mechanical systems or equipment in violation of any of the provisions of this article or the code adopted by this article, or to cause or permit the same to be done in violation thereof.

108.2 It shall be unlawful for any person to do any work on any mechanical systems or equipment without having the requisite state-issued license therefor, or in violation of the restrictions imposed on said license, all as provided for in this article or the code adopted by this article.

108.3 It shall be unlawful for any person to lend his, her or its state-issued license to, or to borrow the license of, another person in connection with any work on mechanical systems or equipment described in this article, or the code adopted by this article.

108.4 Penalty; abatement of violations:

108.4.1 Any person who violates any provision of this article or the code adopted by this article, or who performs any work on any mechanical systems or equipment within the city contrary to the provisions of this article or the code adopted by this article, or who fails to perform any act or duty required by this article or the code adopted by this article, shall be deemed to have committed a municipal infraction. Upon entry of a judgment by a court for such municipal infraction, the person shall be subject to a civil penalty as provided in section 1-9(a). Such judgment may also include an order of court to abate or correct the violation or violations, as authorized by section 1-9.

108.4.2 Any work on a mechanical system or equipment within the city which is performed or done in a manner contrary to the provisions of this article or the code adopted by this article shall, in addition to the penalties described in subsection 108.4.1, be corrected in accordance with the provisions of the code adopted in this article.

108.4.3 Any person violating any provision of this article may be subject to an additional civil penalty and possible denial, revocation or suspension of license pursuant to Iowa Code ch. 105.

(17) Section 114, Means of Appeal, is deleted in its entirety and a new Section 114, Means of Appeal, is substituted in lieu thereof, as follows:

114109.1.4 Appeals.

114109.1.4.1 Any person shall have the right to register an appeal with the board of mechanical appeals for a review of any decision of the mechanical inspector, provided that such appeal is made in writing within ten days after having been notified of such decision by the mechanical inspector. Upon receipt of such appeal, the board of mechanical appeals shall proceed to determine whether the action of the mechanical inspector complies with this article, and shall make a decision in accordance with its findings within ten days of receiving the appeal. No appeal

shall be considered unless the appeal is filed within a period of ten days. The board of appeals shall have no authority to waive requirements of this code.

~~114.109.1.4.2~~ An appeal to the city council of any ruling of the board shall be made by filing a written notice of such appeal with the city clerk within ten days from the date of the ruling being appealed. The council shall give the appellant and the board a minimum of five days written notice by certified mail of the date, time and location of hearing of said appeal. All interested persons shall be given the opportunity to be heard at such hearing and the city council may affirm, modify or overrule the action of the board based upon the evidence submitted before the city council.

(18) Section 115, Violations, is deleted in its entirety and a new Section, Violations, is substituted in lieu thereof, as follows:

115 Violations.

115.1 Unlawful acts. It shall be unlawful for any person, firm or corporation to erect, construct, enlarge, alter, extend, repair, move, remove, demolish or occupy any building, structure or equipment regulated by this code, or cause same to be done, in conflict with or in violation of any of the provisions of the code.

115.2 Notice of Violations. The building official is authorized to serve a notice of violation or order on the owner and person responsible for the erection, construction, enlargement, alteration, extension, repair, movement, removal, demolition, or occupation of any building or structure in violation of the provisions of this Code, or in violation of a detail statement or a plan approved thereunder, or in violation of a permit or certificate issued under the provisions of this Code. Such order shall direct the discontinuance of the illegal action or condition and the abatement of the violation.

115.3 Prosecution of Violation. If the notice of violation is not complied with in the time prescribed by such notice, the building official is authorized to request the city attorney to institute the appropriate proceeding at law or in equity to restrain, correct or abate such violation, or to require the removal or termination of the unlawful occupancy of the building or structure in violation of the provisions of this Code or of the order or direction made pursuant thereto.

115.4 Violation Penalties. Any person who violates a provision of this code or fails to comply with any of the requirements thereof or who erects, constructs, alters or repairs a building or structure in violation of the approved construction documents or directive of the building official, or of a permit or certificate issued under the provisions of this code shall be deemed guilty of a municipal infraction punishable as provided in section 1-9 of the Code of Ordinances of the city.

~~(9) Section 108.6, Abatement of Violation, is deleted in its entirety.~~

~~(10) Section 108.7, Unsafe Mechanical Systems, is hereby amended by adding the following at the end of the section:~~

~~108.7.4 Abatement required. Any building, structure or premises that is unhealthful, unsanitary or otherwise dangerous to human life by reason of inadequate maintenance, obsolescence, overloading, or defective mechanical system or equipment, or mechanical system or equipment not conforming with this article, is hereby declared illegal, and shall be abated by removal, repair or replacement in accordance with the procedures in this division.~~

~~108.7.5 Notice. Whenever the mechanical inspector shall find any building, structure or premises to be unsafe as defined in this division, the inspector shall, in accordance with established procedure for legal notices, give notice to the person responsible for the building, structure or premises.~~

~~Such notice shall require those responsible to correct such condition in accordance with the provisions of this article, within a stated time.~~

~~108.7.6 Vacation of premises on failure to comply with notice. Upon failure to comply with the written notice as set forth in section 108.7.5, the mechanical inspector is hereby authorized to vacate the building, structure or premises and close the building, structure or premises to further use until unsafe conditions are abated; however, when appeal has been filed under section 109.1.4, the vacation shall be stayed until the appeal has been heard.~~

~~108.7.7 Emergency vacation of premises. In case of emergency, where the occupants of a building, structure or premises are in imminent danger because of an unsafe or sanitary condition, the mechanical inspector shall order the occupants thereof to vacate immediately, and such order shall not be stayed by an appeal.~~

(194) ~~A new Section 116, Board of Appeals, is added, as follows Subsection 109.1.1, Limitation of Authority, is amended by adding the following subsections 109.1.1.1 through 109.1.1.3:~~

116 Board of Appeals.

~~109.1.1.1~~ 11609.1.1.1 The board of mechanical appeals shall consist of five members: ~~one member of the city council~~, appointed each year, one owner, officer, director, shareholder or employee of a mechanical contracting company, one master mechanical license holder, ~~two~~one journeyman mechanical license holders, and one public member, each appointed for a period of four years. The mechanical inspector shall serve as secretary to the board but is nonvoting. Appointments are made by the mayor, with the approval of the city council. Should a vacancy ~~o~~in the board occur, it shall be the duty of the secretary of the board to notify the mayor of the vacancy, and the mayor and city council shall, at a regular meeting, as soon as possible thereafter, appoint a new member to the board to fill the vacancy for the unexpired term.

~~109.1.1.2~~ 11609.1.1.2 Expiration of appointments, ~~except for the city council member~~, shall be staggered so that one member is appointed or reappointed each year. Terms of appointment shall expire on December 31. If the mayor and city council fail to appoint at the scheduled time, the expired term member will be held over until re-appointment or replacement.

~~109.1.1.3~~ 11609.1.1.3 In so far as reasonably practicable, appointees for membership on the board shall be residents of the city, or, if that is not reasonably practicable, shall have a place of employment in the city. Appointees who are neither residents of the city nor who have a place of employment in the city may be eligible for appointment to the board upon a finding of the unavailability of qualified applicants, as determined by the mayor. Any person who is a member of the board on the date of adoption of the ordinance from which this article is derived who does not meet the qualifications for membership set forth herein shall continue to be eligible to serve as a member of the board until both the expiration of his ~~or her~~ current term and the member's nonreappointment by the mayor to an additional term.

~~(12) Section 109 is amended by adding thereto the following subsections 109.1.2 through 109.1.4:~~

~~109.1.2~~ 116.4109.1.2 Meetings; Records.

- (1) All meetings of the board of mechanical examiners and appeals are open to the public and shall be held in the council chambers, or other location indicated in a public notice posted 24 hours prior to any meeting.
- (2) Three members of the board shall constitute a quorum for the transacting of all business, but any action taken by the board shall require a majority vote of all members of the board.
- (3) The board shall annually elect one of its members as chairman of the board.

(4) The secretary of the board shall keep a record of the board meetings.

~~116.5109.1.3~~ Compensation of Members.

The members of the board of mechanical examiners and appeals shall serve without compensation.

~~(13) Subsections 109.2 through 109.7 are deleted in their entirety.~~

(204) ~~A~~The following new section 1171.0, *Mechanical Inspector*, is added to chapter 1, as follows:

~~1171.0~~ Mechanical Inspector.

~~111.1 Office Created; Appointment; Qualifications.~~

- ~~(1) The office of the mechanical inspector, within the inspection services division of the department of community development of the city, is hereby created, and such inspector is hereby authorized, directed and empowered to inspect any and all buildings or structures, public and private, and, as provided in this article, to condemn and order removed or remodeled and put into proper and safe condition for safety to life and property, all mechanical systems, equipment and related structures, and to control the disposition and arrangement of such equipment and systems so that persons and property shall not be in danger therefrom. The terms "Authority Having Jurisdiction" and "mechanical inspector," as used in this article or in the code adopted by this article, refer to the same person and are used interchangeably.~~
- ~~(2) The mechanical inspector shall be appointed by the director of community development, after recommendation of the building official, and shall be directly responsible to the building official.~~
- ~~(3) The appointee shall:

 - ~~(a) Be qualified in the mechanical trade and shall have at least ten years of practical experience in the mechanical trade or five years of experience as a mechanical inspector, or, in lieu of such experience, shall have a combination of trade school, practical experience and inspection experience considered by the city council as being suitable for minimum requirements, and shall have had two years of practical mechanical experience;~~
 - ~~(b) Be possessed of such executive ability as requisite for the performance of required duties and have thorough knowledge of the standards, materials and methods used in the installation of mechanical equipment;~~
 - ~~(c) Be well versed in improved methods of construction for safety to persons and property, the statutes of the state relating to mechanical work and any orders, rules and regulations issued by authority thereof, and in the uniform mechanical code; and~~
 - ~~(d) As a minimum, hold a current state journeyman mechanical license, or shall be required to pass an examination for journeyman mechanical prior to appointment by the community development department.~~~~

~~111.2 Supervision by Building Official.~~~~The mechanical inspector shall work fully under the supervision and jurisdiction of the building official and take all orders and perform any duties or services that may be designated by the building official pertaining to mechanical inspections or other related duties.~~~~1171.13~~ Conflict of Interest.

It shall be unlawful for the mechanical inspector or assistant mechanical inspectors to engage in the business of the sales, installation or maintenance of mechanical equipment, either directly or indirectly, and they shall have no financial interest in any concern engaged in such business in the city, at any time, while holding the office provided for in this division.

~~1171.24~~ Records.

(1) The mechanical inspector shall keep or cause to be kept records of all permits issued and inspections made and all other business of his office. The records shall be available to the public.

~~(2) The mechanical inspector shall keep an accounting record for the billing of permit fees.~~~~111.5 Interpretation of regulations.~~~~The mechanical inspector shall have full power to exercise judgment in a reasonable and proper manner and rule accordingly on all special cases in regard to any matters in this article or not specifically covered thereby, subject to section 110.1.4, pertaining to appeals.~~

(215) AThe following new section 1182-0, Licenses and Examinations, is added to chapter 1, as follows:

1182-0 Licenses and Examinations.

1182.1 Licenses Required.

1182.1.1 Unless otherwise specified, any reference to licenses in this article shall mean a license issued by the State of Iowa board of mechanical examiners and appeals.

1182.1.2 No person or business entity shall engage in any business involving installation, maintenance, alteration or repair of mechanical systems or equipment within the scope of this article unless such person has obtained a master mechanical contractor's business license issued by the state.

1182.2 Master mechanical business registration.

Any person who desires to apply for a mechanical permit shall make written application therefor to the mechanical inspector on forms obtained from the mechanical inspector.

New master mechanical contractors will be required to pay a one-time registration fee to be entered into the permit system. Fees shall be set by the city council.

1182.2.1 A mechanical contracting business shall show proof of a state issued master contractor license with the State of Iowa and shall execute and file with the city building official (or a specified inter-governmental agency if so designated by the building official) a certificate of insurance written by a company authorized to transact business in the state, in limits established by Iowa law annually by resolution of the city council; said certificate to be written on a standard form and carrying an endorsement naming the city, and its employees as additional insured's as their interests may appear, and conditioned upon the faithful performance of all duties required of such contractor by any ordinances, rules and regulations of the city. It shall be a further condition of said certificate of insurance that the obligor will hold the city harmless from any and all damages sustained by reason of neglect

~~or incompetency on the part of such contractor, his agents or employees in the performance of the work done under a license or permit issued upon the filing of said certificate.~~

1182.2.2 Said certificate of insurance shall be issued by December 31 of each year and shall be refiled on or before said date for each subsequent year, and shall be in continuous full force and effect. It is the intent and purpose of said certificate of insurance to also bind the individual, company, firm, association or partnership, whether it be trade name, corporation, or other business association or arrangement with which the principal is associated.

202115 IMC Chapter 4 Amendments

(2216) *Subsection 403.3.2.1, Outdoor Air for Dwelling Units*, is deleted in its entirety, and ~~replaced with the following a~~ new Subsection 403.3.2.1, Outdoor air for new dwelling units, is substituted in lieu thereof, as follows:

403.3.2.1 Outdoor air for new dwelling units. Buildings regulated by the International Residential Code shall be required to provide outdoor air ventilation by means of a Heat Recovery Ventilator or Energy Recovery Ventilator.

202115 IMC Chapter 5 Amendments

(2317) *Subsection 508.1, Makeup Air, including subparagraphs 508.1.1, Makeup air temperature and 508.1.2, Air balance*, is deleted in its entirety and a new Subsection 508.1, Makeup air, is substituted in lieu thereof, as follows~~through subsection 508.1.2, Air Balance, are deleted and replaced with the following subsection 508.1, makeup air:~~

~~508.1 Makeup Air. Replacement air quality shall be adequate to prevent negative pressures in the commercial cooking area from exceeding 0.02 inch water column (4.98kPa). Make up air units shall be dedicated to the kitchen area. When its fire extinguishing system discharges, makeup air supplied to the hoods shall be shut off.~~

~~Exception 1: With prior approval the authority having jurisdiction may waive the dedicated makeup air requirement.~~

~~508.1.1 Makeup air.~~ All makeup air shall be capable of maintaining a minimum of 60 degrees in the occupied space. Cooling is not required. All makeup air shall be interlocked with the hood's exhaust system, so that if the makeup air is not operating, the exhaust will not operate.

~~508.1.2 A nationally recognized company certified in testing and balancing, such as National Environmental Balancing Bureau (NEBB) or its equivalent as approved by the authority having jurisdiction, shall balance all systems.~~

202115 IMC Chapter 6 Amendments

(2418) *Subsection 603.6.1.1, Flexible Duct Length*, is deleted in its entirety and a new subsection 603.6.1.1, Flexible duct length, is substituted in lieu thereof, as follows:~~replaced with the following subsection 603.6.1.1:~~

603.6.1.1, Flexible ~~d~~uct ~~l~~ength. Factory made air ducts (flex pipe) at lengths greater than six feet shall require approval of the authority having jurisdiction.

NFPA 54 Amendments

(25) Subparagraph 7.12.2.1, is deleted in its entirety and a new subparagraph 7.12.2.1 is substituted in lieu thereof, as follows:

7.12.2.1 The bonding jumper shall connect to a metallic pipe or pipe fitting after the point of delivery but before the first joint of CSST. Bonding clamps shall be accessible.

(26) Subsection 7.12.3, Arc-Resistant Jacketed CSST, is deleted in its entirety and a new Subsection 7.12.3 , Arc-Resistant Jacketed CSST is substituted in lieu thereof, as follows:

7.12.3 Arc-Resistant Jacketed CSST. Only CSST with an arc resistant jacket or covering shall be installed, in accordance with the terms of its approval, the conditions of its license, the manufacturer's instructions and this code, including the bonding requirements of this section.

(27) Section 7.12, Electrical Bonding and Grounding. Is amended by adding subsection 7.12.6, Bonding Required When Appliances Installed, as follows:

7.12.6 Bonding Required When Appliances Installed. Whenever a permit is issued to open, alter or add an appliance to a gas piping system, any CSST in the structure not previously bonded shall be bonded in accordance with this section as a condition of approval.

(2819) Chapter 10 of NFPA 54, incorporated by reference by section 1 of General IMC Amendments, is amended as follows:

1. Section 10.2~~12~~, Room ~~H~~heaters, is deleted in its entirety.
2. Subsection 12.3.2, Appliances ~~N~~ot ~~R~~required to ~~B~~be ~~V~~vented, is amended by deleting sub~~paragraphs~~~~sections~~ 8 and 10.

(Code 2017, § 7-553; Ord. No. 2869, § 1, 7-5-2016)

INTRODUCED: _____
 PASSED 1ST CONSIDERATION: _____
 PASSED 2ND CONSIDERATION: _____
 PASSED 3RD CONSIDERATION: _____
 ADOPTED: _____

Robert M. Green, Mayor

ATTEST:

Jacqueline Danielsen, MMC, City Clerk



CITY OF CEDAR FALLS, IOWA
 PUBLIC SAFETY – FIRE RESCUE DIVISION
 4600 South Main Street
 Cedar Falls, Iowa 50613
 Phone: 319-273-8690
 Fax: 319-268-5196



 MEMORANDUM

To: Honorable Mayor Robert Green & City Council
 From: John Bostwick, Fire Chief
 Date: October 7, 2021
 Subject: Public Hearing for model code adoption and ordinance amendments

Every 6 years the City of Cedar Falls adopts the most recent versions of the model building codes. This year we are proposing to continue this standard by adopting the 2021 International Fire Code.

By adopting these codes we ensure that our city is being developed to be as safe as possible in regards to life safety. Life safety includes elements of the built environment such as egress, fire separation, and structural stability. The Fire Code is created by architects, engineers, builders, code officials, fire officials, attorneys, and more, which means many entities review them in the context of safety, ease of use, and cost implications. Therefore when we adopt them we are taking advantage of the knowledge of experts in the fields of design and construction. We also ensure that we are referencing the same codes as other local jurisdictions (Waterloo) and the state.

As part of this code adoption we also reviewed Chapter 9 of the City Code of Ordinances. We discovered there were some inconsistencies and some overlap in the City Code of Ordinances and the International Fire Code. In order to align these codes to match our current processes we have updated and clarified some minor points in Chapter 9. One change is to clarify that the design of the fire access roadway will follow Cedar Falls Engineering road standards. A majority of the changes simply clarify or correct the inconsistencies between International Fire Code and City Code of Ordinances. These amendments do not change the processes we have in place; they simply clarify them and make them easier to follow. In addition, there are changes in all the codes to provide consistency between each code type.

Should you have any questions please contact me regarding this update and the public hearing for these ordinance amendments and outside code adoption set for October 18, 2021.

Attachments: Red line version of ordinance and Power point slides

Prepared by: Kevin Rogers, City Attorney, 220 Clay Street, Cedar Falls, IA 50613, (319)273-8600

ORDINANCE NO. _____

AN ORDINANCE AMENDING INCORPORATION OF THE INTERNATIONAL FIRE CODE INTO ARTICLE II, FIRE CODE, OF CHAPTER 9, FIRE PREVENTION AND PROTECTION, OF THE CODE OF ORDINANCES OF THE CITY OF CEDAR FALLS BY (1). AMENDING SECTION 9-19, INTERNATIONAL FIRE CODE ADOPTION, BY REPEALING SAID SECTION AND ENACTING IN LIEU THEREOF A NEW SECTION 9-19; AND (2). AMENDING SECTION 9-20, INTERNATIONAL FIRE CODE AMENDMENTS, BY REPEALING SAID SECTION AND ENACTING IN LIEU THEREOF A NEW SECTION 9-20.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CEDAR FALLS, IOWA:

Section 1. Section 9-19, International Fire Code Adoption, of Article II, Fire Code, of Chapter 9, Fire Prevention and Protection, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby amended by repealing said section in its entirety and enacting a new Section 9-19, International Fire Code Adoption, as follows:

Sec. 9-19. International Fire Code adoption.

- (a) The International Fire Code, 20~~17~~²¹¹⁵ Edition, including appendix chapters B, C, D, E, F, G, H, I, J, and K published by the International Code Council, Inc., and all standards referenced therein, except as such codes and standards are amended in this article, are hereby adopted by reference, and are hereby adopted and incorporated as if fully set out in this section.
- (b) An official copy of the code adopted by this article, including a certificate by the clerk as to its adoption and effective date, is on file in the office of the clerk, ~~in either a hardbound or electronic version,~~ available for public inspection.

(Code 2017, § 11-26; Ord. No. 2871, § 1, 7-5-2016)

Section 2. Section 9-20, International Fire Code Amendments, of Article II, Fire Code, of Chapter 9, Fire Prevention and Protection, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby amended by repealing said section in its entirety and enacting a new Section 9-20, International Fire Code Amendments, as follows:

Sec. 9-20. International Fire Code amendments.

The International Fire Code, 20~~21~~¹⁵ Edition, adopted by section 9-19, is amended as provided in this section.

- (1) *Section 103.2, Appointment*, and *section 103.3, Deputies*, are deleted, and the following substituted therefor:

103.2 Appointment. The chief of the fire operations division may designate a member of the fire operations division to exercise the powers and perform the duties set forth in this code. ~~This person shall be known as the fire marshal.~~

~~*103.3 Deputies.* In accordance with the prescribed procedures of this jurisdiction and with the concurrence of the appointing authority, the fire code official shall have the authority to appoint a deputy fire code official, other related technical officers, inspectors and other employees. The fire code official with the approval of the director of public safety services may appoint and designate such members of the fire operations division who are reserve police officers as fire investigators upon being certified by the Iowa Law Enforcement Academy. Fire investigators shall have the powers of a peace officer in performing their duties under this code, including full powers of arrest to effectuate their duties of enforcing city ordinances and state statutes. Notwithstanding his status as a peace officer, a fire investigator shall be subject to all rules and regulations of the department of public safety services for all purposes, and shall perform such functions as assigned by the fire code official with the approval of the director of public safety services.~~

- (2) *Subsection 105.2 Applications*, is amended by adding the following sentence to the end of the subsection:

Application for an operational permit shall be submitted with all required information not less than 30 days prior to the event requiring a permit.

- (3) *Subsection 105.6.30, Open Burning*, is deleted in its entirety.

- (4) *Subsection ~~105.5.42~~^{105.6.36}, Pyrotechnic Special Effects Material*, is deleted and the following is substituted therefor:

Subsection 105.~~56.42~~³⁶ Pyrotechnic Special Effects Material. The council, upon written request for an application, may grant a permit for the display of fireworks to amusement parks, organizations or groups of individuals as approved by the council when satisfied that such fireworks display will be handled by a competent operator and that adequate protection for public safety has been provided and that adequate fire extinguishing equipment is available. Accident liability protection in an amount of not less than \$2,000,000.00 may be required. Additional reference will be found in ~~State~~ Code of Iowa § 727.2.

- (5) *Subsection 10~~86~~.2 Inspections*, is amended by adding the following to the end of the subsection:

The *fire code official* at the official's sole discretion may send plans to a qualified agency for review. The *fire code official* shall designate the ~~plans~~ review agency for the plans. The applicant shall pay all fees associated with the plan review directly to the outside agency.

- (6) *Subsection 10~~86~~.2 Inspections*, is further amended by adding the following subsection 10~~86~~.2(a):

10~~86~~.2(a) All fire protection systems (sprinkler/fire alarm systems) with a square footage over 10,000 feet shall require a third party review. The third party shall be approved by the *fire code official*.

Any building which contains fire pumps, or stand pipes, regardless of square footage, shall require a third party review. The third party shall be approved by the *fire code official*.

- (7) *Section 10~~86~~ Inspections*, is amended by adding *subsection 10~~86~~.5, Commercial Operations*, as follows:

~~1086.5~~ *Commercial Operations*. All new commercial business and all new commercial business in existing buildings shall have initial pre-inspection conducted by the fire code official before business is open to the general public, and records updated to reflect new business owners.

- (8) Section ~~111108~~, ~~Means~~~~Board~~ of Appeals, including subsections ~~11108.1~~ through ~~11108.43~~, is deleted in its entirety, and the following substituted therefor:

~~Section 11108~~ *Board of Appeals*. In order to determine the suitability of alternate materials and type of construction and to provide for reasonable interpretations of the provisions of this code, the board of appeals shall render decisions upon pertinent matters. The fire chief shall be an ex-officio member of the board. The board shall adopt reasonable rules and regulations for conducting its investigations and shall render all decisions and findings in writing to the fire chief with a duplicate copy to the appellant, and may recommend to the city council such new legislation as is consistent therewith. The board of appeals referred to in this section is the board of appeals created by the building code, as adopted by the city.

- ~~(9) Section 110.1.2 is deleted in its entirety and the following substituted therefor:~~

~~110.1.2 *Unsafe Conditions*. The code official is authorized to order an operation or use stopped, or the evacuation of any premises, building, or vehicle or portion thereof which has or is a fire, life safety or health hazard.~~

- ~~(910)~~ Section 202, *General Definitions*, is amended by adding the following definitions:

Code official.

The chief officer of the fire operations division, the fire marshal, or the fire chief's authorized representative.

Cross aisles.

Required aisles which permit egress from one main aisle to gather through an allowable use area.

~~Crowd management.~~

~~Crowd management meshes the design features of a facility, the established operating features of that facility, and an understanding expected natural behavior of the occupants in that facility for a specific type of event.~~

Emergency communications center.

Black Hawk County Consolidated Communications Dispatch Center.

Exhibits.

A space or portable structure used for the display of products or services.

Flame effect.

The combustion of flammable solids, liquids, or gases to produce thermal, physical, visual, or audible phenomena before an audience.

Main aisle.

That area designated to accommodate the required means of egress width located between the farthest projections of the area designated for use by a tenant and the allowable use area.

Maze.

A labyrinth of paths throughout a confined area accessible by walking or mobile

Mobile catering.

Business of selling prepared food from some sort of vehicle.

Mobile food truck.

A vehicle equipped to cook and sell food.

Outdoor assembly event.

Private and public events conducted outdoors including, but not limited to, beer gardens and mazes, having a projected attendance of 500 or more persons throughout the event, or confining 50 or more attendees by the permanent or temporary installation of barricades or fencing.

Special event.

An assembly of persons with a common purpose to watch or participate in an activity that is different than the normal course of business for the location. The event is for a specific time and location. Events may involve entertainment, food/beverage or alcohol services, use of temporary fencing, stands, structures, or power. Events may include, but not be limited to, concerts, circuses, fairs, festivals, parades, tradeshow, exhibits, mazes, or similar celebrations. Special events may also increase, impact, or disrupt normal traffic flow or involved road closures.

~~(101)~~ Section 307, *Open Burning and Recreational Fires*, is deleted in its entirety.

~~(12)~~ Subsection 315.3.3 is amended by adding the following sentence at the end of the subsection:

~~Combustible material storage shall be confined to approved storage areas, such that the presence of incidental storage in any other area of the building does not constitute a hazard.~~

~~(13)~~ Section 401, *Emergency Planning and Preparedness*, is amended by adding subsection 401.9 as follows:

~~401.9 Building Evacuation. Upon activation of the building fire alarm system or upon notification by other means of detecting and reporting unwanted fire, all building occupants shall promptly evacuate the building. Exception: When the emergency evacuation plan, as approved by the fire code official, does not require the immediate total evacuation of the building.~~

~~(14)~~ Section 403.2 is amended by adding subsection 403.2.4.1, as follows:

~~403.2.4.1 A-2 Occupancy Crowd Managers. Group A-2 occupancies shall be provided with a minimum of one trained crowd manager anytime occupancy reaches 50 or more. Where the occupant load exceeds 250, additional trained crowd managers shall be provided at a ratio of one crowd manager for every 250 occupants. The crowd manager shall annually receive training approved by the fire code official in crowd management techniques.~~

~~(115)~~ Subsection 405.32, *Frequency*, is amended by adding the following at the end of the subsection:

Fire and evacuation drills in Group E occupancies shall be conducted in accordance with section 100.31 of the Code of Iowa. Fire Drills in Group R, Division 2, Fraternities and Sororities, shall be conducted once per academic semester.

~~(126)~~ Section 503, *Fire Apparatus Access Roads*, is amended by adding subsection 503.2.9, *Load Support*, as follows:

~~503.2.9 Load Support Thickness. Fire apparatus access roads shall be constructed of Portland cement concrete and shall comply with Iowa DOT Class C or Class M mix meeting the requirements of Materials I.M. 529. The concrete access road shall be a minimum of seven inches thick over compacted soil. Fire apparatus access roads shall support a minimum wheel load of 18,000 pounds and/or GVW of 80,000 pounds and meet city engineering road standards.~~

~~(137)~~ Section 506, *Key Boxes*, is amended by adding the following subsections 506.3, 506.3.1, 506.3.2, 506.4, 506.4.1, and 506.4.2 thereto:

Subsection 506.3 Key box.

A fire operations division key box shall be installed in each commercial or industrial building in the city which is equipped with a fire detection, fire alarm, or fire suppression system that is monitored by an alarm company with direct connection to the dispatch center of the city, and in each building equipped with an unsupervised local alarm system, and where immediate access to the interior of the building by fire operations division personnel is necessary for life-saving or firefighting purposes. A fire operations division key box shall also be installed in each residential property consisting of three or more residential dwelling units. Each fire operations division key box shall be of a type and shall be installed in a location that is approved by the fire chief or his designee, and shall be installed in accordance with manufacturer's recommendations. Each application for a fire operations division key box shall be submitted to the fire chief or his designee.

The cost of purchase and installation of each fire operations division key box shall be paid by the building owner.

Each fire operations division key box shall contain the following keys:

- a. Keys to each locked point of egress, whether on the exterior or interior of the building.
- b. Keys to each locked mechanical room in the building.
- c. Keys to each locked electrical room in the building.
- d. Keys to other areas as determined by the fire chief or his designee.

A "fire operations division key box" means a secure box installed on the exterior of a building, containing keys to various locks on the premises of the building, to which only the fire chief or his designee has access.

If the building owner changes or causes to be changed any locks such that the keys located in the fire operations division key box will not unlock any of the locks described in this section, it shall be the responsibility of the building owner to furnish to the fire chief or his designee replacement keys to be placed in the fire operations division key box, at the owner's expense.

Subsection 506.3.1 Elevator Knox Box

A fire operations division elevator key box shall be installed in each commercial, industrial and residential building in the city which is equipped with an elevator system. Each fire operations division elevator key box shall be of a type and shall be installed in a location that is approved by the fire chief or his designee, and shall be installed in accordance with manufacturer's recommendations.

Subsection 506.3.2 Fire Department Connection Caps (FDC)

A fire operations division connection (FDC) for water supply to a building from a fire truck shall have locking Knox cap plug installed on all new piping and existing piping, in all sprinkled buildings within the city. Each fire operations division connection locking cap shall be of a type and shall be installed in accordance with manufacturer's recommendations.

Subsection 506.4 Locking Wall File Cabinets.

Generic locking wall file cabinets shall be mounted by the fire alarm control panel. The cabinets shall contain information for fire operations division use. Locking file cabinets shall be approved by the ~~fire code operations division~~ official. The key to file cabinet shall be placed into the key box.

Subsection 506.4.1 Contents.

The cabinets shall contain the following files:

1. Fire alarm as built plans.
2. Sprinkler plans.
3. Emergency contacts.
4. Any other info required by the fire code official.

~~Subsection~~ 506.4.2 Mounting Height.

Cabinets shall be mounted no higher than 5½ feet measured from the floor.

(148) ~~Section 507, Fire Protection Water Supplies~~, is amended by adding subsection 507.5.1.2, FDC Connections, as follows~~the following thereto~~:

~~Subsection~~ 507.5.1.2 FDC Connections. Where a facility or building hereafter constructed or moved into or within the jurisdiction requiring a fire suppression system shall have a fire hydrant located within 100 feet of the buildings FDC connection as measured by an approved route by the fire code official.

(159) ~~Subsection 507.5.1, Where required~~, is amended by deleting exceptions 1 and 2.

(1620) ~~Subsection 507.5.1.1, Hydrant for standpipe systems~~, is amended by deleting exception.

(1721) ~~Subsection 507.5.45, Obstruction~~, is amended by adding ~~the following~~ subsection 507.5.5.1(a) as follows:

507.5.5.1(a) Fire protection equipment and fire hydrants shall not be hidden by vegetation or other means as determined by fire code official.

(1822) ~~Subsection 507.5, Fire hydrant systems~~, is amended by adding the following ~~new~~ subsections 507.5.7 and 507.5.8:

~~Subsection~~ 507.5.7. Fire hydrants shall be marked by approved method for quick response as determined and approved by fire code official. (Marker flags)

~~Subsection~~ 507.5.8. Fire hydrant outlet direction: Fire hydrants shall be positioned so that the 4½-inch port connection is facing in a direction as determined by fire code official.

(1923) ~~Subsection 510.1, Emergency responder communication coverage in new buildings~~, is amended by deleting exception 1.

(204) ~~Subsection 903, Automatic Sprinkler Systems~~, is amended by adding a new subsection 903.1.2, Water supply safety margin, as follows:

903.1.2. Water Supply Safety Margin. Automatic sprinkler systems shall be designed with a minimum of 10 percent or five psi safety margin (whichever is greater) above static pressure in the fire protection systems hydraulic calculations.

(215) ~~Subsection 903.4.2, Alarms~~, is deleted in its entirety and the following new subsection 903.4.2, Alarms, is substituted therefor:

903.4.2. Alarms. An approved weatherproof horn/strobe device shall be mounted directly above ~~at the remote~~ fire operations division connection (FDC) between seven and ten feet in height above grade. Exception: horn/strobe device height and location may be altered by the fire code official as circumstances require in the discretion of the fire code official.

(226) ~~Section 903, Automatic Sprinkler Systems~~, is amended by adding a new subsection 903.7, Zones, as follows:

903.7 Zones. Automatic sprinkler systems zones shall not exceed the area permitted by NFPA 13 or NFPA 13R and shall provide a sprinkler control valve and a water flow device for each normally occupied floor. The location of sprinkler control valves must be approved by the fire code official.

~~(27) Subsection 904.13 is deleted in its entirety.~~

(238) Subsection 906.1, *Where Required*, is amended by deleting the exceptions.

(249) Subsection 906.3, *Size and Distribution*, is amended by adding the following sentence to the end of the subsection:

The minimum rating of any required portable fire extinguisher for Class A, B, C, D hazard shall be 2A-10BC.

(2530) ~~Section 907.1, *General*, is amended by adding the following subsections Subsection 907.1.4, *Conduit Color*, is deleted in its entirety and replaced with the following subsections 907.1.4 through 907.1.4.6:~~

907.1.4 *Fire Alarm Control Panels and Fire Alarm Annunciator Panels*. Installation of fire alarm control panels and fire alarm annunciator panels shall be installed in accordance with subsections 907.1.4.1 through 907.1.4.6

907.1.4.1 *Fire Alarm Panel Height*: Installation of a fire alarm panels shall not exceed six feet in height measured from the floor to the top of panel. Exception: Panel height may be altered by the code official.

907.1.4.2 *Number of Fire Alarm Panels in Buildings*. Only one listed fire alarm control panel shall be allowed per building and shall lock in the alarm until the system is reset and shall not be canceled by the operation of an audible-alarm silencing switch. This control panel shall only receive alarms signals from the fire protection equipment.

907.1.4.3 *Combination Fire/Security Alarm Systems Panels*. A listed combination fire/security alarm system panel that meets all the requirements of this code and amendments may be permitted by approval of the *fire code official*. The fire/security panel shall be capable of providing a signal that can differentiate between the fire and security alarm.

907.1.4.4 *Password/PIN Protection Prohibited*: Fire alarm control panels and/or fire alarm annunciator panels that require a password/PIN to silence an alarm/supervisory/trouble signal and/or to reset an alarm/supervisory/trouble signal shall prohibited

907.1.4.5 *Fire Alarm Annunciator Panels*: The *fire code official* can require the addition of fire alarm annunciator panels based on the size of building and access to the building. These panels shall meet the requirements of section 907.1.4 and 907.2.

907.1.4.6 *Fire Alarm Panels*: All Fire alarm panels shall be the addressable type system.

(2631) Subsection 907.2.1, *Group A*, is amended by deleting the exception contained therein.

(2732) Subsection 907.2.3, *Group E*, is amended by adding the following sentence to the end of the first paragraph:

New and existing educational occupancies shall have a monitored fire alarm system.

(2833) Subsection 907.2.9.1, *Manual fire alarm system*, is amended by deleting exception 2.

(2934) Subsection 907.2.11.2, *Groups R-2, R-3, R-4 and I-1*, is amended by adding a fourth subparagraph, as follows:

4. Supervised smoke alarms shall be installed in all common corridors and at the top and bottom of all stairway enclosures in groups R-2, R-4, and I-1 occupancies. In corridors, detectors shall be located within 15 feet of the end of the corridor and in such a way that one detector is located for each 30 feet of corridor length or spaced as allowed by the code.

- (305) Subsection 907.2.13.2, Fire department communication system, is deleted in its entirety.
- (316) Subsection 907.3, Fire safety functions, is amended by adding ~~the following~~ subsection 907.3.5(d), High velocity low speed fans, as follows:
- 907.3.5(d) High Velocity Low Speed Fans (HVLSF): ~~HVLSFFan~~ shall shut down upon activation of fire alarm system
- (327) Subsection 907.4.2, Manual fire alarm boxes, is amended by adding the following sentence to the end of the subsection:
- Where in the opinion of the fire code official manual fire alarm boxes may be used to cause false fire alarms, the fire code official is authorized to modify the requirements for manual fire alarm boxes.
- (338) Subsection 907.6.4, Zones, is amended by deleting the exception in its entirety and ~~substituting~~inserting the following exception in lieu thereof:
- Exception:* Automatic sprinkler system zones shall not exceed the area permitted by NFPA13 and shall provide a sprinkler control valve and water flow device for each normally occupied floor.
- (349) Subsection 907.6.4, Zones, is further amended by adding ~~the following~~ subsection 907.6.4.3, Zone and address location labeling, as follows:
- 907.6.4.3 Zone and address location labeling. Fire alarm and/or annunciator panels shall have all zones and address points plainly and permanently labeled as to their location on the outside of the panel or on an easily readable map of the building.
- (3540) Subsection 907.6.6, Monitoring, is amended by adding the following paragraph at the end of the subsection:
- Each address point identification shall have an alpha/numeric descriptor location. Alpha/numeric descriptor locations area required to be reported to the emergency communications center upon activation of alarm conditions as specified by the fire code official. Supervisory alarm conditions are required to be reported to the fire code official by an approved manner.
- (3641) ~~SubSection 912.1, Installation, Fire Department Connections~~, is amended by adding ~~the following subsection 9.12.1.1, as follows~~thereto:
- ~~(42) Subsection 912.1.1~~ The fire operations division connections(s) shall be a five inch Storz type connector(s) compatible with hose couplings currently used by Cedar Falls Fire Rescue.
- (37) Subsection 912.4.1, Locking fire department connection caps, is amended by adding subsection 912.4.1.1, as follows:
- 912.4.1.1 FDC size minimum fire operations division connection size shall be 5 inch locking Storz type with a locking Knox cap on commercial buildings and 2 ½ inch Cedar Falls thread on residential buildings with a locking Knox cap.
- (3843) Section 912, Fire Department Connections, is amended by adding ~~the following~~ subsections 912.8, Remote connection, as follows:
- ~~912.8. FDC size minimum fire operations division connection size shall be 5 inch locking storz with a locking Knox cap on commercial buildings and 2½ inch Cedar Falls thread on residential buildings with a locking Knox cap.~~
- 912.89. Remote connection. Any building three stories or higher shall have a remote fire operations division connection.

(394) Subsection 5003.5, Hazardous identification signs, is amended by adding the following sentence to the end of the subsection:

Signs shall also comply with the requirements of the Iowa Right to Know Law.

Chapter 57 Flammable and Combustible Liquids

(405) Subsection 5704.2.13-2, Above-ground tanks, is amended by adding ~~the following new~~ subsection 5704.2.13.2.4, Existing above-ground tanks hazards, as follows:

5704.2.13.2.4. Existing ~~a~~Above-ground ~~t~~Tanks ~~h~~Hazards. Existing above-ground tanks installations, even if previously approved, that are determined to constitute a hazard by the fire code official, shall not be continued in service. Unsafe tanks shall be removed as required by the fire code official and in accordance with this code.

~~(46) Subsection 5705.5.1 is amended by adding the following thereto:~~

~~6. —Corridor installations are prohibited in Group E occupancies.~~

(Code 2017, § 11-27; Ord. No. 2871, § 1, 7-5-2016)

INTRODUCED: _____

PASSED 1ST CONSIDERATION: _____

PASSED 2ND CONSIDERATION: _____

PASSED 3RD CONSIDERATION: _____

ADOPTED: _____

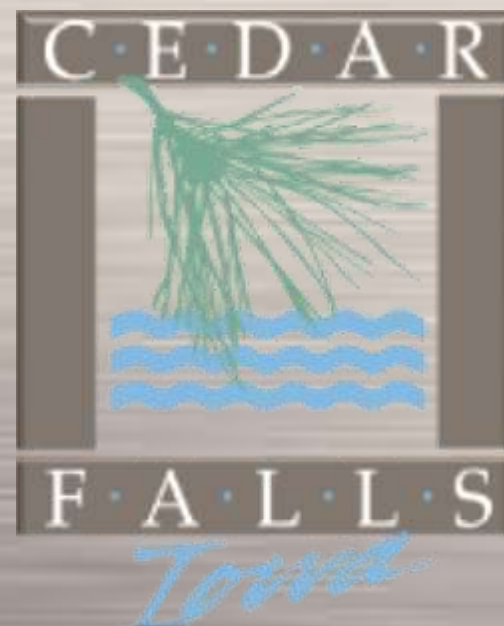
Robert M. Green, Mayor

ATTEST:

Jacqueline Danielsen, MMC, City Clerk

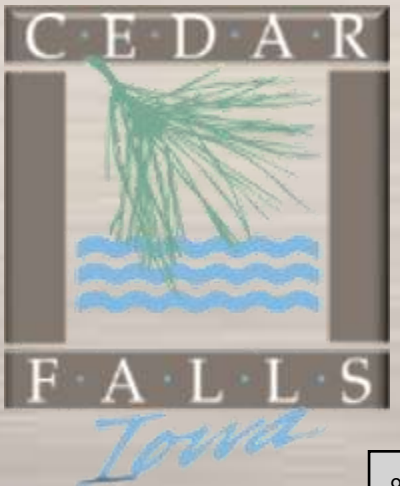
Public Safety

Fire Rescue



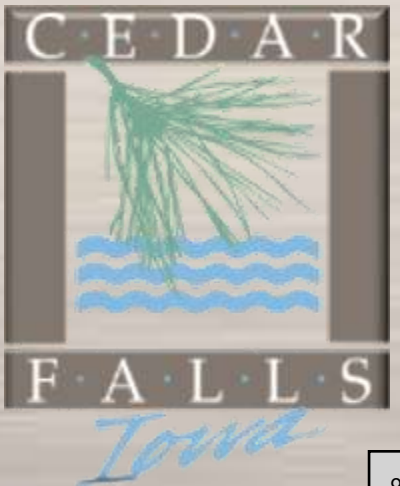
International Fire Code 2021

Cedar Falls City Council Update



International Fire Code Update Purpose

- Minimum Requirements for a reasonable level of life safety and property protection from fires.
- Fire Codes have their roots in catastrophic reform
- Two major improvements in the last 100 years, fire sprinkler systems and smoke alarms



IFC 2021 Update

- Majority of the changes are reference number changes from the IFC
- 2021 IFC has updated and clarified some definitions such as unsafe conditions and crowd managers
- Fire apparatus roadway now references Cedar Falls Engineering Road Standards



IFC 2021 Update

- Clarified the requirement to have fire hydrants visible not hidden by vegetation or other means
- Clarified the requirement for a horn strobe device adjacent to FD connections
- Removed an amendment that disallowed the use of alcohol hand rub stations in educational settings.



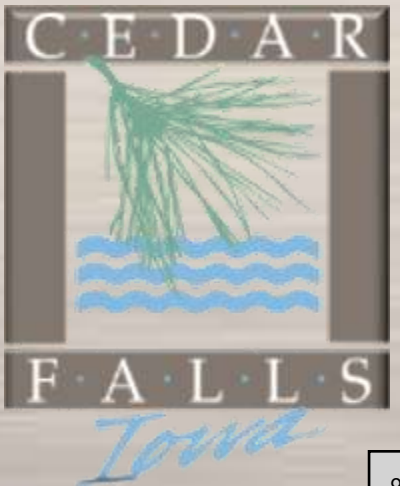
IFC 2021 Update

- Continues to require a plan review agency to review sprinkler/fire alarm building plans over 10,000 square feet for code compliance
- Continues to recognize several appendix chapters which help to further define and provide technical information for other parts of the code, fire flow, fire hydrant locations, fire access roads, and hazardous materials storage



IFC 2021 Update

Questions?





DEPARTMENT OF COMMUNITY DEVELOPMENT

City of Cedar Falls
220 Clay Street
Cedar Falls, Iowa 50613
Phone: 319-273-8600
Fax: 319-273-8610
www.cedarfalls.com

MEMORANDUM
Planning & Community Services Division

TO: Honorable Mayor Robert M. Green and City Council
FROM: Jaydevsinh Atodaria, City Planner I
Ben Claypool, PhD, EI, Civil Engineer II
DATE: October 11, 2021
SUBJECT: Rezoning Request for Direct Appliance at 5424 University Ave (RZ21-007)

REQUEST: Rezone property from R-1, Residential Zoning District and C-2, Commercial Zoning District to C-2, Commercial Zoning District.
PETITIONER: KMTR Properties LLC, Owner / Chris Cummings, Turnkey Associates, Architects
LOCATION: 5424 University Avenue

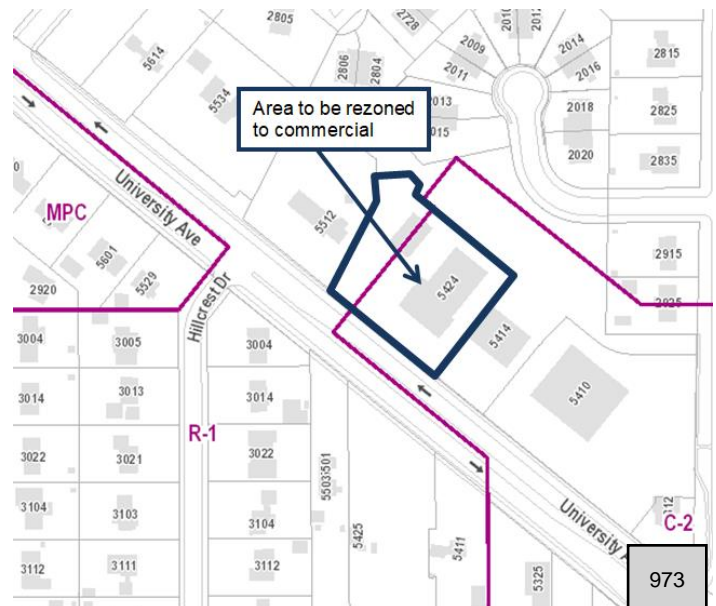
PROPOSAL

The current owner of Direct Appliance has requested to rezone a 1.38 acres parcel (60,113SF) property located at 5424 University Avenue, which currently has split zoning from the R-1, Residential Zoning District and C-2, Commercial Zoning District to C-2, Commercial Zoning District to expand the existing commercial use of the property.

BACKGROUND

KMTR Properties LLC owns the subject property. This parcel was purchased in 2008 with an existing one-story building built in 1976 and a detached accessory structure built in 1988 to operate as a commercial retail property. In addition, there were some building additions done by the owner in 2008 after the purchase of the property. And currently, the property is being used for a retail business of "Direct Appliance".

The subject property at 5424 University Avenue is



Lot 1 of Fogdall University Avenue Minor Plat No.1 which was platted in 2006. And the property has split zoning with the eastern 3/4th area of the lot in the C-2 Commercial District and the western 1/4th area of the lot in the R-1 Residence District. The applicant wishes to expand the business into the R-1 portion of the property, so is requesting to rezone the property so that the entire lot is within the C-2 Commercial District to comply with the zoning.

The property west of the subject property is in the R-1 Zoning district and the property east of the subject property is in the C-2 zoning district. It is unclear why this particular property has split zoning, although there have been a number of property divisions and subdivisions that may not have coincided with the zoning boundaries.

If the petitioner's request to rezone the property to C-2 zone is approved, the intent is to expand the existing use of the property by making building additions as per the attached site plan and expanding the paved area to the west to allow maneuvering of semi-trucks for loading and unloading. A site plan is attached with the packet that shows the proposal for the site.

ANALYSIS

Existing and Proposed Zoning

The request is to rezone 1.38 acres of land located at 5424 University Avenue from R-1, Residential Zoning District and C-2, Commercial Zoning District to C-2, Commercial Zoning District.

The R-1 Residential District allows residential use in the form of one- and two-unit dwellings, churches, and private noncommercial recreational areas. This zone does not allow commercial activity. The C-2 Commercial District allows a variety of commercial uses including but not limited to retail stores of all types, financial institutions, automobiles sales, veterinary clinics, bowling alleys, drive-in restaurants, laundries, offices, printing shops, restaurants, mini-storage warehouses, and similar.

Currently, the property is being used for household appliance sales and repair, which is an allowed use in the C-2 Commercial Zoning District. The owner of the property intends to continue expanding the similar use on the property. City staff notes that once the property is rezoned, it can have any commercial use allowed as per the C-2 zoning district in the future. A property with split zoning creates uncertainty for the property owner and for surrounding properties as to its use and development, so is good practice to change the zoning so the entire lot is within the same zone. The current request aligns with the intent to continue the development of the land for similar use as per the site plan proposal.

Adjacency between R-1 and C-2 Zoning

While it is not preferable to have a property with split zoning, in this case it has in effect created a more significant buffer between the commercial use and the single family home on the abutting property. Rezoning the western portion to C-2 will allow the commercial use to expand into an area where there is a drainageway, significant vegetation, and large overstory trees that create a significant visual and physical buffer between the uses. Staff recommends that if rezoned and the paved area expanded in this direction that stormwater management be carefully considered and that any loss of trees or vegetation be replaced to create an effective screen between the commercial activity and the abutting residential property. With any rezoning

the Commission has the discretion to impose reasonable conditions to mitigate for any potential negative effects caused by the rezoning. Staff is supportive of the rezoning, but notes the following:

- As per code, the minimum setback requirement for the C-2 zoning district is 10 feet from any abutting residential zoning district. However, if the truck turn around area encroaches this close to the property boundary it may result in loss of a significant portion of the existing vegetation and large overstory trees.
- As per code minimum six feet high screen consisting of a fence, wall, or plant material of mature height must be installed to screen the property. Staff notes that the commercial property is at a higher elevation than the residential property, so a taller landscaping screen would be warranted between the paved area and the west property line, particularly if there is significant loss of the existing vegetation and trees.
- All parking lots and vehicular use areas of the commercial property must have peripheral landscape screening from the adjacent properties and the public right-of-way. The applicant has indicated that they will provide the necessary peripheral screening, including along University Avenue.
- The drainageway along the western edge of the subject property for stormwater will need to be maintained as per city standards. City staff notes that the applicant must comply with all stormwater requirements so there is no increase in stormwater flows on adjacent properties due to expansion of the impervious surfaces on the lot (new paving and buildings). Engineering staff have made some recommendations, which are noted in the technical comments below.

Zoning considerations normally involves evaluation of three main criteria:

- *Compliance with the Comprehensive Plan and Future Land Use Map*
The Future Land Use Map in the City's Comprehensive Plan indicates that this property is designated for Community Commercial use. With the proposed area to be rezoned to expand the commercial use, the Future Land Use Map will not need to be amended for the property, as the property is currently under the right designation. See excerpt from the Future Land Use Map below with properties labeled.



• Available access to Public Services (Sewer, water, and electricity)

The property is located in a developed area of the city and has access to all the utilities on site.

• Available adequate roadway access

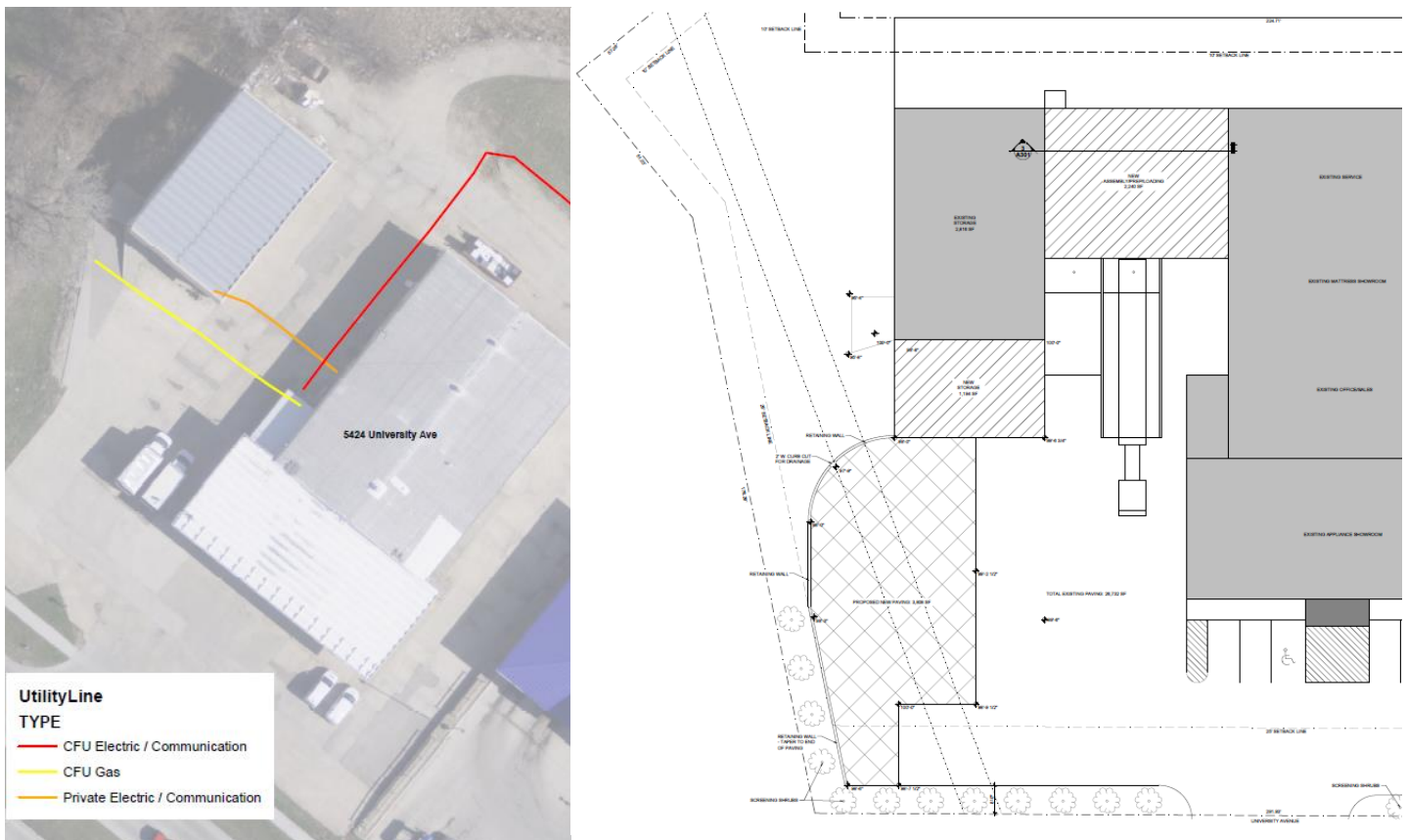
The property does have roadway access from University Avenue.

Public Notice:

Notice of the rezoning proposal was mailed to the adjoining property owners on 1st September 2021. A public hearing notice was also published in Waterloo Cedar Falls Courier on September 16, 2021. Also, a notice was published in Waterloo Cedar Falls Courier on October 8th, 2021 notifying people about the scheduled public hearing on 18th October 2021 City Council Meeting.

Technical Comments:

City staff including the City Engineering Division and Cedar Falls Utilities (CFU) has reviewed the rezoning request. CFU notes that there is a gas service, three-phase electrical and communication fiber lines in the new construction area as per the applicant's site plan proposal and those will have to be relocated by CFU at the owner's expense. See image below for reference.



Stormwater Improvements: The Engineering Division notes, while not triggering the post-construction stormwater control ordinance, the additional retaining wall and truck turn around pavement is shown to slope to the north-west and allow all newly placed impervious area to dump through a curb-cut at the top of the retaining wall. While the plan view of this new impervious area is ok, the City has requested that the new concrete is to be placed with a slope

draining towards an area intake (SW-511 per SUDAS) and then piped into the closest storm water intake along University Avenue. The grading of the new impervious area should collect all new storm water into the intake, allowing only storm events greater than the 100 year overflow to flow north-west toward the adjacent properties. This would prevent any stormwater issues related to the City’s nuisance code. See image above for reference.

In addition to the technical comments from CFU and Engineering above, City staff notes that the following should be addressed by the applicant:

- Need the correct legal description of the entire lot as the lot has been previously platted. *Received and updated.*
- Since there is no established legal description of the zoning boundary line, the entirety of the lot as legally established should be rezoned to C-2. Update the zoning exhibit accordingly with the established legal description of the entire lot. *Received and updated.*
- The applicant will be submitting a revised site plan with correct setbacks and is working to determine what trees and vegetation will need to be removed to establish the truck turn-around. If significant loss of the trees and landscaping is anticipated, Staff recommends establishing a new landscaping buffer that will create an effective screen between the commercial activity on the lot and the abutting residential property, such as columnar arborvitae. *Received and updated. However, staff recommends planting arborvitaes along the western property line as it grows faster and taller. Staff believes that inclusion of such plantings would provide substantive screening to adjacent residential property.*

STAFF RECOMMENDATION

Planning and Zoning Commission recommends approval of the submitted rezoning application at their regular meeting on 22nd September 2021 with a vote of 7 ayes and 0 nays. Staff also recommends approval of the case RZ21-007, a request to rezone a 1.38 acre parcel located at 5424 University Avenue from R-1, Residential District and C-2, Commercial District to C-2, Commercial District.

PLANNING & ZONING COMMISSION

Introduction & Discussion 9/8/2021	Chair Leeper introduced the item and Mr. Atodaria provided background information. He explained that the property is on University Avenue next to Happy Hippo Car Wash. The applicant would like to rezone the property from R-1, Residential and C-2, Commercial to C-2, Commercial to remove split zoning and expand the commercial use of the property. While criteria for the project are met, there are concerns with the adjacent drainage way and loss of a visual buffer. Staff would like the existing vegetation to be maintained and add screening to be added to create a visual buffer. Parking lot screening requirements will also need to be added. Mr. Atodaria explained that there were technical comments from staff that needs to be addressed by the applicant. CFU notes that gas service, three-phase electrical and communication fiber lines in the new construction area will have to be relocated at the owner’s expense. Stormwater improvements should also be done as per the city standard to avoid any city nuisance issues. The legal description of the entire lot needs to be corrected and the zoning exhibit should be updated accordingly. The applicant is working to submit the revised site plan with setbacks, landscaping information and incorporate staff’s
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comments.

Mr. Atodaria noted that staff has received an updated plan from the applicant that addresses the stormwater issues staff had. Staff recommends setting a date of public hearing for September 22 to consider the request. He stated that a call was received with complaints regarding the noise that is made at the property as well as the drainage way.

Chris Cummings, Turnkey Associates, 3015 Greyhound Drive, Waterloo, explained the issues that were addressed and how they are to be handled.

Tom Morris, 2015 Terrace Drive neighbor, stated that he would request that the trees between his property and the location not be removed. Mr. Cummings stated that the trees actually belong to the Happy Hippo Car Wash and are not part of this property.

Ms. Lynch made a motion to set the public hearing date. Ms. Sears seconded the motion. The motion was approved unanimously with 8 ayes (Hartley, Larson, Leeper, Lynch, Prideaux, Saul, Schrad and Sears), and 0 nays.

Discussion
& Vote
9/22/2021

The first item of business was a rezoning request for 5424 University Avenue. Acting Chair Larson introduced the item and Mr. Atodaria provided background information. He explained that it is proposed to rezone the property from R-1, Residential and C-2, Commercial to C-2, Commercial. The case has been brought before the Commission previously so Mr. Atodaria just reiterated the basic details of the item. It is also proposed to include building and paving additions. He discussed the technical comments provided by staff and stated that all issues have been resolved. Staff recommends that the property owner submits a detailed landscaping plan at the site plan approval stage. Staff also recommends approval of the item.

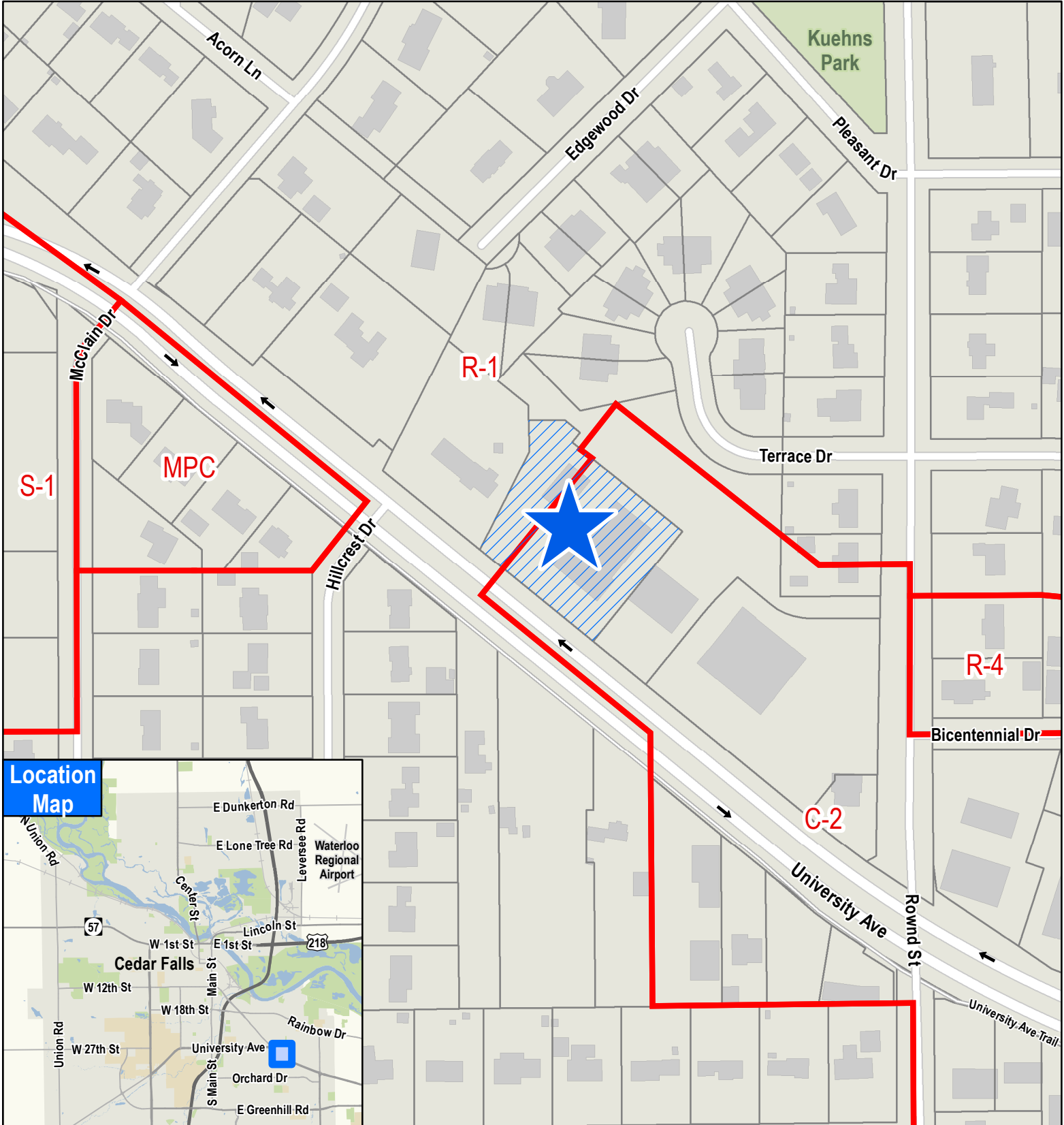
Chris Cummings, TurnKey Associates, (3015 Greyhound Drive, Waterloo) noted that the stormwater concerns have been addressed, as well as concerns regarding trees and plantings.

Ms. Prideaux made a motion to approve the item. Ms. Lynch seconded the motion. The motion was approved unanimously with 7 ayes (Hartley, Holst, Larson, Lynch, Prideaux, Saul and Schrad), and 0 nays.

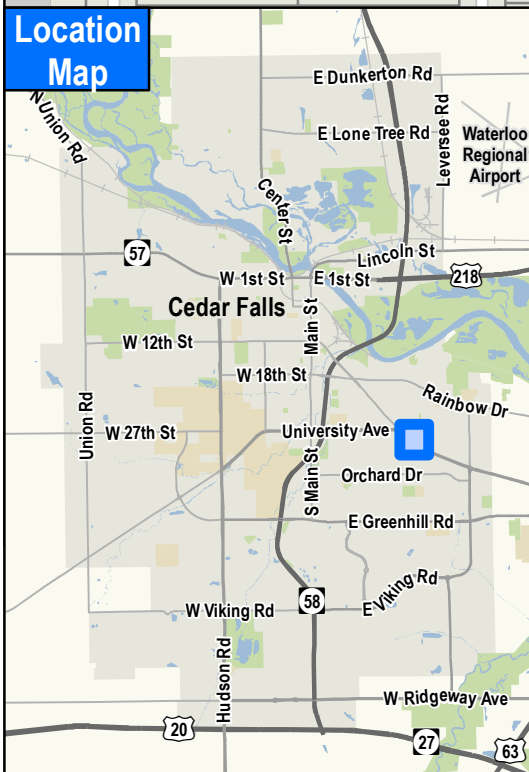
Attachments: Location Map
Rezoning Plat
Site Plan

Cedar Falls City Council October 4, 2021

Item 7.



Location Map



**Direct Appliance Rezoning
from R-1 and C-2 to C-2
5424 University Ave (RZ21-007)**

979

Prepared by: Jaydevsinh Atodaria (JD), City Planner I, 220 Clay Street, Cedar Falls, IA 50613 (319) 273-8600

ORDINANCE NO. _____

AN ORDINANCE REPEALING SECTION 26-118,
DISTRICT BOUNDARIES OF DIVISION I GENERALLY
OF ARTICLE III DISTRICT AND DISTRICT
REGULATIONS OF CHAPTER TWENTY-SIX (26), ZONING,
OF THE CODE OF ORDINANCES, OF THE CITY OF CEDAR FALLS, IOWA,
AND RE-ENACTING SAID SECTION 26-118 OF SAID ORDINANCE, AS
AMENDED, SO AS TO APPLY AND INCLUDE TO THE
CHANGE IN THE ZONING MAP OF THE CITY OF
CEDAR FALLS, IOWA, AS PROVIDED BY THIS ORDINANCE.

WHEREAS, the City Planning and Zoning Commission of the City of Cedar Falls, Iowa, finds that the rezoning is consistent and would eliminate the split zoning on the property to continue expanding existing commercial use on the property for the City of Cedar Falls and therefore has recommended to the City Council of the City of Cedar Falls, Iowa, that all that area described as follows shall be removed from the R-1 Residential Zoning District and C-2 Commercial Zoning District and be placed entirely in C-2 Commercial Zoning District, as follows:

Legal description for land to be rezoned from R-1 and C-2 to C-2:

FOGDALL UNIVERSITY AVENUE MINOR PLAT 1
Lot 1

That part of the Northeast Quarter (NE1/4) of Section Nineteen (19), Township Eighty-nine North (T89N), Range Thirteen West (R13W) of the Fifth Principal Meridian, City of Cedar Falls, Black Hawk County, Iowa, described as follows:

Beginning at the most Easterly corner of parcel described in Land Deed 555, Page 795 of the Black Hawk County Recorder’s Office; thence S27°32’04”W One Hundred Seventy-six and Twenty-eight Hundredths (176.28) feet along the Southeasterly line of said parcel to the present Northeasterly right-of-way line of University Avenue, which is Fifty-five (55) feet Northeasterly of and parallel to the Centerline of said University Avenue; thence S50°46’00”E Two Hundred Thirty-one and ninety-three Hundredths (231.93) feet along said Northeasterly right-of-way line; thence N39°12’21”E Two Hundred Twenty-eight and Twenty-nine Hundredths (228.29) feet; thence N50°42’51”W Two Hundred Twenty-four and Seventy-one Hundredths (224.71) feet; thence N39°17’09”E Nineteen and Eighty-three Hundredths (19.83) feet; thence N50°42’51”W Thirty and Thirty Hundredths (30.30) feet; thence N89°41’08”W Fifty-seven and Thirty-six Hundredths (57.36) feet to a point on the East line of parallel of aforesaid parcel; thence S00°18’52”W Fifty-one and Three hundredths (51.03) feet along said East line to the point of beginning, containing 1.375 acres.

And

WHEREAS, the City Council of the City of Cedar Falls, Iowa, deems it to be in the best interests of the City of Cedar Falls, Iowa, that said proposal be made and approved; and

WHEREAS, the said Section 26-118, District Boundaries of Division I, Generally, of Article III, Districts and District Regulations, of Chapter Twenty-Six (26), Zoning, of the Code of Ordinances of the City of Cedar Falls, Iowa, provides that the zoning map of the City of Cedar Falls, Iowa, attached thereto, is incorporated into and made a part of said Ordinance;

WHEREAS, notice of public hearing has been published, as provided by law, and such hearing held on the proposed amendment; now, therefore,

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CEDAR FALLS, IOWA:

Section 1. That the following described real estate:

Legal description for land to be rezoned from R-1 and C-2 to C-2:

FOGDALL UNIVERSITY AVENUE MINOR PLAT 1
Lot 1

That part of the Northeast Quarter (NE1/4) of Section Nineteen (19), Township Eighty-nine North (T89N), Range Thirteen West (R13W) of the Fifth Principal Meridian, City of Cedar Falls, Black Hawk County, Iowa, described as follows:

Beginning at the most Easterly corner of parcel described in Land Deed 555, Page 795 of the Black Hawk County Recorder's Office; thence S27°32'04"W One Hundred Seventy-six and Twenty-eight Hundredths (176.28) feet along the Southeasterly line of said parcel to the present Northeasterly right-of-way line of University Avenue, which is Fifty-five (55) feet Northeasterly of and parallel to the Centerline of said University Avenue; thence S50°46'00"E Two Hundred Thirty-one and ninety-three Hundredths (231.93) feet along said Northeasterly right-of-way line; thence N39°12'21"E Two Hundred Twenty-eight and Twenty-nine Hundredths (228.29) feet; thence N50°42'51"W Two Hundred Twenty-four and Seventy-one Hundredths (224.71) feet; thence N39°17'09"E Nineteen and Eighty-three Hundredths (19.83) feet; thence N50°42'51"W Thirty and Thirty Hundredths (30.30) feet; thence N89°41'08"W Fifty-seven and Thirty-six Hundredths (57.36) feet to a point on the East line of parallel of aforesaid parcel; thence S00°18'52"W Fifty-one and Three hundredths (51.03) feet along said East line to the point of beginning, containing 1.375 acres.

Be and the same is hereby removed from the R-1 Residential District and C-2 Commercial District and added to the C-2 Commercial District.

Section 2. That the zoning map of the City of Cedar Falls, Iowa, be and the same is hereby amended to show the property described in Section 1, above, as now being in the C-2 Commercial Zoning District, and the amended map is hereby ordained to be the zoning map of the City of Cedar Falls, Iowa, as amended.

Section 3. That said Section 26-118, District Boundaries of Division I, Generally, of Article III, Districts and District Regulations, of Chapter Twenty-Six (26), Zoning, of the Code of Ordinances of the City of Cedar Falls, Iowa, be and the same is hereby repealed and hereby re-

enacted in the identical language as the same now is, in order that the same shall apply to and include the change hereby made in the zoning map of the City of Cedar Falls, Iowa.

INTRODUCED: _____ October 18, 2021 _____

PASSED 1ST CONSIDERATION: _____

PASSED 2ND CONSIDERATION: _____

PASSED 3RD CONSIDERATION: _____

ADOPTED: _____

ATTEST:

Robert M. Green, Mayor

Jacqueline Danielsen, MMC, City Clerk



DEPARTMENT OF COMMUNITY DEVELOPMENT

City of Cedar Falls
 220 Clay Street
 Cedar Falls, Iowa 50613
 Phone: 319-273-8606
 Fax: 319-273-8610
 www.cedarfalls.com

MEMORANDUM

Planning & Community Services Division

TO: Mayor Robert M. Green and City Council
FROM: Karen Howard, AICP, Planning & Community Services Manager
DATE: August 30, 2021
SUBJECT: Zoning Text Amendments - Downtown Character District Code (TA21-001)

Project Background

Cedar Falls has a thriving Downtown District. This success creates momentum for additional investment in Downtown. However, the City has been operating under development standards and processes, some of which were originally established 50 years ago. These regulations have been refined over time, including the CBD overlay district created to preserve and protect the character of the historic Downtown core. However, there was a recognition that more needed to be done to guide future growth in the Downtown District and the surrounding neighborhoods to meet the current and future needs of the community. Therefore, the City Council initiated the *Imagine Downtown!* Visioning Project. There have been two phases to this project: an extensive community visioning effort; followed by development of zoning tools to implement the vision. The study area includes the central business district (CBD) and areas surrounding the CBD that transition into the traditional residential neighborhoods to the west. It also includes the extended Main Street corridor and neighborhood areas immediately south and northwest of the downtown along the south side of the Cedar River.

The *Imagine Downtown!* Vision Plan was adopted in November 2019 after an extensive public engagement effort. The *Imagine Downtown!* Vision Plan provides a road map for growth and development in and around Downtown Cedar Falls. It establishes a general framework for public policy decisions and investment, in tandem with clear aspirations for the scale and character of future development downtown, which are reflected in the proposed zoning standards currently under consideration.

A public review draft of a proposed Downtown Character District code and associated Regulating Plan were presented during a special virtual Cedar Falls Planning and Zoning Commission meeting on February 17, 2021. Since that time, the proposed code and regulating plan map along with new administrative procedures and land use classification system have been available for public review and comment on the project webpage and have been advertised widely on various social media platforms, by press release, and with printed letters to all property owners within the study area. The code project has been featured on local television news broadcasts, articles in the Courier, and on the City Cable Channel 15.

In the three months following the release of the public review draft of the code, consultants and staff met with the Planning and Zoning Commission at four special work sessions to discuss the various elements of the proposed code and regulating plan. Staff also provided three different opportunities for work session discussions with development professionals and with Community Main Street, and encouraged the public to view and submit questions or comments to the Planning Division. Staff have responded to emails and phone inquiries and documented requests for changes to the draft. All property owners in the area were notified by mail inviting them to public hearings at the Planning and Zoning Commission.

Public input was invited during public hearings at the Planning and Zoning Commission on April 14 and April 28, 2021. The Planning and Zoning Commission considered amendment requests from the public, staff, and Commission members at their April 14 meeting. No additional requests for changes were submitted for the April 28 hearing. The consultants and staff documented each requested amendment along with an explanation, pros and cons of making the change, and decisions made by the Commission in a “decision matrix,” which is attached to this memo. **At their May 12 meeting the Commission voted to recommend approval of the draft with their recommended changes from the decision matrix and forward their recommendations to the City Council for consideration.**

The City Council review of the proposed code has included:

- May 17 - Consultants from Ferrell Madden presented the Commission’s recommended draft to the City Council at a Committee of the Whole meeting and copies of the code and regulating plan were distributed to Council members;
- June 7 - Council work session for general discussion and questions;
- June 21 – Council work session to discuss the proposed parking requirements for private development;
- August 2 – Committee of the Whole Meeting to review the parking requirements in more depth, most specifically the concept of shared parking and to invite any feedback from the community;
- August 16 – Council set the date of public hearing for September 7.

Analysis

The proposed Downtown Character District code includes new development standards and architectural standards to control the scale and design of new buildings and specifically addresses how new development relates to the streets and sidewalks to help ensure that new development fits into the context of the surrounding development. The architectural standards include such elements as building material standards, standards for window coverage, entranceway standards, façade variation, and sign standards. The placement of the buildings and the parking on the lot is not left to chance, but is regulated to ensure that building facades designed to support pedestrian activity front on the public sidewalks with parking and mechanical equipment located to the rear.

The frontage designations on the Regulating Plan help to ensure that like-development faces like-development across the street. In addition, where the higher intensity Urban General, Urban General 2, and Storefront frontages lots share a common lot line with a Neighborhood Small or Medium frontage lot or an R-1 or R-2 zoned property along the edge of the district, “Neighborhood Manners” requirements apply that limit building height and include enhanced setback, landscaping, and screening standards to create a buffer.

Creating livable neighborhoods is also a focus of the new zoning, which includes new open space requirements on each lot to ensure even in the most intensive areas usable open space will be provided for future residents. Open yards and courtyards count toward this requirement in neighborhood frontages with some allowance for balconies and shared upper floor or rooftop patios in the more intensive mixed-use frontages where the buildings may cover most of the lot area. The “public realm standards” specify standards for the space between the building and the street curb including requirements for street trees.

The parking requirements are structured to support preservation of and adaptive re-use of existing historic buildings, particularly along the Main Street parkade, while continuing to require parking for residential uses, albeit at a lower rate; and adds a new requirement for upper floor commercial uses for new development. A certain amount of the required parking must be made publicly available (shared) for a certain number of hours when not being used by the residential or commercial tenants of the building. This shared parking will add to the supply of parking that is available to serve customers and clients during peak times. For example, a new building that includes upper floor office space will be required to provide parking and that parking must be located and designed to be available to the public in the evening when not needed for the office employees.

A wide variety of uses are allowed on properties with Urban General, Urban General 2 and Storefront frontages, similar to what is allowed in the CBD Overlay. In Neighborhood frontages a variety of housing options are allowed to encourage new living opportunities in areas close to downtown. These include single family, duplexes, townhomes, cottage courts, small apartment buildings, and an allowance for accessory dwelling units on owner-occupied properties.

The proposed zoning amendments also include new administrative procedures that create a more defined process for review and approval. Since the new standards are more clear and objective they can be more easily be reviewed and approved administratively, reducing the amount of time for review and approval, but providing more certainty for surrounding properties and the community that new development will blend into the neighborhood.

The new use classification system provides a set of land use categories that will help to ensure consistency of development review over time and eliminate the need for extensive lists of specific uses in the code that become redundant and often times obsolete as the market and technology changes.

There are also a number of small amendments to the existing City Code necessary to make it clear that elements such as sidewalk cafes, mobile merchants, sandwich board signs, and the ability to serve alcoholic beverages are also allowed in appropriate locations within the Downtown Character District, similar to how they are currently allowed.

Recommendation

At their May 12th meeting, the Planning and Zoning Commission recommended approval of the Downtown Character District Code, the associated Regulating Plan, new administrative procedures, and land use classification system, as amended by decisions outlined in their decision matrix (attached).

In addition, staff recommends approval of the various smaller amendments to the Cedar Falls Code of Ordinances set forth in the attached ordinance to ensure that the new regulations function smoothly within the existing City Code.

Lastly, staff recommends a review of how the new code is working a year from when it is adopted to make any adjustments necessary to ensure it is achieving its intended goals for the community.

PROPOSED AMENDMENTS TO THE PUBLIC REVIEW DRAFT OF THE DOWNTOWN ZONING CODE

26-193 – Building Form Standards

	Proposed Amendment	Explanatory Notes	Consultant/Staff Recommendation	P&Z Discussion (Date)	P&Z Decision
1	Requestor: Consultant/staff Change Building Form Standards (BFS) Section 193.5 Neighborhood Small Frontage B. Placement 4. Buildable Area to allow Private Open Area to be above grade for lots with less than 70 ft of depth.	Technical Fix: This better accommodates rowhouses on especially shallow lots (such as many of the lots along 2 nd Street, as shown in the Vision Plan) with their 66ft width/depth. This will make Neighborhood Small consistent with Neighborhood Medium.	Consultant/staff are in support of this amendment.	Commission directed staff to make the change.	Amendment Approved
2	Requestor: Consultant/staff Change Required Building Line (RBL) on the Downtown Regulating Plan, on the north side of W 2 nd St. from Franklin St. to the western border of the District. The RBL should be moved forward an additional 5ft, from 15ft to 10ft off the front property line.	Technical Fix: This is for consistency with the RBL to the east of Franklin (Urban General 2) and better accommodates rowhouses fronting 2 nd Street (as shown in the Vision Plan) within the shallower (66ft) depth of many of those lots. This keeps the building form and scale consistent with the Neighborhood Small designation, but allows room for both parking and for usable ground floor space within the buildings.	Consultant/staff are in support of this amendment to the Downtown Character District Regulating Plan.	Commission directed staff to make the change.	Amendment Approved
3	Requestor: Staff a) Insure consistency of terms between new proposed Section 26-140. Use-Specific Standards, Category Descriptions, and Definitions and proposed Section 26-197. Building Functions; b) Clarify language in Character District Use Table introductory paragraph concerning additional standards that apply	Technical Fix: a) Because drafting was an iterative process, additional revisions were made to Section 26-140, Use Classification, after the public review draft of Downtown Character District Code (Section 26-197) was released. This is a simple clean-up to make sure terms are internally consistent. Also to correct the Code Section number of the Use Classification to Sec. 26-140 (not 26-132). b) Make clear that additional development and performance standards apply above and beyond the broad permitted use categories.	Consultant/staff are in support of these amendments	Commission directed staff to make these changes.	Amendment Approved

<p>4</p>	<p>Requestor: Staff Correct outline format, as needed</p>	<p>Technical Fix: Some outline numbers are out of sequence and need correction</p>	<p>Consultant/staff are in support of this amendment</p>	<p>Commission directed staff to make these changes.</p>	<p>Amendment Approved</p>
<p>5</p>	<p>Requestor: Historical Society and Planning Staff Add Civic Building designations to Regulating Plan</p>	<p>Technical Fix: The Cedar Falls Woman’s Club and Cedar Falls Historical Society Victorian House Museum and Museum Buildings in Sturgis Park should be identified as Civic Buildings.</p>	<p>Consultant/staff are in support of this amendment</p>	<p>Commission directed staff to make these changes.</p>	<p>Amendment Approved</p>
<p>6</p>	<p>Requestor: Consultant/Staff Change to Section 26-140. Use-Specific Standards, Category Descriptions, and Definitions for clarity, etc.</p>	<p>Technical Fix: Clarification concerning categorization of commercial assembly uses as large or small based on size and the other classification criteria in Section 26-140(a)(3) This will help in classifying uses appropriately in different zoning districts. Examples include small commercial assembly uses, such as theaters that fit into a main street area, like the Oster Regent Theater downtown versus large commercial assembly uses, such as a large metroplex theater complex located in a suburban shopping center.</p>	<p>Consultant/staff are in support of this amendment</p>	<p>Commission directed staff to make these changes.</p>	<p>Amendment Approved</p>

<p>7</p>	<p>Requestor: P&Z Member Larson</p> <p>Change the Regulating Plan designated building frontage on west side of Overman Park from Neighborhood Small to Urban General 2 to accommodate existing businesses located in buildings along Franklin Street;</p> <p>or alternatively:</p> <p>Requestor: Tom and Dorinda Pounds They own a house on Franklin Street that was converted to office space for their business. They want assurance their business can continue, but also have maintained many of the historic residential features of the home, so it could be converted back to residential use in the future, if desired.</p> <p>They would like an approach to better accommodate existing businesses, while maintaining the residential character and scale of the area</p>	<p>As drafted, all existing businesses can remain as non-conforming uses. The new code requires no changes unless/until the owner makes a significant change to their business or building, at which time the standards identified in Section 26-38 Proportionate Compliance would apply, based on the [level/degree] of proposed change.</p> <p>The intent of the proposed limitations on new businesses in the Neighborhood frontage areas is to encourage their concentration in the core of Downtown for the synergy it creates and to stabilize and encourage reinvestment in the surrounding residential areas and preservation of the historic character of these areas.</p> <p>Options for change:</p> <p>Option 1: Change the regulating plan along west side of Franklin Street to Urban General 2.</p> <p>Pro: Insure existing business are not made non-conforming</p> <p>Con: Change in building frontage designation affects more than use; it would also change the physical scale and character of permitted new buildings, potentially incentivizing the demolition of other houses in the neighborhood. This could potential affect the historic residential character along Franklin Street. Most businesses are located within existing residential structures.</p> <p>Option 2: Language could be added to state that all existing businesses at the time of code adoption are considered conforming, so can continue and even expand, but that no new businesses are permitted in the Neighborhood frontages. This is a similar approach we took for manufacturing businesses on the far east side of the study area.</p>	<p>Consultant/staff are in support of Option 2, as it achieves the goal of keeping existing businesses conforming, but doesn't have the unintended consequences noted with Option 1.</p>	<p>Commission directed staff to make the changes per Option 2.</p>	<p>Amendment Approved Option 2.</p> <p>(Note: add a parking requirement for non-residential uses in Neighborhood Frontages).</p>
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<p>8</p>	<p>Requestor: P & Z Chair: Include a design review process/role for P&Z</p>	<p>Commission expressed concern that it is difficult to legislate good design and that some additional design guidance may be needed, at least for some projects; and this process should be conducted through a public review process at P&Z and/or Council.</p> <p>Pros: Provides for more public scrutiny of development projects in the downtown area. Provides additional reassurance that a project will be consistent with the vision for downtown.</p> <p>Cons: One of the goals of the Downtown Zoning Code update was to streamline the development review process and move toward by-right approvals for those projects that meet a set of objective form-based standards. The benefits of this approach are to a) provide a greater level of predictability for property owners, developers, and neighbors; b) move away from the time and expense of negotiating individual projects in the Downtown district, particularly if it requires project redesign or additional legal fees; and c) remove the subjectivity of the public review process, where individual opinions can cause projects that otherwise meet the standards to be redesigned adding cost to the project.</p> <p>From a fairness and equity standpoint, it can also give undue influence to particularly persuasive or well-connected applicants or to those who may simply want to prevent development from occurring.</p> <p>The purpose of establishing the staff Zoning Review Committee is to ensure that development projects meet the adopted standards, but also to assist applicants in their understanding of the intent of the provisions of the code, so they can achieve a more cohesive design, so in essence will serve as an administrative design review.</p>	<p>Consultants/staff do not recommend adopting a public design review process at this time.</p> <p>If a majority of the Commission would still like to move forward with a public design review process, the consultants and staff will continue to work to determine a workable approach.</p>	<p>Commission directed staff to keep the draft the same and not require a separate design review through P&Z and Council.</p>	<p>No change recommended</p>
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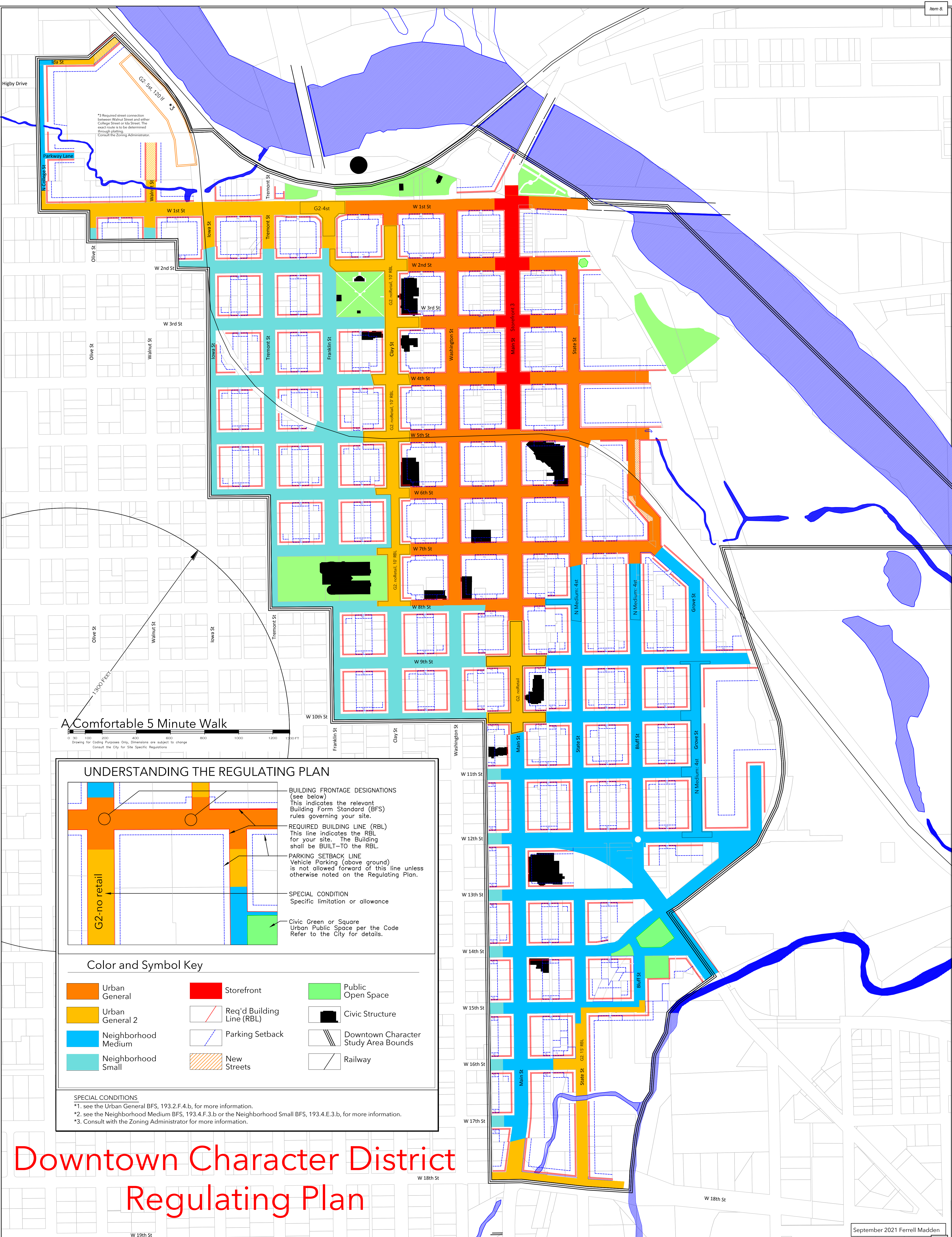
<p>9</p>	<p>Requestor: Kevin Harberts (owns two residential properties along 2nd Street).</p> <p>Change the Regulating Plan so that the General Urban frontage designation goes from the 1st Street frontage to 2nd Street frontage</p> <p>The requestor would like the option to create larger through lots for commercial uses that extend the full depth of the block from 1st to 2nd Street.</p>	<p>The regulating plan designations between 1st and 2nd Street are already set up to provide more lot depth for Urban General along 1st Street to accommodate the larger footprint of many commercial buildings, leaving a shallower depth for the neighborhood frontage designation along 2nd Street, which can accommodate smaller footprint residential building types, such as rowhouses.</p> <p>Pros and Cons of making this change:</p> <p>Pro: Uniform building form standards for the entire parcel (with considerably more buildable area)</p> <p>Con: This would undermine the scale transition from the higher intensity, mixed-use 1st Street down to the less intense Overman Park neighborhood to the south.</p> <p>The code provides considerable flexibility for parcels with more than one frontage designation to shift the frontage designation to accommodate specific needs of the development. However, it is important for the buildings along both sides of 2nd Street to relate to one another, rather than having residential buildings facing the backs of 1st Street businesses. The regulating plan designations ensure buildings of similar scale and character along both sides of a street.</p>	<p>Consultant/staff are <u>not</u> in support of this amendment.</p> <p>The regulating plan already establishes Urban General deeper into the block (from north to south) and leaves a rather shallow area along 2nd Street that will accommodate residential building forms, such as townhomes, as shown in the <i>Imagine Downtown! Vision Plan</i>.</p>	<p>Commission directed staff to keep the regulating plan the same. No change recommended.</p>	<p>No change recommended</p>
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<p>10</p>	<p>Requestor: Planning & Zoning Commission and questions from several members of the public.</p> <p>Consider the inclusion of vinyl siding as an approved wall material in Neighborhood Frontages</p>	<p>There is concern that prohibiting vinyl siding in the Neighborhood Frontages could be cost prohibitive and encourage disinvestment in existing residential properties.</p> <p>The intent of the proposed prohibition was to promote more durable and environmentally sustainable building materials. (The issue is not one of aesthetics).</p> <p>Pro: Reduce the up-front cost of building construction and maintenance</p> <p>Con: Higher long-term costs for maintenance and upkeep; concerns related to durability and fire-resistance; environmental impacts of PVC, i.e. produces toxic smoke when it burns and melts at a fairly low temperature; damaged or melted siding often ends up in the landfill and is not biodegradable. While it is possible to recycle it, there are often issues of contamination from dirt, nails, and mixed-in aluminum flashing. In contrast, wood, brick or stone have a life cycle of more than 100 years. The life span of vinyl is 15 to 20 years before it becomes brittle from ultraviolet light and is easily damaged.</p> <p>If change to the ordinance is desired, following are some options:</p> <ol style="list-style-type: none"> 1. Maintain the prohibition of vinyl siding for new construction. 2. Permit the use of vinyl siding to replace or repair existing vinyl siding. 3. Permit use of vinyl siding that meets higher minimum standards for quality, maintenance, and durability, based on industry standards to replace or cover over other types of siding on existing single family dwellings. 4. Delete the prohibition on vinyl siding from the code altogether, so it would be allowed on all existing and new buildings in the Neighborhood Frontages. 	<p>Consultant/staff are particularly concerned about the long term consequences of allowing vinyl siding related to the noted environmental concerns, so recommend prohibiting vinyl siding for new construction.</p> <p>With regard to the second bullet point, the current draft already allows replacement of like material with like material for maintenance purposes. Consultant/staff would be in support of adding some additional language to make sure this is clear.</p> <p>Consultant/staff are <u>not</u> supportive of allowing vinyl siding to replace existing environmentally sustainable building materials, such as wood, stone, or brick. We feel that the long term costs outweigh the short term savings.</p> <p>Consultant/staff strongly recommend against listing vinyl siding as a generally allowed building material.</p>	<p>Commission directed staff to move forward with making changes consistent with 1, 2, and 3, but did not support option 4.</p> <p>Bullet points 1 and 2 were supported unanimously. Bullet point 3 was supported by a majority.</p> <p>With regard to bullet 1, the Commission requests that the language be clarified to indicate that for additions to existing buildings that have vinyl siding that vinyl siding can be used for the addition. We will need to discuss how to fit that into the trigger chart.</p> <p>Bullet point 4 was rejected by a majority.</p>	<p>Amendments Approved according to bullet points 1, 2, and 3. Majority of the Commission does not support 4.</p>
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<p>11</p>	<p>Requestor: Jesse Lizer, Emergent Architects</p> <p>Permit the use of higher quality foam products for architectural detailing</p>	<p>There is concern that the prohibition of “all other foam-based products” in Sec. 26-194.C.5. would limit options for restoration of historic buildings. That was never the intent of this prohibition, but rather to limit the use of flimsy, easily damaged building materials, particularly at the street level. Potential change:</p> <ul style="list-style-type: none"> • Delete “all other foam-based products” from the prohibited list and add a new item to the secondary materials list in Sec. 26-194.C.4. as follows: “Durable foam-based products, such as Fypon, may be used for architectural detailing.” 	<p>Consultant/staff are in support of this amendment,</p>	<p>Commission directed staff to make this change.</p>	<p>Amendment Approved</p>
<p>12</p>	<p>Requestor: Staff</p> <p>Provide more direction for ADUs</p>	<p>Concern that there is insufficient enforceability of owner-occupancy requirement following the development of an ADU. Consider including a requirement for an affidavit/legal agreement with the City in Sec. 26-193.1.G (p.24) to be filed and recorded, so that it is clear to future owners or prospective buyers that the dwelling is not considered a duplex, so that the limits on size and occupancy for ADUs continue to be enforceable over time.</p> <p>The allowance for ADUs is intended to make home ownership more affordable and encourage investment and reinvestment that will help stabilize existing older neighborhoods surrounding downtown.</p>	<p>Consultant/staff are in support of this amendment.</p>	<p>Commission directed staff to make this change.</p>	<p>Amendment Approved</p>

13	<p>Requestor: Staff</p> <p>Prohibit conversion of existing single unit dwellings into duplexes or multi-unit dwellings.</p>	<p>The new code opens up the possibility for new types of housing, but in a manner that ensures that new housing fits into the context of the neighborhood with quality design and a logical configuration of the dwelling units. However, the new standards and allowances are not intended to encourage existing single unit dwellings to be chopped up into additional units in a manner that reduces the functionality and livability of the dwelling and makes it less desirable for those seeking a long term rental opportunity or homeownership. As is often experienced in college towns this is a common practice to provide short term rentals for college students by converting living rooms, dining rooms, and other spaces to maximize the number of bedrooms. While providing rental housing for students is important, this particular practice often creates units that are not very conducive to long term renters and cannot be easily or cost-effectively adapted or converted back to the original condition in response to market fluctuations, such as a drop in enrollment.</p> <p>Staff notes that making this change will keep the new code consistent with the City's current conversion prohibition in the R1 and R2 Districts.</p>	Staff is in support of this change.	Commission directed staff to make this change.	Amendment approved.
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Item 8.



*3 Required street connection between Walnut Street and either College Street or 14th Street. The exact route is to be determined through platting. Consult the Zoning Administrator.

A Comfortable 5 Minute Walk

0 300 600 900 1200 1500 FT
Drawing for Coding Purposes Only. Dimensions are subject to change. Consult the City for Site Specific Regulations.

UNDERSTANDING THE REGULATING PLAN

- BUILDING FRONTAGE DESIGNATIONS** (see below)
This indicates the relevant Building Form Standard (BFS) rules governing your site.
- REQUIRED BUILDING LINE (RBL)**
This line indicates the RBL for your site. The Building shall be BUILT TO the RBL.
- PARKING SETBACK LINE**
Vehicle Parking (above ground) is not allowed forward of this line unless otherwise noted on the Regulating Plan.
- SPECIAL CONDITION**
Specific limitation or allowance
- Civic Green or Square**
Urban Public Space per the Code Refer to the City for details.

Color and Symbol Key

Urban General	Storefront	Public Open Space
Urban General 2	Req'd Building Line (RBL)	Civic Structure
Neighborhood Medium	Parking Setback	Downtown Character Study Area Bounds
Neighborhood Small	New Streets	Railway

SPECIAL CONDITIONS

- *1. see the Urban General BFS, 193.2.F.4.b, for more information.
- *2. see the Neighborhood Medium BFS, 193.4.F.3.b or the Neighborhood Small BFS, 193.4.E.3.b, for more information.
- *3. Consult with the Zoning Administrator for more information.

Downtown Character District Regulating Plan



August 31st, 2021

Robert M. Green MA, MLIS
Mayor, City of Cedar Falls
220 Clay Street
Cedar Falls, Iowa 50613

Dear Mayor Green,

Americans for Independent Living is a nonprofit based in Waterloo assisting veterans in need within Black Hawk County. AFIL has assisted over 1,100 veterans and their families since 2017. Assistance has been provided in the form of housing, home items, furniture, food, clothing, and home modifications for disabled or elderly veterans in need.

Many of the veterans assisted by AFIL live in homes in impoverished areas which are meager and have poor conditions for life. Having safe, secure, and affordable housing for our veterans, who have voluntarily sacrificed for us, is a critical need.

We were excited to learn of the upcoming meetings to discuss changes in the Cedar Falls zoning laws. We would like the opportunity to pursue cottage court housing for veterans in the area. Because of this, we are in favor of updating the zoning to make this critical need happen.

Thank you for the consideration.

Respectfully,

Tim Combs, Executive Director



310 East 4th Street
Cedar Falls, IA 50613

Phone: 319-277-0213
www.communitymainstreet.org

2021-2022

Board of Directors:

- Lexie Heath - Chair
- Darin Beck
- Natalie Brown
- Ann Eastman
- Crystal Ford
- Wynette Froehner
- Brent Johnson
- Audrey Kittrell
- Jenny Leeper
- Helen Pearce
- Clark Rickard
- Stephanie Sheetz
- Mark Schowalter
- Brad Strouse

August 30, 2021

Dear Mayor, Council, City Administrator and Staff:

On behalf of Cedar Falls Community Main Street and our board of directors, we would like to express our support for the Downtown Zoning code.

Community Main Street has been a part of the visioning process since it began. We feel like staff has done a great job reaching out to the community, those that live/work in the zoning code area, developers and our board, seeking feedback and input. The new zoning plans are both progressive and objective and will unify the vision for Cedar Falls' future. It will also provide much-needed clarity/direction to developers, and hopefully spur new development ideas and activities that'll keep Cedar Falls, and downtown specifically, marching forward.

As you are aware there can be no conversation downtown without addressing parking and we have received feedback with concerns regarding the parking requirement in the code. Our role as CMS is to advocate for our constituents, the fear is reducing the requirement in new development will force those tenants into spots the consumers should be utilizing. We ask that you be mindful of how this may affect existing development in the District.

We appreciate the due diligence that has gone into the new zoning code process and look forward to how it will shape the future of Downtown.

Best regards,

Kim Bear, on behalf of the Community Main Street Board of Directors
Executive Director
Community Main Street





808 Dearborn Ave.

Item 8.

Waterloo, IA 50703

800-760-0222

Fax: 319-235-7032

www.alineeds.com

September 3, 2021

Mayor of Cedar Falls and City of Cedar Falls City Council Members

RE: Form Based Zoning

Dear Mayor and Ladies and Gentlemen of the City Council,


Main Street has become the heart and soul of downtown Cedar Falls, offering some of the city's best shopping, dining and night life. It is my hope that we keep it that way. When it comes to the Form Based Zoning proposal, I agree there may very well be some beneficial aspects of the zoning, however, I think there is much more to think about and many more discussions to be had before ramming this through Council.

There is more to think about regarding these zoning changes and this proposal should be tabled to give adequate time for further discussion. After more consideration this proposal should either be rejected or approved with considerable modifications. I have enough faith in the intelligence of this Council, that this will stimulate enough thought to assist in reaching a logical conclusion.

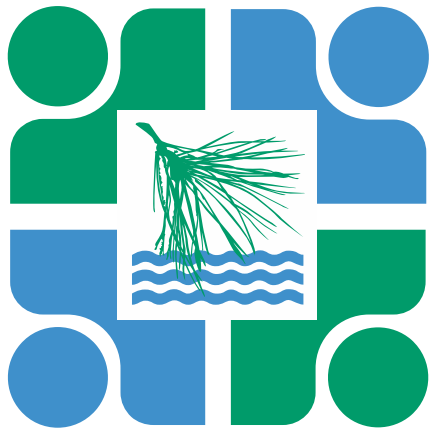
My concern is that adopting the Form Based Zoning will negatively impact the overall parking availability downtown Cedar Falls by shifting the parking responsibility from the developers and onto the City of Cedar Falls and current businesses, property owners and all taxpayers. The ½ or ¾ stall parking requirement per bedroom could well create another parking fiasco downtown especially allowing remote parking up to 600 feet away. Elimination of Planning and Zoning and replacing with three staff members is a recipe for easy manipulation and cronyism and an overall bad idea. It is my opinion, along with many other business owners on Main Street, that the parking requirements are being buried in the Form Based Zoning Proposal and unfortunately, many other business owners are not aware that this adaptation of parking requirements will have a large detrimental effect on parking in downtown Cedar Falls. The proposed downsized parking requirements will put the overflow vehicles in the already congested parking lots, take away street parking lots from current businesses or push them many blocks into the residential area thereby competing for homeowner's parking opportunities and creating complaints on noise, litter and congestion.

Let's be clear that I am in total support of the progress and development in downtown Cedar Falls. However, this proposal has a bad odor to it and lacks transparency. I believe that there is clearly a hidden agenda that is known by a silent few that effects many other business owners and most of them are unaware of the possible effects.

Respectfully,



Ben Stroh



OUR CEDAR FALLS

Downtown
Imagine the possibilities!

Item 8.



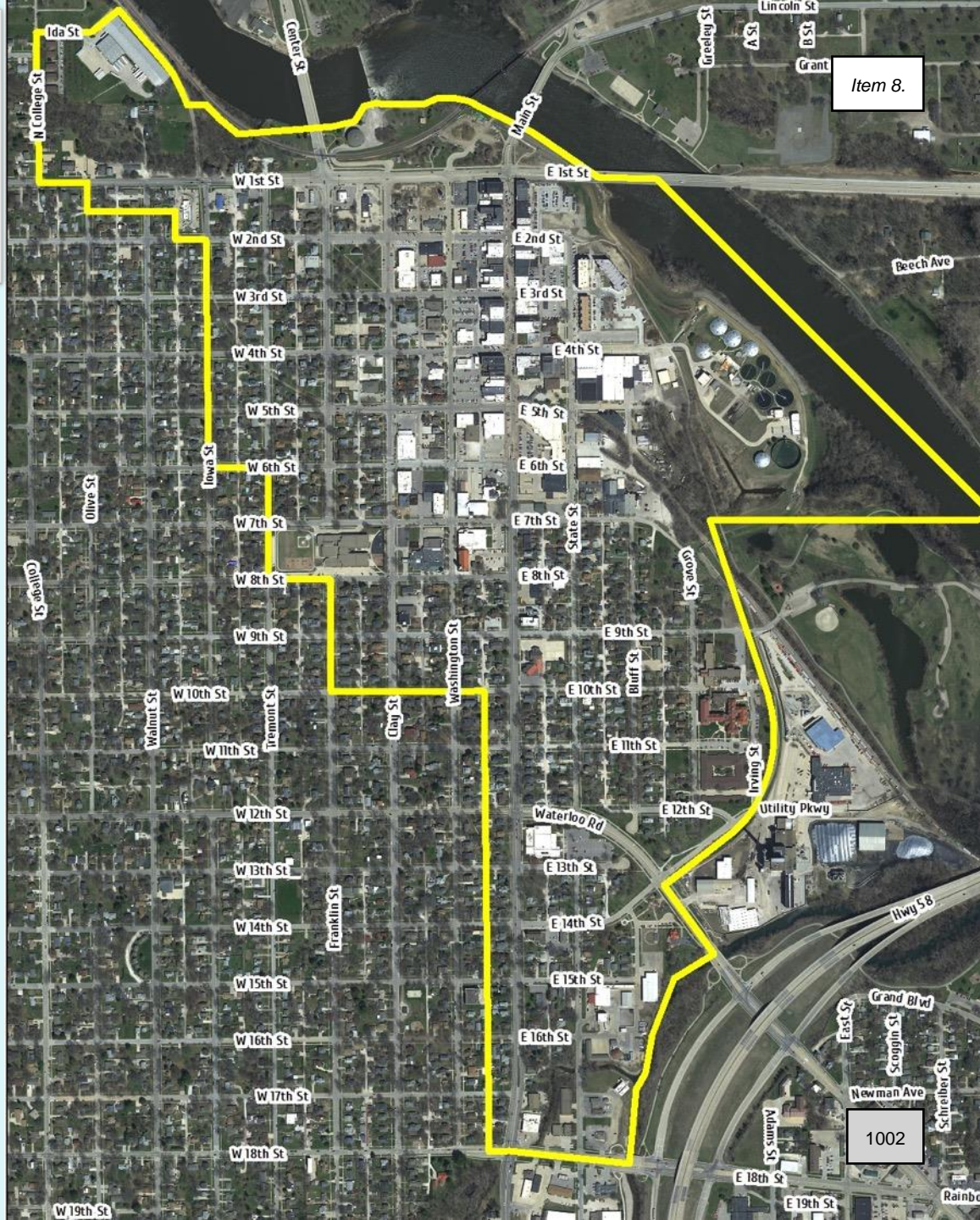
1001



OUR CEDAR FALLS

Downtown
Imagine the possibilities!

Project Study Area



City Council Project Priorities - April 2019

1. Create a thoughtful vision plan to manage change in the community over time.
2. Vision will be based on broad community input, gathered through a robust community outreach process.
3. Create a safe and welcoming process to explore new ideas.
4. Take into account market realities, changing demographics for all types of development, and diversity of uses.
5. Build on our success! Maintain/foster a unique sense of place.
6. Encourage economic development based on the adopted vision.
7. Establish clear and objective zoning standards to achieve the adopted community vision.

Downtown Study Area Existing Zoning

Commercial

- C-1, C-2, C-3

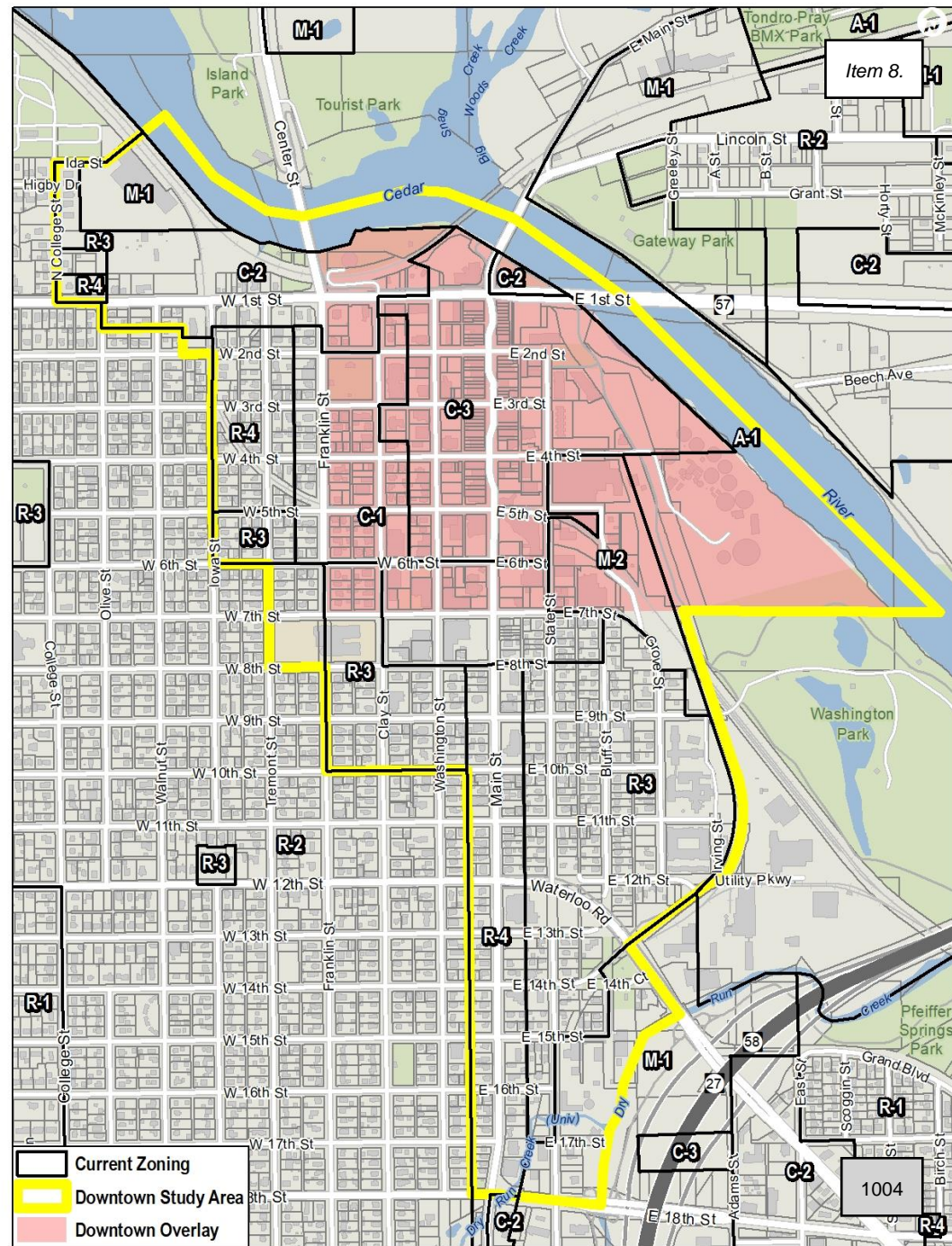
Industrial

- M1, M2

Residential

- R-2, R-3, R-4

CBD - Central Business District Overlay



Current Zoning

- Traditional Zones established in 1970
- Traditional Zoning Districts
 - One size fits all standards – not based on neighborhood context
 - Set of basic zoning standards
 - Building setbacks
 - Lot Area Requirements
 - Parking standards
 - Out-dated and vague list of uses
- Numerous amendments over the years to address issues of the moment
- CBD Overlay
 - Traditional C-3 zoning district conflicted with Main Street character
 - Layer of additional standards
 - Subjective design standards open to debate and interpretation

IMAGINE DOWNTOWN!
Cedar Falls Downtown Vision Plan



Adopted November 18, 2019



***Downtown
Vision Plan***

Item 8.

**Adopted by the
City Council
November 2019**

Imagine Downtown! Vision Plan

- **Build on Downtown's Unique Sense of Place**
 - Preserve historic mainstreet character of the parkade and expand to surrounding streets



Imagine Downtown! Vision Plan

Item 8.

- **Foster pedestrian-oriented streets and public spaces**
 - Line public streets with active building facades
 - Add street trees



Imagine Downtown! Vision Plan

Item 8.

- **Encourage Economic Development**

- Preserve/enhance existing properties
- Encourage infill development consistent with Vision



Imagine Downtown! Vision Plan

Item 8.

- **Provide a variety of housing options for all ages**
 - Downtown mixed-use buildings
 - Encourage historical missing middle housing types in surrounding neighborhoods



1010

Encourage a mix of housing types for all ages

Item 8.



1011

Missing Middle Housing that fits into the scale of the neighborhood

Item 8.





Item 8.





Item 8.



1016

Item 8.



FOR RENT
(319) 768-7150
www.BrentCasoffAuldy.com

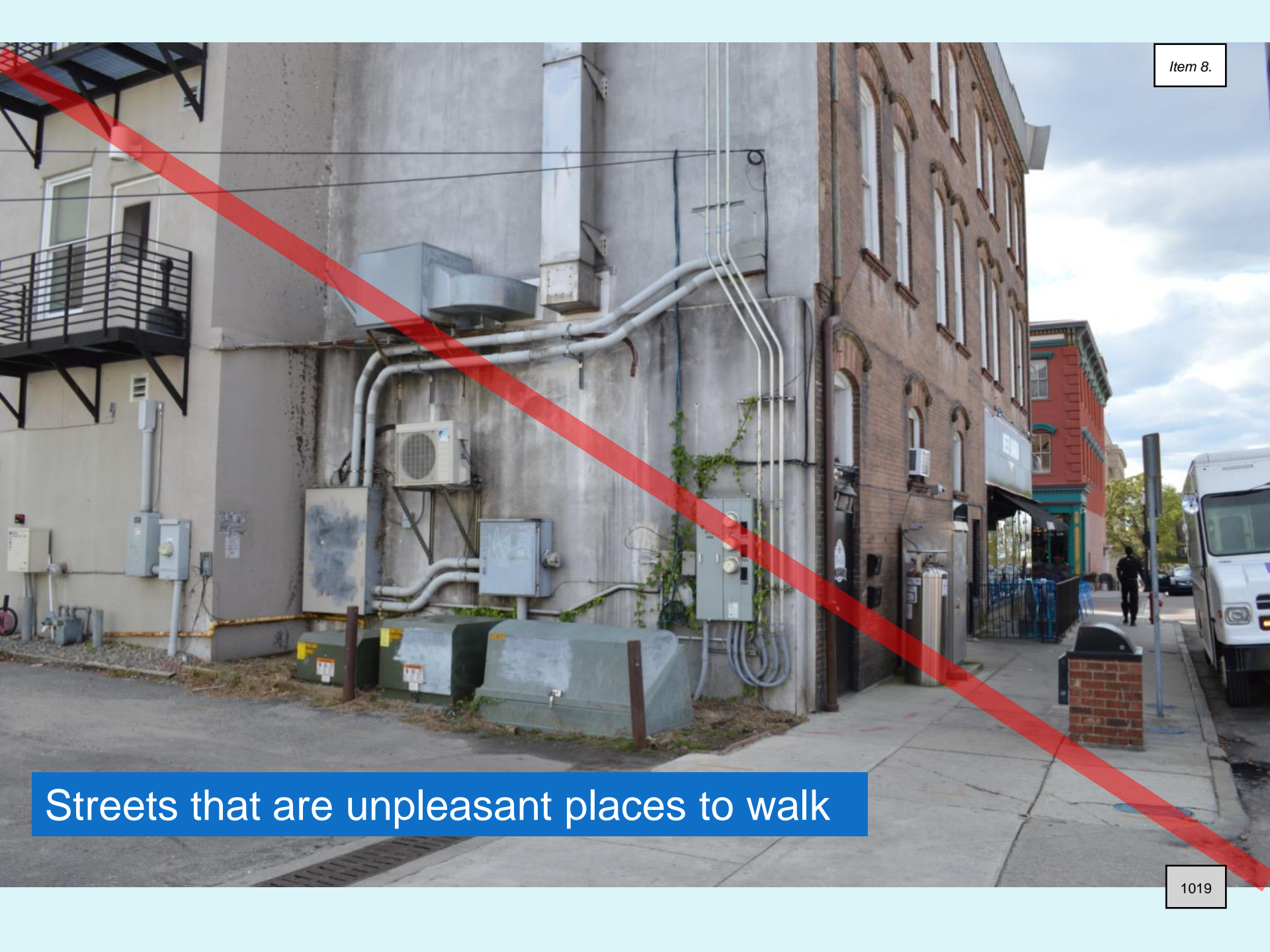
1017

A code that will prevent what we don't want

Item 8.



10/17/2009



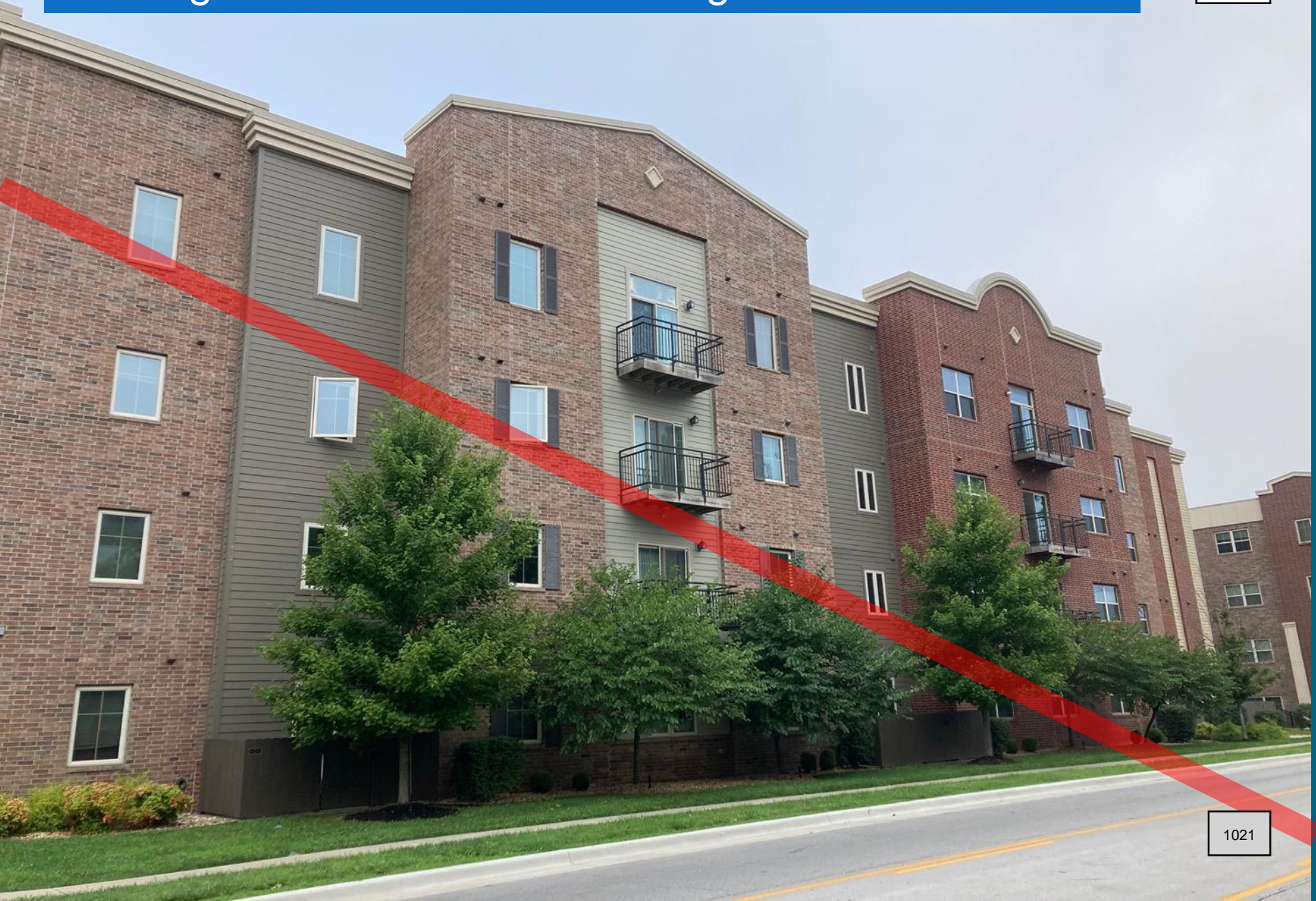
Streets that are unpleasant places to walk



Blank walls, buildings not oriented to the street

Buildings out of scale with the neighborhood

Item 8.



Poorly placed parking makes for unpleasant streets

Item 8.



Imagine Downtown! Vision Plan

Item 8.

- **Establish new zoning regulations to achieve the Vision**
 - Use a variety of zoning tools
 - Adopt clear and objective standards
 - Right-size development standards to fit the neighborhood context
 - Make the code more user-friendly with tables and illustrations (not just text).
 - Create a simplified and consistent process for development review
 - Update and simplify land uses

Establish New Zoning to Achieve the Vision

Item 8.

- **Use a variety of zoning tools**
- **Building Form Standards**
 - Size, height, and placement of buildings
 - Location of Parking and Access
 - Required open space
 - Transitions – Neighborhood Manners
- **Architectural Standards**
 - Building elements – materials, entrances, windows, awnings, shopfronts
 - Screening, fences, and walls
 - Exterior lighting
 - Sign standards
- **Public Realm Standards**
 - Sidewalks and street trees
- **Parking & Loading Standards**
- **Building Functions**

Establish New Zoning to Achieve the Vision

Item 8.

Right-size development standards to fit the neighborhood context

- Move away from one-size fits all
- Building height and size to fit into the neighborhood

26-193 Building Form Standards

Character Districts

Summary Frontage Descriptions

The frontages are designated on the REGULATING PLAN by color filling their right-of-way.

Urban General Frontage

Urban General 2 Frontage

Urban General is the basic urban building form. These frontages produce multi-story buildings placed directly at the sidewalk or behind small DOORYARDS, with windows across the FACADE, and one or more entrances. The uses range from commercial to residential, institutional to ground-floor retail and restaurants—and combinations of all of the above. This frontage has two levels of intensity, with an **Urban General 2** for less intense areas.

Storefront Frontage

Storefront is a subset of the Urban General frontage, with more specific requirements at the street level, that of the prototypical ground floor SHOPFRONT with large windows and frequent doors along the sidewalk. Ground floor uses are limited to retail or other active commercial uses along the frontage, creating a vibrant pedestrian realm. Upper STORY uses are flexible.

Neighborhood Small

Neighborhood Medium

Neighborhood frontage includes detached and attached houses up to small apartment buildings. The buildings may be placed close to the sidewalk with a small DOORYARD, or farther back with a small front yard. STOOPS or FRONT PORCHES are required for new buildings in this frontage. This frontage has two levels of intensity, Medium and Small, its character and intensity will vary depending on this designation.



Illustration: Urban General - Typical Frontage



Illustration: Storefront - Typical Frontage



Illustration: Neighborhood Medium - Typical Rowhouse form



Illustration: Neighborhood Small - Single Family Detached form



Illustration: Neighborhood Small - Typical Two Family form

1025

Neighborhood Manners

Special protection for existing houses relative to new, more intensive development

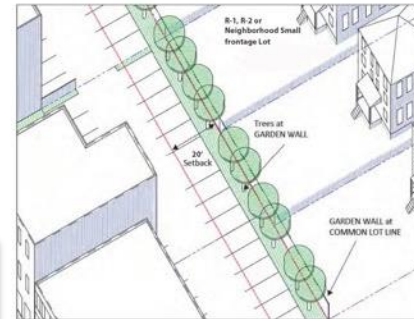
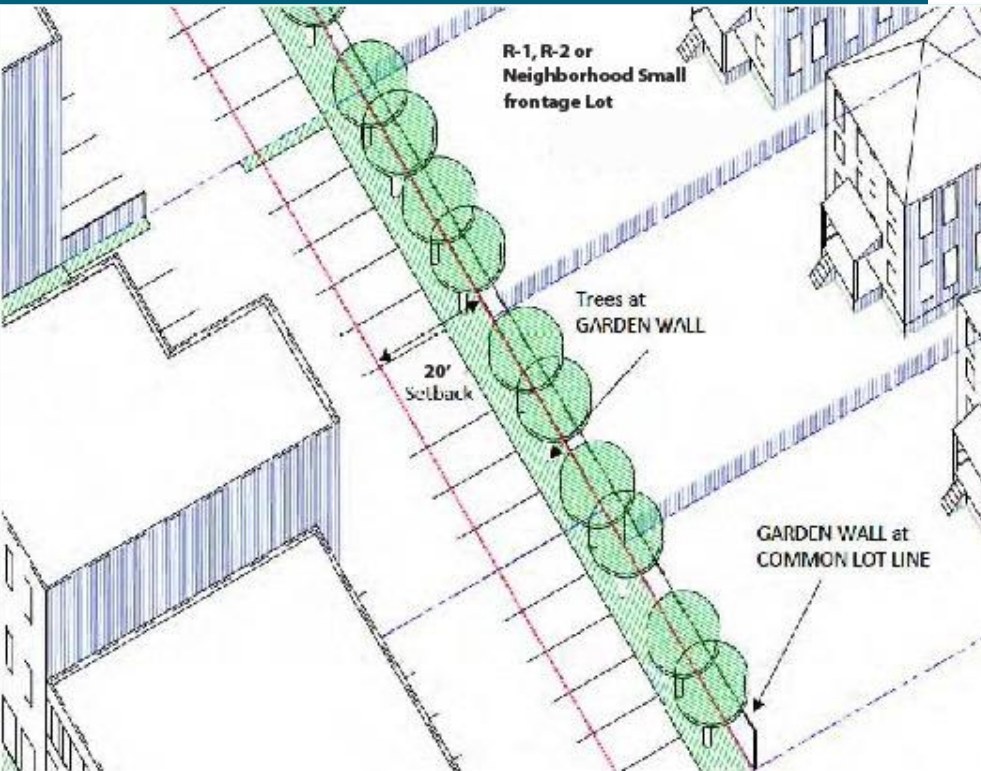


Illustration L. Neighborhood Manners Context

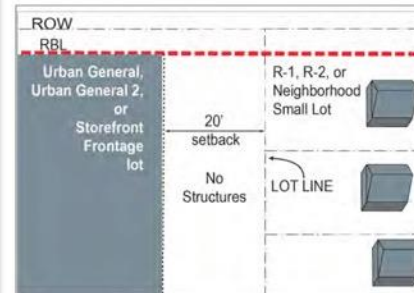


Diagram M. Neighborhood Manners Setback

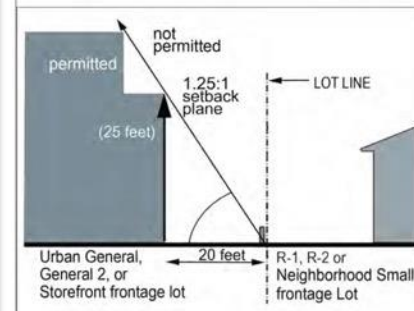


Diagram N. Neighborhood Manners Setback Plane

- d. The habitable area in an ATTIC STORY is restricted by the limitations on roof pitch.
- 4. Roof configurations are regulated in 194. *Architectural Standards, D. Roofs and Parapets.*

D. Frontage Designation Flexibility
When the building frontage designation shown on the REGULATING PLAN changes along a property's REQUIRED BUILDING LINE (RBL), the applicant has the option of applying either BUILDING FORM STANDARD for a maximum additional distance of 30 feet in either direction, for that parcel only, from the transition point shown on the REGULATING PLAN. This flexibility is limited by the configuration of the REGULATING PLAN (including the parcel lines) at the time of its adoption. An adjustment greater than 30 feet requires a rezoning. (See Diagram K)

E. Civic Buildings
When CIVIC BUILDINGS, existing or proposed, are designated on the REGULATING PLAN, they are exempt from the BUILDING FORM STANDARD provisions except those that relate to *F. Neighborhood Manners* and/or R-1 and R-2 districts.

F. Neighborhood Manners
Where Urban General, Urban General 2, and Storefront frontage lots share a COMMON LOT LINE with a Neighborhood Small or Medium frontage lot, or an R-1 or R-2 district, the following standards apply (See Illustration L.).

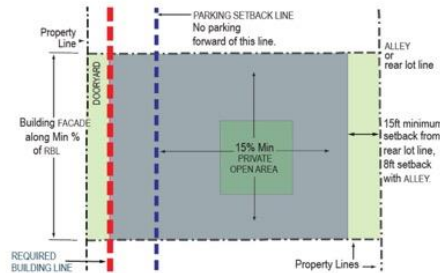
1. A wall, 4 to 8 feet in height, shall be constructed within one foot of the COMMON LOT LINE.
2. Trees from the *Street Tree List* (see Section 195 *Public Realm Standards*) shall be planted, on maximum 30-foot centers, between 5 and 10 feet from the wall.¹
3. Neighborhood Manners Setback (See Diagram M):
 - a. There shall be a 20 foot setback from the lot line shared with the R-1 or R-2 or Neighborhood Small or Medium frontage lot. There shall be no structures within this area.
 - b. There shall be a setback plane, beginning at the R-1 or R-2 or Neighborhood Small or Medium frontage lot line, extending at a slope of one and one quarter to one (1.25: 1),

¹ Drafting note: At planting, trees shall be at least 2.5 inches in diameter at designated breast height (DBH) and at least eight feet in

Establish New Zoning to Achieve the Vision Item 8.

• Adopt Clear and Objective Standards

193.2 Urban General Frontage



C. PLACEMENT

1. FACADE

- a. On each lot the building FACADE shall be built to the REQUIRED BUILDING LINE (RBL) for at least:
 - i. Urban General: 80% of the RBL length.
 - ii. Urban General 2: 70% of the RBL length.
- b. A STREET WALL is required on any unbuilt REQUIRED BUILDING LINE.
- c. Within 12 feet of the BLOCK CORNER, the GROUND STORY FAÇADE may be chamfered to form a corner entry.
- d. A FORECOURT configuration may be used within the minimum build-to parameters provided:
 - i. All elevations facing the FORECOURT are regulated as FACADES;
 - ii. the FORECOURT depth is no more than 20' and the width between 15' and 30';
 - iii. the FORECOURT may not be used for parking, drop-off driving area or storm-water management;
 - iv. the FORECOURT opening does not require a STREET WALL.

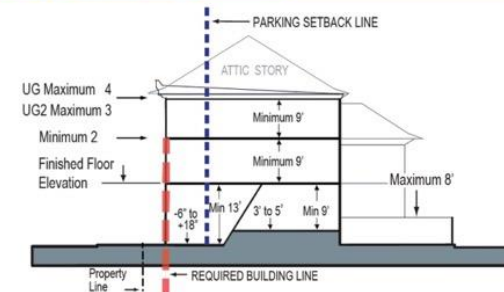
2. BUILDABLE AREA

- a. The BUILDABLE AREA is delineated by the gray area in the diagram above.
- b. The REQUIRED BUILDING LINE is generally located 5' off the ROW/property frontage, except where otherwise indicated on the REGULATING PLAN. Exceptions to the 5' offset on the REGULATING PLAN and the exact position of the RBL should be confirmed in consultation with the Zoning Review Committee.
- c. Setbacks: there are no required side setbacks; rear setbacks are: 8' from an ALLEY and 15' if no ALLEY.
- d. The maximum building footprint is 25,000 Sq Ft.
- e. A PRIVATE OPEN AREA equal to at least 15% of the BUILDABLE AREA must be provided on every lot.
- f. The minimum PRIVATE OPEN AREA dimension is 20'
- g. Up to 33% of the required PRIVATE OPEN AREA may be satisfied by the BALCONIES of individual units which are exempt from the minimum dimension in f. above, and PARKING SETBACK LINE restrictions in h. and i. below. (See 193.1 General Standards, C. Elements, 2.f. Balconies, for qualifying BALCONY requirements.)
- h. The PRIVATE OPEN AREA must be located behind the PARKING SETBACK LINE when it is below the third STORY.
- i. Where provided at or above the third STORY, the PRIVATE OPEN AREA may be located forward of the PARKING SETBACK LINE (such as in a raised courtyard configuration) only if:
 - i. it opens onto no more than one STREET-SPACE, and
 - ii. is set back at least 30' from any BLOCK CORNER or BUILDING CORNER.
- j. When on the building's highest roof level, the PRIVATE OPEN AREA may be located anywhere on the roof.

3. Other

- a. The PARKING SETBACK LINE is indicated on the REGULATING PLAN, generally 30' behind the REQUIRED BUILDING LINE, with limited exceptions at ALLEY/RBL intersections. See F.4. Rear Lot Area below.
- b. A PRIVACY FENCE is permitted and may be required. See Section 193.1.E. Neighborhood Manners.

193.2 Urban General Frontage



D. HEIGHT

1. STORY Height

- a. Urban General: minimum at RBL 2 STORIES, maximum 4 STORIES and 52'
- b. Urban General 2: minimum at RBL 2 STORIES, maximum 3 STORIES and 42'
- c. STORY heights may be different for specific locations; refer to the REGULATING PLAN. Where BONUS HEIGHT is awarded by the city, the maximum STORY height will increase by 1-2 STORIES and 10' for each STORY.

2. Ground floor finished elevation

- a. For Commercial or Retail: -6" to +18"
- b. For Residential units within 30' of the REQUIRED BUILDING LINE: 3' to 5'. Entrances may be at grade, with transitions within the building to meet the minimum finished floor elevation for the units. Support functions such as lobbies, rental offices, and club rooms may be located at grade.

3. Second floor finished elevation

- a. Urban General: 16' to 22'
- b. Urban General 2: 16' to 18'

4. GROUND STORY clear height

- a. For Commercial or Retail: 13' minimum
- b. For Residential: 9' minimum

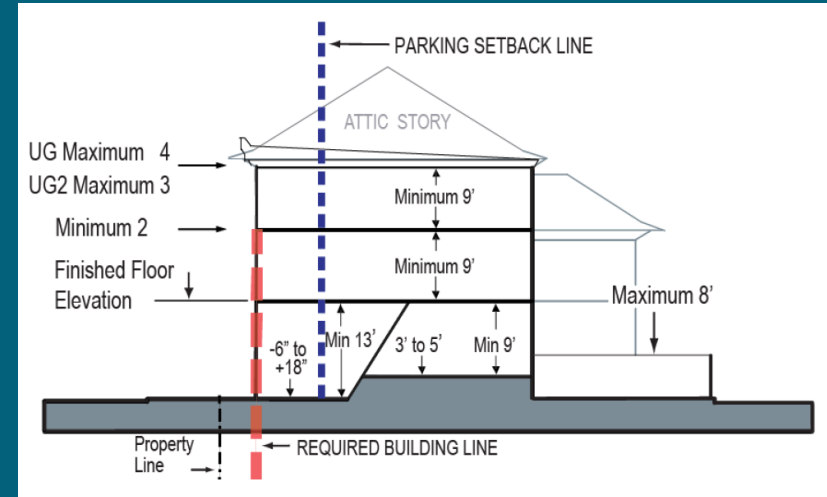
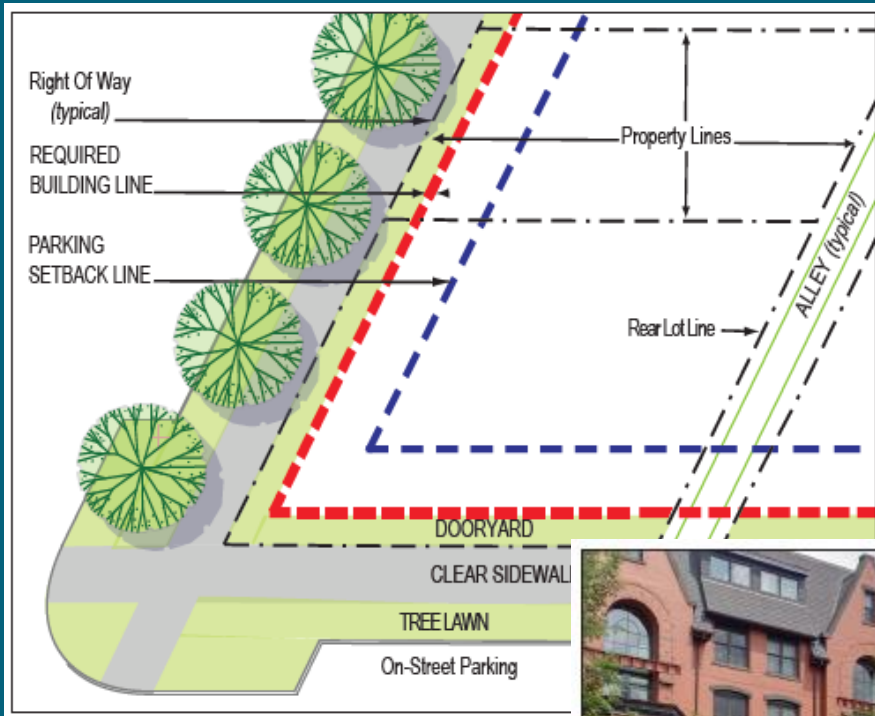
5. Upper STORIES clear height: 9' minimum

6. STREET WALL: 4' to 8'

7. PRIVACY FENCE: 8' Maximum, measured from adjacent grade.

Establish New Zoning to Achieve the Vision Item 8.

- Make the code more user-friendly with tables, photos, and illustrations (not just text).



Establish New Zoning to Achieve the Vision

Item 8.

Create a simplified and consistent process for development review

- New clear and objective standards allow for projects to be approved administratively
 - saving time and money for developers
 - Providing certainty for surrounding property owners
- Flexibility built into the Code:
 - Standards for rehab and remodel of existing buildings
 - Minor adjustments allowed for unique site conditions or unanticipated construction issues

Establish New Zoning to Achieve the Visio Item 8.

Update and simplify land uses

- Eliminate laundry list of specific uses, easily becomes outdated
- Uses grouped by category
 - Description
 - Examples
 - Exclusions
- Process for interpreting new uses
- Categories included in Character District in table form

DOWNTOWN CHARACTER DISTRICT USE TABLE											
USE CATEGORY	BUILDING FORM FRONTS										Additional Regulations
	General Urban		Storefront		General Urban 2		Neighborhood Medium		Neighborhood Small		
	Ground Story	Upper Story	Ground Story	Upper Story	Ground Story	Upper Story	Ground Story	Upper Story	Ground Story	Upper Story	
RESIDENTIAL											Section E.
Household Living	X	X	X	X	X	X	X	X	X	X	Sec. D. and E.1-4
Group Living	X	X	X	X	X	X	X	X	X	X	Sec. D. and E.1-6
COMMERCIAL											Section F.
Amusement & Recreation	X	X		X	X	X					Sec. D. and F.1.
Animal Sales & Service	X	X		X	X	X					Sec. D. and F.2.
Commercial Assembly	X	X	X	X	X	X					Sec. D. and F.1.
Eating & Drinking Establishments	X	X	X	X	X	X					Sec. D. and F.3.
Financial Services	X	X	X	X	X	X					Sec. D. and F.4.
Gas Station/Accessory Repair	X				X						Sec. D. and F.5.
Heavy Commercial	X	X	X	X	X	X					Sec. D. and F.6.
Lodging	X	X	X	X	X	X	X	X	X	X	Sec. D. and F.7.
Office	X	X	X	X	X	X					Sec. D. and F.8.
Parking, Commercial	X	X	X	X	X	X					Sec. D. and F.9.
Retail Sales & Service	X	X	X	X	X	X					Sec. D. and F.10.
Self-service storage			X		X						Sec. D. and F.5.
Vehicle Sales & Service	X	X		X	X	X					Sec. D. and F.4.
CIVIC & INSTITUTIONAL											Section G.
Civic & Cultural Assembly	X	X	X	X	X	X	X	X	X	X	Sec. D. and G.1.
Community Services											Sec. D.
Colleges & Universities											Sec. D.
Day Care	X	X		X	X	X	X	X	X	X	Sec. D. and G.2.
Educational	X	X		X	X	X	X	X	X	X	Sec. D.
Government & Public Safety	X	X		X	X	X					Sec. D.
Health Care	X	X		X	X	X					Sec. D.
INDUSTRIAL, WHOLESALE, & STORAGE											Section H.
	X										Sec. D.

Key: X= Permitted, Additional Regulations Apply Blank Cell = Not Permitted

Zoning Code Review Process

Item 8.

Internal Review

- Draft Code prepared by Ferrell-Madden and Community ReCode
- Internal Staff Review

Preparing for the Review and Adoption Process

- P&Z Work Session: Overview of Review Process (November, 2020)
- Community Main Street Board – Overview of Review Process (December, 2020)
- Council Work Session: Overview of Review Process (January, 2021)

Zoning Code Review Process

Item 8.

Public Review Period at P&Z: February 17 – May 12

- Feb 17: Special P&Z Meeting - Presentation of the Public Review Draft
- Public Review Draft available on OurCedarFalls.com – promoted widely on social media, *Currents*, mailers, TV news features
- Three Work Sessions offered to Development Professionals (March)
- Work Session with Community Main Street (March)
- Four P&Z Work Sessions (Feb 24, March 3, March 10, March 17)
- Three P&Z Formal Public Meetings and consideration of amendments
 - March 24, April 14 & April 28
- P&Z Recommendation to City Council – May 12, 2021

1032

Decision Matrix for proposed amendments

- 13 amendments proposed by Commissioners, citizens, and staff

PROPOSED AMENDMENTS TO THE PUBLIC REVIEW DRAFT OF THE DOWNTOWN ZONING CODE

26-193 – Building Form Standards

	Proposed Amendment	Explanatory Notes	Consultant/Staff Recommendation	P&Z Discussion (Date)	P&Z Decision
1	Requestor: Consultant/staff Change Building Form Standards (BFS) Section 193.5 Neighborhood Small Frontage B. Placement 4. Buildable Area to allow Private Open Area to be above grade for lots with less than 70 ft of depth.	Technical Fix: This better accommodates rowhouses on especially shallow lots (such as many of the lots along 2 nd Street, as shown in the Vision Plan) with their 66ft width/depth. This will make Neighborhood Small consistent with Neighborhood Medium.	Consultant/staff are in support of this amendment.	Commission directed staff to make the change.	Amendment Approved
2	Requestor: Consultant/staff Change Required Building Line (RBL) on the Downtown Regulating Plan, on the north side of W 2 nd St. from Franklin St. to the western border of the District. The RBL should be moved forward an additional 5ft, from 15ft to 10ft off the front property line.	Technical Fix: This is for consistency with the RBL to the east of Franklin (Urban General 2) and better accommodates rowhouses fronting 2 nd Street (as shown in the Vision Plan) within the shallower (66ft) depth of many of those lots. This keeps the building form and scale consistent with the Neighborhood Small designation, but allows room for both parking and for usable ground floor space within the buildings.	Consultant/staff are in support of this amendment to the Downtown Character District Regulating Plan.	Commission directed staff to make the change.	Amendment Approved
3	Requestor: Staff a) Insure consistency of terms between new proposed Section 26-140. Use-Specific Standards, Category Descriptions, and Definitions and proposed Section 26-197. Building Functions; b) Clarify language in Character District Use Table introductory paragraph concerning additional standards that apply	Technical Fix: a) Because drafting was an iterative process, additional revisions were made to Section 26-140, Use Classification, after the public review draft of Downtown Character District Code (Section 26-197) was released. This is a simple clean-up to make sure terms are internally consistent. Also to correct the Code Section number of the Use Classification to Sec. 26-140 (not 26-132). b) Make clear that additional development and performance standards apply above and beyond the broad permitted use categories.	Consultant/staff are in support of these amendments	Commission directed staff to make these changes.	Amendment Approved

Zoning Code Review Process

Item 8.

City Council Review

- May 17 COW - Presentation of P&Z's Recommended Draft
- June 7 – Work Session – General questions and discussion
- June 21 – Work Session – Parking Standards
- August 2 – COW – Parking Standards/Shared Parking
- September 7 – Public Hearing

Zoning Code Adoption

Next Steps

- Code Adoption
- Give the Code a chance to work
- No code is perfect - revisit in a year to see if any adjustments are needed

Questions?

Rezoning property to CD-DT

- Rezoning all property within the downtown study area to CD-DT Downtown Character District
- Adopting the Downtown Regulating Plan as the new Zoning Map for this area
- **Note: Changing the zoning does not require anyone to change how they are using their property currently.**

Downtown Study Area Existing Zoning

Commercial

- C-1, C-2, C-3

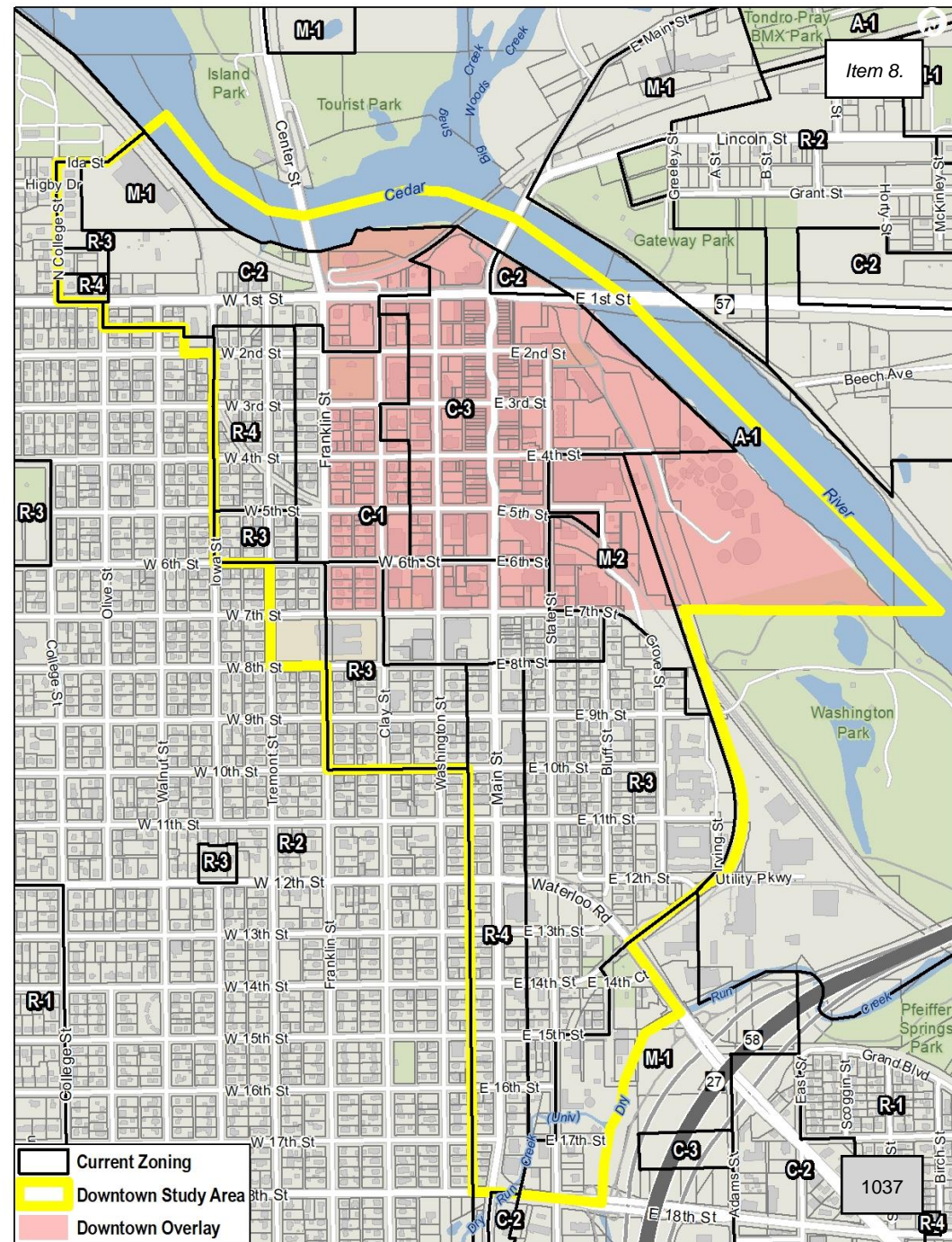
Industrial

- M1, M2

Residential

- R-2, R-3, R-4

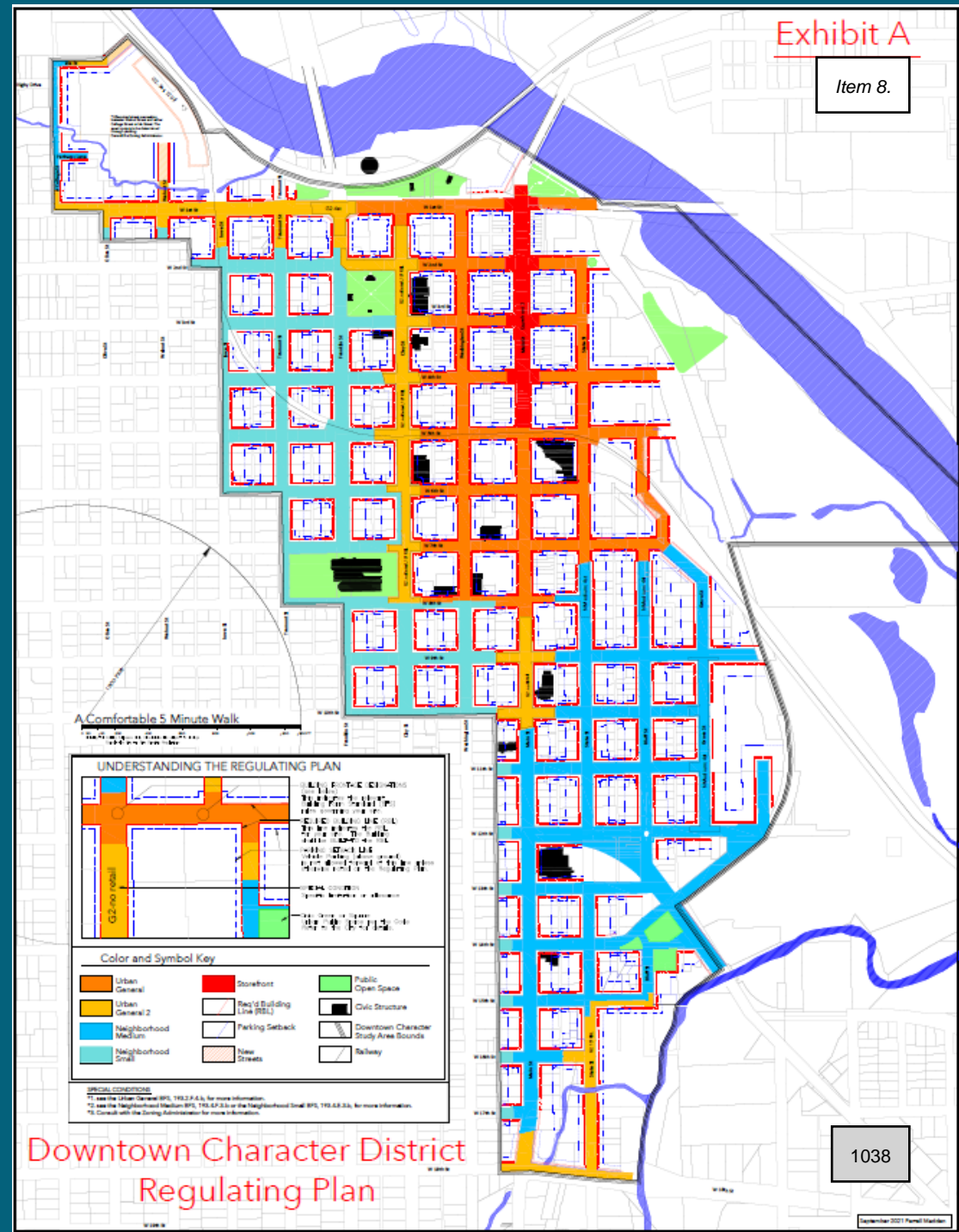
CBD - Central Business District Overlay



Downtown Character District Regulating Plan

Frontage Designations

- Storefront
- Urban General
- Urban General 2
- Neighborhood Medium
- Neighborhood Small



Downtown Character District Regulating Plan

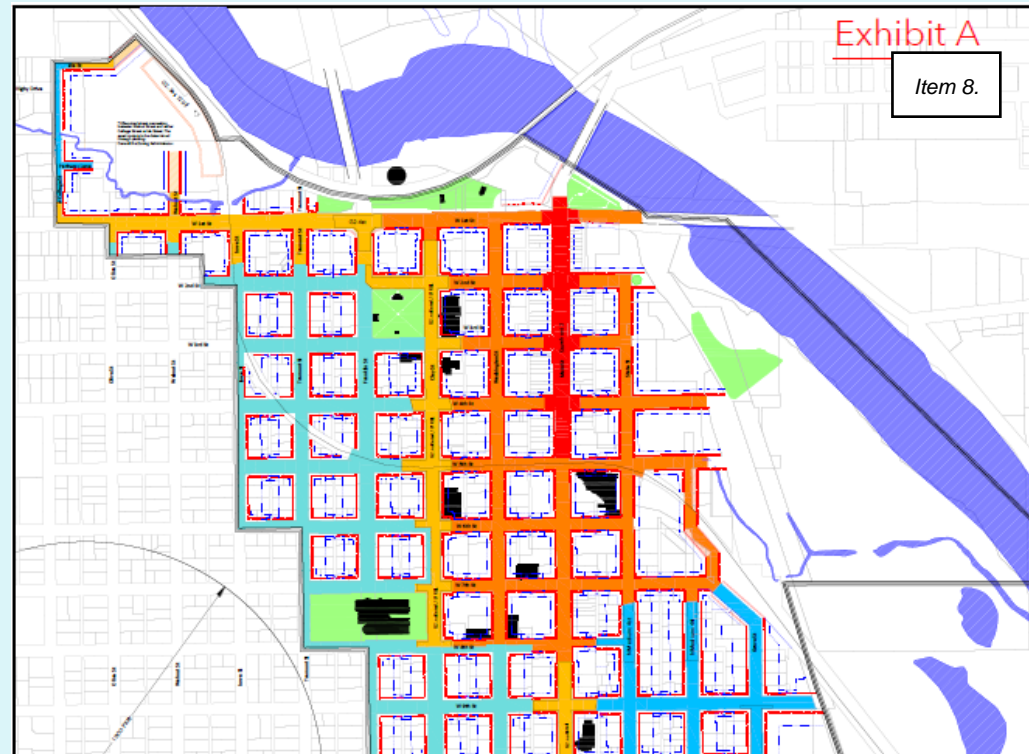
Downtown Zoning Map (Regulating Plan) Character Areas Summary



Urban
General

The basic urban building form. Creates larger multi-story buildings placed at the property line. Multiple uses permitted.

- Height: 2-4 stories (52' maximum)
 - **Note C-3 allows 15+ stories**
 - **CBD Overlay: width and height of adjacent buildings shall be considered**
- Regulating Building Line: 1-5 ft. (varies)
- Span 80%+ of property's frontage
- Building footprint: 25,000 sq. ft. maximum
- Windows (fenestration):
 - Ground: 50-80%
 - Upper: 20-80%
- Entrance spacing: 70' maximum
- Mix of Uses :
 - Ground: Non-residential or Residential
 - Upper: Non-residential or Residential (no retail)
 - Existing Manufacturing Uses remain conforming



Downtown Zoning Map (Regulating Plan) Character Areas Summary



Urban
General 2

The basic urban building form. Less intensity than Urban General

Height: 2-3 stories (42' maximum)

Note: C-1 allows 2 stories

C-2 allows 3 stories

- Regulated Building Line: 5'-10' or 10'-15'
Note: C-1 – Front Setback 25'
C-2 – Front Setback varies
- Span 70%+ of property's frontage
- Building footprint: 25,000 sq. ft. maximum
- Windows (fenestration):
 - Ground: 50-80%
 - Upper: 20-80%
- Entrance spacing: 80' maximum
- Mix of Uses:
 - Ground: Non-residential or Residential
 - Upper: Non-residential or Residential**Note: C-1 and C-2 do not allow residential uses on ground floor**



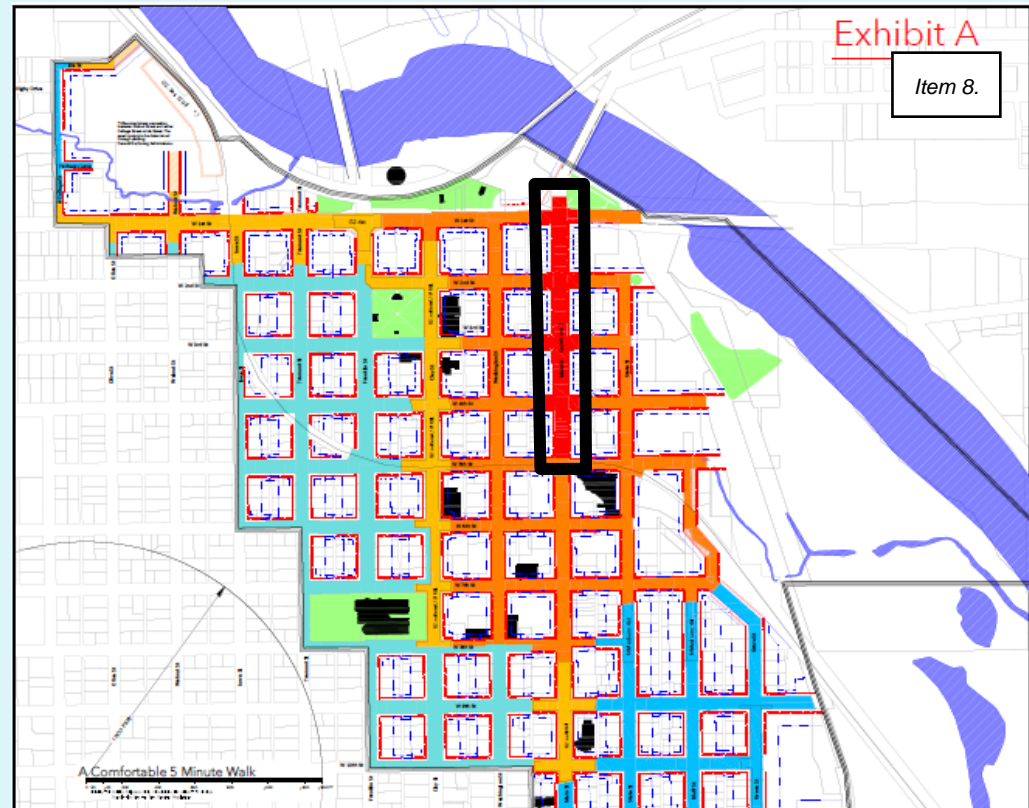
Downtown Zoning Map (Regulating Plan) Character Areas Summary



Storefront

Subset of Urban General, for specific requirements at the street level aimed to continue the large storefront windows found in the core & have active uses for pedestrian engagement.

- Span 85%+ of property's frontage
- Building height limited to 3 stories
 - Note C-3 allows 15+ stories
 - CBD Overlay: width and height of adjacent buildings shall be considered
- Apply Urban General standards, adding the following at the ground story:
 - Windows (fenestration): 70-90%
 - Entrance spacing: 50' maximum
 - Uses:
 - Mixed
 - Main St. (1st-6th) retail only on ground floor



Downtown Zoning Map (Regulating Plan)

Character Areas Summary



Attached & detached housing, up to apartment buildings (missing middle housing)

- Height: 1-3 stories (36' maximum)
Note: R-3 & R-4 Zoning allow 3 stories, 45 ft.
- Span 66%+ of property's frontage
- Max 80' building width
- Regulated Building Line: 15' -20'
- Windows (fenestration): 25-70%
- Stoop/front porch required
- 20% open space
- Use: Residential
- **Existing Commercial uses remain conforming**
- Accessory Dwelling Unit (ADU) permitted.



Exhibit A
Item 8.

UNDERSTANDING THE REGULATING PLAN

District n

1042

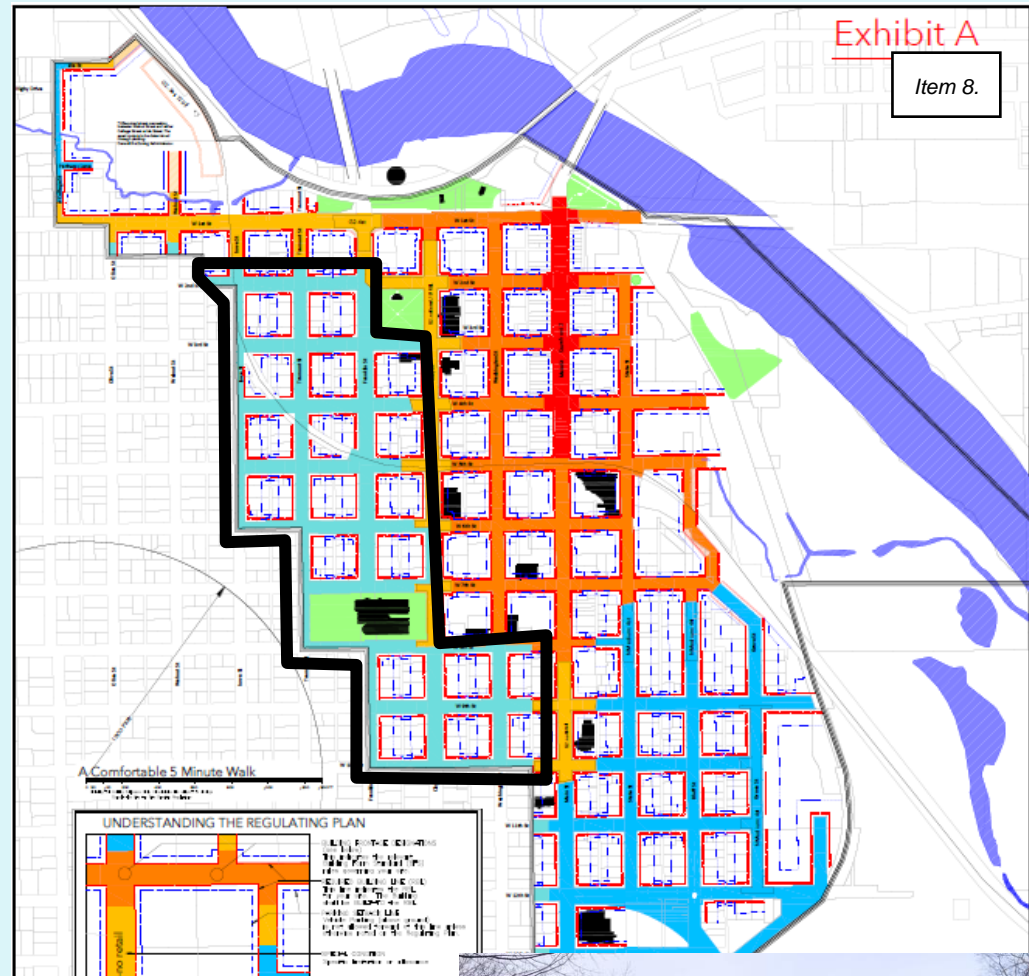
Downtown Zoning Map (Regulating Plan)

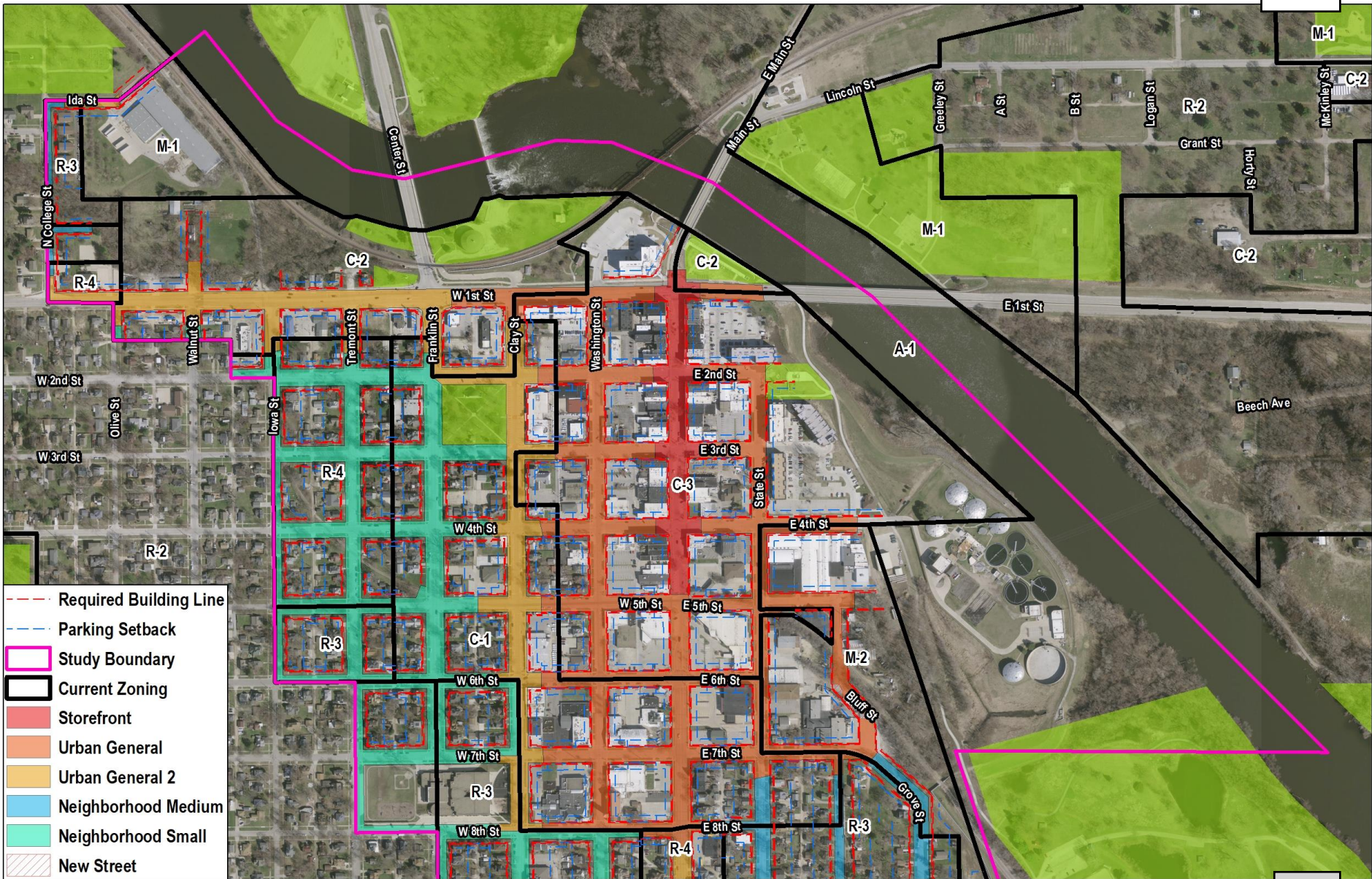
Character Areas Summary

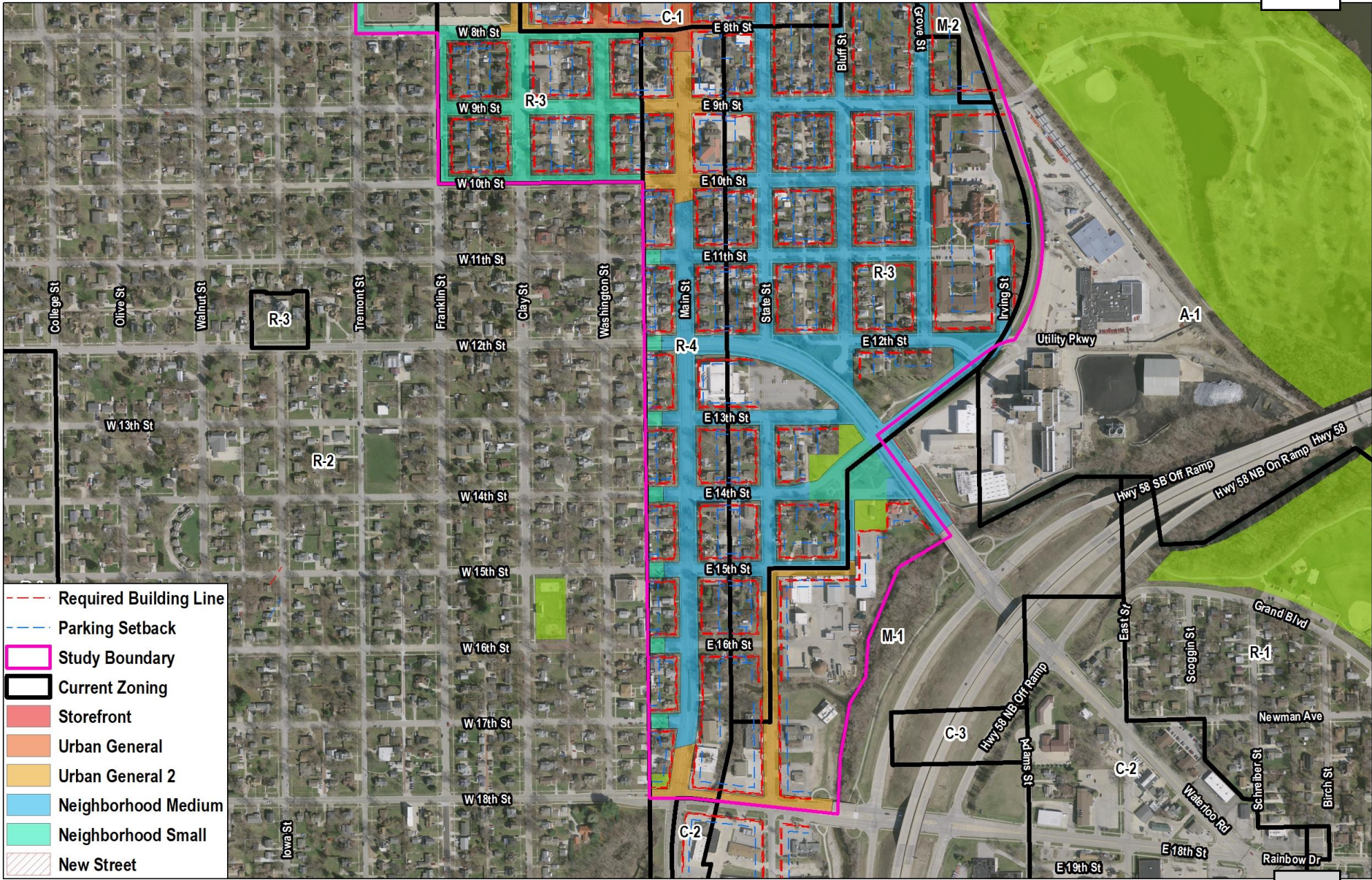
 Neighborhood
Small

Attached & detached housing, allows small apartment buildings.

- Height: 1-2 stories (26' maximum)
Note: R-3 & R-4 Zoning allow 3 stories, 45 ft.
- Span 50%+ of property's frontage,
- 60' max. building width
- 15' -20' Build-to Line
- Windows (fenestration): 25-70%
- Stoop/front porch required
- 20% open space
- Use: Residential
- **Existing commercial uses remain conforming**
- Accessory Dwelling Unit (ADU) permitted.







City Council Work Session

June 21, 2021



Parking Requirements: Current (Section 26-220)

Item 8.

CBD Overlay Parking:

No parking required for principal commercial, professional office, or service business uses

Parking for secondary, incidental or accessory residential uses in the C-3 Commercial District is subject to review and approval by the planning and zoning commission and city council. In practice in recent years, a requirement of 1 space per bedroom has been applied with on-street parking counting toward visitor parking.

Dwellings – Citywide:

- Owner-occupied, single-unit – 2 spaces per unit.
- Renter-occupied, single-unit – 2 per unit + 1 space for each bedroom in excess of 2 bedrooms.
- 2 or more units – 2 spaces per unit + 1 space for each bedroom in each unit in excess of 2 bedrooms. 1 additional space for every 5 units in excess of 5 units for visitor parking.

Parking Requirements: Proposed (Section 26-196)

Item 8.

INTENT – some key points

- Reduce fragmented, uncoordinated, inefficient, reserved single-purpose parking.
- Provide flexibility for redevelopment of small sites and for the preservation or reuse of historic buildings.
- Increase visibility and accessibility of publicly available parking.
- Most effective model to increase the parking supply for customers is shared publicly available parking, not parking that is “locked up” on private lots. Many cities are lowering or eliminating private, off-street parking requirements from their zoning ordinances and focusing instead on publicly available shared parking.

Parking Requirements: Proposed (Section 26-196)

Item 8.

General Urban, General Urban 2, and Storefront Frontages –

No Minimum Parking Requirement for the following:

Existing Parkade buildings (fronting Main Street between 1st Street and 6th Street) are exempt from any minimum parking requirements, regardless of use.

In addition:

- No parking requirement for:
 - ✓ ground floor commercial space;
 - ✓ the re-use or renovation of an existing structure, in addition to those on Main Street identified above, in which there is no gross floor area expansion and the use is non-residential.

Parking Requirements: Proposed (Section 26-196)

Item 8.

- *Key Concepts: Reserved vs. Shared Parking*

General Urban, General Urban 2, and Storefront Frontages –

Minimum Reserved Parking

- No minimum requirement for commercial or civic uses
- Residential in mixed-use or multi-unit buildings
 - ✓ .5/bedroom
- Residential in single-unit, 2-unit, or rowhouse
 - ✓ 1 per unit (owner-occupied)
 - ✓ 1 per unit + 1 per bedroom for 3 or more BRs (rental)

Parking Requirements: Proposed (Section 26-196)

Item 8.

- *Key Concepts: Reserved vs. Shared Parking*

General Urban, General Urban 2, and Storefront Frontages –

Minimum Shared Parking

Accessible to the public at least 12 hours/day and designated by appropriate signage and markings; on-site or within 600-ft walking distance

- Commercial upper stories
 - ✓ No minimum for <5000sf non-residential GFA
 - ✓ 1.25 spaces per 1000sf for \geq 5000 sf non-residential GFA
- Residential in mixed-use or multi-unit buildings
 - ✓ .25/bedroom

Parking Requirements: Proposed (Section 26-196)

Item 8.

- *Key Concepts: Reserved vs. Shared Parking*

Neighborhood Frontages –

Minimum Reserved Parking

- Residential in multi-unit buildings
 - ✓ .75/bedroom
- Residential in single-unit, 2-unit, rowhouse, or cottage court
 - ✓ 1 per unit (owner-occupied)
 - ✓ 1 per unit + 1 per bedroom for 3 or more BRs (rental)
- 1 per 300sf for non-residential uses

Minimum Shared Parking

- Residential in multi-unit buildings
 - ✓ .25/bedroom

City Council Committee of the Whole

Downtown Code Update: Parking

August 2, 2021



Focus of Tonight's Discussion

- Parking requirements proposed in the Downtown Zoning Code.
 - Parking requirements when new development is proposed (does not affect existing development)
 - Parking located on private property
- We are not talking about City-owned, public parking lots.

Downtown is Special

Item 8.

Why do people come downtown?

- Destination
- Unique shops and restaurants
- Special events
- New urban residences
- Walkable
- ‘Different’ than the rest of city

Don't regulate it the same



How does Cedar Falls get more of this...

Item 8.



1056

How does Cedar Falls get more of this...

Item 8.



1057

How does Cedar Falls get more of this...

Item 8.



1058

How does Cedar Falls get more of this...

Item 8.



1059

...and less of this?

Item 8.



1060

...and less of this?

Item 8.



Downtown is Special *Build on the Success*

Item 8.



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Unlocking Economic Development Potential

Item 8.

VISION PLAN RECOMMENDATIONS:

- Intensify development with a mix of uses
- Facilitate development (if it meets the Plan)
- Maintain the retail concentration
- **Right-size parking**
- Zone for housing variety





Item 8.

E 3rd St

E 4th St

E 5th St

E 5th St

E 6th St

State St

E 7th St

E 8th St

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Item 8.

E 3rd St

E 4th St

E 5th St

E 5th St

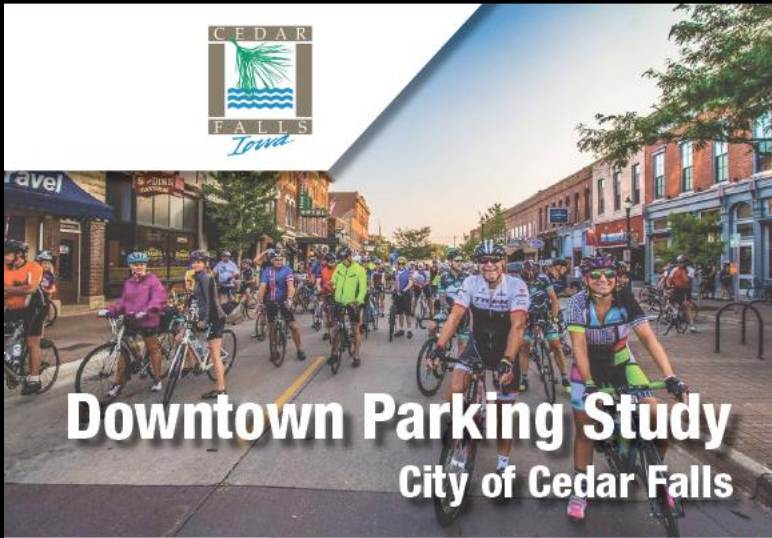
E 6th St

State St

E 7th St

E 8th St

1065



Downtown Parking Study City of Cedar Falls



Final Report
February 15, 2019



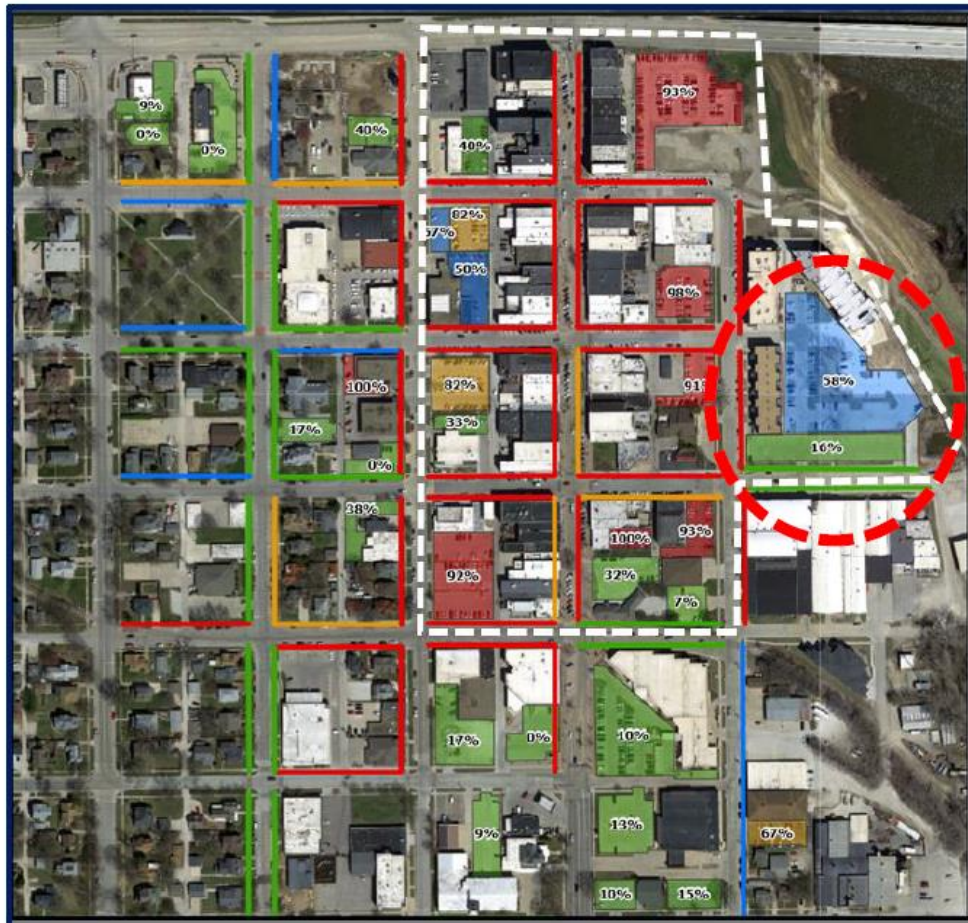
The underutilization of private of street parking in the evenings after 5:00pm has been documented in every data collection count that was conducted.

Item 8.

This condition underscores the fact that parking exempt districts are good public policy for downtown urban centers, and that requiring individual land uses to create their own on-site parking is bad public policy.

When individual land uses are required to create their own on-site parking based on antiquated parking ratios, the typical result is an oversupply of private parking that is not shared with other land uses.

Observed Parking Occupancies, Friday Evening 7:00pm On-Street and Off-street Public Parking at Maximum Occupancy



PARKING OCCUPANCY COUNTS FRIDAY, OCTOBER 26 - 7PM

On-Street Occupancy = 90%

Public Surface Lots = 89%

Private Surface Lots = 52%
(172 open spaces)

Off-Street	On-Street
Green	Less than 40%
Blue	41% to 60%
Yellow	61% to 85%
Red	Greater than 86%



Site Analysis 2019: Parking

Item 8.



Site Analysis 2019: Parking

Item 8.



Community Input 2019

Item 8.



OUR CEDAR FALLS

Downtown
Imagine the possibilities!

Cedar Falls, Iowa
Public Kick-Off Meeting
April 2, 2019
Visual Preference Exercise
RESULTS

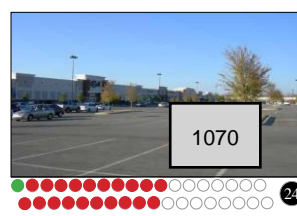
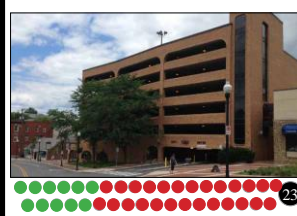
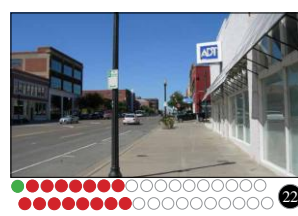
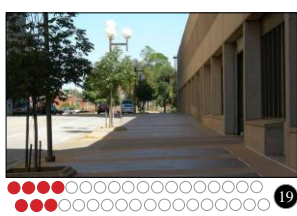
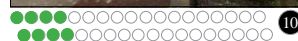
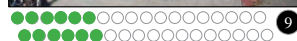
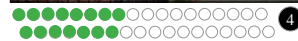
BOARD C

FERRELL MADDEN
urban design,
town planning, &
form-based coding



Street Space – Public Realm

Downtown Parking



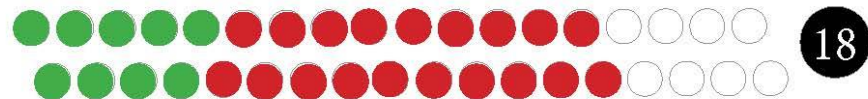
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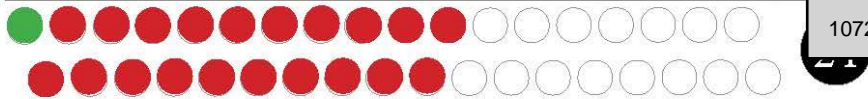
Item 8.



18



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Stakeholder Interviews Spring 2019:

Item 8.

- Business and property owners
- Retail, restaurant, and bar owners
- Local developers, architects, and real estate professionals
- Community Main Street staff and board members

Plus

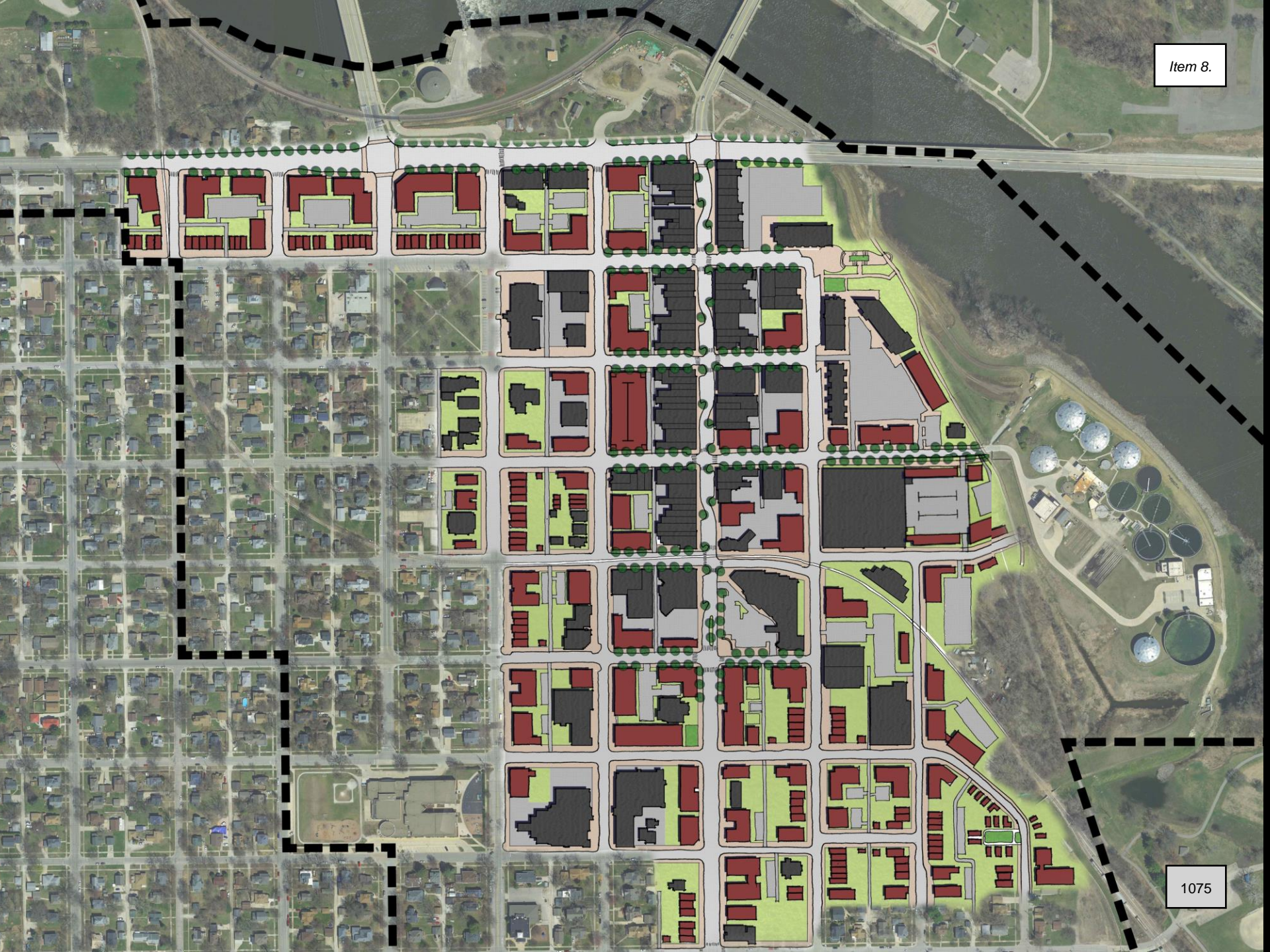
- City planning and community development staff
- City department directors
- the “Downtown parking study implementation staff”

Stakeholder Interviews Spring 2019:

Item 8.

Consistent themes and concerns identified:

- Maintain the “small town feel” of Main Street but allow for growth and change elsewhere in Downtown
- Lack of significant office space in Downtown
- Recognition that Downtown has thrived as a specialty destination, dependent on boutique shops and restaurants; but market dynamic is changing, with growing demand for residences, offices, and related daily services
- *Need to better manage existing parking*
- *Need to increase the supply of publicly available parking to support growth*
- Desire for the City to support both small scale reinvestment and revitalization and medium scale redevelopment within the Downtown context





W 1st St

W 2nd St

W 3rd St

W 4th St

W 5th St

W 6th St

Fremont St

Franklin St

Clay St

Washington St

Main St

State St

Bluff St

From Vision to Code Update

Item 8.

IMAGINE DOWNTOWN! Cedar Falls Downtown Vision Plan



Adopted November 18, 2019



26-196. Character District Parking and Loading

A. Intent

1. Promote a “park once” environment within each Character District that will enable people to conveniently park and access a variety of commercial, residential, and civic enterprises in pedestrian friendly environments by encouraging SHARED PARKING.
2. Reduce fragmented, uncoordinated, inefficient, reserved single-purpose parking.
3. Avoid adverse parking impacts on neighborhoods adjacent to Character District mixed-use areas.
4. Utilize on-street parking.
5. Provide flexibility for redevelopment of small sites and for the preservation or reuse of historic buildings.
6. Increase visibility and accessibility of publicly available parking.
7. Support and encourage a multi-modal, bicycle and pedestrian-friendly environment.

<p>Character District Sections: 26-191 to 26-198</p> <p>191. Introduction & Definitions</p> <p>192. Regulating Plans</p> <p>193. Building Form Standards</p> <p>194. Architectural Standards</p> <p>195. Public Realm Standards</p> <p>196. Parking & Loading</p> <p>197. Building Functions</p> <p>198. Reserved</p> <p>199. Reserved</p>
--

B. Other Applicable Regulations

Pervious surfaces approved by the City Engineer are encouraged for surface parking lots.

C. General Urban, General Urban 2, and Storefront Frontages – Minimum Parking Requirements

1. Existing buildings fronting Main Street between 1st Street and 6th Street at the time of the Downtown Character District adoption are exempt from these minimum parking requirements, regardless of use.
2. There is no minimum parking requirement for:
 - a. ground floor commercial space;
 - b. the re-use or renovation of an existing structure, in addition to those on Main Street identified in Item C. 1. above, in which there is no gross floor area expansion and the use [is/remains] non-residential.
3. Minimum Reserved Parking
Reserved parking includes all parking that is not SHARED PARKING.
 - a. Commercial/civic uses: There is no minimum requirement for reserved parking.
 - b. Residential uses in mixed-use or multi-unit buildings—minimum reserved parking spaces per dwelling unit:

(i) Efficiency/1-bedroom	0.5 spaces/unit
(ii) 2 or more bedroom units	additional .5 spaces per bedroom

Note: In calculating the total number of minimum reserved spaces per building, any partial spaces .5 or above are rounded to the next whole number.
 - c. Residential uses in single-unit attached and detached, multi-unit ROWHOUSE, and two-unit configurations—minimum reserved parking spaces per dwelling unit:

(i) Owner-occupied	1 space/unit
(ii) Renter-occupied	1 space/unit + one space/per bedroom for each bedroom above 2
4. Minimum SHARED PARKING:
 - a. Commercial UPPER STORIES
 - (i) Under 5,000 square feet non-residential Gross Floor Area (GFA) has no minimum SHARED PARKING requirements.
 - (ii) 5,000 square feet or greater, non-residential GFA shall provide a minimum of 1.25 spaces per square feet as SHARED PARKING.

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Parking -- Think Differently

INTENT

- Reduce fragmented, uncoordinated, inefficient, reserved single-purpose parking.
- Provide flexibility for redevelopment of small sites and for the preservation or reuse of historic buildings.
- Increase visibility and accessibility of publicly available parking.
- Most effective model to increase the parking supply for customers is shared publicly available parking, not parking that is “locked up” on private lots. Many cities are lowering or eliminating private, off-street parking requirements from their zoning ordinances and focusing instead on publicly available shared parking.

New zoning: encourage more of this...

Item 8.



What is shared parking?

- Automobile parking that is accessible to the public at least 12 hours/day and designated by appropriate signage and markings; on-site or within 600-ft walking distance

See Sec. 26-191.H. Definitions (p. 8) & Sec. 26-196.C.5. Achieving Parking Requirements (p. 78)

- The shared parking requirement would not obligate owners to “give up” any percentage of their parking; the goal is to maximize the usage of any new parking by making a small percentage of it available for some portion of the day, most typically when it is not needed by property owners, their tenants, or employees.

What is shared parking?

- Automobile parking that is accessible to the public at least 12 hours/day and designated by appropriate signage and markings; on-site or within 600-ft walking distance

See Sec. 26-191.H. Definitions (p. 8) & Sec. 26-196.C.5. Achieving Parking Requirements (p. 78)

- The shared parking requirement would not obligate owners to “give up” any percentage of their parking; the goal is to maximize the usage of any new parking by making a small percentage of it available for some portion of the day, most typically when it is not needed by property owners, their tenants, or employees.

What is shared parking?

For example:

- Parking for an office might be fully used from 8 AM to 6 PM, on Monday to Friday, but would sit empty on most evenings and weekends.
- The goal is to make some portion of that parking available to other users during those night and weekend hours.
- Similarly, the parking for an apartment or condominium building may be occupied by residents most evenings and weekends, but sit primarily empty during weekdays.
- A portion of that parking would be made available during those hours.
- In either scenario, the owners could maintain a percentage of their parking as “reserved” at all times.

Parking Requirements: Current (Section 26-220)

Item 8.

CBD Overlay Parking:

No parking required for principal commercial, professional office, or service business uses

Parking for secondary, incidental or accessory residential uses in the C-3 Commercial District is subject to review and approval by the planning and zoning commission and city council. In practice in recent years, a requirement of 1 space per bedroom has been applied with on-street parking counting toward visitor parking.

Dwellings – Citywide:

- Owner-occupied, single-unit – 2 spaces per unit.
- Renter-occupied, single-unit – 2 per unit + 1 space for each bedroom in excess of 2 bedrooms.
- 2 or more units – 2 spaces per unit + 1 space for each bedroom in each unit in excess of 2 bedrooms. 1 additional space for every 5 units in excess of 5 units for visitor parking.

Parking Requirements: **Proposed** (Section 26-196)

Item 8.

General Urban, General Urban 2, and Storefront Frontages –

No Minimum Parking Requirement for the following:

- Existing Parkade buildings (fronting Main Street between 1st Street and 6th Street) regardless of use.
- Ground floor commercial space
- The re-use or renovation of an existing structure with no expansion and for non-residential use

Parking Requirements: **Proposed** (Section 26-196)

Item 8.

- *Key Concepts: Reserved vs. Shared Parking*

General Urban, General Urban 2, and Storefront Frontages –

Minimum Reserved Parking

- No requirement for non-residential uses
- Required for all residential uses excluding existing buildings along the Parkade

Parking Requirements: **Proposed** (Section 26-196)

Item 8.

- *Key Concepts: Reserved vs. Shared Parking*

General Urban, General Urban 2, and Storefront Frontages –

Minimum Shared Parking

Accessible to the public at least 12 hours/day

Required for:

- Commercial upper stories above 5000 square feet
- Residential in mixed-use or multi-unit buildings

Unintended Consequences of high parking requirements

- Stunts growth Downtown; shifts development to outlying areas where land is less costly
- Cost of parking is passed down to businesses, customers, and residents = increased commercial lease rates and higher residential rents
- Un-used parking generates no revenue and no tax base

Donald Shoup, *Parking and the City*
...Chapter 11 estimates that parking requirements increase the rent households pay for their apartments by 13 percent



The High Cost of Free Parking

DONALD SHOUP

Parking Lots

Walkability

Tax Base



Item 8.

1088

Parking lots

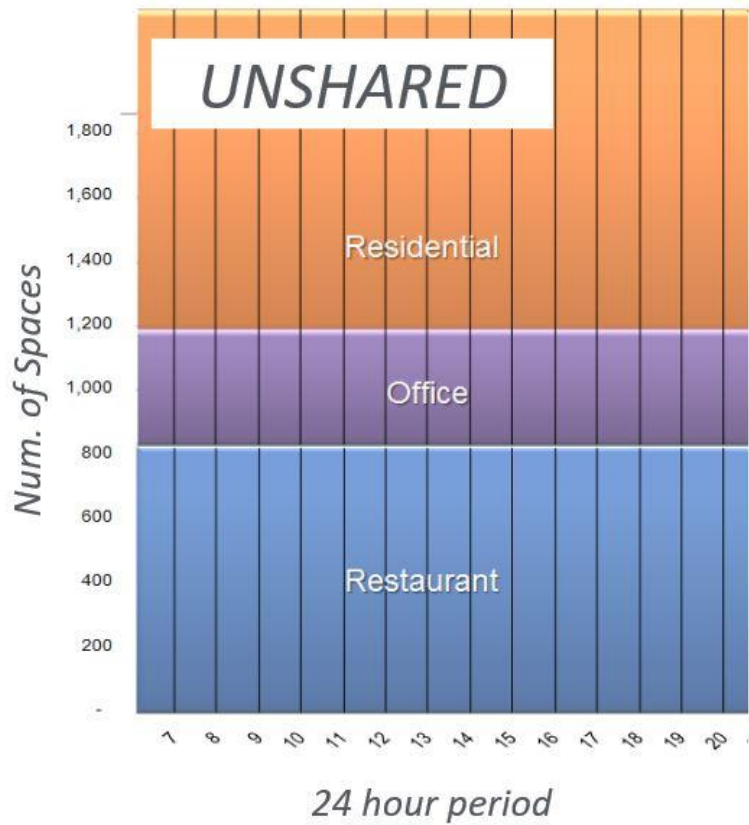
Walkability

Tax Base

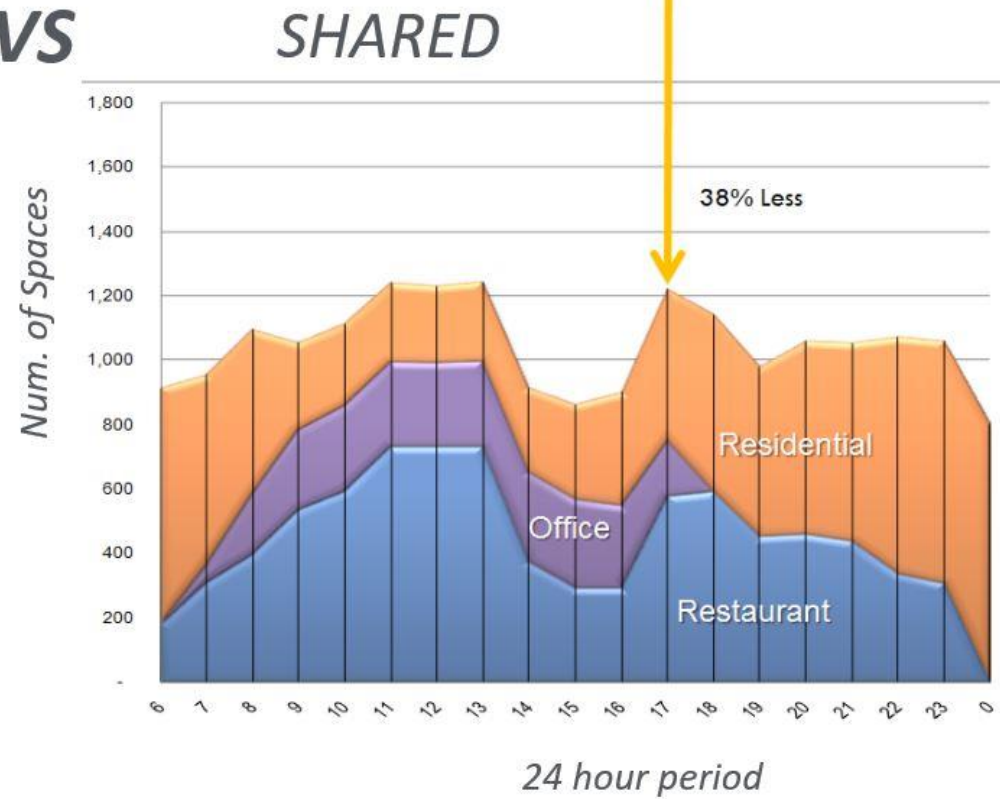
Shared Parking = some spaces available during peak demands.



SHARED PARKING



VS



Downtown Vision: More of this...

Item 8.



Reminder: Focus of Tonight's Discussion

- Parking requirements proposed in the Downtown Zoning Code.
 - Parking requirements when new development is proposed (does not affect existing development)
 - Parking located on private property
- We are not talking about City-owned, public parking lots.

Prepared by: Karen Howard, P&CS Manager, 220 Clay Street, Cedar Falls, Iowa 50613 (319) 273-8600

ORDINANCE NO. 2994

AN ORDINANCE AMENDING CHAPTER 26, ZONING, OF THE CODE OF ORDINANCES OF THE CITY OF CEDAR FALLS, IOWA, ADDING NEW SECTIONS TO BE NUMBERED 26-191 THROUGH 26-197 UNDER ARTICLE III, DISTRICTS AND DISTRICT REGULATIONS, DIVISION 2. SPECIFIC DISTRICTS, TO ESTABLISH ZONING STANDARDS AND REGULATIONS FOR CHARACTER DISTRICTS; AND ADDING NEW SECTIONS TO BE NUMBERED 26-36 THROUGH 26-39 UNDER ARTICLE II. ADMINISTRATION AND ENFORCEMENT, DIVISION 1, GENERALLY, ESTABLISHING NEW ADMINISTRATIVE PROCEDURES FOR SITE PLAN REVIEW; AND ADDING A NEW SECTION 26-141 UNDER ARTICLE III, DISTRICTS AND DISTRICT REGULATIONS, DIVISION 1, GENERALLY, ESTABLISHING USE SPECIFIC REGULATIONS AND CLASSIFICATION; AND TO REPEAL IN ITS ENTIRETY SECTION 26-189 CBD CENTRAL BUSINESS DISTRICT OVERLAY ZONING DISTRICT, UNDER ARTICLE III, DISTRICTS AND DISTRICT REGULATIONS, DIVISION 2, SPECIFIC DISTRICTS; AND TO AMEND SECTION 26-117, DISTRICTS ESTABLISHED, UNDER ARTICLE III. DISTRICTS AND DISTRICT REGULATIONS, DIVISION 1 GENERALLY, ADDING A NEW ZONING DISTRICT TO BE KNOWN AS "DOWNTOWN CHARACTER DISTRICT" WITH ABBREVIATION, CD-DT, AND DELETING REFERENCE TO THE CENTRAL BUSINESS DISTRICT OVERLAY ZONING DISTRICT, CBD; AND TO AMEND SECTION 26-118, DISTRICT BOUNDARIES, CLARIFYING THAT FOR EACH CHARACTER DISTRICT THE ASSOCIATED REGULATING PLAN IS THE OFFICIAL ZONING MAP; AND CLARIFYING THE INTERPRETATION OF BOUNDARIES FOR CHARACTER DISTRICTS; AND TO AMEND SECTION 26-126, DETACHED ACCESSORY STRUCTURES TO CLARIFY HOW SAID PROVISIONS APPLY IN CHARACTER DISTRICTS; AND TO AMEND SECTION 26-127 SETBACKS FOR CORNER LOTS; AND TO AMEND CHAPTER 5, ALCOHOLIC AND MALT BEVERAGES, ARTICLE 1, IN GENERAL, TO CLARIFY ZONING DISTRICTS WHERE LIQUOR CONTROL LICENSES OR WINE OR BEER PERMITS ARE ALLOWED; AND TO AMEND CHAPTER 13, LICENSES AND BUSINESS REGULATIONS, DIVISION 1, MOBILE MERCHANTS, TO CLARIFY ZONING DISTRICTS WHERE SAID

PERMITS ARE ALLOWED; AND TO AMEND CHAPTER 19, STREETS AND SIDEWALKS, TO CLARIFY THAT TABLES AND CHAIRS, TEMPORARY MOVABLE SIGNS, AND SIDEWALK CAFES SHALL BE ALLOWED IN CERTAIN FRONTAGE DESIGNATIONS WITHIN CHARACTER DISTRICTS

WHEREAS, in November of 2019, the City Council of the City of Cedar Falls adopted the *Imagine Downtown! Vision Plan*, as an integral part of the Cedar Falls Comprehensive Plan; and

WHEREAS, in order to ensure future development and redevelopment is consistent with the adopted *Imagine Downtown! Vision Plan*, the City of Cedar Falls drafted new zoning regulations, new administrative procedures, use classification regulations, and an associated regulating plan for the downtown area covered by the *Imagine Downtown! Vision Plan*; and

WHEREAS, the new zoning regulations establish a new zoning district entitled, "Downtown Character District" abbreviated as "CD-DT," and an associated zoning map, referred to as the "Downtown Character District Regulating Plan;" and

WHEREAS, the Planning and Zoning Commission has reviewed the proposed amendments to Chapter 26, Zoning, under Case # TA21-001 and recommends approval; and

WHEREAS, the Cedar Falls City Council has determined that said amendments to Chapter 26, Zoning are in the best interests of the community; and now, therefore:

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CEDAR FALLS, IOWA, THAT:

Section 1. Article II, Administration and Enforcement, Division 1, Generally, is hereby amended to add new sections to be numbered 26-36 through 26-39, (previously reserved) as follows:

Sec. 26-36. Administrative Determination

(a) APPLICABILITY

The Zoning Administrator shall review and decide upon applications for the following administrative reviews and code adjustments in consultation with the Zoning Review Committee(ZRC) and/or the staff Technical Review Committee, as applicable. Some of these processes have additional review and approval requirements; a cross-reference to those requirements is provided in the right column.

Permit or Adjustment	Additional Review Requirements
Site Plan	Section 26-37.D
Proportionate Compliance	n/a
Minor Adjustment	Section 26-39.E

(b) APPLICATION COMPLETENESS REVIEW

(1) Applications shall not be processed until all materials have been submitted and are deemed sufficient in form and content such that recommendations, as required, and a decision may be made on the application by the Zoning Administrator, or other decision-making body, as specified in this chapter. The Zoning Administrator shall determine application sufficiency.

- (2) If an application is deemed insufficient, the Zoning Administrator shall inform the applicant of the specific submittal requirements that have not been met. The Zoning Administrator may provide notice in writing, electronically, or in conversation with the applicant.
- (3) If an application is deemed insufficient, the applicant must resolve and resubmit the materials required to complete the application within 30 days of the date informed of the insufficiency of the application.
 - a. An insufficient application that has not been revised to meet the completeness requirements shall expire on the 30th day. An expired application shall be returned to the applicant along with any original documents submitted in support of the application.
 - b. The City, at its discretion, may retain the application fee paid. Once an application has expired, the application must be resubmitted in full, including application fee.

(c) REVIEW, REFERRAL, AND RECOMMENDATION

- (1) Upon submission of an application, the Zoning Administrator shall review the application and accompanying documentation to determine whether the information included in the application is sufficient to evaluate the application against the approval criteria of the procedure or permit requested.
- (2) The Zoning Administrator may refer any application to the Zoning Review Committee (ZRC) or Technical Review Committee (TRC) for review and recommendation.

(d) REVIEW AND DECISION-MAKING

- (1) The Zoning Administrator shall review the application for conformance with all applicable provisions of this chapter.
- (2) To be approved, an application shall be fully consistent with the standards of this chapter unless a minor adjustment is concurrently approved to allow specified deviation from applicable standards. An administrative approval may include instructions and clarifications regarding compliance with this Code, but shall not be approved with conditions that require action beyond the specific requirements of the City Code of Ordinances.
- (3) The Zoning Administrator shall approve or deny the application and provide written notification of the decision to the applicant. If an application is denied, the written notification shall include the reasons for denial.

(e) APPEAL

Administrative determinations are appealable pursuant to Section 26-62.

Sec. 26-37. Site Plan

(a) APPLICABILITY

The purpose of this section is to set forth the procedures and criteria for review and approval of site plans. Site plans are technical documents that illustrate how the structure(s), layout of an area, and proposed uses meet the requirements of this chapter and any other applicable ordinances, standards, regulations, and with all previously approved plans applicable to the property.

(b) AUTHORITY

A site plan is required for:

(1) Character Districts

- a. Any application for development in a character district.
- b. All requests for structures, architectural elements or accessory structures (front porch, front yard fence) at or forward of the required building line, and accessory or temporary uses; however, for minor accessory structures not located forward of

the required building line, such as sheds, fences, or decks, the site plan shall only be required to show the location of the proposed structure or addition in relation to property boundaries, required setbacks, easements, and terrain changes as more fully detailed in this Code;

(2) Traditional Zone Districts

- a. Any application for a commercial, industrial, institutional, or multi-unit dwelling project;
- b. Any application for development requiring site plan review as set forth elsewhere in this chapter.

(c) APPLICATION PROCEDURES

- (1) A pre-application meeting with the Zoning Review Committee (ZRC) is required prior to the submission of a site plan application for development in a character district. Pre-application meetings are optional and encouraged for all other applications.
- (2) The applicant shall submit the site plan application to the Planning and Community Services Division. Application submittal deadlines and requirements shall be established on submittal forms available from the Planning and Community Services Division and on the City's website.

(d) DECISION CRITERIA

The site plan shall be reviewed against the following criteria:

- (1) The site plan is consistent with all applicable adopted plans and policies;
- (2) The site plan is consistent with any prior approvals, including any conditions that may have been placed on such approvals; and
- (3) The site plan conforms with all applicable requirements of the Code of Ordinances, or with all applicable requirements as modified by a request for a minor adjustment.

(e) LIMITATION OF APPROVAL

Zoning Administrator approval of a site plan does not in any way imply approval by any other City department.

(f) EFFECT

- (1) Approved site plans shall be binding upon the property owner(s) and their successors and assigns.
- (2) No permit shall be issued for any building, structure, or use that does not conform to an approved site plan.
- (3) No building, structure, use or other element of the approved site plan shall be modified without amending the site plan, unless it is determined by the City that such modification will not require an amended site plan.
- (4) All buildings, structures and uses shall remain in conformance with the approved site plan or be subject to enforcement action.

(g) POST-APPROVAL ACTIONS

(1) Expiration

- a. Approved site plans shall expire one year after approval if a building permit has not been issued, or the approved use established. In the event that the documents expire due to the passage of this time period, new site plan review documents must be submitted for approval in the same manner as an original application for development review.
- b. An extension not to exceed one year may be granted by the Zoning Administrator.

(2) Modifications to Site plans

The holder of an approved site plan may request an adjustment to the document, or the conditions of approval, by submitting either an application for minor adjustment or an amended site plan, whichever is appropriate, to the Zoning Administrator. An amended site plan shall be filed and processed in accordance with the procedures for an initial site plan submittal.

Sec. 26-38. Proportionate Compliance in Character Districts**(a) APPLICABILITY****(1) Purpose**

To encourage redevelopment, continuing property investment, and infill development, it may be necessary to determine site appropriate adjustments to applicable development standards that will allow the development to take place while applying proportional development standards. This section identifies the process for determining specific site compliance with a proportionate standard.

(2) No New or Increased Noncompliance

Any redevelopment of a structure or site shall be designed to either increase conformance with this Code or, at a minimum, not increase an existing nonconformity. Redevelopment shall not establish new nonconformity(ies) with this Code, regardless of the applicability of this section.

(3) Development Standards in Character Districts

A request for proportionate compliance is limited to Character District development standards listed in Table 26-38.1.

(4) Required Parking

The standards of Sec. 26-196, Character District Parking and Loading, shall apply for any new use, change of use, or expansion of a current use within a Character District, and are not subject to adjustment through proportionate compliance.

(b) CALCULATING PROPORTIONATE COMPLIANCE

- (1) Requests for proportionate compliance shall be made through Section 26-37, Site Plan.
- (2) Proportionate compliance for standards applicable to a specific development or structure type may be requested for development changes listed in Table 26-38.1 according to Section 26-38(E), below.
 - a. Standards that must be fully complied with are marked with an /X/.
 - b. Standards that will be applied to the maximum extent practicable based on a site-specific determination are marked with an /S/.
- (3) Applicants shall clearly label all requested adjustments and identify the applicable standard in this section that allows the proposed adjustment.

Table 26-38.1: Proportionate Compliance

ALL FRONTAGE TYPES	BUILDING FORM STANDARDS									ARCHITECTURAL STANDARDS			PUBLIC REALM STANDARDS	
	Placement: Required Building Line	Placement: Buildable Area	Placement: Parking Setback Line	Height: Minimum/Maximum	Elements: Fenestration	Elements: Façade Projections	Uses	Neighborhood Manners	Materials	Configurations	Signs	ROW Frontage Area	Dooryard	
Key: X = compliance with standard is required S = site-specific determination														
Full Compliance: Entire Structure Must Comply with Standards														
New Construction	X	X	X	Both	X	X	X	X	X	X	X	X	X	
Expansion of Building Area														
For buildings < 2000 sf GFA, an expansion > 75%	X	X	X	Both	X	X	X	X	X	X	X	X	X	
For buildings ≥2000 sf GFA, an expansion > 66%	X	X	X	Both	X	X	X	X	X	X	X	X	X	
New, Expanded, or Relocated Parking Area			X											
Changes with No Building Expansion														
Change of use							X				X [3]			
Façade changes [1]					X	X			X	X	X [3]			
Expansion of Building Area (GFA) for Buildings < 2000 sf														
Minimal Change: 0 to 40%		X	X	Max			X	X	X			X	S	
Proportionate Change: 41% to 75% [2]		X	X	Max	X		X	X	X			X	X	
Façade Changes [1]					X	X			X	X	X [3]			
Expansion of Building Area (GFA) for Building 2000 sf or more														
Minimal Change: 0 to 20%		X	X	Max			X	X	X			X	S	
Proportionate Change: 21 to 66% [2]		X	X	Max	X		X	X	X			X	X	
Façade Changes [1]					X	X			X	X	X [3]			
Expansion of Parking Area			X					X						

[1] Major façade changes (as defined in Section 26-62(E)(3)) will trigger compliance with the standards marked in this row.

[2] Expansion area shall comply with identified development standards.

Table 26-38.1: Proportionate Compliance

ALL FRONTAGE TYPES	BUILDING FORM STANDARDS										ARCHITECTURAL STANDARDS			PUBLIC REALM STANDARDS	
	Placement: Required Building Line	Placement: Buildable Area	Placement: Parking Setback Line	Height: Minimum/Maximum	Elements: Fenestration	Elements: Façade Projections	Uses	Neighborhood Manners	Materials	Configurations	Signs	ROW Frontage Area	Dooryard		
	Key: X = compliance with standard is required S = site-specific determination														
[3] Where a use or façade change results in new signage, changes to a sign structure, relocation of an existing sign, or changes to the sign area of an existing sign.															

(c) MEASURING REQUIRED COMPLIANCE**(1) New Development**

New development shall comply fully with the applicable development standards.

(2) Façade Changes:

Where development changes are limited to the façade of a structure, the following standards shall apply:

- a. Maintenance or Minimal Change: Normal maintenance and façade changes that do not qualify as major changes shall not be required to comply with the qualified development standards. Individual façade element changes shall be made in compliance with applicable Elements and Architectural development standards applicable to that individual element to the maximum extent possible.
- b. Major Façade Changes: Façade changes that include any of the following are considered major changes and the façade shall be brought into full compliance with the Elements and Architectural development standards:
 1. Removing or changing architectural detailing that is consistent with and integral to the style and period of the building;
 2. Changing or adding architectural detailing that is inconsistent with the standards of this Code;
 3. Change to more than 50% of the surface area of the façade, measured by including all openings such as doors and windows;
 4. Altering, closing, or covering windows, doors, or transoms; or
 5. Any roof or wall structure reframing, including adding fenestration.

(3) Redevelopment:

- a. Minimal Change. Redevelopment that changes or increases the total gross floor area of a structure within the range identified in Table 26-38.1, as determined by the building permit application, shall comply with the standards identified in Row A as applicable to development with minimal change.
- b. Proportionate Change. Redevelopment that changes or increases the total gross floor area of a structure within the range identified in Table 26-38.1, as determined by the building permit application, shall comply with the standards identified in Row B as applicable to development with proportionate change.
- c. Full Compliance. Redevelopment that changes or increases the total gross floor area of a structure within the range identified in Table 26-38.1, as determined by the building permit application, shall be required to fully comply with these standards.
- d. Measurement is based on changes to an individual structure that is subject to improvements, regardless of the total number of structures on the site.

(4) Expansion of Parking Area

Expansion of a parking area is defined as the addition of any parking spaces or the restriping or reconfiguration of more than 50% of the surface area of an existing parking area.

(d) TEN-YEAR TIMEFRAME

Any application by property owners to expand or replace part of an existing structure shall remain on record for 10 years from the date of work completion. Any subsequent application to expand or replace part of an existing structure shall be cumulative to any requests made within the previous 10 years. The total shall be used by the City to determine the property owner's necessary level of compliance.

Sec. 26-39. Minor Adjustments for Development in Character Districts

(a) APPLICABILITY

- (1) A minor adjustment allows the modification of an existing numeric dimensional standard in a character district to accommodate:
 - a. Anticipatory site-specific issues, or
 - b. Minor construction issues.
- (2) Minor adjustments are applicable to new development, redevelopment, and major façade changes.
- (3) A minor adjustment may be requested either as part of an original application or as a modification to an existing approval.

(b) PROCEDURES

(1) Application

Applications for minor adjustments shall be submitted on forms required by the City. Supporting materials must be submitted as specified on the application form.

(2) Specific Procedures

All applications for minor adjustment shall identify the specific issue that the minor adjustment is intended to address and how the minor adjustment will resolve that issue:

- a. A request for minor adjustment prior to issuance of a building permit shall be submitted with the project site plan application.
- b. A request for minor adjustment to address a minor construction issue shall be submitted with the approved project site plan, a written description of the minor construction issue, and an amended drawing of that part of the site for which the minor adjustment is requested.

(c) PERMITTED TYPE AND SCOPE OF MINOR ADJUSTMENTS

(1) Specific Building Form Standards

The Zoning Administrator, after consulting with the ZRC, may grant minor adjustments as necessary up to the following maximum adjustments:

- a. Height
 1. Minimum and maximum height - up to 5% for any cumulative increase or decrease in building height.
 2. Street wall/fence requirements – up to 10%.
 3. Finished ground floor elevation – up to 5%; upper floor elevation(s) shall be adjusted accordingly.
 4. Finished ground floor elevation, flood hazard area – minor adjustments to finished ground floor elevation requirements necessary to meet lowest floor elevation requirements according to the applicable floodplain regulations. Upper floor elevation(s) shall be adjusted accordingly. The Zoning Administrator does not have the authority to issue permits for special exceptions or variances to flood hazard regulations.
 5. When the finished ground floor elevation is not subject to adjustment, upper floor finished elevation(s) may be adjusted up to one foot.
- b. Placement
 1. Required building line (RBL) – adjust forward up to 6 inches; may not encroach into the public right-of-way.
 2. Required building line minimum percentage built-to – reduction of up to 5% of required length.

3. Parking setback line – move forward up to 6 feet; provided, the parking setback line remains separated at least 20 feet from the RBL.
 4. Mezzanine floor area – up to 10% additional area.
 5. Street wall requirements – up to 10% of the height/fenestration/access gate requirements.
 6. Entrances (maximum average spacing) – up to 10% increase in spacing.
- c. Elements
1. Fenestration (minimum and maximum percent) – up to 5%.
 2. Other elements (minimum and maximum projections) – up to 5%.

(2) Approval of Equivalent or Better Synthetic Materials

- a. Reflecting that the technology and production of building materials is constantly changing, an applicant may request that a material be added to the applicable approved materials list, provided:
 1. The material is not included in the applicable prohibited materials list; and
 2. The proposed material is similar to a permitted material and is equal to or better than the permitted material in terms of quality, maintenance, and durability as shown by the manufacturer's specifications and industry studies. For example, a new generation of cementitious fiber siding may be substituted for wood clapboard siding.
- b. The Zoning Administrator shall maintain a list of approved materials. Materials included on the approved list may be used for later projects without further ZRC review.

(3) Non-Alley Curb Cut

If vehicular access to a rear alley or private rear drive is not available, an applicant may request a minor adjustment to permit driveway access directly from a public street. Shared access or cross access with abutting lots may be required and any driveway spacing requirements shall apply. The width and location of the driveway access point shall be determined by the Zoning Administrator, after consulting with the ZRC and the City Engineer. The pavement width forward of the Parking Setback Line shall be 18 feet or less.

(d) DECISION CRITERIA

The Zoning Administrator, in consultation with the ZRC, shall consider the following provisions in making a determination on a minor adjustment request. When the minor adjustment is sought prior to the issuance of a building permit, the application must meet all five criteria in Sections (E)(1) and (E)(2). When a minor adjustment is sought to address a minor construction issue, the application only needs to comply with the criteria in Section (E)(2).

(1) Anticipatory Site-Specific Issues Only

- a. The proposed structure or site feature is permitted in the character district.
- b. The minor adjustment allows development that is consistent or compatible with the intent and purpose of the Character District and the regulation modified.
- c. The impact of the minor adjustment is internal to the subject property and will not impede the normal and orderly development or improvement of adjacent properties.

(2) Anticipatory Site-Specific Issues and Minor Construction Issues

- a. There are special circumstances existing on the property for which the application is made related to size, shape, area, topography, surrounding conditions, and/or location that make it practically difficult to meet the standard or requirement.

- b. The minor adjustment is necessary to permit the applicant the same ability to use the property that is enjoyed under this Code by other properties in the vicinity and Character District, but which are limited or denied to the subject property based on the applicability of the regulation sought to be adjusted.

(e) REVIEW AND DECISION-MAKING

Minor adjustments are processed as an administrative review decided by the Zoning Administrator upon consultation with the ZRC.

Section 2. Section 26-117, Districts Established, of Division 1, Generally, of Article III, Districts and District Regulations, of Chapter 26, Zoning, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety and the following Sec. 26-117, is enacted in lieu thereof:

Sec. 26-117. Districts established.

In order to classify, regulate and restrict the location of trades and industries and the location of buildings designed for specified uses, to regulate and limit the height and bulk of buildings erected or altered, to regulate and limit the intensity of the use of lot areas and to regulate and determine the area of yards, courts and other open spaces within and surrounding such buildings, the city is hereby divided into districts. The districts shall be known as:

A-1	Agricultural District
R-1SU	Single-Unit Residence District
R-1	Residence District
R-2	Residence District
R-3	Multiple Residence District
R-4	Multiple Residence District
R-5	Residence District
S-1	Shopping Center District
C-1	Commercial District
C-2	Commercial District
C-3	Commercial District
M-1	Light Industrial District
M-2	Heavy Industrial District
M-P	Planned Industrial District
F-W	Floodway Overlay District
F-F	Floodway Fringe Overlay District
F-P	General Floodplain Overlay District
R-P	Planned Residence District
HCG	Highway Corridor and Greenbelt Overlay Zoning District
CHN	College Hill Neighborhood Overlay Zoning District
MPC	Major Thoroughfare Planned Commercial District

PO-1	Professional Office District
BR	Business/Research Park District
MU	Mixed Use Residential District
HWY-1	Highway Commercial District
PC-2	Planned Commercial District
HWY-20	Highway 20 Commercial Corridor Overlay District
CD-DT	Downtown Character District
P	Public Zoning District

Section 3. Paragraph (a), Zoning Maps, of Section 26-118, District Boundaries, of Division 1, Generally, of Article III, Districts and District Regulations, of Chapter 26, Zoning, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby amended to add a subparagraph (4), as follows:

- (4). *Character District Regulating Plans.* The boundaries of each Character District shall be indicated on the zoning map of the City and shall be governed by the associated Regulating Plan, which shall be the zoning map for each said Character District and shall be made a part of this article by reference. Each regulating plan is on file in the office of the city planner in hard copy and as a digital file, at the city hall. It shall be the responsibility of the city planner to see that the regulating plan is kept current at all times. To the extent there is any inconsistency between the regulating plan held on file in the office of the city planner and the digital regulating plan, the digital regulating plan shall take precedence.

Section 4. Paragraph (b), Interpretation of boundaries, of Section 26-118, District Boundaries, of Division 1, Generally, of Article III, Districts and District Regulations, of Chapter 26, Zoning, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety and the following paragraph (b) is enacted in lieu thereof:

- (b) *Interpretation of boundaries.* Where uncertainty exists with respect to the boundaries of the various districts as shown on the map accompanying and made a part of this article, the following rules apply:
- (1) The district boundaries are either street lines or alley lines unless otherwise shown, and where the districts designated on the map accompanying and made a part of this article are bounded approximately by street lines or alley lines, the street lines or alley lines shall be construed to be the boundary of the district. Street and alley rights-of-way are not included in zoned areas, except within Character Districts, as shown on the subject Regulating Plan.
 - (2) In unsubdivided property, the district boundary lines on the map accompanying and made a part of this article shall be determined by use of the scale appearing on the map.
 - (3) Publication of the legal description of property zoned or rezoned shall constitute an official amendment to the official zoning map, and, as such, the map or portion of the map need not be published.

Section 5. Division 1, Generally, of Article III, Districts and District Regulations, of Chapter

26, Zoning, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby amended to add a new Section 26-141 (previously reserved), titled Use-Specific Standards, as follows:

Sec. 26-141. Use Specific Standards

When reference is made to a group of zone districts, the following individual districts shall be included:

District Groupings Used in this Section	
Residential	R-1SU, R-1, R-2, R-3, R-4, R-5, R-P
Mixed-Use	MU
Commercial	S-1, C-1, C-2, C3, MPC, BR, PO-1, HWY-1, PC-2
Character District Frontage Designations	Urban General, Urban General 2, Storefront, Neighborhood Medium, Neighborhood Small
Industrial	M-1, M-2, M-1-P, M-2-P
Overlay	HCG, CHN, HWY-20
Public	P
Agricultural	A1

(a) USE CLASSIFICATION, ORGANIZATION, AND INTERPRETATION

(1) Organization

- a. Land uses are assigned to the use category that most closely describes the nature of the principal use. Some categories are further divided into subcategories.
- b. A number of the most common uses are listed under the "Examples" subsection for each use category. The examples are generic and may be used in the process of interpreting new uses. Example lists are not exhaustive.
- c. In some cases, developments may have more than one principal use.
 - 1. When all of the principal uses of a development fall within one use category, then the entire development is assigned to that use category. All uses are subject to any applicable use-specific standards.
 - 2. When the principal uses of a development fall within different use categories, each principal use is classified into the applicable use category and each use is subject to all applicable regulations for the use category.
 - 3. A use that is otherwise not permitted in a district may not be included as one of multiple principal uses through interpretation. For example, if colleges and universities are not permitted in a residential district, that district may not be interpreted to allow both residences and colleges as multiple principal uses.
- d. Developments may have one or more accessory uses or structures.
 - 1. A list of accessory uses commonly associated with a particular use category is included under a paragraph entitled, "Accessory Uses and Structures." The examples are generic and may be used in the process of interpreting new uses. Accessory uses are subject to all applicable regulations. Example lists are not exhaustive.
 - 2. Uses are categorized as accessory or principal as determined by the circumstances of the use on the site. A cafeteria may be an accessory use to a principal industrial use, while a restaurant may be a principal use.
- e. Prohibited uses: Some uses are prohibited in individual zone districts, as noted in that district.

- f. Excluded uses: Some of the use categories may contain excluded uses. These are uses that may seem to be part of a particular category, but which are explicitly classified into a different use category.

(2) Use-Specific Standards

- a. All uses shall comply with any applicable use-specific standards.
- b. Uses located in character districts shall comply with the applicable site and structure standards of that district.
- c. When a use is changed on a property, the new use shall comply with all applicable use-specific and site-specific standards. Changing from one use category or use subcategory to another is considered a change of use.

(3) Classification

- a. For uses not listed as examples, the Zoning Administrator shall consider the following list of factors when classifying a use into a particular category, and/or to determine whether the activities constitute principal uses or accessory uses:
 1. How closely the use matches the description of the use category, as stated in Section 26-132(b);
 2. The intensity of the activity or use in comparison to the stated characteristics of a use category and list of examples;
 3. Conformance with the currently adopted comprehensive plan and purpose of the zoning district in which the use is proposed;
 4. Types of vehicles, equipment and/or processes to be used;
 5. The amount of site or floor area and equipment devoted to the use or activity;
 6. The hours of operation;
 7. How the use advertises itself;
 8. Number of employees, visitors, or customers generated;
 9. Parking demands associated with the use; and
 10. Special public utility requirements for serving the proposed use type, including, but not limited to, electricity, water supply, wastewater output, pre-treatment of wastes and emissions required or recommended, and any significant power structures or infrastructure and communications towers or facilities;
 11. Whether the use or activity would be likely to be found independent of the other activities on the site;
 12. Whether a use is subordinate in area, extent, or purpose to the principal building or use served;
 13. Whether the use contributes to the comfort, convenience, or necessity of occupants, customers, or employees of a principal use;
 14. Any other relevant evidence regarding use or activity that would help to classify a particular land use.
- b. If, based on the criteria identified above, the Zoning Administrator determines that a use can reasonably be determined to be similar to more than one use or category of uses, the Zoning Administrator in consultation with the Zoning Review Committee or other appropriate city staff shall select the use category that provides the most exact, narrowest, and appropriate fit.
- c. The following categories of uses typically impose substantial impacts on a site, adjacent sites and structures, pedestrians or cyclists, the road network, or public infrastructure. Where a new use, not listed as an example, is proposed that might be categorized into one of these categories, the applicant shall file an application for text amendment to determine if the use will be permitted. Through this process, the City will have the opportunity to review and determine the impacts of the

proposed use and establish any prescribed conditions that may be appropriate to allowing the use.

1. Agricultural Uses
 2. Industrial Services
 3. Manufacturing, Processing, and Assembly
 4. Waste and Salvage
- d. Determination of Non-Similarity
1. The Zoning Administrator may determine that a proposed use is not substantially similar to any use identified in Section 26-197 or Table 26-231.1 because either:
 - (i) The potential impacts of the use are significantly more impactful on the site, street, or neighborhood, than other permitted uses in the same use category and that the use would not otherwise be permitted without prescribed conditions or through a public review process, or
 - (ii) There are no similar uses permitted on the site or in the applicable zone district.
 2. When this is the case, the Zoning Administrator shall provide the applicant with a written determination of non-similarity within 15 business days of the request for interpretation.
- e. In cases of dispute, the Zoning Administrator shall issue a zoning determination letter and the proposed use shall comply with any conditions and review procedures that may apply to that use. Such determinations may be appealed to the Board of Adjustment. If an appeal is made, the Board of Adjustment shall determine whether the City has made an error in classifying the subject use based on the facts in evidence and the factors listed in paragraph a. above.
- f. Post-Decision Actions
1. A Zoning Administrator's written determination regarding classification may be appealed to the Board of Adjustment, or
 2. An applicant may apply for a zoning code text amendment.
 - 3.

(b) USE CLASSIFICATION CATEGORY DESCRIPTIONS

(1) Residential Uses

- a. General Description: Residential uses offering habitation of a dwelling on a continuous basis. The continuous basis is established by tenancy with a minimum term of one month or habitation by the property owner.

b. Use Categories

1. **Household Living:** This use category is characterized by residential occupancy of a dwelling unit by one or more persons living together as a single housekeeping unit. A household typically includes four or fewer adults. Each dwelling unit contains its own facilities for living, sleeping, cooking and eating meals. Uses where tenancy may be arranged for a period of less than one month are not considered residential, they are considered to be a form of transient lodging. Household living also include group homes, which is a category of household living that receives equal treatment with single-household residential living pursuant to Iowa and federal law.

(i) Sub-categories

- (a) Group Homes, as defined by Iowa law: elder family homes, elder group homes, and family care homes. Large group care facilities that

provide housing for nine or more individuals are considered Group Living Uses.

- (b) Single-unit dwellings, detached: A residential building containing one principal dwelling unit. Each unit is located on a separate, legal lot, except for cottages within a cottage court, as defined and regulated within a character district. Examples include detached houses, zero lot line dwellings, cottages, and manufactured homes,¹ provided the manufactured home complies with the district standards and has been converted to real property and taxed as a site-built dwelling.
 - (c) Single-unit dwellings, attached: A residential building containing more than one principal dwelling unit, with each dwelling unit sharing one or more common walls with at least one other dwelling unit, no unit is located above another unit, and each unit is located on a separate, legal lot. Examples include townhome/rowhouse, and bi-attached dwellings.
 - (d) Two-unit dwellings (also called duplexes): A residential building containing two principal dwelling units located on one lot.
 - (e) Multi-unit dwellings: A residential building containing three or more principal dwelling units located on one lot. Examples include apartment buildings, condominium buildings, rowhouse/townhome configurations with multiple side-by-side dwelling units on one lot.
 - (f) Dwelling(s) in Mixed-Use Structure: A building, or portion of a building, which contains one or more dwelling units in addition to commercial or other non-household living uses. Examples include apartments and condominiums.
- (ii) Accessory Uses and Structures: bed and breakfast establishments, storage buildings, accessory dwelling units, residential vehicle parking, home occupations, child care home.
2. **Group Living:** This use type is characterized by residential occupancy of a dwelling or associated group of dwellings by a group of people who do not meet the definition of "Household Living". The size of the group residing in the structure is typically larger in size than a single household. Group Living Uses contain individual rooming units with private or shared bathroom facilities and may also contain shared kitchen facilities and/or common dining and meeting areas for residents. The residents may or may not receive any combination of care, training, or treatment, but those receiving such services must reside at the site. Alternatives to incarceration, such as halfway houses, where residents are placed in the facility by court order and are under supervision of the Department of Corrections, are excluded from this category and classified as Detention Facilities.
- (i) Sub-categories
 - (a) Assisted group living: nursing and convalescent homes, assisted living communities; group care facility.
 - (b) Hospice home.
 - (c) Independent group living: rooming or boarding houses.
 - (d) Fraternal group living: fraternities, sororities, monasteries, convents.
-

- (ii) Accessory Uses and Structures: Recreational facilities, meeting rooms, offices, storage facilities, food preparation and dining facilities.

(2) Civic and Institutional Uses

- a. General Description: Civic and Institutional Uses are public, quasi-public, and private non-profit uses that provide unique services that are of benefit to the public at-large.
- b. Use Categories
 - 1. **Civic and Cultural Assembly and Service:** Civic and cultural assembly and service uses are permanent places where persons regularly assemble for religious worship or secular activities, and which are maintained and controlled by a body organized to sustain the religious or public assembly.
 - (i) Sub-categories:
 - (a) Community Assembly: Places of community assembly, such as libraries, museums, community centers, senior centers, and recreation centers that are open and available to the general public.
 - (b) Human or neighborhood services: Uses that provide non-commercial activities or support services to individuals or groups that are not otherwise defined by this code. Examples include food pantries, literacy and language instruction, counseling and therapy, and other human service agencies. Social service agencies that consist primarily of office and counseling functions and operate in a similar fashion to other office uses are classified as Office.
 - (c) Emergency Shelter: facilities providing emergency temporary shelter operated by a public or nonprofit agency, such as homeless shelters.
 - (d) Religious/Private Group Assembly: Private, non-profit membership organizations that provide meeting space and facilities for their members. Examples include religious institutions and civic and social organizations such as private lodges, clubs, fraternal organizations, and similar private, non-commercial membership organizations.
 - (ii) Accessory uses and structures: Non-commercial recreation, food preparation and dining facilities; maintenance/storage buildings; living quarters for clergy; columbarium; accessory daycare facilities; offices; parking
 - 2. **College and University:** Public or private colleges, universities, business, or technical colleges that offer courses of general or specialized study leading to a formal degree and requiring at least a high school diploma or equivalent general academic training for admission. These uses tend to be in campus-like settings or on multiple blocks. Non-degree granting business, technical, trade, martial arts, music, dance, and drama schools/studios are excluded from this category and classified as Specialized Educational Facilities.
 - (i) Subcategories:
 - (a) Private: Private colleges, universities, professional, and technical schools.
 - (b) Public: Colleges, universities, and professional schools that are under state jurisdiction.

- (ii) Accessory Uses and Structures: offices; housing for students; food service; laboratories; health and sports facilities; theaters; meeting areas; parking; maintenance facilities.
3. **Day Care:** A non-residential facility that provides less than 24-hour-per-day care or supervision for children and adults according to Iowa statutory requirements. Examples: childcare center, adult daycare center; preschools and latch key programs not accessory to an Educational Facility Use or other principal use. In-home daycare services, which are determined to be accessory to a principal Household Living Use, are not included in this principal use category.
 4. **Educational Facilities:** An educational institution that satisfies the compulsory education laws of the State of Iowa for students in the elementary grades, middle school grades, or high school grades, respectively; and schools for specialized activities, such as dance, music, martial arts, business, and technical skills. Business and technical colleges that offer degree programs in campus-like settings are excluded from this category and classified as College and University, Private.
 - (i) Subcategories:
 - (a) General Educational Facilities: This definition includes both public schools and private, non-boarding schools that have a curriculum similar to that in the permitted public schools.
 - (b) Specialized Educational Facilities: Schools primarily engaged in offering specialized trade, business, or commercial courses, but not academic training. Also specialized nondegree-granting schools, such as music schools, dramatic schools, dance studios, martial arts studios, language schools and civil service and other short-term examination preparatory schools.
 - (ii) Accessory Uses and Structures: Play areas, cafeterias, recreational and sport facilities, auditoriums, preschools, and before- or after-school day care.
 5. **Detention Facilities and Community Service:** Facilities for the judicially required detention or incarceration of people. Inmates and detainees are under 24-hour supervision by the Department of Corrections, except when on an approved leave. This category also includes alternatives to incarceration, such as halfway houses, where residents or inmates are placed by and remain under the supervision of the courts.
 - (i) Examples:
 - (a) Prison, jail, probation center, juvenile detention home, halfway house for current offenders.
 - (b) Work release: Facilities participating in a work release, or similar programs from a state institution, and under the supervision of a court, state or local agency.
 - (ii) Accessory uses: Offices, recreational and health facilities, therapy facilities, maintenance facilities, hobby and manufacturing activities.
 6. **Government and Public Safety Services:** This is a use type for locations and structures that provide a place for the regular transaction of governmental business. This category does not include utilities or industrial-scale public facilities. Examples: Public safety facilities, governmental offices, storage areas and yards, fleet storage, and service areas.
 7. **Health Care Facilities:** Larger health care facilities, particularly licensed public or private institutions that provide principal health services, medical

care, emergency care, and surgical care to persons suffering from illness, disease, injury, or other physical or mental conditions. Smaller standalone medical and dental clinics and mental health counseling offices are classified as Office uses.

- (i) Examples:
 - (a) Hospital, hospice center, surgicenter.
 - (b) Treatment facility: A health care facility providing either or both inpatient or outpatient therapy for substance abuse, mental illness, or other behavioral problems.
- (ii) Accessory uses: laboratories, outpatient, or training facilities, and parking, other amenities primarily for the use of facility employees.

8. **Non-Commercial Recreation and Open Space:** This use type includes uses that focus on natural areas, large areas consisting mostly of vegetative landscaping or outdoor recreation, community gardens, or public squares. These lands tend to have few structures.

- (i) Examples: Passive and active recreation, parks, playgrounds, community gardens, public squares, cemeteries, conservation lands.
- (ii) Accessory uses and structures: Clubhouses, playgrounds, maintenance facilities, concessions, caretaker's quarters, and parking for cars and RVs as permitted by the City.

(3) **Commercial Uses**

a. General Description: Commercial uses include any retail, consumer service, or office use.

b. Use Categories

1. **Amusement and Recreation:** This use type includes a broad array of commercial establishments, divided into indoor and outdoor categories, which operate or provide services to meet varied artistic, cultural, entertainment, and recreational interests of their patrons and the community. Restaurants and bars that provide live entertainment in addition to the sale of food and beverages, are excluded from this classification and categorized as Eating and Drinking Establishments.

(i) Sub-categories:

- (a) Adult Business: Any amusement or entertainment establishment, bookstore, massage establishment, motion picture theater, video rental or sales establishment, or other similar use, in which 25% of more of its floor area is customarily not open to the public generally but only to one or more classes of the public excluding any minor by reason of age under Chapter 728, obscenity, Code of Iowa, as amended.
- (b) Indoor: movie theaters and live theaters; video arcades; pool halls.
- (c) Outdoor: drive-in movie theater; amusement park or theme park; fairgrounds; miniature golf establishments; golf driving ranges; water slides; and batting cages.

2. **Animal Sales and Services:** This use category groups uses related to animal care, sales, and provision of supplies. Some uses, such as kennels, runs, and outdoor play spaces may not be permitted as principal or accessory outdoor facilities where they are incompatible with adjacent uses.

(i) Subcategories

- (a) Indoor: Pet stores, dog bathing and clipping salons, pet grooming shops, pet clinics, animal hospitals
 - (b) Outdoor: Boarding (kennels and stables), any animal sales and service use that includes outdoor runs and/or play areas.
 - (ii) Accessory Uses and Structures: Indoor and outdoor kennels and runs.
3. **Commercial Assembly:** Commercial assembly is that category of uses that are designed or used primarily for small or large group assembly or meeting. As a principal use, commercial assembly is located in a permanent structure. Temporary commercial assembly, such as a theater in the park event, is regulated separately. Restaurants and bars that provide live entertainment in addition to the sale of food and beverages, are excluded from this classification and categorized as Eating and Drinking Establishments.
- (i) Examples: convention centers, concert halls, banquet facilities, stadiums, arenas, skating rinks (ice or roller), wedding venues.
 - (ii) Commercial assembly uses are categorized as large or small based on the criteria in Section 26-141(a)(3), Classification.
4. **Eating and Drinking Establishment:** This is a use category for businesses that prepare or serve food or beverages intended for immediate consumption on or off the premises.
- (i) Examples: Restaurants and bars.
 - (ii) Accessory uses and structures: Production of specialty foods or beverages primarily for on-site consumption, such as baking, coffee roasting, and craft brewing; food preparation areas, outdoor seating, offices, and parking.
5. **Financial Services:** Facilities that have as their principal purpose the custody, loan, exchange or issue of money, the extension of credit and the transmission of funds.
- (i) Sub-categories:
 - (a) Financial institution: Establishments engaged in deposit banking. Banks and financial institutions may include, but are not limited to, commercial banks, loan or mortgage companies, stockbrokers, savings institutions, credit unions, and other similar uses.
 - (b) Alternative financial services: The use of a site for the provision of alternative financial services such as vehicle title loans, check cashing, payday advance/payday loan, or money transfer, including: check cashing business, payday advance/loan business, money transfer business, vehicle title loan business.
 - (ii) Accessory uses and structures: drive-in/drive-through facilities, automatic teller machines, parking.
6. **Heavy Commercial:** This use category includes businesses that have a size, functional use, or site difference from other types of commercial that makes the use generally incompatible with residential uses, such as uses that have large outdoor storage and display areas, such as lumber yards and landscape nurseries; or uses that involve frequent interaction with freight trucking or activities that produce excessive noise, dust, or odor. Commercial uses that involve both manufacturing or production and retail

sales belong in this category where the work activities or storage take place outside or in large indoor facilities. .

(i) Subcategories:

- (a) **Heavy Retail and Commercial Services:** Uses that typically include large areas of outdoor storage, work areas, or display, such as lumber yards, garden and landscaping centers, farm supply and implement sales, RV and camper sales. Trailers and commercial containers mounted on wheels are not accepted structures for outdoor storage unless such trailers and commercial containers remain movable and are regularly moved to and from work sites as part of the principal use of the property. Storage of wrecked or inoperable vehicle(s) is excluded from this category and classified as Waste and Salvage.
- (b) **Self-Service Storage:** Real property designed and used for the purpose of renting or leasing individual storage space to tenants with access to such spaces for the purpose of storing and removing personal property. All storage of goods and materials under this definition shall occur within a completely enclosed structure. The leasing of space outdoors for storage shall be defined as outdoor storage.

(ii) **Accessory Uses:** office, outdoor storage, retail and wholesale sales, parking.

7. **Lodging:** Uses in this use type provide customers with temporary housing for an agreed upon term of less than 30 consecutive days; any use where temporary housing is offered to the public for compensation and is open to transient guests.

- (i) **Examples:** Hotels, motels, bed and breakfast inns, short-term rentals, and RV parks.
- (ii) **Accessory uses and structures:** food preparation and service, offices, meeting space.

8. **Office:** This type includes uses where people are engaged primarily in on-site administrative, business, or professional activities. These uses are characterized by activities in an office setting that focus on the provision of off-site sale of goods or on-site information-based services, usually by professionals.

- (i) **Examples:** Real estate, insurance, medical offices and clinics, urgent care facilities, property management, investment, employment, travel, advertising, law, architecture, design, engineering, accounting, call centers, and similar offices. This category may also include laboratory services that are conducted entirely within an office-type setting.
- (ii) **Accessory uses and structures** may include cafeterias, health facilities, parking, or other amenities primarily for the use of employees in the firm or building.

9. **Parking, Commercial:** A use type that distinguishes principal commercial parking facilities from accessory parking.

10. **Retail Sales and Services:** This is a use type for businesses involved in the sale, lease, or rental of new or used products to the general public at retail, along with the provision of commercial and personal services. Also includes cottage industries, as defined below.

- (i) Subcategories:
 - (a) Commercial Services: uses that provide services for consumers or businesses, such as copy services, catering, laundromats, dry cleaners, tailors, photographic studios; and uses that provide repair and maintenance of consumer goods, such as office equipment, appliances, bicycles, shoes, and similar.
 - (b) Retail sales: Stores selling or leasing a wide variety of consumer, home, and business goods, including convenience food store, drug store, grocery store, clothing store, hardware store, general merchandise store, furniture store, and stores that sell gifts and specialty goods.
 - (c) Personal services: Establishments engaged in providing services related to personal care and grooming, such as hair salon, exercise facilities, spa, tanning salon, tattooing, piercing, and body art. Also includes mortuaries and funeral homes.
 - (d) Cottage Industry: A firm that manufactures, fabricates, creates, or assembles goods for on-site sales to the general public for personal or household consumption. The goods may also be sold at wholesale to other outlets or firms, but on-site, retail sales is a significant component of the operation. Such uses operate on a small scale, in keeping with the surrounding neighborhood, with little impact in terms of noise, and no discernible impact in terms of vibration, dust, or odor. Examples: artisanal fabrication of craft or custom home goods, furniture, or other products; artist studios; small-scale food or beverage production (such as a microbrewery, bakery, or confectionery).
- (ii) Accessory uses and structures: offices; parking; indoor or outdoor storage and display of goods.

11. **Consumer Vehicle and Equipment Sales and Services:** This use type includes a broad range of uses for the maintenance, sale, or rental of motor vehicles and related consumer equipment. This use category is intended for the regulation of personal vehicles; Large vehicles and heavy equipment are regulated in the Industrial and Construction Services use category.

- (i) Subcategories
 - (a) Vehicle Sales: Sales, lease, or rental of personal vehicles, including automobiles, motorcycles, pick-up trucks, and incidental maintenance services and auto parts sales associated with such uses.
 - (b) Quick Vehicle Servicing: Direct services for motor vehicles where the driver generally waits in the car or on-site before and while the service is performed. The facility may include a drive-through area where the service is performed. Examples include gas stations and car washes.
 - (c) Vehicle Repair: Establishments providing repair and servicing of passenger vehicles, light and medium trucks and other consumer motor vehicles such as motorcycles, boats and recreational vehicles. Generally, the customer does not wait at the site while the service or repair is being performed. Examples include: vehicle repair shops; auto body shops; transmission and muffler shops; alignment shops; auto upholstery shops; auto detailing services; tire sales and mounting.
- (ii) Accessory uses and structures: Storage, offices, parking.

(4) **Industrial Uses**

- a. **General Description:** This is a use category including uses that produce goods from extracted and raw materials or from recyclable or previously prepared materials, and also including the design, storage, packaging, shipping and distribution, and handling of these products and the materials from which they are produced.
- b. **Use Categories**
1. **Industrial and Construction Services:** This use type is characterized by companies that are engaged in the repair or servicing of heavy machinery, equipment, products, or by-products, or the provision of heavy services including construction or contracting. Examples include contractor facilities, yards, and pre-assembly yards; welding shops; machine shops; towing and vehicle storage; service and repair of medium and heavy trucks; exterminators; janitorial and building maintenance services; fuel oil distributors; solid fuel yards; laundry, dry-cleaning, and carpet cleaning plants; may include schools for the industrial trades if activities and facilities are similar to other uses in this category. Junkyards and auto salvage are not included in this category but are categorized as Waste or Salvage. Accessory uses and structures: Sales, offices, parking, and storage yards.
 2. **Industrial Manufacturing, Assembly, or Processing:** Establishments involved in the manufacturing, processing, fabrication, packaging, or assembly of goods. This category is divided into light and heavy manufacturing based on the potential external impacts (noise, smell, heat, vibration) of the use and the extent to which outdoor production or storage is required. Natural, constructed, raw, secondary, or partially completed materials may be used. Products may be finished or semi-finished, and are generally made for the wholesale market, for transfer to other plants, or to order for firms or consumers. Goods are generally not displayed or sold on site, but if so, such activity is a subordinate part of sales. Relatively few customers come to the manufacturing site. Accessory use and structures include offices, cafeterias, parking, employee recreational facilities, warehouses, storage yards, repair facilities, truck fleets, and caretaker's quarters.
 3. **Natural Resource Extraction:** This use type includes removal of resources from the ground. Example: mining, oil and gas extraction.
 4. **Wholesale Sales:** This use type includes facilities used for the sale, lease, or rent of products primarily intended for industrial, institutional, or commercial businesses. These uses often include on-site sales staff for order taking, and may include display areas. Businesses may or may not be open to the general public, but sales to the general public are limited as a result of the way in which the firm operates. Products may be picked up on site or delivered to the customer.
 5. **Warehousing and Distribution:** Firms involved in the storage or movement of goods for themselves or other firms. Goods are generally delivered to other firms or the final consumer, except for some will-call pickups. There is little on-site sales activity with the customer present. Typical uses include

storage warehouses, distribution centers, moving and storage firms, trucking or cartage operations, truck staging or storage areas. Human occupancy is limited to that required to transport, arrange, and maintain stored materials.

(i) Examples: Warehouses for furniture and appliance stores; household moving and general freight storage; cold storage plants; major wholesale distribution centers; truck and air freight terminals; railroad switching yards; bus and railcar storage lots; taxi fleet parking and dispatch; fleet parking parcel services; major postal sorting and distribution facilities; grain terminals; and the stockpiling of sand, gravel, and other aggregate materials. This use does not include the storage of goods incidental to a different principal use on the same lot, which is considered an accessory use.

(ii) Accessory uses and structures: offices, parking, outdoor storage.

6. **Waste and Salvage:** This is a use category for uses that collect, store, process, or sell waste or salvage materials, or collect and process recyclable material, for the purpose of marketing or reusing the material in the manufacturing of new, reused, or reconstituted products.

(i) Examples: refuse hauling facility, salvage yard, recycling collection and processing facility; sanitary landfills; waste composting facilities; waste transfer stations; portable sanitary collection equipment storage and pumping; and hazardous waste collection sites.

(5) **Transportation, Utilities, and Communication**

a. General Description: This use group includes providers and uses that provide public and quasi-public services to individuals and the community in the following categories.

b. Use Categories

1. **Alternative Energy Production:** This is a use category that includes energy produced from resources that are regenerative, such as wind and solar energy.

2. **Transportation:** This is a use category that includes uses involving public and private modes of transportation.

(i) Examples: bus terminal (but not individual bus stops), train terminal, airport, heliport, park and ride lot.

3. **Utilities and Public Facilities:** This use type includes structures and locations for public or private lines and facilities related to the provision, distribution, collection, transmission, or disposal of water, storm and sanitary sewage, oil, gas, power, information, telecommunication and telephone cable, and facilities for the generation of electricity. Utility uses may or may not have regular employees at the site and the services may be public or privately provided.

(i) Subcategories

(a) Utilities, major: Infrastructure services that have substantial land use impacts on surrounding areas. Typical uses include, but are not limited to, water and wastewater treatment facilities, major water storage facilities, railroad infrastructure, and electric generation plants.

(b) Utilities, minor: Infrastructure services that do not have substantial impacts on surrounding areas or are otherwise necessarily distributed throughout the community to aid in the operation, distribution, collection, conveyance, transmission, storage or other necessary aspect of a public or private utility service. Typical uses include electric substations, pump or lift stations, water towers,

electric or control vaults or cabinets, and other similar equipment or structures necessary for the operation of any public or franchised private utility or service.

4. **Wireless Communication Facilities:** This use type includes structures, locations, and equipment for the transmission of voice, data, image, video, or other electronic programming.

(6) Agricultural Uses

- a. General Description: This is a category of uses characterized by active and on-going agricultural uses, activities, and related uses. An agricultural use, in general, means the use of land for the growing and production of field crops, livestock, aquatic, and animal products for the production of income. Other agricultural uses might include fruit and vegetable stands, livestock sales, wholesale nurseries, and stables. Lands in agricultural uses and districts may also be held for preservation and conservation purposes. The sale or service of agricultural products and equipment included in similar commercial use categories.
- b. Use Categories
 1. **Agricultural Cultivation:** Uses in this category are characterized by the cultivation of plants for consumption or commercial sale. Products may include, but are not limited to, vegetables, grains, fruits, plants, sod, trees, and other similar products.
 - (i) Sub-categories
 - (a) General Crop Farms: examples include truck farming; grain farming; tree farms; fruit, nut, and berry farms; and wineries.
 - (b) Community gardens: A parcel of land where members of the community have access to individual garden plots for the cultivation of fruits, flowers, vegetables, or ornamental plants.
 - (c) Plant Nursery: A parcel of land used to raise plants, shrubs, trees, and other horticultural and floricultural products, conducted within or without an enclosed building.
 - (ii) Accessory Uses and Structures: farm dwelling; greenhouse, retail sales, office, parking; indoor and outdoor storage, machine shed and other farm outbuildings
 2. **Animal Agriculture:** Uses in this category are characterized by the commercial breeding, raising, and/or keeping of fish, livestock, and/or any type of fowl for sale or use of the animal, their products, or byproducts. Accessory uses and structures: Farm dwelling, offices, indoor and outdoor storage, machine sheds and other farm outbuildings; feedlots; pasture.
 3. **Agricultural Infrastructure Facilities:** Uses in this category support agricultural production, including: including grain elevators, commercial feed outlets, farm supply stores, truck and animal weigh stations, and agricultural chemical or fuel bulk and storage facilities.

Section 6. The introductory paragraph for Section 26-126, Detached Accessory Structures, of Division 1, Generally, of Article III, Districts and District Regulations, of Chapter 26, Zoning, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby repealed in its entirety and the following introductory paragraph, is enacted in lieu thereof:

Accessory structures shall be permitted in all zoning districts, subject to the floodplain regulations contained in this article, where applicable, in accordance with the following provisions. If any of said provisions conflict with a provision or provisions in a Character

District, as determined by the Zoning Administrator, the Character District provision(s) shall apply.

Section 7. Section 26-127, Setbacks for corner lots, of Division 1, Generally, of Article III, Districts and District Regulations, of Chapter 26, Zoning, of the Code of Ordinances of the City of Cedar Falls, Iowa, shall include an introductory statement, as follows:

This section does not apply in Character Districts.

Section 8. Sec. 26-189, Central Business District Overlay Zoning District, within Division 2, Specific Districts, of Article III, Districts and District Regulations, of Chapter 26, Zoning, of the Code of Ordinance of the City of Cedar Falls, Iowa is hereby repealed in its entirety.

Section 9. Division 2, Specific Districts, of Article III, Districts and District Regulations, of Chapter 26, Zoning, of the Code of Ordinances of the City of Cedar Falls, Iowa, is hereby amended to add new Sections 26-191 to 26-197 (previously reserved), to establish Character District regulations and standards, as set forth in the attached Exhibit A, incorporated herein by reference.

Section 10. Paragraph (c)(1) of Section 5-5, Conditions for issuance of license or permit, within Article I, In General, of Chapter 5, Alcoholic and Malt Beverages, is hereby repealed in its entirety and the following paragraph (c)(1) is enacted in lieu thereof:

- (1) The place of business for which such liquor control license or wine or beer permit is sought must be located within a commercial district (C-1, C-2, C-3, S-1, HWY-1, PC-2, PO-1, MPC, BR), industrial district (M-1, M-2, M-P), MU Mixed Use Residential District, or CD-DT Downtown Character District.

Section 11. Paragraph (b) of Section 13-38, Location restrictions, of Division 1, Mobile Merchants, of Article II, Specific businesses and occupations, of Chapter 13, Licenses and Business Regulations, is hereby repealed in its entirety and the following paragraph (b) is enacted in lieu thereof:

- (b) Mobile merchants who are engaged in business on private property may only do so if said property is located within a commercial district (C-1, C-2, C-3, S-1, HWY-1, PC-2, PO-1, MPC, BR), industrial district (M-1, M-2, M-P), MU Mixed Use Residential District, or within the Urban General, Urban General 2, or Storefront Frontage Designations of the CD-DT Downtown Character District.

Section 12. Paragraph (d) of Section 19-74, Certain commercial use of public sidewalks, of Division 1, Generally, of Article III, Obstructions, of Chapter 19, Streets and Sidewalks, is hereby repealed in its entirety and the following paragraph (d) is enacted in lieu thereof:

- (d) Tables, chairs and/or benches. Any proprietor of an establishment in those areas of the city that are zoned C-3 Commercial District or within the Urban General, Urban General 2, or Storefront Frontage Designations of the CD-DT Downtown Character District under the zoning chapter, who sells food for consumption on or off the premises of such establishment may use that portion of the public sidewalk that is immediately adjacent to and that lies in between the side property lines, as extended to the curb of the public sidewalk, for the purpose of providing tables, chairs, and /or benches for the convenience of and use by such proprietor's customers and others, with the following restrictions:

Section 13. Paragraph (e) of Section 19-74, Certain commercial use of public sidewalks, of Division 1, Generally, of Article III, Obstructions, of Chapter 19, Streets and Sidewalks, is hereby repealed in its entirety and the following paragraph (e) is enacted in lieu thereof:

- (e) Temporary movable signs on certain public sidewalks. Any proprietor of an establishment in those areas of the city that are zoned C-3 Commercial District or within the Urban General, Urban General 2, or Storefront Frontage Designations of the CD-DT Downtown Character District, under the zoning chapter, may use a portion of the public sidewalk that is immediately adjacent to and that lies in between the side property lines, as extended to the curb of the public sidewalk, for the purpose of displaying one temporary movable sign for such establishment, with the following restrictions:

Section 14. Paragraph (a)(2) of Section 19-94, Use of public sidewalks for sidewalk cafes, of Division 2, Sidewalk Cafes, of Article III, Obstructions, of Chapter 19, Streets and Sidewalks, is hereby repealed in its entirety and the following paragraph (a)(2) is enacted in lieu thereof:

- (2) Are within those areas of the city that are zoned C-3 Commercial District or within the Urban General, Urban General 2, or Storefront Frontage Designations of the CD-DT Downtown Character District, under the zoning chapter;

INTRODUCED: _____ September 7, 2021

PASSED 1ST CONSIDERATION: _____ September 7, 2021

PASSED 2ND CONSIDERATION: _____

PASSED 3RD CONSIDERATION: _____

ADOPTED: _____

Robert M. Green, Mayor

ATTEST:

Jacqueline Danielsen, MMC, City Clerk

26-191 Introduction to Character Districts & Definitions

How to Use the Character Districts

Look at the adopted ZONING MAP to determine if property is located within a Character District with an adopted REGULATING PLAN.

If no:

These standards are not applicable.

If yes:

I want to know what is allowed for my property:

1. Find the specific property in question on the adopted REGULATING PLAN. Identify the REQUIRED BUILDING LINE and the PARKING SETBACK LINE. The color of the fronting STREET-SPACE determines the applicable BUILDING FORM STANDARD (see the key located on the REGULATING PLAN).
2. Find the applicable BUILDING FORM STANDARD in Section 26-193. *Building Form Standards*. The standards in Section 26-193.1 *General Provisions* that apply to all properties in the Character Area Districts. The BUILDING FORM STANDARD describes the parameters for development on the site in terms of placement, height, elements, and use.
3. Additional regulations regarding architecture, streets and other public spaces, parking requirements, and permitted building functions are found in Sections 26-194 through 26-197.
4. See Sections 26-36 through 26-39 for information on the development review process.

I want to modify an existing building:

Determine whether your intended changes would trigger a level of code compliance by looking at Section 26-193 *Building Form Standards* and the Proportionate Compliance Table in Section 26-63.

If yes, follow the process delineated therein (and the indicated portions of steps 2-4, above).

I want to establish a new use in an existing building:

Find the property on the REGULATING PLAN and determine the applicable BUILDING FORM STANDARD. Determine whether the use is allowed by looking at the Permitted Use Table in Section 26-197. If the use is listed with a cross-reference in the right-hand column, refer to those specific performance standards.

I want to change the REGULATING PLAN regarding my property:

Minor adjustments to an adopted Character District REGULATING PLAN are permitted according to Section 26-192.H. A Character District REGULATING PLAN is amended through a Rezoning Process. See Section 26-4 *Amendments to Chapter*.

I want to subdivide my property:

Property may be subdivided in accordance with the procedures of Chapter 20 Subdivisions. Any subdivision of a property within a Character District shall also meet the applicable standards of Sections 26-192 to 197.

Character Districts: Sections 26-191 to 26-198

26-191. Introduction & Definitions

26-192. Regulating Plans

26-193. Building Form Standards

26-194. Architectural Standards

26-195. Public Realm Standards

26-196. Parking & Loading

26-197. Building Functions

26-198. Reserved

26-199. Reserved

A. Purpose & Intent

This section establishes the Character Districts. *Sections 26-192 through 26-198* provide the rules for development in these districts.

The Character Districts are established to implement adopted community vision plans. They focus on community character, through an emphasis on development character, intensity, and physical form and patterns, rather than solely on land uses. They emphasize the relationship between private development and the public realm to promote an overall sense of place within the designated areas of Cedar Falls, while allowing a wide variety of land uses.

A Character District is a defined geographic area in a specific location (rather than a land use designation on a single parcel) that accommodates a mix of uses—either within the same building, on the same parcel, or within close proximity—in a pedestrian-oriented, transit-supportive, compact, walkable form. Each Character District is developed around an existing or new interconnected street network. These Districts are intended to maintain or create traditional urban design and preserve and enhance community character. All Character Districts provide a range of housing options and include, and/or are within walking distance of, a mixed-use center.

New Character Districts may be designated or created. The City or the property owner shall plan, design, and construct any new Character Districts to be integrated with the larger community and accessible by all modes of transportation—private automobile, public transit, bicycle, and pedestrian.

The District regulations establish requirements related to form, character and design that will complement the established pattern, promote compatible infill and redevelopment, and create an environment where people can live, work, learn, worship, and relax within a compact urban setting. The standards foster a system in which buildings are oriented toward the street or public realm, and organized around perimeter blocks,¹ ideally with rear lot service access via alleys or shared drives.

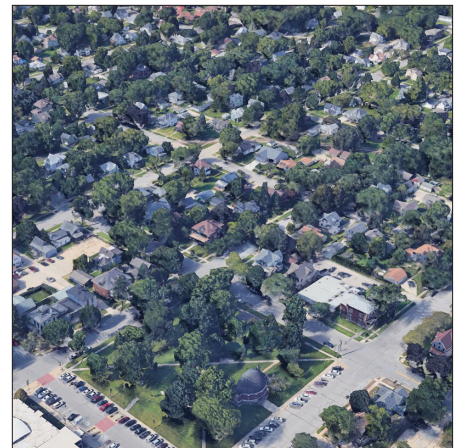
B. Organization

Each Character District is mapped by a REGULATING PLAN and divided into two or more building frontages. Each building frontage is defined primarily by a common scale, character, and intensity, rather than land use category (although uses are broadly regulated).

The Character District regulations include a set of BUILDING FORM STANDARDS that establish a hierarchy of development forms, within which the scale and intensity can be tailored for each designated Character District. The goal of the BUILDING FORM STANDARDS is to create a vital and coherent public realm



Birds-Eye Downtown Cedar Falls

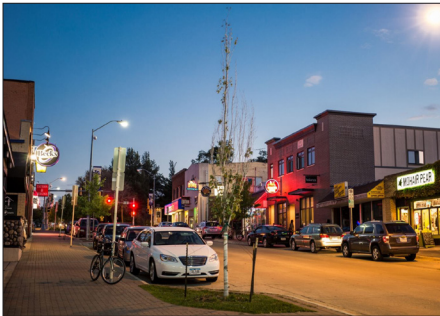


Aerial photo Cedar Falls Neighborhood

¹ Certain terms in the Character District Sections of this Code are used in specific ways, often excluding some of the meanings of common usage. Wherever a word is in SMALL CAPITALS format, consult Section G. Key Character District Concepts (below) or this Section G and H for its specific and limited meaning within the Character Districts.

through the definition and shape of the STREET-SPACE—the specific physical and functional character—of the Character Districts.

1. The regulations on building forms are applied at the parcel level and put primary emphasis on the building frontage—the relationship between the building and the STREET-SPACE. The regulations work together to frame the PUBLIC REALM throughout each Character District.
2. The BUILDING FORM STANDARDS are tailored to the existing or desired physical context of each Character District, using a range of scales and intensities, as identified by the adopted plan.



College Hill, mixed-use core area.

C. Applicability

1. Where an adopted REGULATING PLAN is shown on the zoning map, these Character District standards immediately apply at the parcel level.
2. The process for developing or redeveloping within a Character District is delineated in *Section 26-36 through Section 26-39. Site Plan.*

D. Other Applicable Regulations

Where apparent conflicts exist between the provisions of the Character Districts and other existing ordinances or approvals, these Character District standards shall govern within a Character District.

E. Minimum Requirements

In interpreting and applying the provisions of the Character Districts, they are the minimum requirements for development under this Code.

F. Components

The Character District standards are included in the following sections:

1. *Section 26-191 Introduction & Definitions* instructs on the use and organization of the Character District Code. It's *Definitions* component includes those terms that are used in the Character District regulations in specific ways, often excluding some of the meanings of common usage. Wherever a word is in SMALL CAPITALS format, consult *G. Key Character District Concepts*, below, or *H. Definitions* for its specific and limited meaning. Where there is an apparent contradiction between the definitions in the Character Districts and those elsewhere in the Cedar Falls Zoning Ordinance, the definitions in this section shall prevail. Words used but not defined in the Character Districts, but that are defined elsewhere in the Cedar Falls Zoning Ordinance, shall have the meanings set forth therein.
2. *Section 26-192 Regulating Plans:* The REGULATING PLAN is the application map for each Character District. The REGULATING PLAN provides specific information on the rules for development within the parcel. The REGULATING PLAN makes the development standards place-specific, by designating the BUILDING FORM STANDARD frontages and delineating the public spaces.

The REGULATING PLAN identifies: the boundaries for the Character District; existing and new streets; the REQUIRED BUILDING LINE; and the PARKING SETBACK LINE throughout the Character District; and may identify additional regulations and/or special circumstances for specific locations.



Downtown, Parkade area.

3. *Section 26-193 Building Form Standards* sets out the rules for building siting, scale, and massing that control how buildings frame and relate to the STREET-SPACE or public realm. The BUILDING FORM STANDARDS establish the parameters for development on each site in terms of building placement, height, elements, and uses.
4. *Section 26-194 Architectural Standards* provide parameters for a building's exterior elements, with an emphasis on FACADES. These standards govern materials, configurations, and techniques for development under all BUILDING FORM STANDARDS. They are established in order to ensure a coherent and high-quality building character that is complementary to the best traditions of Cedar Falls.
5. *Section 26-195 Public Realm Standards* include standards for the public realm: streets and sidewalks, and SQUARES, CIVIC GREENS, and other public open spaces. They are established in order to ensure a vital and complete public realm with a high level of walkability.
6. *Section 26-196 Parking and Loading Standards* provide goals and requirements to promote a "park once" environment through shared parking and encourage pedestrian-friendly, walkable Character Districts.
7. *Section 26-197 Building Function Standards* define the uses allowed and/or required on ground floors and in upper floors, correlated with each BUILDING FORM STANDARD. Because the Character Districts emphasize form more than use, these standards include fewer, broader categories than those provided elsewhere in the Cedar Falls Zoning Ordinance.

G. Key Character District Concepts

The following list of concepts are important components of the Character District regulations and are provided here for quick reference. These and other terms in the Character District sections are used in specific ways, often excluding some of the meanings of common usage. Wherever a word is in SMALL CAPITAL format, consult below or *H. Definitions* for its complete specific and limited meaning.

Attic Story:

Habitable space situated within the structure of a pitched roof and above the uppermost STORY that does not count against the ultimate building or STORY height if constructed within the prescribed standards.

Block:

An increment of land comprised of lots, ALLEYS, and parcels circumscribed and not traversed by streets (PEDESTRIAN PATHWAYS excepted). BLOCKS are measured at the REQUIRED BUILDING LINE (RBL).

Buildable Area:

The area of the lot that structure(s) may occupy, which generally includes the area of the lot behind the REQUIRED BUILDING LINE and excluding any required setbacks, as designated in the individual BUILDING FORM STANDARD. Any building additions shall be within the specified BUILDABLE AREA.

Clear Sidewalk:

The portion of a sidewalk that must remain clear of obstructions (furniture, signage, trees, lighting, etc.) to allow for unimpeded public passage.

Clearly Visible from the Street-Space:

Some requirements of the Character Districts apply only where the subject is "clearly visible from the STREET-SPACE." (Note the definition of STREET-SPACE below.) A building element more than 30 feet from a REQUIRED BUILDING LINE OR STREET-SPACE is by definition not CLEARLY VISIBLE FROM THE STREET-SPACE. Common or party walls are by definition not CLEARLY VISIBLE FROM THE STREET-SPACE.

Dooryard:

The area within the STREET-SPACE, extending across the entire frontage of the lot, between the building FAÇADE (the REQUIRED BUILDING LINE) and the CLEAR SIDEWALK. This area may be hard-surfaced or planted according to Section 195.2.A *Public Realm Standards, General, Dooryards*.

Façade (building face):

The building elevation facing the STREET-SPACE OR REQUIRED BUILDING LINE. Building walls facing private interior courts, COMMON LOT LINES, and ALLEYS are not FAÇADES (they are elevations).

Fenestration:

Openings in a wall, including windows and doors, allowing light and views between the building and/or lot interior (private realm) and exterior (PUBLIC REALM).

Parking Setback Line:

A line or plane, generally parallel to the REQUIRED BUILDING LINE, that extends vertically up from the ground STORY floor level (unless otherwise noted on the REGULATING PLAN), behind which parking may be located.

Private Open Area:

An occupiable area within the BUILDABLE AREA, generally only accessible to occupants of the particular building or site, and (primarily) open to the sky. The permitted location(s) for the PRIVATE OPEN AREA is designated in the individual BUILDING FORM STANDARD.

Public Realm:

See STREET-SPACE

Required Building Line (RBL):

A line or plane indicated on the REGULATING PLAN, defining the street frontage, that extends vertically and is generally parallel to the street, at which the building FAÇADE shall be placed. It is a requirement, not a permissive minimum, such as a setback. (The minimum length and height of FACADE that is required at the RBL is shown on the applicable BUILDING FORM STANDARD.)

Street-Space (Public Realm):

The space between fronting FAÇADES OR REQUIRED BUILDING LINES, including streets, SQUARES, GREENS, sidewalks, DOORYARDS, and parks—but not within ALLEYS.

Street Wall:

A primarily masonry wall which assists in defining the STREET-SPACE, filling in the gaps between adjacent building FAÇADES.

Tree Lawn (tree trench/planting strip):

A continuous strip of soil area—typically covered with bridging pavement, tree grates, porous pavers, or grass and other vegetation—located between the back of curb and the CLEAR SIDEWALK, and used for planting STREET TREES and configured to foster healthy STREET TREE root systems. TREE LAWN configurations are specified in the *Public Realm Standards, Section 195.5*.

H. Definitions

The following terms are defined for the purpose of the Character Districts. Terms not defined here may be defined elsewhere in the zoning ordinance. In such case, the definition contained in the zoning ordinance shall be used. Certain terms in these districts are used in very specific ways, often excluding some of the meanings of common usage. Where there is an apparent conflict or contradiction, the definition herein shall prevail.

ALLEY. The public right-of-way or public access easement for vehicles and pedestrians within a BLOCK that provides service access to the rear or side of properties, vehicle parking (e.g., garages), loading docks, utility meters, recycling containers, and garbage bins.

ATTIC STORY. See *G. Key Character District Concepts*.

AWNING. A solid or fabric-on-frame roof-like element attached to the FAÇADE OR REQUIRED BUILDING LINE side of a building to provide shelter or shade.

BALCONY. An exterior platform attached to the upper STORIES of the building FAÇADE (generally forward of the REQUIRED BUILDING LINE).

BAY WINDOW. Generally, a U-shaped enclosure extending the interior space of the building forward of the FACADE/ REQUIRED BUILDING LINE (along its STREET-SPACE side).

BLOCK. See *G. Key Character District Concepts*.

BLOCK CORNER. The outside corner of a BLOCK at the intersection of any two REQUIRED BUILDING LINES. Inside corners, where the resulting angle formed by the BLOCK FACE is less than 180 degrees (concave) are not considered BLOCK CORNERS for the purposes of the Character Districts.

BLOCK FACE. The REQUIRED BUILDING LINE frontage between BLOCK CORNERS.

BUILDING CORNER. The outside corner of a building where the primary building mass is within an angle less than 180 degrees. Inside corners, where the exterior space of the building mass forms an angle of more than 180 degrees are not considered BUILDING CORNERS for the purposes of the Character Districts.

BUILDABLE AREA. See *G. Key Character District Concepts*.

BUILDING FORM STANDARDS (BFS). The part of the Character District standards that establish basic parameters regulating building form, including: the envelope (in three dimensions); placement on the lot; and certain permitted and required building elements, such as SHOPFRONTS, BALCONIES, and FENESTRATION.

CANOPY. The solid or fabric-on-frame roof-like element, covering an entry door(s), attached to the FAÇADE OR REQUIRED BUILDING LINE side of the building to provide shade or shelter.

CIVIC BUILDINGS. Those buildings designated on the REGULATING PLAN that are or were designed to house strictly civic or cultural assembly uses or are historically and urbanistically significant structures. These may include meeting halls; libraries; schools; police and fire stations; post offices (retail operations only, no primary distribution facilities); places of worship; museums; cultural, visual and performing art centers; transit centers; courthouses; and other similar community uses. Public ownership alone does not constitute a CIVIC BUILDING. CIVIC BUILDINGS and publicly-owned public art are not subject to the BUILDING FORM STANDARD prescriptions of the Character Districts unless specifically noted otherwise.

CLEAR HEIGHT. Within a structure, the habitable distance between the floor and ceiling. For entrances and other external building features, the unobstructed distance from the ground/sidewalk to the lowest element above. CLEAR HEIGHT is not applicable to parking structures.

CLEAR SIDEWALK. See *G. Key Character District Concepts*.

CLEARLY VISIBLE FROM THE STREET-SPACE. See *G. Key Character District Concepts*.

COMMON LOT LINES. Lot lines shared by adjacent private lots.

COTTAGE. The building form used for a COTTAGE COURT.

COTTAGE COURT. The configuration of small single unit buildings/houses around a shared COURTYARD green space that is open to the STREET-SPACE.

CORNER LOT. A lot that has frontages on two intersecting STREET-SPACES. Special building placement, fencing and landscape requirements may apply.

COURTYARD. The shared central area, that is open to the STREET-SPACE in a COTTAGE COURT configuration.

DUPLEX A two-unit dwelling, built according to the Neighborhood Medium or Neighborhood Small frontage standards, with the two units arranged either side by side or one above the other in the same structure, each having substantially the same exposure to the street frontage.

DOORYARD. See *G. Key Character District Concepts*.

EQUIVALENT OR BETTER. A building material or construction technique that has been determined, by the Zoning Administrator in consultation with the Zoning Review Committee, to be at least equal to, in appearance, durability, etc., or surpassing those expressly permitted herein.

ENGLISH BASEMENT. A habitable floor level below the first floor that is partially above and below grade. The ceiling of an ENGLISH BASEMENT is at least 3 feet above sidewalk grade with windows and an entry with direct STREET-SPACE access. ENGLISH BASEMENT units do not count against the story height limit but do count against the maximum height measurement. An ENGLISH BASEMENT unit is considered an accessory dwelling unit.

FAÇADE COMPOSITION. The arrangement and proportion of materials and building elements (windows, doors, columns, pilasters, bays) on a given FAÇADE.

FENESTRATION. See *G. Key Character District Concepts*.

FORE COURT. A building FACADE configuration where a central portion of the FACADE is set back from the REQUIRED BUILDING LINES to form a space that is enclosed on 3 sides by building elevations, with the entry door on one of the three elevations. Forecourts are limited in size and must satisfy all their frontage standards.

FIRST FLOOR. See GROUND STORY.

FRONT PORCH. An entry platform attached to the GROUND STORY FAÇADE OF REQUIRED BUILDING LINE side of the building.

GREEN OR SQUARE. A public open space designated on the REGULATING PLAN. The term GREEN is used to describe a small public lawn, playground, or other public open area that is primarily unhard-surfaced. The term SQUARE is generally used to describe spaces that have more hard-surfaced area. See *Section 26-195 Public Realm Standards* for the specific controls on GREENS and SQUARES.

GROUND STORY. The first habitable level of a building at or above grade. The next STORY above the GROUND STORY is the second STORY or floor.

MEZZANINE. An intermediate level between the GROUND STORY and the second STORY that may be in the form of a platform, podium, or wide balcony.

MUNTIN. A strip of wood or metal separating and holding panes of glass in a window, less than 1" in thickness. Muntins divide a single window sash or casement into a smaller grid system of panes of glass.

PARKING SETBACK LINE. See *G. Key Character District Concepts*.

PEDESTRIAN PATHWAY. A publicly accessible interconnecting hard-surfaced way, open to the sky, providing pedestrian and bicycle passage through BLOCKS running from a STREET-SPACE to another STREET-SPACE, ALLEY, or an interior BLOCK parking area.

PRIVACY FENCE. An opaque fence generally along ALLEYS, PEDESTRIAN PATHWAYS, and COMMON LOT LINES. See the *Section 26-193 Building Form Standards* for height and placement specifications and *Section 26-194 Architecture* for material and configuration standards.

PRIVATE OPEN AREA. See *G. Key Character District Concepts*.

PUBLIC REALM. See *G. Key Character District Concepts*.

REGULATING PLAN. The implementing plan for development within the Character Districts. REGULATING PLANS designate the BUILDING FORM STANDARDS for private development and may provide specific information for the disposition of each building site. The REGULATING PLAN also shows how each site relates to adjacent STREET-SPACES, the overall district, and the surrounding neighborhoods.

REQUIRED BUILDING LINE (RBL). See *G. Key Character District Concepts*.

ROWHOUSE. A single-unit multi-story attached building, sharing one or more common walls with at least one other unit, and with a direct STREET-SPACE FACADE entry and no principal dwelling unit above another principal dwelling unit.

SHARED PARKING. Automobile parking that is visible and accessible to the public for a minimum portion of each day.

SHOPFRONT. The area of the frontage running, vertically from the sidewalk up to the bottom of the second STORY floor structure and horizontally, the full width of the interior shop or store space. This is comprised of the various architectural elements including kneewalls, transoms, window panes, mullions, muntins, posts, pilasters, columns, and any roofs, cornices or eaves—all of which shall comply with the standards of *Section 26-193.3 Building Form Standards, Storefront Frontages*, and *Section 26-194.4.F Architectural Standards, Shopfronts*.

SIDEWING. The portion of a building attached to and behind the primary structure extending along a COMMON LOT LINE toward the ALLEY or rear of the lot.

SMALL APARTMENT. A multi-unit dwelling built according to the Neighborhood Medium or Neighborhood Small frontage standards.

SQUARE. See GREEN.

STOOP. An entry platform on the FAÇADE of a building. (See the individual BUILDING FORM STANDARDS for specifications.)

STORY. That space within a building and above grade that is situated between one floor level and the floor level next above, or if there is no floor above, the ceiling or roof above.

STREET-SPACE. See *G. Key Character District Concepts*.

STREET-SPACE FRONTAGE. That portion of the lot or building that is coincident with the REQUIRED BUILDING LINE as required by the Character Districts.

STREET TREE. A tree required in the Character Districts that is used to define the STREET-SPACE or pedestrian realm and listed in the Street Tree List in *Section 26-195 Public Realm Standards*. STREET TREES are large enough to form a shade canopy with sufficient clear trunk to allow traffic to pass under unimpeded.

STREET WALL. See *G. Key Character District Concepts*.

TREE LAWN. See *G. Key Character District Concepts*.

USES. See *Sections 26-132 and 26-133* for categories and definitions.

ZONING REVIEW COMMITTEE (ZRC). An internal staff committee established to review development proposals for compliance with applicable Character District regulations and to interpret the ordinance in such a way as to carry out its purpose and intent. The committee shall consist of the Zoning Administrator, the Building Official, and a Planner designated by the Zoning Administrator.

Section 26-192 Regulating Plan

A. Purpose and Intent

The REGULATING PLAN is the controlling document and principal tool for identifying the applicable regulations in each Character District. Each Character District will have its own REGULATING PLAN.

1. The REGULATING PLAN is the mandatory base zoning for the Character District.
2. The REGULATING PLAN makes the Character District development standards place-specific by:
 - a. Identifying the boundaries of the district;
 - b. Laying out a specific street and BLOCK configuration, including any new streets;
 - c. Designating the building frontage for each STREET-SPACE (regulated in *Section 26-193, Building Form Standards*);
 - d. Identifying any CIVIC BUILDINGS; and
 - e. Delineating any new or existing GREENS OR SQUARES.
3. The REGULATING PLAN also specifies the REQUIRED BUILDING LINE and PARKING SETBACK LINE. *See also the Placement page in the individual building frontage in Section 26-193 Building Form Standards.*
4. The REGULATING PLAN may identify:
 - a. Specific characteristics assigned to a lot or a section of street frontage;
 - b. Additional regulations for lots in specific locations;
 - c. Exceptions to the BUILDING FORM STANDARDS or other Character District standards related to unique context or urban design.
5. Changes to an adopted REGULATING PLAN beyond those specifically allowed in this section will require a rezoning process. *(See H Amending Regulating Plans below.)*

B. REGULATING PLAN Configuration Standards

1. Building form frontages on the REGULATING PLAN
 - a. The applicable building form frontages for private parcels are designated on the REGULATING PLAN by their street frontage.
 - b. The BUILDING FORM STANDARDS—which define the form and character of the district—are allocated based on the adopted Vision Plan.
2. Streets
 - a. Generally, connectivity of the street grid throughout the Character Districts, specifically intersection alignments, is regulated by these standards. An interconnected street grid is fundamental to creating a compact, walkable, and bikeable environment that is transit-supportive. These standards are intended to preserve and establish that connectivity, whether it is constructed immediately or in a phased manner. The REGULATING PLAN delineates the street network that creates a pattern for growth while providing flexible opportunities for infill.
 - b. Streets on an adopted REGULATING PLAN shall be considered mandatory when developing under this district: if proposed they shall be included, if existing they shall not be removed.

Character District Sections: 26-191 to 26-198

- 191. Introduction & Definitions
- 192. Regulating Plans**
- 193. Building Form Standards
- 194. Architectural Standards
- 195. Public Realm Standards
- 196. Parking & Loading
- 197. Building Functions
- 198. Reserved
- 199. Reserved

- c. No STREET-SPACE may be gated.
 - d. All lots shall share a frontage line with, and all principal buildings shall directly front, a STREET-SPACE and/or a REQUIRED BUILDING LINE - as designated on the approved REGULATING PLAN. Phased projects may meet this requirement for each phase of development, satisfying it in increments.
 - e. Where a new street or a street stub-out is shown on the REGULATING PLAN, no other curb cut and/or intersecting street is permitted within 100 feet.
3. New Streets designated on the REGULATING PLAN
 - a. Any new streets will require subdivision and a new plat. Consult the Zoning Administrator.
 - b. In addition to the street connectivity requirements in 2. *Streets* above, the following standards apply to those streets constructed after the adoption of the Character District REGULATING PLAN.
 - (i) New streets designated on the REGULATING PLAN may or may not be immediately constructed.
 - (ii) Any new streets that create frontage on a parcel being developed shall be constructed at the time of development.
 - (iii) New streets shall be public.
 - c. If constructed within 50 feet of the center line location in an adopted REGULATING PLAN, the street repositioning will not require a rezoning, provided the resulting configuration meets these street configuration standards and that any other properties with frontage are not adversely affected. All regulatory elements of the street, such as the REQUIRED BUILDING LINE, PARKING SETBACK LINE, and the building form frontage designation, shall move with any street repositioning.
 - d. Additional new streets or ALLEYS may be added to an adopted REGULATING PLAN by an applicant to create a smaller BLOCK pattern; however, no streets or ALLEYS may be deleted without being replaced and the result shall meet all the prescriptions of the Character District standards.

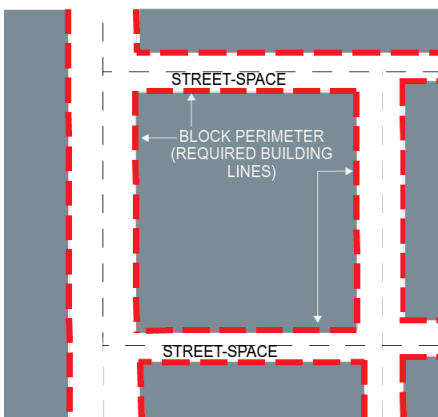


Diagram A.

C. Blocks

1. BLOCKS are measured at the REQUIRED BUILDING LINES or, where a REQUIRED BUILDING LINE is not present, along public rights-of-way, or other public, conservation, and/or property outside of the Character District. All lots and/or contiguous lots shall be considered to be part of a BLOCK for this purpose. (see Diagram A)
2. Within an approved REGULATING PLAN: no BLOCK FACE shall have a length greater than 360 feet without an ALLEY, public access easement or PEDESTRIAN PATHWAY of not less than 24 feet in width, providing through-access to another STREET-SPACE, or ALLEY. If a BLOCK does not meet this standard, then at the time of development, the following standards apply:
 - a. Individual lots with less than 100 feet of STREET-SPACE frontage are exempt from this requirement.

- b. Lots from 100 through 200 feet in frontage shall, in coordination with the Zoning Review Committee, reserve a public access easement at least 12 feet wide, unless already satisfied within that BLOCK face.
- c. Lots with over 200 feet of street frontage shall meet the through-access requirement within their lot, unless already satisfied within that BLOCK face.
- d. New lots shall not be platted in order to avoid/circumvent the through-access requirement

The Zoning Administrator in consultation with the ZRC shall determine which type of through-access must be implemented.

- 3. Where a new REGULATING PLAN is being created, or an approved REGULATING PLAN is being amended that involves a change to the number of streets or BLOCKS, the following standards apply:
 - a. No BLOCK FACE shall have a length greater than 360 feet.
 - b. The average perimeter of the BLOCKS within the developed area shall not exceed 1100 feet.
- 4. Curb Cuts: No new curb cuts are permitted unless otherwise specified below. The creation and retention of curb cuts in the CHARACTER DISTRICT shall be dependent on their providing access to, and circulation for, ALLEYS as per the following:
 - a. For lots with ALLEY access, existing or in a redevelopment plan, existing curb cuts other than those necessary for ALLEY circulation, shall be eliminated or vacated at the time of redevelopment.
 - b. For lots without ALLEY access, existing curb cuts may be maintained or required to be relocated, subject to the standards of this section.
 - c. For lots without a curb cut or ALLEY access, new curb cuts for shared driveways have priority over those for single access. No new curb cut may be within 100 feet of another curb cut except where the new curb cut provides needed access for existing or planned ALLEY circulation.
 - d. All curb cuts are subject to Zoning Review Committee approval. (See Section 26-196.C.5)
- 5. Where a parking structure or surface lot with more than 20 spaces, existing or planned, is being provided with at least 40% of its spaces available to the general public, existing curb cuts that provide access to the public parking may be retained or relocated even if the lot has ALLEY access. Such parking must meet the requirements of Section 26-196.C.5 for shared parking.

D. Alleys

ALLEYS provide internal BLOCK circulation and shared access to rear parking and service areas. They may also serve as fire lanes.

- 1. Existing ALLEYS shall be maintained.
- 2. Access to parking and service areas shall be from ALLEYS or public access easements as set forth in this section. ALLEYS or public access easements shall, at the time of redevelopment, provide access to the rear of all lots. The Zoning Administrator may waive or approve alternative access to parking and service areas where the absence of the ALLEY would not deprive an adjacent lot/neighbor of rear lot access, and:
 - a. The lots are on a perimeter common to non-developable or conservation lands, or
 - b. A lot has streets on three sides.
- 3. ALLEYS may be incorporated into parking lots as standard drive aisles. Access from ALLEYS to all adjacent properties shall be maintained.
- 4. In Storefront, Urban General, and Urban General 2 frontages, vehicular access between adjacent parking lots and across property lines is encouraged.
- 5. In Storefront, Urban General, and Urban General 2 frontages, where an ALLEY does not exist and is not feasible to construct at the time of development of any property, the applicant is required to preserve rear service access and maintain the area within the rear setback by, at a minimum:
 - a. Providing routine landscape maintenance to the area.
 - b. Keeping the area clear of debris, stored materials, and stored or parked vehicles.

E. Public Open Space

Standards for structures and plantings in public open spaces are provided in *Section 26-195 Public Realm Standards*.

F. Sample Regulating Plan Key

Each REGULATING PLAN contains a key explaining the plan designations. The key below, *Illustration B*, is provided as an example.

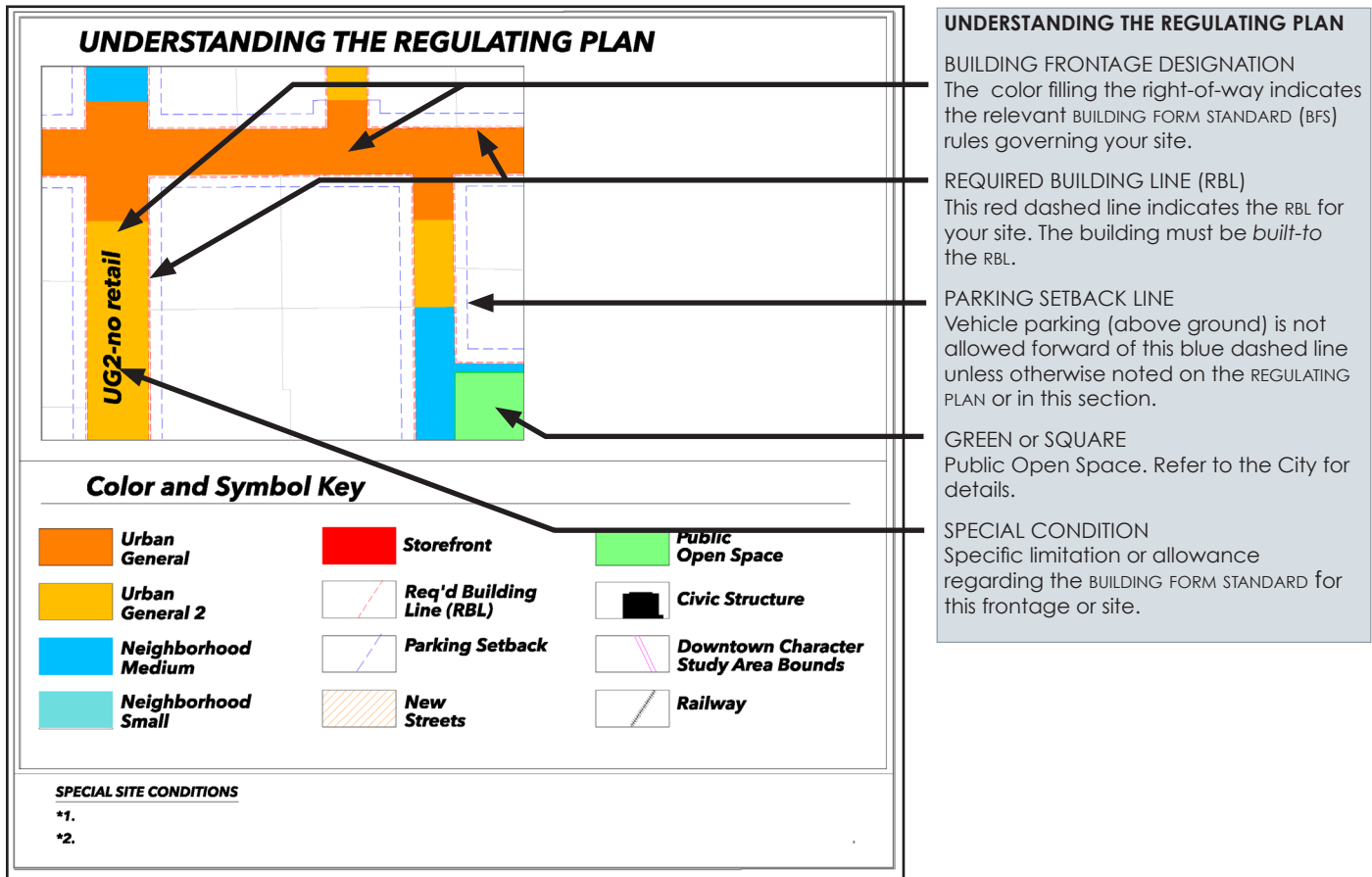
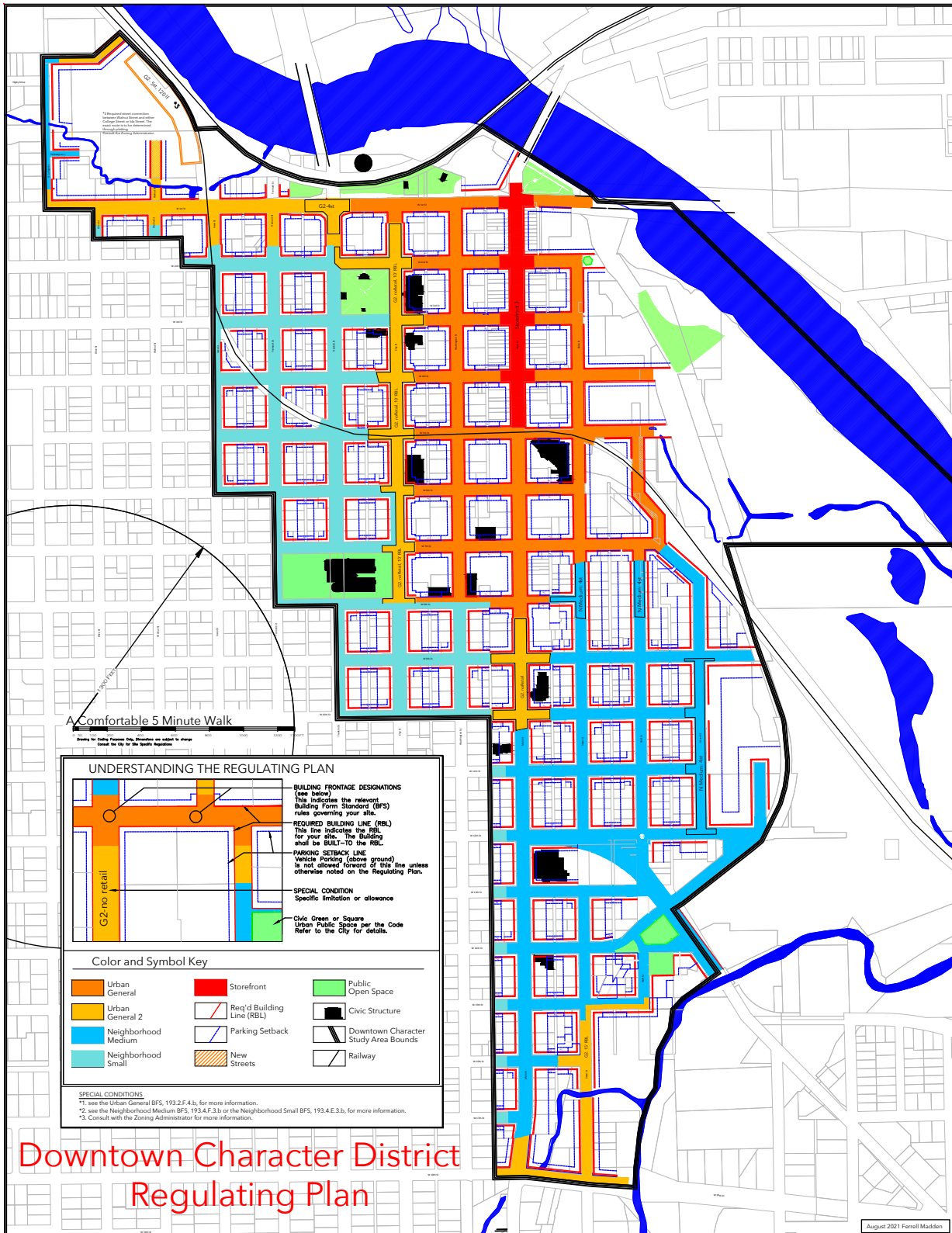


Illustration B.

G. Example Regulating Plan

Each Character District has its own REGULATING PLAN. The REGULATING PLAN below is provided as an example. See the City for the REGULATING PLAN for a specific Character District.



Downtown Character District Regulating Plan

Illustration C. This image of the REGULATING PLAN for the Downtown Character District is shown for illustrative purposes only; refer to the City for the REGULATING PLAN specific to your Character District.

H. Amending Regulating Plans

1. Certain minor reconfigurations to the street alignments shown on an adopted REGULATING PLAN may be allowed, subject to re-platting and the design standards in *Sections B.3.c and d above*, without triggering a rezoning. Any other changes to an adopted REGULATING PLAN shall meet all the criteria of this chapter and will require a rezoning.
2. Certain minor adjustments to the frontage designation shown on the REGULATING PLAN are permitted within the parameters of *Section 26-193. Building Form Standards D.5 Frontage Designation Flexibility*.
3. REQUIRED BUILDING LINE location or new street alignments may be reconfigured by the Zoning Review Committee, without triggering a rezoning, if the presence of a flood plain or wetland on the parcel prohibits development envisioned by the code.

4. Street Connectivity

- a. Any proposals to reconfigure the street network in the adopted REGULATING PLAN shall be configured such that:
 - (i) Street connectivity is maintained; cul-de-sacs and other dead-end streets are not permitted except as specified here; and
 - (ii) No street intersection occurs within 100 feet of another street intersection; and
 - (iii) The BLOCK configuration meets the standards defined in *Section B, Blocks above*; and
 - (iv) The average perimeter of the resulting BLOCKS within the area of change does not exceed 1,100'.
- b. Streets that do not connect to other streets, as part of an interconnected network, are not permitted except:
 - (i) Where configured with a one-way loop around the perimeter of an open area, having a maximum depth (perpendicular to the primary street centerline) of 100 feet and a minimum width (dimension parallel to the primary street) of 75 feet (see Diagram E);
 - (ii) Where less than 130 feet long and configured as a stub-out designed for connection to future streets/development (see Diagram F);
 - (iii) Where less than 130 feet long and connected to an ALLEY, providing rear lot access, and ending at designated conservation lands. (see Diagram G).

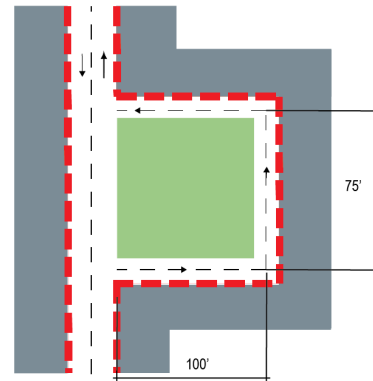


Diagram E.

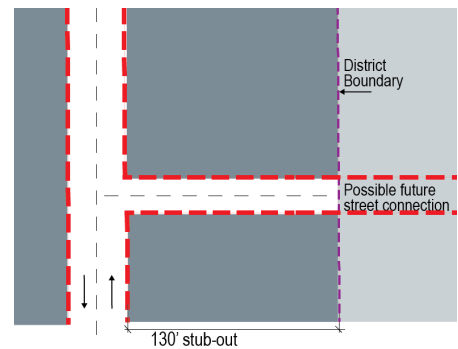


Diagram F.

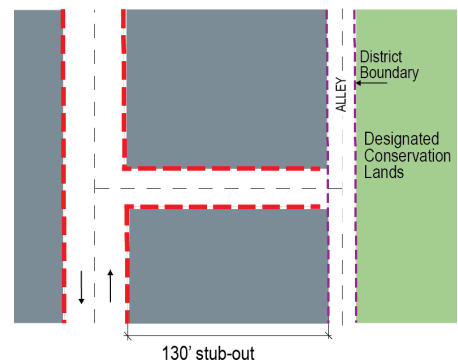


Diagram G.

Section 26-193. Building Form Standards

The BUILDING FORM STANDARDS (BFS) establish the rules for development and redevelopment on private lots. They work through form and function controls on building frontages to frame the STREET-SPACE and foster a vital public realm.

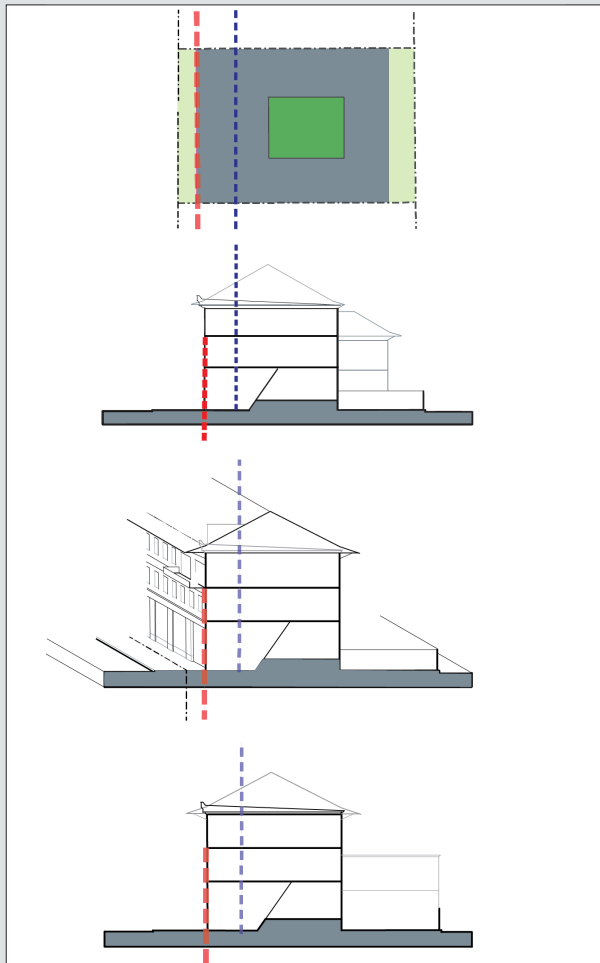
The building frontage designations are denoted on the REGULATING PLAN by the color filling the STREET-SPACE fronting the parcel. The same colors are shown in the section for each frontage designation that follows. The BUILDING FORM STANDARDS set the basic parameters governing building form, including building placement, the building envelope (in three dimensions), and certain required or permitted functional elements. These standards allow change-over-time and promote lasting and contributing buildings

Character District Sections: 26-191 to 26-198

- 191. Introduction & Definitions
- 192. Regulating Plans
- 193. Building Form Standards**
- 194. Architectural Standards
- 195. Public Realm Standards
- 196. Parking & Loading
- 197. Building Functions
- 198. Reserved
- 199. Reserved

HOW TO USE THE BUILDING FORM STANDARDS (BFS):

The BUILDING FORM STANDARDS are divided into General Standards, that apply to all frontage designations, and Individual BUILDING FORM STANDARDS that only apply where a frontage has been designated. Standards include required minimums, allowed maximums, and some permissive parameters for specific building or lot features. The individual BUILDING FORM STANDARDS (BFS) are organized into four categories: *Placement*, *Height*, *Elements*, and *Use*. You should review both the General and Individual BUILDING FORM STANDARD before planning your project.



PLACEMENT: These standards set the BUILDABLE AREA of your lot. Note the REQUIRED BUILDING LINE (RBL) and the minimum percent required for building along the lot frontage. Next, look for specifics about the depth and breadth of the BUILDABLE AREA relative to the RBL and any side and rear setbacks. You should also note any requirements for open area. Then you will know where on your lot you may build—as well as where your building must be placed (the RBL).

HEIGHT: These standards set the minimum and maximum height for the building. Note also any specifications for floor elevations, and fence or wall heights. Heights are primarily measured relative to the fronting sidewalk.

ELEMENTS: These standards regulate important details of the building, like FRONT PORCHES, BALCONIES, and FENESTRATION (windows and doors). These standards apply primarily to the front of the building (as it faces the street)—with much less emphasis on what happens behind the FACADE.

USE: These standards define the broad categories of use that are permitted, often differentiating between the ground floor and the upper STORIES. The standards are typically less specific in the regulation of use than conventional zoning.

Summary Frontage Descriptions

The frontages are designated on the REGULATING PLAN by color filling their right-of-way.

Urban General Frontage

Urban General 2 Frontage

Urban General is the basic urban building form. These frontages produce multi-story buildings placed directly at the sidewalk or behind small DOORYARDS, with windows across the FACADE, and one or more entrances. The uses range from commercial to residential, institutional to ground-floor retail and restaurants—and combinations of all of the above. This frontage has two levels of intensity, with an **Urban General 2** for less intense areas.

Storefront Frontage

Storefront is a subset of the Urban General frontage, with more specific requirements at the street level, that of the prototypical ground floor SHOPFRONT with large windows and frequent doors along the sidewalk. Ground floor uses are limited to retail or other active commercial uses along the frontage, creating a vibrant pedestrian realm. Upper STORY uses are flexible.

Neighborhood Small

Neighborhood Medium

Neighborhood frontage includes detached and attached houses up to small apartment buildings. The buildings may be placed close to the sidewalk with a small DOORYARD, or farther back with a small front yard. STOOPS or FRONT PORCHES are required for new buildings in this frontage. This frontage has two levels of intensity, Medium and Small, its character and intensity will vary depending on this designation.



Illustration: Urban General - Typical Frontage



Illustration: Storefront - Typical Frontage



Illustration: Neighborhood Medium - Typical Rowhouse form



Illustration: Neighborhood Small - Single Unit Detached form



Illustration: Neighborhood Small - Typical Two Unit form

193.1 General Provisions

These provisions apply to all building frontage designations, unless expressly stated otherwise within the BUILDING FORM STANDARDS for an individual frontage designation or on the REGULATING PLAN.

A. Placement

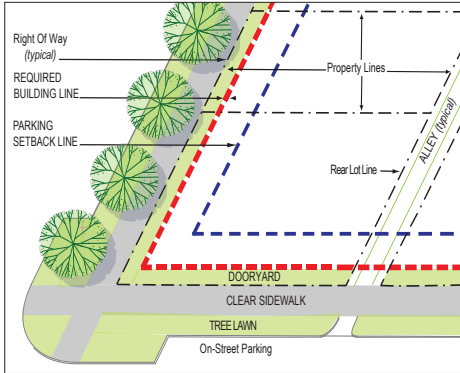


Illustration A. Key Character District elements

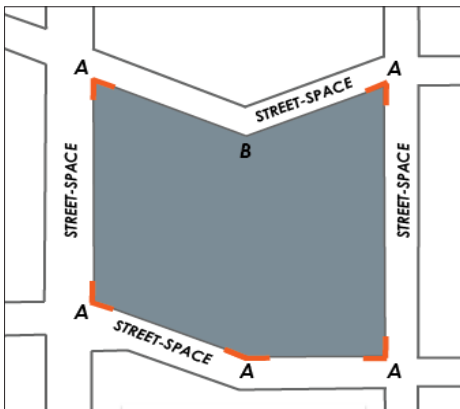


Diagram B. BLOCK CORNERS

- A. BLOCK CORNER
- B. not a BLOCK CORNER

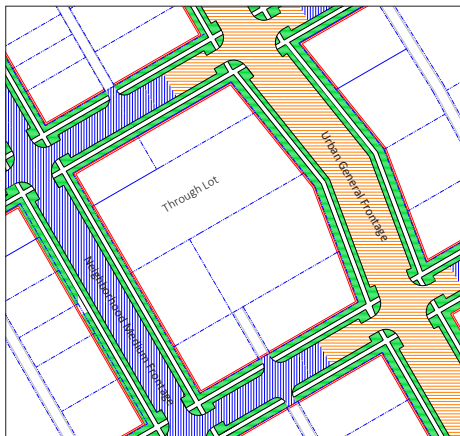


Diagram C. Through Lots

1. REQUIRED BUILDING LINE (RBL)
 - a. Building FACADES shall be *built to* the REQUIRED BUILDING LINE as prescribed in the individual BUILDING FORM STANDARD.
 - b. The REQUIRED BUILDING LINE includes an offset area (or depth) of 5 feet behind that line (into the BUILDABLE AREA) allowing for jogs and FACADE articulation. Therefore, where the FACADE is placed within that 5-foot zone, it is considered to be built to the REQUIRED BUILDING LINE.
 - c. The building FACADE shall be built to the REQUIRED BUILDING LINE within 30 feet of a BLOCK CORNER. (See *Diagram B. BLOCK CORNERS*)
 - d. For CORNER LOTS, the REQUIRED BUILDING LINE is continuous around the BLOCK CORNER (not broken into separate frontages or REQUIRED BUILDING LINES).
 - e. All lots, including CORNER LOTS and through lots, shall satisfy the requirements of their individual BUILDING FORM STANDARD for both frontages. (See *Diagram C Through Lots*.)
 - f. Where a through lot has frontages with different height limits, the greater of the 2 maximum height limits shall not come within 60 feet of the RBL of the lower height frontage. (See *Diagram C Through Lots*.)
2. BUILDABLE AREA (See *Table A. Facade Projection Limitations*)
 - a. Buildings may only occupy that portion of the lot specified as the BUILDABLE AREA: the area behind the REQUIRED BUILDING LINE and excluding any required setbacks, as prescribed in the BUILDING FORM STANDARD.
 - b. No part of any building may be located outside of the BUILDABLE AREA except projecting eaves, AWNINGS, SHOPFRONTS, BAY WINDOWS, STOOPS, steps, or BALCONIES.
 - c. Accessibility ramps approved by the Zoning Administrator in consultation with the ZRC may be located within the DOORYARD area.
 - d. Rear and side lot setbacks, where required, are specified in the individual BUILDING FORM STANDARD and/or *Section 193.1.F. Neighborhood Manners*.
3. DOORYARDS
See *Section 195.2.A Public Realm Standards*. (See also *Illustration A. Key Character District elements*.)
4. PRIVATE OPEN AREA
Private or semi-private usable open area is required on every lot, measured as a specified percentage of the BUILDABLE AREA. This requirement may be satisfied in a variety of at or above-grade configurations, as prescribed in each BUILDING FORM STANDARD.
 - a. The PRIVATE OPEN AREA must be improved and available for safe and convenient access to all occupants of the building.
 - b. The PRIVATE OPEN AREA must be open to the sky except for pergolas and porches, decks.

- c. The PRIVATE OPEN AREA, when located at grade, must be not more than 33% impervious surface area and shall be designed with green features.
- d. Any PRIVATE OPEN AREA located at grade or below the third STORY shall not encroach into any required side or rear set-backs. See the individual building frontage standards for additional parameters.
- e. Any shared PRIVATE OPEN AREA located above the second STORY (excluding BALCONIES) shall be designed with green features, such as planters or functional green roofs, contain outdoor seating and other appropriate amenities, be free of any obstructions, be screened from rooftop mechanical equipment, and be located and configured to prevent views into adjacent dwelling units.
- f. The PRIVATE OPEN AREA may be distributed among separate areas, but at least 67% shall be in no more than two separate areas.
- g. The PRIVATE OPEN AREA is not to be used to satisfy minimum stormwater Best Management Practice area (if thereby excluding active tenant use), parked, or driven upon.
- h. Any development on a lot that is exclusively reusing existing structures is exempt from the PRIVATE OPEN AREA requirement.

5. STREET WALLS and PRIVACY FENCES

- a. Unless otherwise indicated in the individual BUILDING FORM STANDARD, a STREET WALL is required along any REQUIRED BUILDING LINE (RBL) frontage that is not otherwise occupied by a building. (See *Illustration D. STREET WALL at RBL*) Note that a building is required along any RBL within 30 feet of a BLOCK CORNER.
- b. Any STREET WALL above four feet in height shall meet the FENESTRATION requirements of the applicable BUILDING FORM STANDARD.
- c. PRIVACY FENCES may be constructed along COMMON LOT LINES, behind the REQUIRED BUILDING LINE, and along ALLEYS.
- d. PRIVACY FENCES have a maximum height of eight feet.

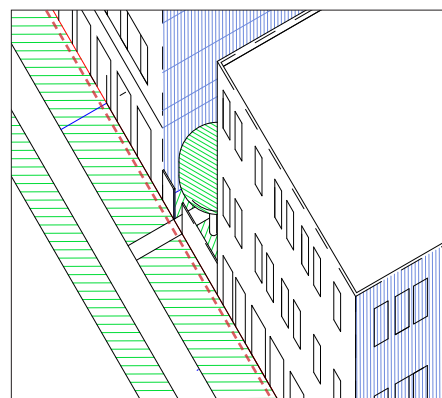


Illustration D: STREET WALL at RBL

6. On-Site/Off-Street Vehicle Parking and Access (curb cuts)

In Character Districts, off-street vehicle parking and access should have minimal intrusion on the public realm. Off-street parking should not be CLEARLY VISIBLE FROM THE STREET-SPACE. Access should be provided from ALLEYS, or shared access lanes, minimizing potential vehicular-pedestrian points of conflict. Properties within a Character District are exempt from any parking standards not in Sections 26-191 through 26-197. The following standards apply.

- a. The PARKING SETBACK LINE is designated on the REGULATING PLAN, with additional specifications in the applicable individual BUILDING FORM STANDARD.
- b. The PARKING SETBACK LINE extends vertically, as a plane, from the first-floor level.
- c. Vehicle parking must be located behind the PARKING SETBACK LINE, with the following exceptions.
 - (i) Parking may be forward of the PARKING SETBACK LINE where it (see *Diagram E*):
 - (a) is beneath a habitable first floor and completely within the building envelope;

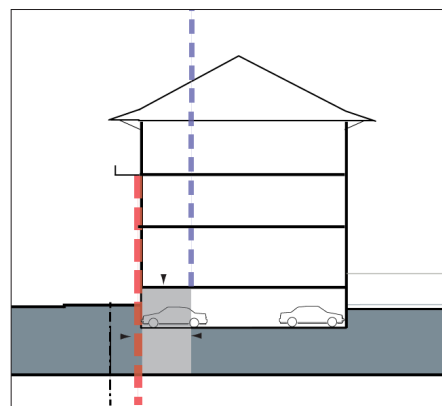


Diagram E: Parking allowed forward of the PARKING SETBACK LINE.

- (b) has a floor level at least four feet below grade; and
 - (c) has FENESTRATION not greater than 15% (from the average fronting sidewalk elevation to the finished first floor level.
 - (ii) Parking may be forward of the PARKING SETBACK LINE only where designated on the REGULATING PLAN:
 - (a) at the rear of lots with ALLEY/REQUIRED BUILDING LINE intersections, as prescribed in the individual building frontage standard; or
 - (b) above the floor level specified on the REGULATING PLAN.
 - d. Curb cuts and driveways shall be located at least 75 feet away from any BLOCK CORNER, other curb cut, or parking garage entry on the same BLOCK FACE. These requirements are not applicable along ALLEYS.
 - e. No project may create any new curb cuts where ALLEY or shared access exists or is designated on the REGULATING PLAN – unless it is created to provide access to publicly-available parking.
 - f. If ALLEY or shared access is not available, an applicant may request direct driveway access from a street, subject to approval by the Zoning Administrator in consultation with the ZRC.
7. Publicly accessible parking structures:
- a. Built according to this code are not included in or subject to the calculation of the maximum building footprint in the individual BUILDING FORM STANDARD, but shall meet all other applicable standards.
 - b. Parking spaces on the top level of a parking structure shall not count as an additional STORY against the height limits of this code. Shading and solar structures that are not CLEARLY VISIBLE FROM THE STREET-SPACE are permitted.
 - c. Any portion of any parking structure within 25 feet of a building constructed under this code shall not exceed that building's primary ridge or parapet height,
 - d. All parking structures are subject to *Section 193.1.F. Neighborhood Manners*.
 - e. Openings in any REQUIRED BUILDING LINE for parking garage entries shall have a maximum CLEAR HEIGHT of 16 feet and a maximum clear width of 22 feet.
 - f. Parking structures may have parking beyond the PARKING SETBACK LINE at and above the second STORY provided that:
 - (i) the parking is clearly identified and accessible to the public; and
 - (ii) no less than 90% of the parking spaces are available to the public; and
 - (iii) at least 12 hours of public parking are provided in any 24-hour period; and
 - (iv) that at least 8 of those hours are provided during either business or nighttime hours depending on whether the Zoning Administrator in consultation with the ZRC determines that the primary use will be for commercial or residential uses.

B. Height¹

Heights are specified in the individual BUILDING FORM STANDARD. CIVIC BUILDINGS are exempt from these standards.

1. Heights in Character Districts are generally measured from the average fronting CLEAR SIDEWALK elevation.
2. Building height is measured in STORIES, with an ultimate building height limit in feet.
 - a. Building heights are measured to the top of the wall plate or top of the parapet, whichever is higher. (See *Diagram F*)
 - b. Finished floor elevation and minimum building height requirements shall be satisfied from the REQUIRED BUILDING LINE back to a minimum depth of 30 feet.
3. CLEAR HEIGHT is measured from the finished floor elevation to the finished ceiling directly above.² For external

¹ Note of intent: This is not the way height is typically measured. The datum is intentionally set relative to an occupant of the STREET-SPACE.. This is also to incentivize the use of pitched roofs, adding variety to the rooflines without arbitrarily requiring it. This will allow additional habitable space (see ATTIC STORY in C. Elements. 3) while maintaining a smaller scale appearance.

² Note of intent: The minimum CLEAR HEIGHT is a value preservation and quality-of-life-over-time measure.

building features, it is measured as the unobstructed distance from the ground/sidewalk to the lowest element above.

4. The prescribed minimum CLEAR HEIGHT shall be met by at least 75 percent of the floor area for the specified STORY.
5. A single ATTIC STORY, constructed according to the Character District standards, is not included in any building height measurement, whether in STORIES or feet. (see *Elements C.3* below).
6. MEZZANINES (See *Diagram G*):
 - a. with a floor area greater than 1/3rd of the floor area of the STORY in which it is located will count as an additional full STORY in the building height measurement;
 - b. below the second STORY shall be set back from the REQUIRED BUILDING LINE at least 15 feet; and
 - c. GROUND STORY MEZZANINES are not included in the CLEAR HEIGHT measurement.
7. PARKING STRUCTURES
 - a. are limited by the maximum height in feet of their frontage, not by STORIES; and
 - b. are exempt from the CLEAR HEIGHT prescriptions.

C. Elements

1. FENESTRATION
 - a. FENESTRATION is regulated, on a STORY by STORY basis, as a percentage of the FAÇADE between floor levels. It is measured as glass area (including MUNTINS and similar window frame elements with a dimension less than one inch) and/or the open (void) area in the wall surface.
 - b. Lengths of wall exceeding 20 linear feet (horizontal) with no FENESTRATION are prohibited on all STREET WALLS, and FACADES below the 4th STORY. This measurement includes the entire STORY, from floor to floor.
 - c. Each FACADE shall have at least one functioning entrance.
 - d. The maximum distance between functioning entrances in the same building FACADE is specified in the BUILDING FORM STANDARD.
 - e. Windows should not direct views into or across an adjacent private lot. COMMON LOT LINES with a General, Storefront, or Neighborhood Medium frontage may be built with zero or minimal setback. Any views directed into or across a private lot are specifically not protected. (See *Illustration H*.)
 - f. Windows shall not direct views into an adjacent private lot where the COMMON LOT LINE is less than 10 feet away. (See *Diagram I*.) Specifically, the window opening and its window panes shall be at an angle of greater than or equal to 90 degrees to/with the COMMON LOT LINE unless:
 - (i) that view is contained within the lot (e.g. ground or first STORY window views blocked by a privacy fence, opaque glass, or garden wall), or
 - (ii) the window's sill is at least 6 feet above its finished floor level; or
 - (iii) otherwise specified in the individual BUILDING FORM STANDARD.

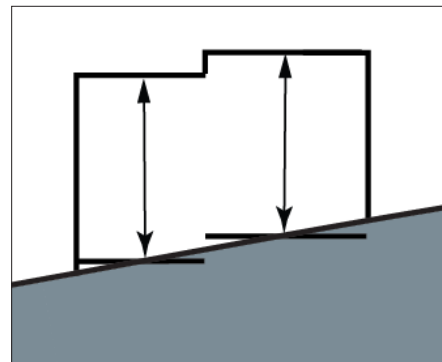


Diagram F. Building FACADE view
Building height measurement:
Large floorplates along significantly sloped frontages need to 'step' the building in order to maintain the proper relationship with the sidewalk.

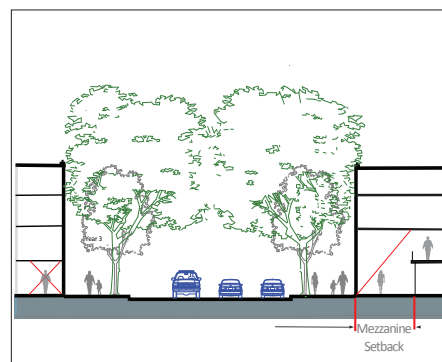


Diagram G. Mezzanine GROUND STORY setback

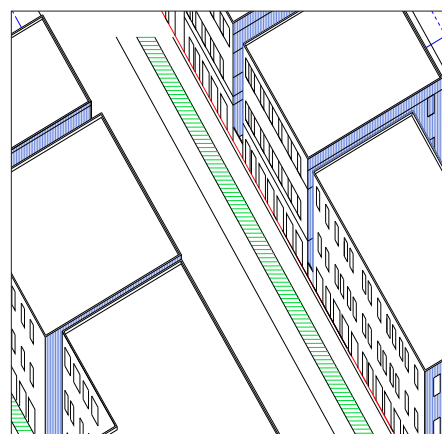


Illustration H. Caution: In an Urban context FENESTRATION along COMMON LOT LINES may be blocked by adjacent buildings.

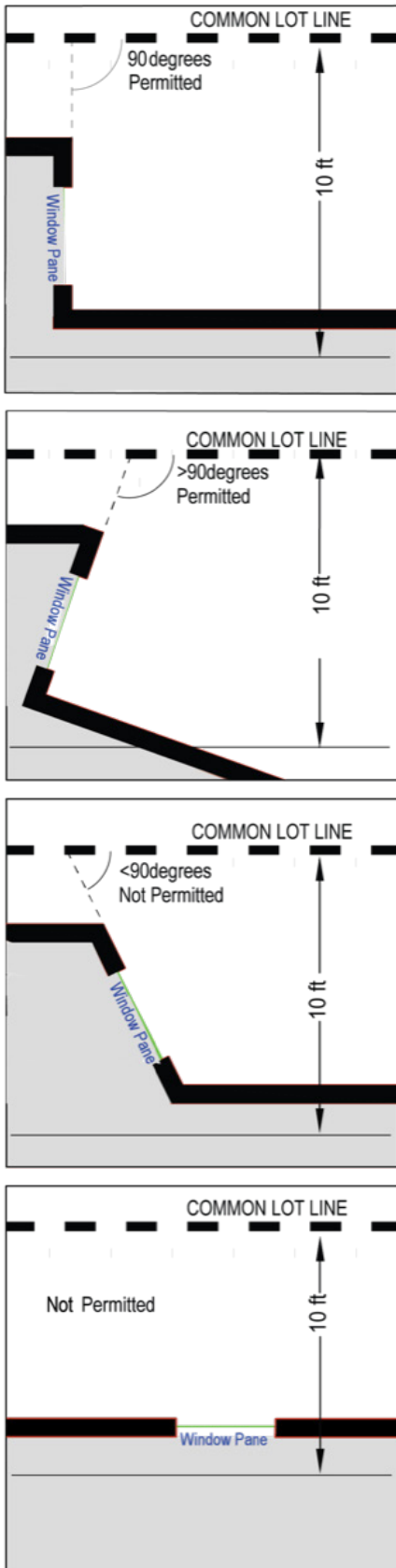


Diagram I. Permitted orientation for windows within 10 feet of a COMMON LOT LINE.

2. FACADE Projections

- a. No part of any building may project forward of the REQUIRED BUILDING LINE except for: overhanging eaves, AWNINGS, SHOPFRONTS, signs, BAY WINDOWS, steps for STOOPS and FRONT PORCHES, BALCONIES, or accessibility ramps approved by the Zoning Administrator in consultation with the ZRC. (See Table A.)
- b. Any encroachment over the CLEAR SIDEWALK and/or the right-of-way requires an encroachment agreement with the City, except for signs, overhanging eaves, and AWNINGS, as set forth herein. (See Table A. Facade Projection Limitations)
- c. STOOPS OR FRONT PORCHES:
 - (i) All required FRONT PORCHES shall be completely covered by a roof.
 - (ii) FRONT PORCHES may be screened (insect screening) when all architectural elements (columns, railings, etc.) occur on the outside of the screen.
 - (iii) STOOPS must be fully covered by a roof or CANOPY.
 - (iv) Finished floor height shall be no more than 8 inches below the first interior finished floor level of the building.
 - (v) See the individual BUILDING FORM STANDARDS for additional dimensional standards.
 - (vi) See Section 194.J Architectural Standards, for design standards for FRONT PORCHES and STOOPS.
- d. Ground STORY AWNINGS and CANOPIES
See Section 194.G Architectural Standards, for design standards for AWNINGS and CANOPIES.
- e. BAY WINDOWS:
 - (i) shall have an interior clear width of between four and eight feet at the FACADE;
 - (ii) at the ground STORY shall project no more than 24 inches beyond the REQUIRED BUILDING LINE;
 - (iii) at the second STORY and above, shall project no more than 42 inches beyond the REQUIRED BUILDING LINE; and
 - (iv) shall not project into the right-of-way or over the CLEAR SIDEWALK.

Table A. FACADE Projection Limitations	Reference	Limit
ADA Ramps		ROW
AWNINGS, CANOPIES, ground floor	2.(d)	
BAY WINDOWS	2.(e)	ROW
BALCONIES	2.(f)	ROW
Eaves		ROW
SHOPFRONTS	per BFS	ROW
Steps / STOOPS / FRONT PORCHES	per BFS	ROW
PROJECTING SIGNS	26-194.I	
Consult the Zoning Administrator and ZRC for all encroachments into the ROW; additional requirements may apply.		

- f. **BALCONIES¹:**
Where an individual BUILDING FORM STANDARD permits, BALCONIES being used as a method for achieving the required PRIVATE OPEN AREA shall:
- (i) meet all prescriptions in its BUILDING FORM STANDARD,
 - (ii) be enclosed by balustrades, railings, or other means that are not less than 50% opaque;
 - (iii) not otherwise be enclosed above a height of 42 inches, except with insect screening and/or columns/posts supporting a roof or connecting with another BALCONY above; and have either:
 - (a) a recess in the FACADE behind the BALCONY of at least 18";
 - or
 - (b) must be fully covered by, and posted up to, a roof.
 Alternately, where a BALCONY aligns with a BALCONY on a different STORY, it may post up to the BALCONY above.

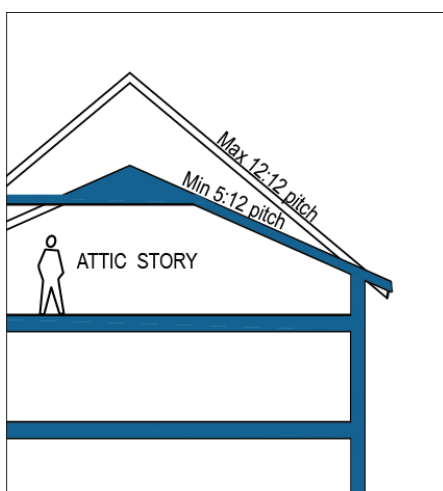


Diagram J. ATTIC STORY

3. An ATTIC STORY does not count against the maximum height in feet or STORIES, provided it meets the following standards:
 - a. There is not more than one floor level within the roof.
 - b. ATTIC STORY windows fronting the REQUIRED BUILDING LINE may only be located in DORMERS.
 - c. DORMERS for ATTIC STORIES are permitted so long as they do not break the primary eave line, are individually less than 15 feet wide, and their collective width is not more than 60 percent of the FACADE.
 - d. The habitable area in an ATTIC STORY is restricted by the limitations on roof pitch.
4. Roof configurations are regulated in 194. *Architectural Standards, D. Roofs and Parapets.*

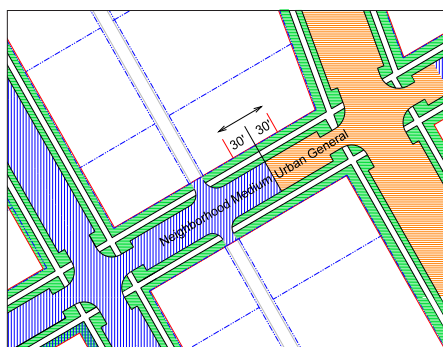


Diagram K. Frontage designation flexibility

D. Frontage Designation Flexibility

When the building frontage designation shown on the REGULATING PLAN changes along a property's REQUIRED BUILDING LINE (RBL), the applicant has the option of applying either BUILDING FORM STANDARD for a maximum additional distance of 30 feet in either direction, for that parcel only, from the transition point shown on the REGULATING PLAN. This flexibility is limited by the configuration of the REGULATING PLAN (including the parcel lines) at the time of its adoption. An adjustment greater than 30 feet requires a rezoning. (See Diagram K)

E. Civic Buildings

When CIVIC BUILDINGS, existing or proposed, are designated on the REGULATING PLAN, they are exempt from the BUILDING FORM STANDARD provisions except those that relate to F. *Neighborhood Manners* and/or R-1 and R-2 districts.

¹ Note of Intent: These standards are to ensure suitability for use as PRIVATE OPEN AREA. They do not apply to other balconies or decks.

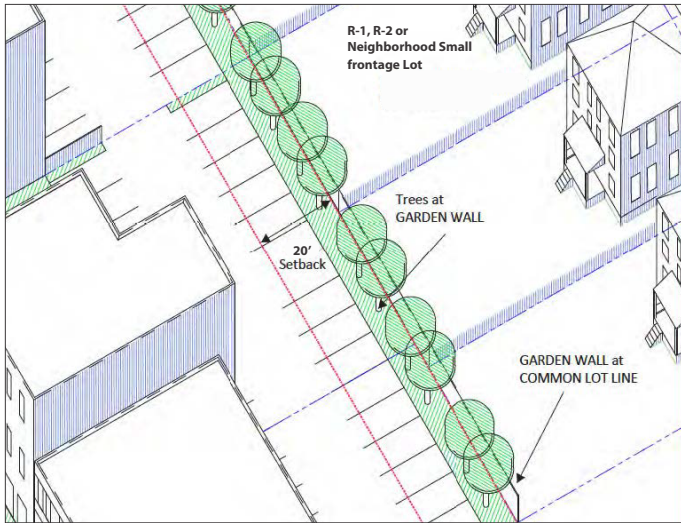


Illustration L. Neighborhood Manners Context

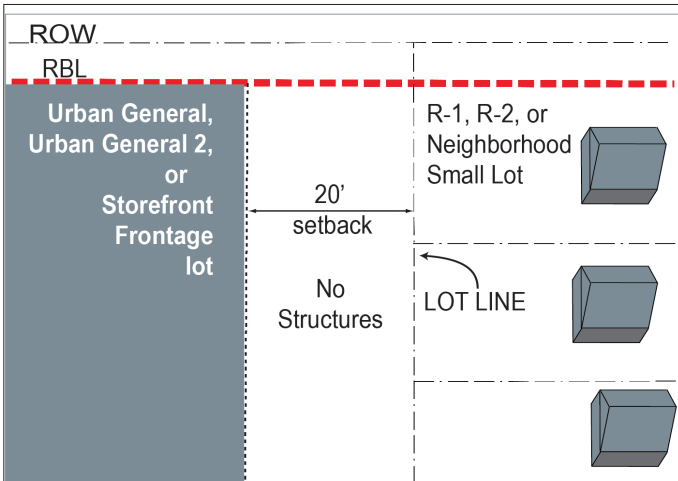


Diagram M. Neighborhood Manners Setback

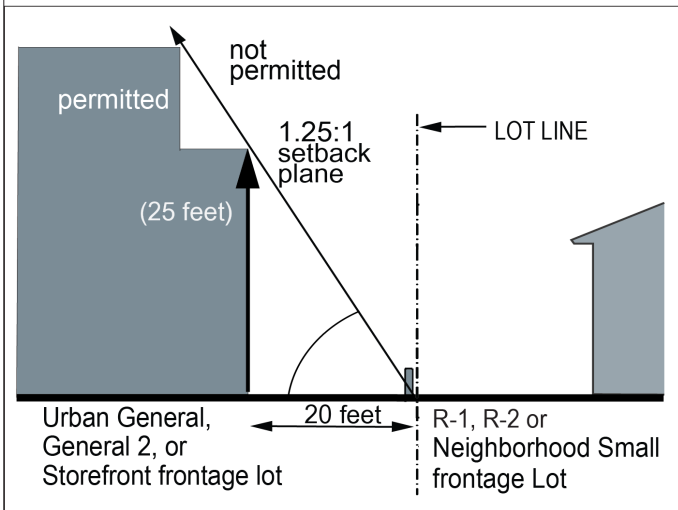


Diagram N. Neighborhood Manners Setback Plane

F. Neighborhood Manners

Where Urban General, Urban General 2, and Storefront frontage lots share a COMMON LOT LINE with a Neighborhood Small or Medium frontage lot, or an R-1 or R-2 district, the following standards apply (See Illustration L.).

1. A masonry wall, 4 to 8 feet in height, shall be constructed within one foot of the COMMON LOT LINE.
2. Trees from the *Street Tree List* (see Section 195 *Public Realm Standards*) shall be planted, on maximum 30-foot centers, between 5 and 10 feet from the wall. At planting, trees shall be at least 2.5 inches in diameter at designated breast height (DBH) and at least 8 feet in overall height.
3. Neighborhood Manners Setback (See Diagram M):
 - a. There shall be a 20 foot setback from the lot line shared with the R-1 or R-2 or Neighborhood Small or Medium frontage lot. There shall be no structures within this area.
 - b. There shall be a setback plane, beginning at the R-1 or R-2 or Neighborhood Small or Medium frontage lot line, extending at a slope of one and one quarter to one (1.25: 1), beyond which no building or structure (including parking structures) is permitted. (See Diagram N.)
 - c. Balconies or rear decks above the first STORY level are not permitted on building elevations facing and within 40 feet of a Neighborhood Manners Setback¹.
4. The Neighborhood Manners Setback shall be adjusted with any frontage change per D. *Frontage Designation Flexibility* above.

¹ Note of Intent: This standard is purposefully not written as "BALCONIES". It addresses privacy concerns, to ensure balconies are not overlooking private space/back yards

G. Accessory Dwelling Units (ADU)

1. ACCESSORY DWELLING UNITS are permitted for owner-occupied detached or attached single-unit dwellings only. Properties with ADUs shall not be considered duplexes.
 - a. ADUs may take the form of ENGLISH BASEMENTS or in the BUILDABLE AREA at the rear of the lot (often called a Granny Flat or, when above a garage, a Carriage House).
 - b. ADUs have the following maximums:
 - (i) a 600 square foot footprint (this does not apply to ENGLISH BASEMENT units); and
 - (ii) one bedroom;
 - (iii) rental occupancy, no more than two adults; and
 - (iv) no more than one ADU per lot.

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193.2 Urban General Frontages

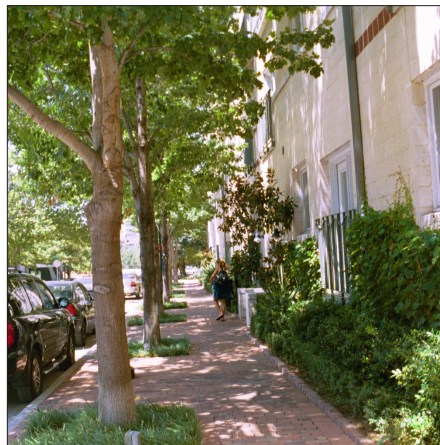
A. Illustrations and intent

The Urban General frontage is the basic American “downtown” building frontage, once typical in towns and cities across the United States. Multi-story buildings with closely spaced entrances and windows are lined up shoulder to shoulder behind the sidewalk, filling out the BLOCK-face.

This frontage is for street-oriented, downtown-type buildings. These building forms can accommodate a range of uses, allowing retail shopfronts, office or residential buildings, and/or mixed-use buildings, with service access and parking lots in the BLOCK interior, accessed from the ALLEY.



Note: These photos and statements are provided as illustrations of intent and are advisory only. They are not regulatory. Refer to the standards on the following pages for the specific standards of the Urban General Building Form Standard.



B. Example Building Configurations and Placement

Note: These diagrams illustrate some of the building configurations possible under the Placement standards on the following page. They do not represent fully designed buildings nor do they fully address issues such as parking or the International Building Code. Refer to the following pages for the specific standards of the Urban General Frontage.

The Urban General frontage standards provide a great deal of flexibility. Once the minimum height and frontage build-out requirements are met, the building behind the FACADE can take most any configuration. These diagrams, aligned above the Placement Diagram from the standards on the following pages, illustrate a few of the possible configurations a building can take under the General Urban BUILDING FORM STANDARDS. The green area represents the required PRIVATE OPEN AREA—which in Urban General frontages may be on or above ground, including on the roof.

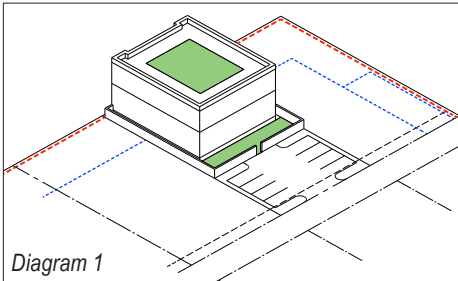


Diagram 1 shows a simple bar building. The FACADE meets the required percentage build-out and minimum height and has a STREET WALL spanning the unbuilt REQUIRED BUILDING LINE. The PRIVATE OPEN AREA is provided on the roof, with additional rear yard area. The building is likely configured with units facing the street or the rear yard. A surface parking lot is accessed from the ALLEY.

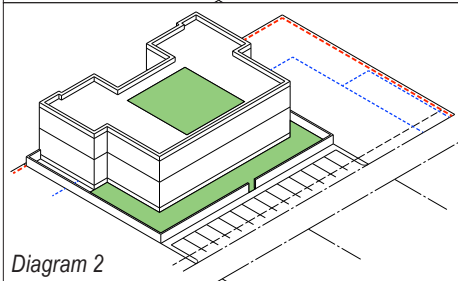


Diagram 2 shows a building with a forecourt entry. The FACADE spans most of the REQUIRED BUILDING LINE to meet its build-out requirement—the forecourt takes advantage of the percentage of the frontage not required to have a building on it. The PRIVATE OPEN AREA is provided on the roof, with additional rear yard area. Parking for the building is directly off the ALLEY.

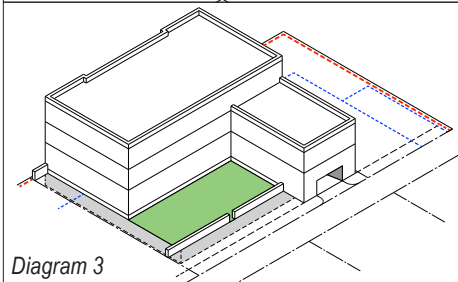


Diagram 3 shows a building with a lower, rear "L" section. The PRIVATE OPEN AREA requirement is met with a rear yard. This diagram suggests basement-level parking, accessed from the ALLEY. Larger buildings may have to meet parking requirements with a combination of inside/under the building, and/or off-site arrangements.

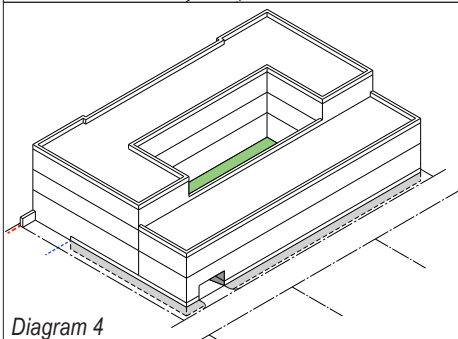


Diagram 4 shows a building with a central courtyard, providing a shared PRIVATE OPEN AREA for its occupants. This diagram also suggests semi-basement level parking, under the elevated first floor and accessed from the ALLEY.

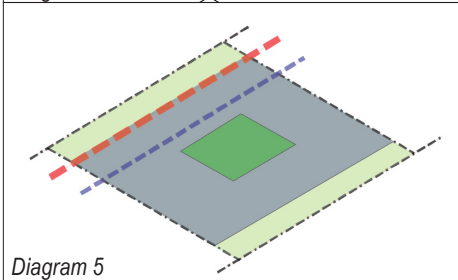
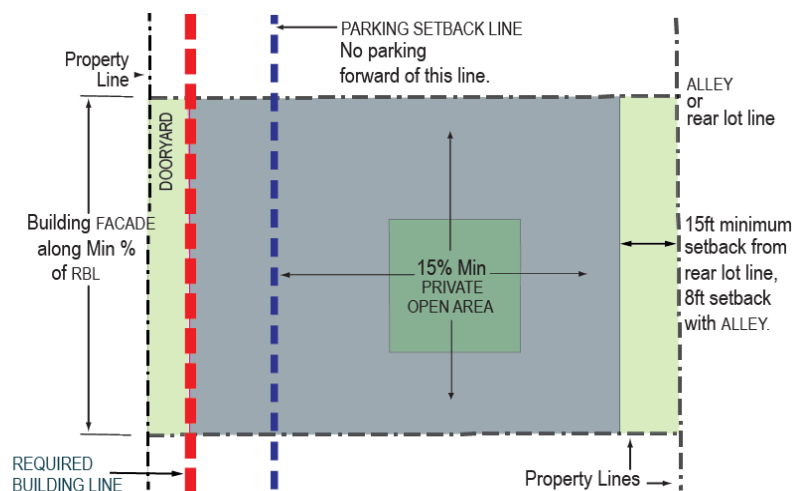


Diagram 5. This is a re-oriented *Placement Diagram* for the Urban General frontages, provided for reference. The red dashed line is the REQUIRED BUILDING LINE, the blue dashed line is the PARKING SETBACK LINE, the gray area is the BUILDABLE AREA, and the green rectangle within it represents the PRIVATE OPEN AREA. This is more fully explained in the frontage standard itself, located on the following pages.

193.2 Urban General & Urban General 2 Frontages



C. PLACEMENT

1. FACADE

- On each lot the building FACADE shall be built to the REQUIRED BUILDING LINE (RBL) for at least:
 - Urban General: 80% of the RBL length.
 - Urban General 2: 70% of the RBL length.
- A STREET WALL is required on any unbuilt REQUIRED BUILDING LINE.
- Within 12 feet of the BLOCK CORNER, the GROUND STORY FAÇADE may be chamfered to form a corner entry.
- A FORECOURT configuration may be used within the minimum build-to parameters provided:
 - All elevations facing the FORECOURT are regulated as FACADES;
 - the FORECOURT depth is no more than 20' and the width between 15' and 30';
 - the FORECOURT may not be used for parking, drop-off driving area or storm-water management;
 - the FORECOURT opening does not require a STREET WALL.
- In case of conflict, these standards shall supersede vision triangle requirements in the Code of Ordinances.

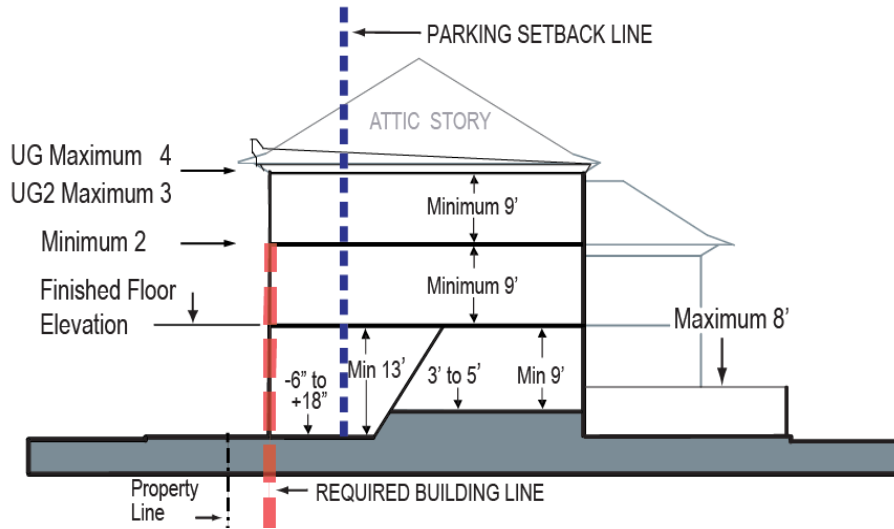
2. BUILDABLE AREA

- The BUILDABLE AREA is delineated by the gray area in the diagram above.
- The REQUIRED BUILDING LINE is indicated on the REGULATING PLAN. It is generally located 1' off the ROW/property line for Urban General and 5' off for Urban General 2. The exact position of the RBL should be confirmed in consultation with the Zoning Administrator and ZRC.
- Setbacks: there are no required side setbacks; rear setbacks are: 8' from an ALLEY and 15' if no ALLEY.
- The maximum building footprint is 25,000 Sq Ft.
- A PRIVATE OPEN AREA equal to at least 15% of the BUILDABLE AREA must be provided on every lot.
- The minimum PRIVATE OPEN AREA dimension is 18'
- Up to 33% of the required PRIVATE OPEN AREA may be satisfied by the BALCONIES of individual units which are exempt from the minimum dimension in f. above, and PARKING SETBACK LINE restrictions in h. and i. below. (See 193.1. General Standards, C. Elements, 2.f. Balconies, for qualifying BALCONY requirements.)
- The PRIVATE OPEN AREA must be located behind the PARKING SETBACK LINE when it is below the third STORY.
- Where provided at or above the third STORY, the PRIVATE OPEN AREA may be located forward of the PARKING SETBACK LINE (such as in a raised courtyard configuration) only if:
 - it opens onto no more than one STREET-SPACE, and
 - is set back at least 30' from any BLOCK CORNER or BUILDING CORNER.
- When on the building's highest roof level, the PRIVATE OPEN AREA may be located anywhere on the roof.

3. Other

- The PARKING SETBACK LINE is indicated on the REGULATING PLAN, generally 30' behind the REQUIRED BUILDING LINE, with limited exceptions at ALLEY/RBL intersections. See F.4. Rear Lot Area below.
- A PRIVACY FENCE is permitted and may be required. See Section 193.1.E. Neighborhood Manners.

193.2 Urban General Frontage & Urban General 2 Frontages



D. HEIGHT

See Section 193.1.B. for information about measuring height.

1. Building Height

- a. Urban General: minimum at RBL 2 STORIES, maximum 4 STORIES and 52'
- b. Urban General 2: minimum at RBL 2 STORIES, maximum 3 STORIES and 42'
- c. STORY heights may be different for specific locations; refer to the REGULATING PLAN.

2. Ground floor finished elevation

- a. For Commercial or Retail: -6" to +18"
- b. For Residential units within 30' of the REQUIRED BUILDING LINE: 3' to 5'. Entrances may be at grade, with transitions within the building to meet the minimum finished floor elevation for the units. Support functions such as lobbies, rental offices, and club rooms may be located at grade.

3. Second floor finished elevation

- a. Urban General: 16' to 22'
- b. Urban General 2: 16' to 18'

4. GROUND STORY finished CLEAR HEIGHT

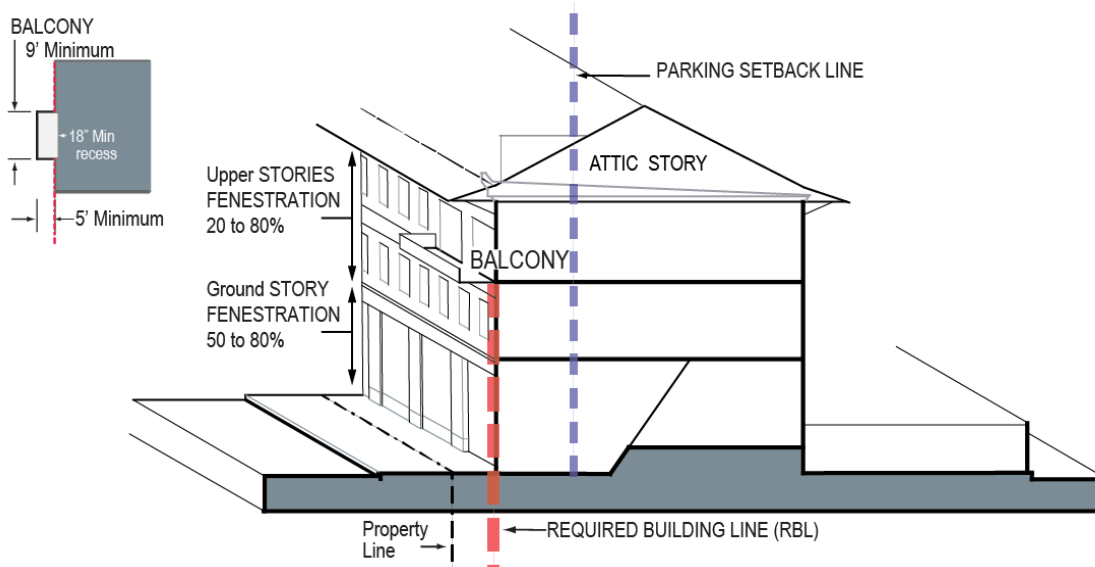
- a. For Commercial or Retail: 13' minimum
- b. For Residential: 9' minimum

5. Upper STORIES finished clear height: 9' minimum

6. STREET WALL: 4' to 8'

7. PRIVACY FENCE: 8' Maximum, measured from adjacent grade.

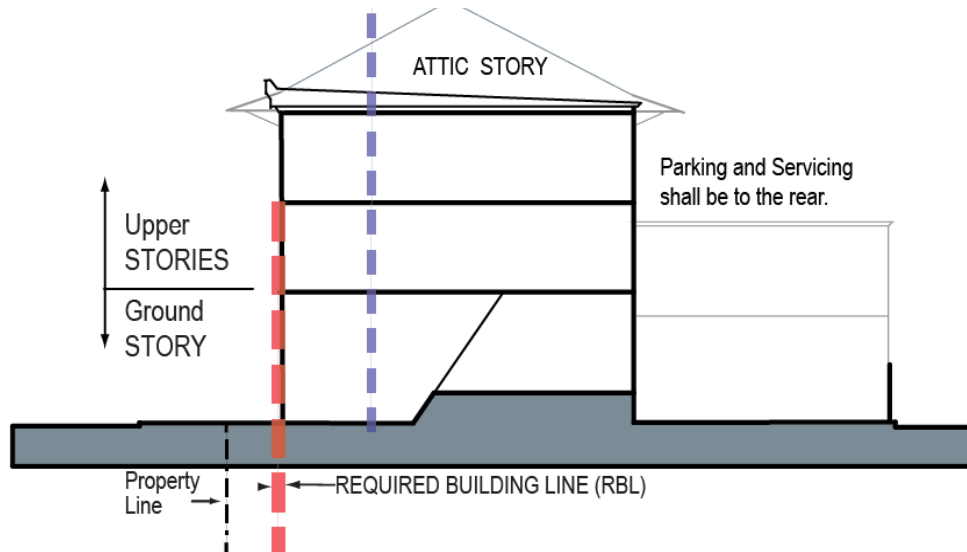
193.2 Urban General Frontage & Urban General 2 Frontages



E. ELEMENTS

1. **FENESTRATION, GROUND STORY:** 50 to 80%
2. **FENESTRATION, upper STORIES:** 20 to 80%
3. **ATTIC STORY:** permitted within the parameters of *Sections 193.C.3. above and 194.D. Architecture.*
4. **BALCONIES:** (Applicable where a BALCONY is used to contribute to the PRIVATE OPEN AREA calculation): Minimum depth 5', minimum width 9'.
5. **FACADE entry doors:** Maximum door to door distance:
 - a. Urban General: 70'
 - b. Urban General 2: 80'
 - c. All upper STORY uses must be directly accessible from the STREET-SPACE through a FACADE entry. Unenclosed or partially enclosed exterior staircases may not be used to access upper STORY units.

193.2 Urban General Frontage & Urban General 2 Frontages



F. USES

See Section 197. Building Functions for specific parameters and/or performance standards.

1. Ground STORY:

- a. Urban General: Non-Residential or Residential
- b. Urban General 2: Non-Residential or Residential
- c. Residential uses are permitted on all STORIES. See the Height standards, above for specific configuration standards for GROUND STORY Residential.

2. Upper STORIES: Residential or Non-Residential (no Retail).

- a. Non-Residential uses are not permitted above a Residential use.
- b. Retail is only permitted in a second STORY where it is an extension of a GROUND STORY retail business and is no larger in gross floor area than that GROUND STORY retail space.

3. ATTIC STORY: Residential or Non-Residential. Additional habitable space is permitted within the roof where it is configured as an ATTIC STORY

4. Rear Lot Area:

- a. In addition to the other permitted GROUND STORY uses, parking and loading is permitted behind the PARKING SETBACK LINE.
- b. For lots with an ALLEY/REQUIRED BUILDING LINE intersection, where there is an additional parking area designated on the REGULATING PLAN, parking is permitted in this area when:
 - i. it is within a building and under a habitable second STORY;
 - ii. the FACADE of the building enclosing the parking meets all requirements;
 - iii. it is 2' off the front of the REQUIRED BUILDING LINE; and
 - iv. within 62' of the rear lot line.

193.3 Storefront Frontage



A. Illustrations and intent

Note: These photos and statements are provided as illustrations of intent and are advisory only. They are not regulatory. Refer to the standards on this page and the previous pages for the specific rules of the Storefront Building Form Standard.

This is the quintessential American “main street” frontage, with retail and restaurant uses on the ground floor and residences or offices upstairs. The overall building form is the same as the Urban General frontage, but with large display windows across the ground floor FACADE and frequent entrances along the street. Display windows should be large to allow unimpeded views into the interior of the shop. Closely spaced mullions or muntins, punched windows, and horizontal grids should be avoided.

B. Storefront Frontage Specifications

Where the Storefront frontage is designated on the REGULATING PLAN, the ground STORY configuration shall be that of a SHOPFRONT. The BFS standards for Urban General apply with the following exceptions and modifications:

1. **FENESTRATION:** GROUND STORY: 70 to 90%
2. **Frontage Build-To Minimum:** 85%
3. **Ground STORY uses:** Within 30' of the REQUIRED BUILDING LINE, uses are limited to non-residential categories. Frontages on Main Street between 1st and 6th Streets are generally limited to retail sales and service, and eating and drinking establishments. A lobby and/or entry, serving an upper STORY use, is permitted on the GROUND STORY. At the owner's discretion, that lobby or entry portion of the FACADE may be governed by the Urban General or the Storefront frontage standards. *See Section 197. Building Functions for specific parameters and/or performance standards.*
4. **Shopfront Encroachment:** Up to 2'. The SHOPFRONT may encroach beyond the REQUIRED BUILDING LINE into the DOORYARD, but not into the CLEAR WALKWAY or right of way.
5. **FACADE Entry Doors:** Maximum door to door: 50'

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193.4 Neighborhood Medium Frontage

A. Illustrations and intent

The Neighborhood Medium frontage is designed to fit comfortably into an existing neighborhood context, allowing redevelopment with a slightly increased scale and intensity. This frontage allows attached dwellings (rowhouses, duplexes), detached houses, COTTAGE COURTS, and/or small apartment buildings. The character and intensity of this frontage varies depending on the scale of its context. These frontages generally have rear yards and parking accessed from an ALLEY.

Note: These photos and statements are provided as illustrations of intent and are advisory only. They are not regulatory. Refer to the standards on the following pages for the specific standards of the Neighborhood Medium Building Form Standard.



B. Example Building Placement Configurations

Note: These diagrams illustrate some of the building configurations possible under the Placement standards on the following page. They do not represent fully designed buildings nor do they address issues such as parking or the International Building Code. Refer to the following pages for the specific standards of the Neighborhood Building Form Standards.

These diagrams, aligned above the Placement Diagram from the standards on the following pages, illustrate a few of the possible configurations a building can take under the Neighborhood Medium and Neighborhood Small BUILDING FORM STANDARDS. The green area represents the required PRIVATE OPEN AREA.

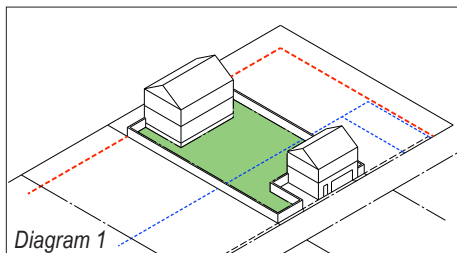


Diagram 1 shows a detached house, single-unit or two-unit. The area at the rear of the lot shows a 2-story building—a garage with an accessory dwelling unit or extra room above it. There could be a sidewing connecting the garage to the main house. The house has its own side and rear yards providing the required PRIVATE OPEN AREA.

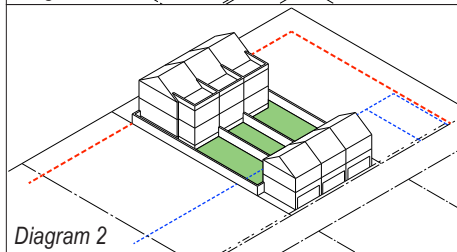


Diagram 2 is a set of three rowhouses. The buildings may be attached single-family units, with each unit on a separate lot, or they may be by a multi-unit building on a single lot. The area at the rear of each rowhouse has 2 ground level parking spaces with an accessory dwelling unit (ADU) or extra room above the garage. Each rowhouse has a DOORYARD, with its PRIVATE OPEN AREA provide by a rear yard and rear terrace.

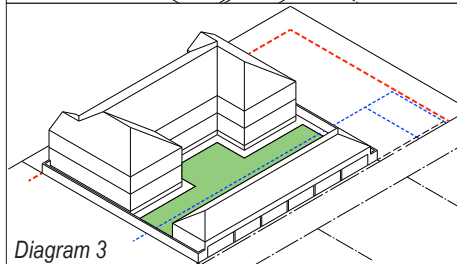


Diagram 3 represents a small apartment building. The building has sidewings that project into the rear yard of the building. The rear of the lot has a parking shed, accessed from the ALLEY. The green area between the parking shed and the main building satisfies the PRIVATE OPEN AREA requirement.

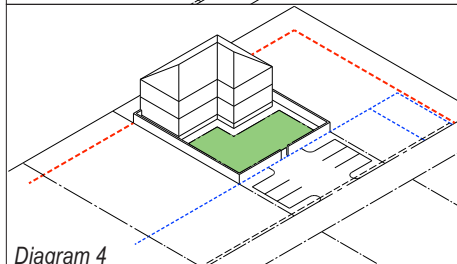


Diagram 4 is a small apartment building on one lot. The building is likely configured as a “double-loaded corridor” building with units facing the street or the rear yard. The green area behind the main building satisfies the PRIVATE OPEN AREA requirement with a shared yard. A surface parking lot is accessed from the ALLEY.

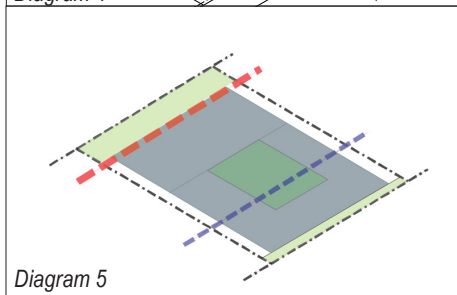
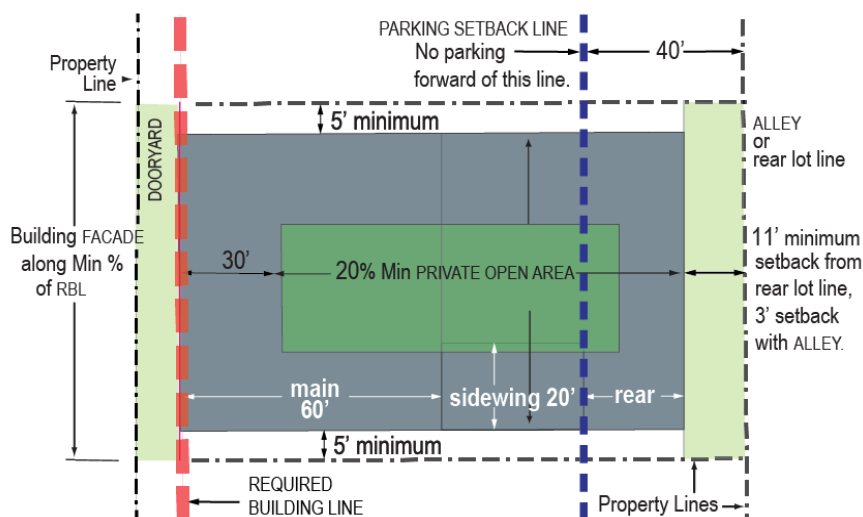


Diagram 5. This is a re-oriented Placement Diagram for the Neighborhood frontages, provided for reference. The red dashed line is the REQUIRED BUILDING LINE, the blue dashed line is the PARKING SETBACK LINE, the gray area is the BUILDABLE AREA, and the green rectangle within it represents the PRIVATE OPEN AREA. This is more fully explained in the frontage standard itself, located on the following pages.

193.4 Neighborhood Medium Frontage

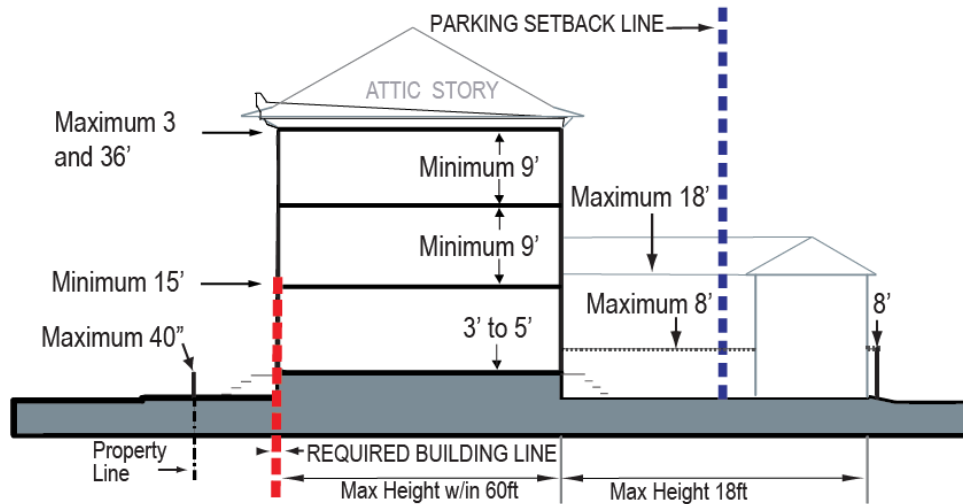


C. PLACEMENT

1. **FAÇADE** On each lot the building FAÇADE shall be built to the REQUIRED BUILDING LINE (RBL) for at least 66% of the RBL length.
2. **A STREET WALL** or PRIVACY FENCE is permitted on any unbuilt REQUIRED BUILDING LINE.
3. **Maximum FAÇADE width:** No individual structure or attached set/group of ROWHOUSES may exceed a maximum FAÇADE frontage length of 80 Ft. A gap of at least 10' is required between each building or set of ROWHOUSES.
4. **BUILDABLE AREA**
 - a. The BUILDABLE AREA is delineated by the gray area in the diagram above. The main portion of the BUILDABLE AREA is within 60' of the RBL. The SIDEWING BUILDABLE AREAS are between the main and rear BUILDABLE AREAS and within 20' of each side setback.
 - b. The REQUIRED BUILDING LINE is indicated on the REGULATING PLAN. It is generally located 15' off the ROW/property line for Neighborhood Medium. The exact position of the RBL should be confirmed in consultation with the Zoning Administrator and ZRC.
 - c. Setbacks: 5' each side lot line¹; 3' from an ALLEY and 11' from rear lot line where there is no ALLEY.
 - d. A PRIVATE OPEN AREA equal to at least 20% of the BUILDABLE AREA must be provided on every lot.
 - i. The minimum PRIVATE OPEN AREA dimension is 18'.
 - ii. The PRIVATE OPEN AREA must be located at least 30' behind the REQUIRED BUILDING LINE.
 - iii. The PRIVATE OPEN AREA must be at grade, except BALCONIES and extremely shallow lots, as specified in v. below;
 - iv. Up to 33% of the required PRIVATE OPEN AREA may be satisfied through the BALCONIES of individual ROWHOUSES and/or units, which are exempt from *i* and *ii* above.
 - v. The PRIVATE OPEN AREA for lots with less than 70' from the REQUIRED BUILDING LINE to the rear setback, may be above grade.
5. **Other**
 - a. The PARKING SETBACK LINE is indicated on the REGULATING PLAN, generally 40' from the rear lot line, with limited exceptions at ALLEY/RBL intersections and for other special conditions, see *F.3. Rear Lot Area*, below. The side setback for parking is 3' from any COMMON LOT LINE.
 - b. The minimum ROWHOUSE width, measured parallel to the RBL, is 18'.
 - c. A PRIVACY FENCE is permitted, at or behind the REQUIRED BUILDING LINE, on COMMON LOT LINES, and on rear lot lines.

¹ This setback does not prohibit sets of attached houses (ROWHOUSES) whose combined width does not exceed the maximum FAÇADE width listed above. It is a setback from other sets of rowhouses and/or adjacent lots.

193.4 Neighborhood Medium Frontage



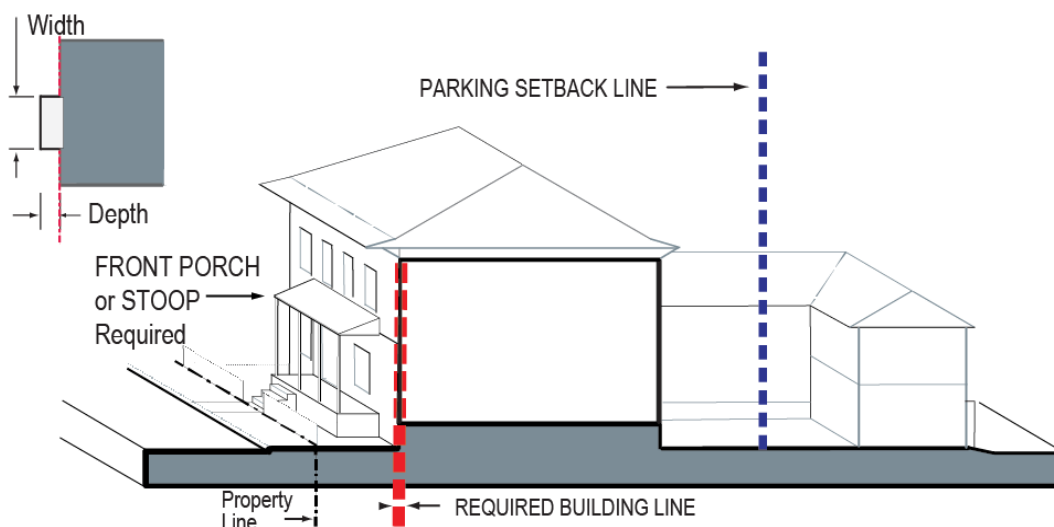
D. HEIGHT

1. Building Height:

- a. At and within 60' of the RBL: minimum 15' at RBL, maximum 3 STORIES and 36 feet.
- b. SIDEWING and rear lot area: maximum 18'.

- 2. **Ground floor finished elevation:** within 30' of the REQUIRED BUILDING LINE, 3' to 5'. Entrances may be at grade, with transitions to meet the minimum finished floor elevation within the building interior. This does not prohibit an ACCESSORY UNIT in an ENGLISH BASEMENT form.
- 3. **All STORIES clear height:** 9' minimum
- 4. **STREET WALL:** permitted, 4' to 8'
- 5. **DOORYARD wall or fence:** permitted, maximum 40". This is an optional low garden wall or fence surrounding the DOORYARD area. See Section 194. Architectural Standards, I. Street Walls and Fences.
- 6. **PRIVACY FENCE:** permitted, 6' maximum, measured from adjacent grade.

193.4 Neighborhood Medium Frontage



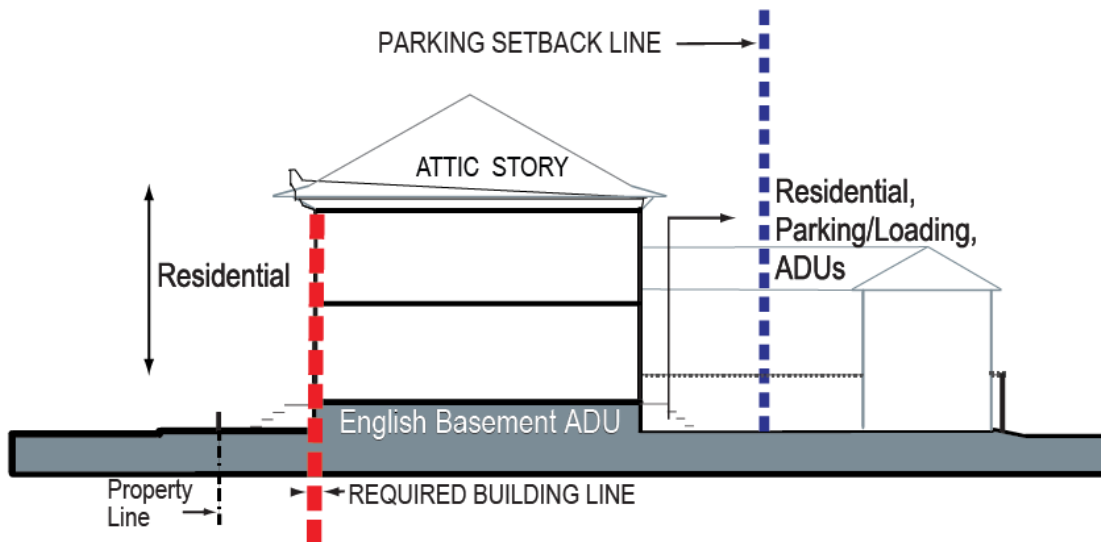
E. ELEMENTS¹

1. **FENESTRATION, all STORIES:** 25 to 70%
2. **A STOOP or FRONT PORCH²** is required:
 - a. **FRONT PORCH:** minimum width 10', minimum depth 8'
 - b. **STOOP:** for **SMALL APARTMENTS**, width 10' to 15', depth 6' to 8'; for all others, width 4' to 6', depth 3' to 5'
 - c. For **ROWHOUSE** or duplex configurations this requirement applies to each **ROWHOUSE** or to each unit for a duplex.
3. **BALCONIES:**
Required on the upper **STORIES** of **SMALL APARTMENTS** with more than 45' of frontage width. **ROWHOUSES** are not subject to this requirement. Where used to satisfy this requirement, or as part of the **PRIVATE OPEN AREA** calculation, the below dimensions are required:
 - a. **BALCONIES** shall cumulatively be a minimum 1/3rd the **FACADE** width for each upper **STORY**.
 - b. Minimum depth 5', Minimum width 7';
4. **ATTIC STORY:** permitted within the parameters of *Section 194.D*.
5. **FACADE Entries:** All dwellings must have at least one entry in the **FACADE** that provides direct access to the **STREET-SPACE**, whether through a shared lobby or their own entry door. **ADUs** are exempt but must have a clear access to the **STREET-SPACE**.
6. **Upper STORY Access:** Unenclosed or partially enclosed exterior staircases may not be used to access upper **STORY** dwelling units.

¹ See Section 194. Architectural Standards, for specific **FACADE** materials & configuration requirements.

² **STOOPS** and **FRONT PORCHES**, by definition, encroach into the **DOORYARD**.

193.4 Neighborhood Medium Frontage



F. USES

See Section 197. Building Functions for specific parameters and/or performance standards.

1. **All STORIES:** Residential.
2. **Accessory Dwelling Units:** permitted for owner-occupied attached and detached single-unit dwellings. (See 193.1 General Standards, G. Accessory Dwelling Units, above.)
3. **Rear Lot Area:**
 - a. In addition to the residential use, parking and loading is permitted, behind the PARKING SETBACK LINE.
 - b. For lots with an ALLEY/REQUIRED BUILDING LINE intersection, where there is an additional parking area designated on the REGULATING PLAN, parking is permitted in this area when:
 - i. it is within a building;
 - ii. the FACADE of the building enclosing the parking meets all requirements;
 - iii. it is 2' off the front of the REQUIRED BUILDING LINE; and
 - iv. within 40' of the rear lot line.

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193.5 Neighborhood Small Frontage

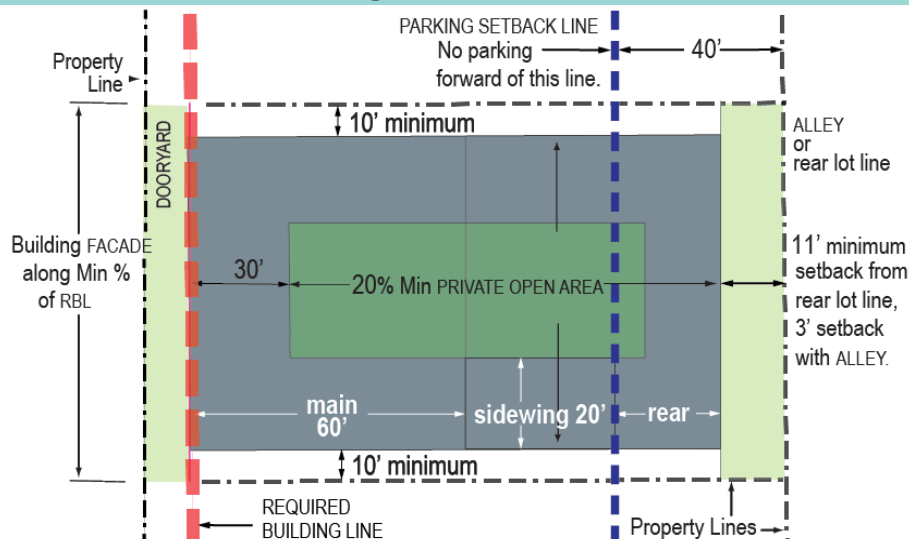
A. Illustrations and intent

The Neighborhood Small frontage is designed to fit comfortably into an existing neighborhood context, allowing redevelopment at a similar or slightly increased scale and intensity. This frontage includes houses (detached and attached), and/or small apartment buildings. The character and intensity of this frontage varies depending on the scale of its context. These frontages generally have rear yards and parking accessed from an ALLEY.

Note: These photos and statements are provided as illustrations of intent and are advisory only. They are not regulatory. Refer to the standards on the following pages for the specific standards of the Neighborhood Medium Building Form Standard.



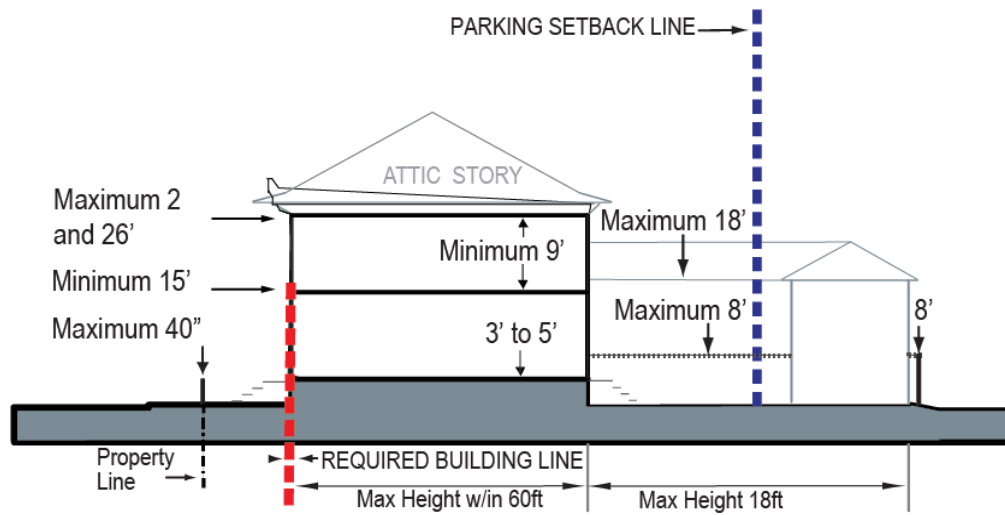
193.5 Neighborhood Small Frontage



B. PLACEMENT

1. **FACADE:** On each lot the building FAÇADE shall be built to the REQUIRED BUILDING LINE (RBL) for at least 50% of the RBL length.
2. **A STREET WALL** or PRIVACY FENCE is permitted on any unbuilt REQUIRED BUILDING LINE.
3. **Maximum FACADE width:** No individual structure or attached set/group of ROWHOUSES may exceed a maximum FAÇADE frontage length of 60 Ft. A gap of at least 10' is required between each building or set of rowhouses.
4. **BUILDABLE AREA**
 - a. The BUILDABLE AREA is delineated by the gray area in the diagram above. The main portion of the BUILDABLE AREA is within 60' of the RBL. The SIDEWING BUILDABLE AREAS are between the main and rear BUILDABLE AREA and within 20' of each side setback.
 - b. The REQUIRED BUILDING LINE is indicated on the REGULATING PLAN. It is generally located 15' off the ROW/property line for Neighborhood Small. The exact position of the RBL should be confirmed in consultation with the Zoning Administrator and ZRC.
 - c. Setbacks: 10' each side lot line; 3' from an ALLEY and 11' from rear lot line where there is no ALLEY.
 - d. A PRIVATE OPEN AREA equal to at least 20% of the BUILDABLE AREA must be provided on every lot.
 - i. The minimum PRIVATE OPEN AREA dimension is 18'.
 - ii. The PRIVATE OPEN AREA must be located at least 30' behind the REQUIRED BUILDING LINE.
 - iii. The PRIVATE OPEN AREA must be at grade, except BALCONIES and extremely shallow lots, as specified in v. below;
 - iv. Up to 33% of the required PRIVATE OPEN AREA may be satisfied through the BALCONIES of individual ROWHOUSES and/or units, which are exempt from *i* and *ii* above.
 - v. The PRIVATE OPEN AREA for lots with less than 70' from the REQUIRED BUILDING LINE to the rear setback, may be above grade.
5. **Other**
 - a. The PARKING SETBACK LINE is indicated on the REGULATING PLAN, generally 40' from the rear lot line, with limited exceptions at ALLEY/RBL intersections and for other special conditions, see E.3. *Rear Lot Area below*. The side setback for parking is 3' from any COMMON LOT LINE
 - b. The minimum ROWHOUSE width, measured parallel to the RBL, is 18'.
 - c. A PRIVACY FENCE is permitted, at or behind the REQUIRED BUILDING LINE, on COMMON LOT LINES, and on rear lot lines.

193.5 Neighborhood Small Frontage



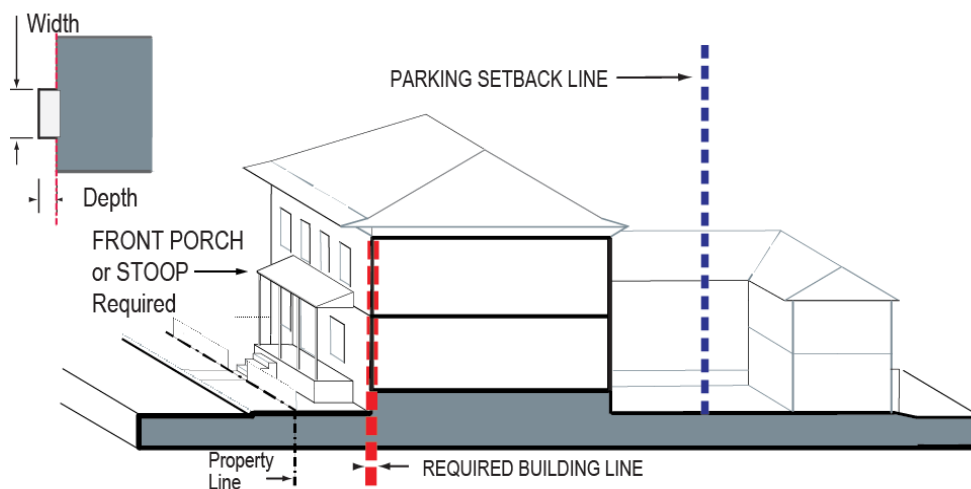
C. HEIGHT

1. Building Height:

- a. At and within 60' of the RBL: minimum 15', maximum 2 STORIES and 26 feet.
- b. Sidewing and rear lot area: maximum 18'.

2. **Ground floor finished elevation:** within 30' of the REQUIRED BUILDING LINE: 3' to 5'. Entrances may be at grade, with transitions to meet the minimum finished floor elevation within the building interior. This does not prohibit an ACCESSORY UNIT in an ENGLISH BASEMENT form.
3. **All STORIES CLEAR HEIGHT:** 9' minimum
4. **STREET WALL:** permitted, maximum 6'.
5. **DOORYARD wall or fence:** permitted, maximum 40". This is an optional low garden wall or fence surrounding the DOORYARD area.
6. **PRIVACY FENCE:** permitted, 6' maximum along RBL, 8' maximum along COMMON LOT LINES and rear lot lines, measured from adjacent grade.

193.5 Neighborhood Small Frontage



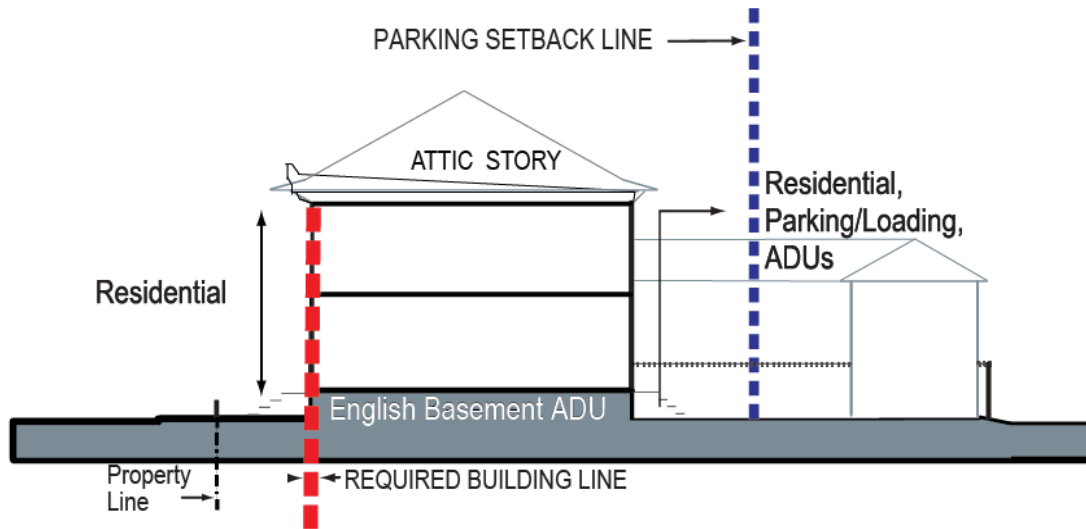
D. ELEMENTS¹

1. **FENESTRATION, all STORIES:** 25 to 70%
2. **A STOOP or FRONT PORCH²** is required:
 - a. FRONT PORCH: minimum width 10', minimum depth 8
 - b. STOOP: for SMALL APARTMENTS, width 6' to 10', depth 6' to 8'; for all others width 4' to 6', depth 3' to 5'
 - c. For ROWHOUSE configurations, this applies to each ROWHOUSE or to each unit for a duplex.
3. **BALCONIES:**
Required on the upper STORIES of SMALL APARTMENTS with more than 45' of frontage width. Where used to satisfy this requirement, or as part of the PRIVATE OPEN AREA calculation, these dimensions are required:
 - a. BALCONIES shall cumulatively be a minimum 1/3rd the FACADE width for each upper STORY. ROWHOUSES are not subject to this requirement.
 - b. Minimum depth 5', minimum width 7';
4. **ATTIC STORY:** permitted within the parameters of *Section 194.D*.
5. **FACADE Entries:** All dwellings must have at least one entry in the FACADE that provides direct access to the STREET-SPACE, whether through a shared lobby or their own entry door. ADUs are exempt but must have a clear access to the STREET-SPACE.
6. **Upper STORY Access:** Unenclosed or partially enclosed exterior staircases may not be used to access upper STORY dwelling units.

¹ see Section 194. Architectural Standards, for specific FACADE materials & configuration requirements,

² STOOPS and FRONT PORCHES, by definition, encroach into the DOORYARD.

193.5 Neighborhood Small Frontage



E. USES

See Section 197. Building Functions for specific parameters and/or performance standards.

1. **All STORIES:** Residential.
2. **Accessory Dwelling Units:** permitted for owner-occupied ROWHOUSES and detached houses. (See 193.1 General Standards, G. Accessory Dwelling Units, above.)
3. **Rear Lot Area:**
 - a. In addition to the residential use, parking and loading is permitted, behind the PARKING SETBACK LINE.
 - b. For lots with an ALLEY/REQUIRED BUILDING LINE intersection, where there is an additional parking area designated on the REGULATING PLAN, parking is permitted in this area when:
 - i. it is within a building;
 - ii. the FACADE of the building enclosing the parking meets all requirements;
 - iii. it is 2' off the front of the REQUIRED BUILDING LINE; and
 - iv. within 40' of the rear lot line.

193.6 Cottage Courts in Neighborhood Frontages



Note: The photos above are provided as illustrations of intent and are advisory only. They are not regulatory. Refer to the standards below for the specific standards for COTTAGE COURTS.

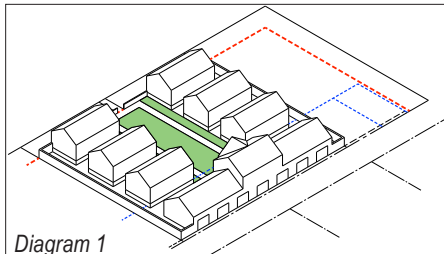


Diagram 1
COTTAGE COURT with a COTTAGE above the parking shed

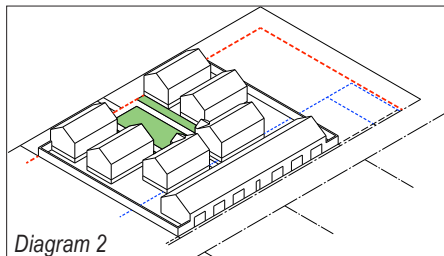


Diagram 2
COTTAGE COURT with 6 COTTAGES

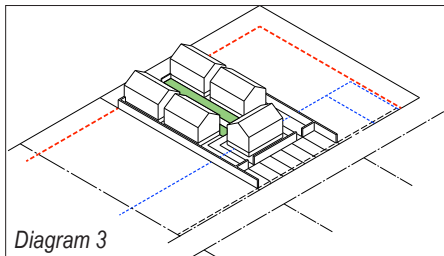


Diagram 3
A small COTTAGE COURT with 5 COTTAGES and a rear parking lot

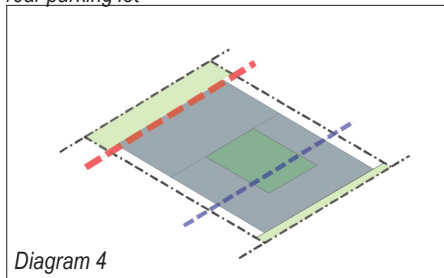


Diagram 4

See 193.4 Neighborhood Medium or 193.5 Neighborhood Small for the base frontage standards.

A. Cottage Court Specifications

Where a COTTAGE COURT configuration is being proposed, all rules of the designated Neighborhood Frontage apply, with the following additions and modifications:

1. The minimum lot width necessary for a cottage court is 66' in Neighborhood Medium frontages and 76' in Neighborhood Small frontages
2. Minimum 5' separation between all buildings (walls).
3. Minimum COTTAGE width and/or length of 18'.
4. Maximum COTTAGE and/or unit footprint of 700 sq ft (parking garages and parking sheds are not limited by this)
5. Maximum height of 1 ½ STORIES or 18'.
6. Maximum 2 bedrooms per cottage.
7. Maximum rental occupancy 2 adults (children are not precluded).
8. The Central Courtyard:
 - a. Must be contiguous with the RBL and open to the RBL not less than 80% of the widest COURTYARD dimension (parallel to the RBL).
 - b. Must be open to the STREET-SPACE, with no wall or fence taller than 40" above the average fronting CLEAR SIDEWALK elevation.
 - c. Must be configured as a simple rectangle,¹ with no more than one width and/or depth variation.
 - d. Must be between 20' and 70' wide and between 40' and 90' deep.
 - e. Must be a green space, not more than 1/3rd paved.²
 - f. Satisfies the PRIVATE OPEN AREA requirement.
9. COTTAGES not on the RBL shall front the central COURTYARD. Elevations fronting the COURTYARD will be regulated as FACADES.
10. At least 15' of each COTTAGE must be contiguous along the COURTYARD.
11. All COTTAGE roofs shall be simple hip or gable roofs with a pitch between 5:12 and 12:12. Shed roofs, minimum pitch 3:12, are permitted on dormers, porches, and parking sheds.
12. A PRIVACY FENCE is required on the side lot lines behind the RBL.
13. Vehicle parking must be behind the PARKING SETBACK LINE.

1. The central COURTYARD for irregular lots may vary to accommodate the shape of the side lot lines, but must maintain a simple shape, as approved by the Zoning Administrator.

2. All paved areas, other than central COURTYARD walkways, must be reviewed by the ZRC.

Section 26-194. Architectural Standards

A. General Purpose and Intent

The primary purposes of the *Architectural Standards*, working in tandem with *Section 26-193. Building Form Standards*, is to complement and reinforce the pedestrian environment and STREET-SPACE of the Character Districts through the application of high quality materials and architectural designs. These standards are intended to result in construction that is simple and functional, includes sustainable elements, and that will result in quality development that uses durable materials and design. A wide range of architectural expressions, from traditional to contemporary, can be achieved through these standards. The character of new building FACADES should complement the materials and general scale of surrounding district buildings and, through application of these standards, create a cohesive ensemble of buildings within the Character District.

These *Architectural Standards* include basic parameters for functional building element configurations and a palette of exterior building materials. In order to establish and maintain a sense of place, these standards specify an architectural aesthetic of load-bearing walls and regional materials. The standards also specify details, such as window proportions, roof or cornice configurations, shopfronts, and overhangs. Buildings should reflect and complement the traditional materials and techniques of the greater Cedar Falls region.

B. General Principles

1. Applicability:

- a. These standards apply to all new construction within the Character Districts, unless otherwise expressly stated in this section. *See Section 26-63 Proportionate Compliance* for specific applicability when remodeling or renovating existing structures.
- b. Where CLEARLY VISIBLE FROM THE STREET-SPACE:
 - (i) Many of these standards apply only where clearly visible from the STREET-SPACE. Note that the definition of STREET-SPACE includes parks, SQUARES, and CIVIC GREENS but NOT ALLEYS.
 - (ii) These controls concentrate on the public realm and views from the public realm, and minimize interference in the private realm. For example, an architectural element that is visible only through an opening in a STREET WALL is NOT CLEARLY VISIBLE FROM THE STREET.

2. Materials

- a. All building materials shall express their structural properties. For example, stronger and heavier materials (masonry) should be located below lighter materials (wood). Material changes should occur at logical construction locations (such as at an inside corner).
- b. EQUIVALENT OR BETTER:

Materials, techniques, and product types listed in this Section are prescribed. Where indicated, materials that are EQUIVALENT OR BETTER may be proposed to the Zoning Administrator and ZRC for review according to the Minor Adjustments process established in Section 26-39, not including any materials specifically prohibited in the individual sub-Section. The Zoning Administrator will maintain a list of approved materials containing materials that have met this standard and are therefore permitted under this section.

Character District Sections: 26-191 to 26-198

- 191. Introduction & Definitions
- 192. Regulating Plans
- 193. Building Form Standards
- 194. Architectural Standards**
- 195. Public Realm Standards
- 196. Parking & Loading
- 197. Building Functions
- 198. Reserved
- 199. Reserved

C. Architectural Standards: Building Walls

1. Purpose and Intent

BUILDING FACADES define the **PUBLIC REALM**, or **STREET-SPACE**. All walls should express the construction techniques and structural constraints of their building materials. These standards are intended to achieve simple configurations and solid craftsmanship.

Photographs are provided as illustrations of intent, with no regulatory effect. They shall not imply that every element in the image is permitted. Refer to the standards on the following page for the specific requirements of this section.



Building with stone and brick FACADE



Cast iron SHOPFRONT with brick second STORY



Material change at an interior corner, a logical structural location.



Building with copper FACADE



Recent all-brick townhouses with significant architectural detailing



Stucco building FACADE.

2. Applicability

The standards in this section apply to all building walls that are **CLEARLY VISIBLE FROM THE STREET-SPACE**. Where expressly stated, they also apply to additional building elevations.

3. Primary FAÇADE Materials

- a. Any of the following building materials shall be used on a minimum of 75% of the FACADE area. This measurement shall be calculated as a percentage of the wall portion of the FACADE, exclusive of FENESTRATION.
 - (i) Brick and terra cotta;
 - (ii) Natural stone;
 - (iii) Stucco (cement plaster); prefabricated stucco panels and sprayed on stucco finishes are prohibited;
 - (iv) Cast iron, copper, stainless steel (18-8 or better), or titanium metal.
- b. For Neighborhood frontages only:
 - (i) Wood or approved fiber cement siding;
 - (ii) Vinyl siding may be used to replace other types of siding on existing single-unit residential buildings. On other buildings with existing vinyl siding, that siding may be replaced or repaired with vinyl siding and any additions may be clad with vinyl siding.
- c. Additional materials may be proposed to the Zoning Administrator and ZRC for review under the EQUIVALENT OR BETTER standard, see *Section B.2.b* above.

4. Secondary Materials

Any of the following materials are permitted on a maximum of 25% of the FAÇADE area and on all side and rear elevations.

- a. All permitted primary materials;
- b. Metal (heavy gauge & non-reflective);
- c. Ground- or Split-faced block (integrally colored);
- d. Glass block;
- e. Decorative tile;
- f. Pre-cast masonry;
- g. Durable foam-based products, such as Fypon, may be used for architectural detailing; and
- h. EIFS (Exterior Insulation and Finishing System) and other synthetic materials may be used above the second story, if on the ZRC Approved Alternate Materials List.

5. Prohibited Materials

- a. Styrofoam;
- b. Vinyl (except as noted above for Neighborhood frontages) and aluminum siding.

6. Configurations and Techniques

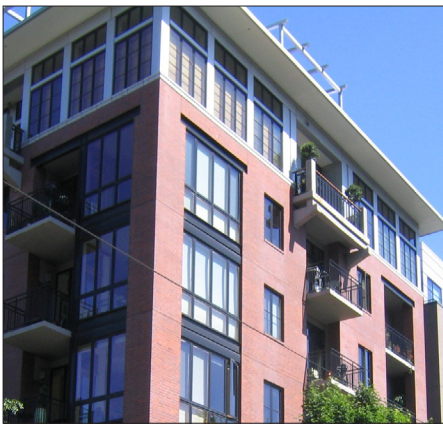
- a. When different materials are used on a FACADE, heavier materials shall be used below lighter materials (i.e., stone below brick; brick below metal panel; brick below siding).
- b. All masonry, including brick, block, and stone, shall be in an apparent load-bearing configuration.
- c. Where siding, including panels, is not mitered at corners, siding shall incorporate corner boards on the outside building corners to conceal raw edges.
- d. Wall openings (FENESTRATION) must:
 - (i) have a vertical dimension equal to or greater than the horizontal dimension unless otherwise specifically permitted in these district standards;
 - (ii) correspond to the interior space and shall not span across building structure such as a floor or wall.
- e. Wood Siding and Wood Simulation Materials
 - (i) Horizontal siding shall be configured with a maximum board exposure of 8 inches.
 - (ii) Board and batten siding shall have a maximum board width of 10 inches.
 - (iii) Siding and shingles shall be smooth, not rough-sawn finish.
 - (iv) Shall not come in contact with the ground surface.
- f. Stucco:
 - (i) Shall have a smooth or sand finish only; no rough textured finish.
 - (ii) Shall not come in contact with the ground surface.
- g. All exposed masonry walls (i.e., STREET WALLS, garden and other free-standing walls, and parapets) shall have a cap or coping to protect the top of the wall from weather.

D. Architectural Standards: Roofs, Eaves and Parapets

1. Purpose and Intent

Roofs and parapets are part of the **FACADE** composition (its crown or hat) and contribute to the spatial definition of the **STREET-SPACE**. They should demonstrate common-sense recognition of the climate by utilizing appropriate pitch, drainage, and materials in order to provide visual coherence to the district. Roof forms are not interchangeable. The roof type is integral to the design of the building and its architectural character and the configuration should be appropriate for the building and its **FACADE**.

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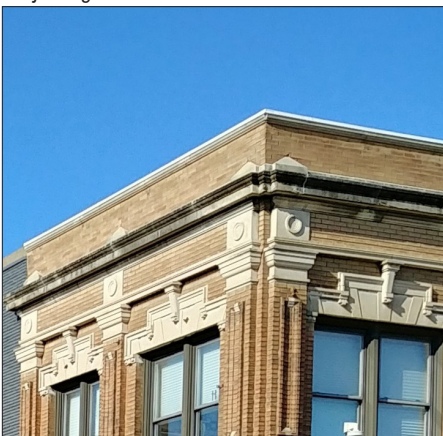
Projecting cornice



Parapet wall as Dutch Gable



Building with gable eaves and **FACADE** cornice



Parapet wall with projecting cornice



Overhanging eave



Parapet walls with projecting brick corbels

2. Applicability

The standards in this section apply to any roof or parapet that is CLEARLY VISIBLE FROM THE STREET-SPACE.

3. Permitted Roofing Materials

- a. Tile;
- b. Slate, and equivalent synthetic materials or better;
- c. Metal, shingle or standing seam, equivalent or better;
- d. Dimensional architectural grade composition shingles; or
- e. Wood shingles.

3. Prohibited Roofing Materials: corrugated metal

4. Additional Permitted Materials and Elements

- a. Cornices and soffits may be comprised of wood or metal.
- b. Gutters and downspouts may be vinyl and/or metal, in accordance with industry standards.
- c. Parapet wall materials, exclusive of copings, shall match the building wall.

5. Additional materials may be proposed to the Zoning Administrator and ZRC for review under the EQUIVALENT OR BETTER standard, see *Section B.2.b* above.

6. Configurations and Techniques

- a. Flat roofs are allowed except in COTTAGE COURT configurations.
- b. Pitched Roofs
Roof pitch is measured as rise over run. For example, a 4:12 pitched roof increases 4" in height for every 12" of horizontal distance.
 - (i) Roofs that cover the main body of a building shall have a slope of no less than 5:12 and no more than 12:12.
 - (ii) The roofs of FRONT PORCHES, STOOPS, and BALCONIES shall have a slope of no less than 2:12 and no more than 6:12.
 - (iii) The end walls of a Dutch gable or gambrel roof may extend up above the roof line to form a parapet.
 - (iv) Pitched roofs, except those on the FACADE side of the building, may be "cut out" to allow roof access for terraces and mechanical equipment. The cut out area may not be within 18 inches of end of the individual exterior wall nor within 18 inches of the roof ridge.
- c. Overhang Requirements
 - (i) There shall be a 10 to 30 inch overhang near the top of the primary structure, with the exception of parapet walls, which have a minimum overhang of 3". This does not apply to walls on/at COMMON LOT LINES or rear elevations.
 - (ii) Buildings may satisfy the overhang requirement with eaves, a cornice, or similar form projecting horizontally from near the top of the building wall or above the ceiling of the uppermost STORY.
- d. Other Elements
 - (i) Roof-mounted equipment is permitted only when screened from view (from the STREET-SPACE) by the building's parapet wall.
 - (ii) Skylights, solar shingles, and solar panels that are flat and flush to the roof are permitted; however, non-flat/flush panels should be mounted at least 5 feet from the roof outer edge/eaves or behind the parapet wall.

E. Architectural Standards: Windows and Doors

1. Purpose and Intent

The placement, configuration, type, and size of windows and doors on the **FACADE** greatly influences the scale and character of the **STREET-SPACE**. For Storefront frontages, windows allow interplay between the ground floor interiors and the sidewalk. Commercial uses (especially restaurants and retail establishments) benefit from exposure to the passers-by and the **STREET-SPACE** benefits from the visual activity. For residences, windows foster the “eyes on the street” surveillance which provides for the security and safety for the area.

Photographs are provided as illustrations of intent, with no regulatory effect. They shall not imply that every element in the image is permitted. Refer to the standards on the following page for the specific requirements of this section.



Door with transom and sidelight windows



Windows recessed behind **FACADE** surface



Ground STORY **SHOPFRONT** and upper story double-hung windows



Grouped windows



SHOPFRONT windows with stained glass transom



Grouped windows

2. Applicability

The standards in this section apply to any window or door that is CLEARLY VISIBLE FROM THE STREET-SPACE. See *Section 26-63* for specific applicability when remodeling or renovating existing structures. Specific requirements and exceptions for SHOPFRONTS are provided in section *F. Shopfronts*, below.

3. Materials

- a. Glass panes must be clear, with low reflectivity and light transmission at the GROUND STORY of at least 75%. SHOPFRONT transoms are excluded from this restriction.
- b. Doors shall be of wood, clad wood, glass, steel, or any combination thereof.
- c. Shutter materials shall be wood or clad wood.
- d. Additional materials may be proposed to the Zoning Administrator and ZRC for review under the EQUIVALENT OR BETTER standard, see *Section B.2.b* above.

4. Configurations and Techniques

- a. All Windows except SHOPFRONTS (see *F. Shopfronts*, below)
 - (i) The horizontal dimension of the opening shall not exceed the vertical dimension except for transom windows above an entrance;
 - (ii) Windows may be grouped horizontally if each grouping is separated by a mullion, column, pier, or wall section that is at least seven inches wide. A group is limited to a maximum of five windows;
 - (iii) Windows should be subdivided to provide a pedestrian scale. The maximum dimensions for glass panes are 60 inches vertical by 36 inches horizontal.
 - (iv) Window panes shall be recessed behind the surface of the FACADE a minimum of three inches, except for BAY WINDOWS and SHOPFRONTS.
 - (v) Windows must correspond to the clear height within a building and may not span across building structure such as floor structural and mechanical thicknesses. Windows on different story levels must be separated by a minimum 24-inch wall or framing element.
 - (vi) Window types: single-, double-, and triple-hung, hopper, awning, casement, clerestory, and transom.
 - (vii) Fixed windows are only permitted as part of a window grouping that includes an operable window.
 - (viii) Egress windows may be installed as required by the applicable building code.
 - (ix) Snap-in mullions and MUNTIN are permitted but not considered in any proportion calculation or measurements for fenestration.
 - (x) Exterior shutters, when used, shall be sized and mounted appropriately for the window (one-half the width).
- b. GROUND STORY Windows and Doors
 - (i) Double-height entryways (those that span more than one STORY) are not permitted.
 - (ii) General and Storefront FACADE doors shall not be recessed more than four feet¹ behind their FACADE and, in any case, shall have a clear view and path to a minimum 45-degree angle past the perpendicular from each side of the door into the STREET-SPACE. Doors may not encroach into the right-of way when opened.
- c. Upper STORY Windows

On all upper STORIES, a minimum of 40% of the window area, per STORY, must be operable.
- d. Garage doors

When a lot is adjacent to an ALLEY, garage doors shall face towards the ALLEY.

¹ *Note of Intent: there may be historic shopfronts in the downtown that do NOT meet this standard. This is done in consideration of the materials, craftsmanship and aesthetic of contemporary construction (new buildings won't be built out of the same materials or with the same kind of craftsmanship as the historic buildings).*

F. Architectural Standards: SHOPFRONTS

1. Purpose and Intent

SHOPFRONTS enliven the public realm. They improve walkability, with frequent entrances and large display windows providing transparency and connection between the interior activity and the public sidewalk. Display windows should be large to allow unimpeded views into the interior of the shop. Closely spaced mullions or muntins, punched windows, and horizontal grids should be avoided.

2. Applicability

The standards in this section apply to building frontages designated as Storefront on the Character District REGULATING PLAN. They include more requirements than, and some exceptions to, the standards in *Section E. Windows and Doors*, above. Where there is an apparent conflict, these rules apply. Applicants may use the SHOPFRONT standards for any portion of a General Urban frontage, subject to ZRC approval.

3. Requirements and Configurations

- a. The bottom of SHOPFRONT window glass shall be between 1 and 3 feet above the sidewalk and shall run from the sill to a minimum of 8 feet above the sidewalk. Materials per *Section C. Building Walls* must be used below the window sill.
- b. Roll-up garage doors are not permitted for designated Storefront Frontages.
- c. SHOPFRONT window and door glass shall be clear, with light transmission of at least 75%. Transom glass may be tinted, obscured, stained, or glass block.
- d. Individual panes of glass in SHOPFRONTS shall be no larger than 11 feet in height and 6 feet in width.
- e. SHOPFRONT windows and doors may not be made opaque by window treatments, except by operable sunscreen devices within the interior. A minimum of 75% of the FENESTRATION must allow views into the interior for a depth of at least 10 feet.
- f. Shopfront doors must have at least 60% glass. Solid and opaque doors are prohibited.
- g. Shopfront doors must be distinguished by features such as: transom windows, AWNINGS or CANOPIES, or a recessed entryway.
- h. SHOPFRONTS must be differentiated from the FACADE above by a projection or string course, with a minimum relief of one inch and minimum vertical width of three inches, between each SHOPFRONT and the window-sill level of the second STORY.

Photographs are provided as illustrations of intent, with no regulatory effect. They shall not imply that every element in the image is permitted. Refer to the standards on the following page for the specific requirements of this section.



G. Architectural Standards: AWNINGS and CANOPIES

1. Purpose and Intent
 AWNINGS and CANOPIES provide protection from the elements and create shade and shadow on the building, enhance the three dimensional quality, add interest, and can help emphasize a primary building entrance. Open ended AWNINGS are preferred to make blade signs and transom windows more visible from the sidewalk.
2. Applicability
 The standards in this section apply to any AWNING or CANOPY that is CLEARLY VISIBLE FROM THE STREET-SPACE.
3. Materials
 - a. AWNING must be made of commercial-grade fabric and may be either fixed or retractable. High-gloss, plasticized, shiny or reflective materials are prohibited.
 - b. CANOPY framing shall be constructed of either metal or wood.
 - c. CANOPY roofing materials, where CLEARLY VISIBLE FROM THE STREET-SPACE, may be: metal standing seam (5V crimp or equivalent), slate, glass, or durable fabric.
 - d. Additional materials may be proposed to the Zoning Administrator and ZRC for review under the EQUIVALENT OR BETTER standard, see Section B.2.b above.
4. Configurations
 - a. AWNINGS and CANOPIES shall not interfere with utilities, street trees, or other important ROW elements.
 - b. AWNINGS and CANOPIES shall shade windows with the awning top mounted no more than one foot above the opening below.
 - c. AWNING and CANOPY overhangs shall have a minimum of nine feet clear height above the sidewalk and be minimum of four feet deep, measured from the FAÇADE. The maximum depth is to back-of-curb or the TREE LAWN edge, whichever is less. (subject to approval by the Zoning Administrator and ZRC).
 - d. Back-lighting or internal illumination through the AWNING or CANOPY is not permitted.
 - e. One-quarter cylinder configurations are not permitted.
 - f. CANOPIES shall be mounted to the building wall and supported either from below by brackets or from above by cables or chains, or be structurally integrated with the building.

Photographs are provided as illustrations of intent, with no regulatory effect. They shall not imply that every element in the image is permitted. Refer to the standards on the following page for the specific requirements of this section.



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H. Architectural Standards: FACADE Composition for Large Building Frontages

1. Intent

General and Storefront frontages have additional specific design parameters to ensure that they create a positive pedestrian environment.

2. Applicability

These standards maintain a pedestrian scale, even where the buildings are quite large. They apply to the first four STORIES of the FACADE. This conservatively covers the distance within which one can discern the human face from the street. Building FACADES with 100 feet or more of frontage on a BLOCK FACE are subject to this rule. Lots with street frontage of less than 100 feet on a BLOCK FACE are exempt from this rule for that BLOCK FACE, but shall still include at least one functioning pedestrian street entry and meet all other applicable BUILDING FORM STANDARDS.

3. Facade Composition

The FACADE composition rule is intended to maintain a pedestrian-friendly scale. “FACADE COMPOSITION” is the arrangement and proportion of FACADE materials and elements (windows, doors, columns, pilasters, bays). “Complete and discrete” distinguishes one part of the FACADE from another to give the appearance of distinct FACADES.

a. For each BLOCK FACE, FACADES along the REQUIRED BUILDING LINE shall present a complete and discrete vertical FACADE COMPOSITION for the STREET-SPACE, at no greater than the following average STREET FRONTAGE lengths:

- (i) 60 feet for Storefront frontages;
- (ii) 75 feet for General frontages.

These are average frontage lengths; the FACADE may be composed of bays of different sizes to achieve the average; uniform spacing is not required.

b. Each FACADE COMPOSITION shall include at least one functioning street entry door.

c. The FACADE COMPOSITION requirement may be satisfied by liner shops, which are shallow shops located in front of larger footprint uses such as grocery stores or parking structures.

d. To achieve a complete and discrete vertical FACADE COMPOSITION within a BLOCK FACE the applicant shall demonstrate that at least two of the following features that distinguish one FACADE COMPOSITION from the next are included:

- (i) Different FENESTRATION proportions of at least 20% in height or width or height:width ratio. (See Figure 1.)
- (ii) Different FACADE configurations, through a change in architectural features, such as FACADE elements, bay rhythm, cornice line, articulation, or detailing; change in the wall plane alone is insufficient. (See Figure 2.)
- (iii) Change in wall material; color changes alone are insufficient.
- (iv) Change in total FENESTRATION percentage with a minimum difference of 12%. Ground floor FACADES are not included.
- (v) Clearly different ground story FACADE composition, using framing material and fenestration proportions.

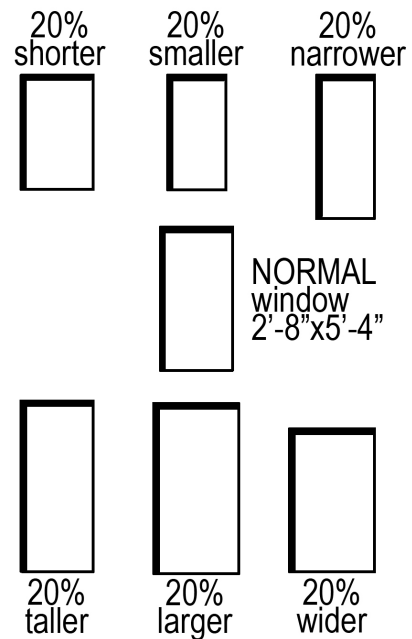


Diagram 1. Illustration of different FENESTRATION proportions

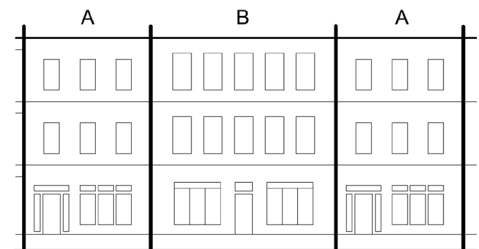


Diagram 2. Illustration of FACADE configurations with a clearly different rhythm

I. Architectural Standards: Street Walls and Fences

1. Purpose and Intent

The STREET-SPACE is physically defined by buildings, walls, or fences. Land should be clearly public or private; in the public view or private and protected.

STREET WALLS establish a clear edge to the STREET-SPACE where there is no building. These requirements include masonry walls that define outdoor spaces and separate the STREET-SPACE from the private realm (e.g. parking lots, gardens, trash cans, and equipment). All STREET WALL faces should be designed as is the building FAÇADE, with the finished side out (i.e. the “better” side facing the STREET-SPACE).

Photographs are provided as illustrations of intent, with no regulatory effect. They shall not imply that every element in the image is permitted. Refer to the standards on the following page for the specific requirements of this section.



STREET WALL defining private garden or courtyard



STREET WALL with door



STREET WALL with gate



STREET WALL with gates shielding service area from PUBLIC REALM



Not permitted—no STREET WALL and parking visible from the STREET-SPACE

2. Applicability

The following standards apply to all STREET WALLS and fences that are CLEARLY VISIBLE FROM THE STREET-SPACE.

3. Materials

a. Walls

- (i) Brick;
- (ii) Natural stone
- (iii) Stucco on masonry (such as concrete block or poured concrete)
- (iv) A combination of materials, e.g., stone piers with brick infill panels, masonry with iron or steel.

b. Gates and Fenestration

- (i) Metal, including wrought iron, welded steel and/or electro-plated black aluminum; may also be used for FENESTRATION in the wall itself; or
- (ii) Wood.

c. DOORYARD and Privacy Fences

- (i) Wood;
- (ii) Wrought iron or metal that faithfully imitates wrought iron;
- (iii) Dimensional composite material (synthetic and composite woods); or
- (iv) A combination of any of the above materials with masonry piers.
- (v) Rolled fencing (such as chain link) is prohibited where CLEARLY VISIBLE FROM THE STREET-SPACE.
- (vi) Additional materials may be proposed to the Zoning Administrator and ZRC for review under the EQUIVALENT OR BETTER standard, see *Section B.2.b* above.

4. Configurations and Techniques

Permitted configurations and techniques (See also *Section 26-193. Building Form Standards*):

a. STREET WALLS:

- (i) shall be built to the height and length specified in the applicable BUILDING FORM STANDARD.
- (ii) taller than 5 feet are subject to the FENESTRATION requirements of the applicable BFS frontage; those lower than 5 feet may use the FENESTRATION parameters.

b. DOORYARD Fences and Privacy Fences:

- (i) shall be “finished side” facing the street or adjacent property;
- (ii) DOORYARD fences: must be at least 1/3 open and not solid. Wooden picket boards should not be more than 3.75 inches wide and set so that the space between them is not more than 3 inches wide.



STREET WALLS with coping and wrought iron along an unbuilt street frontage.



J. Architectural Standards: Entry Features, FRONT PORCHES, STOOPS and CANOPIES

1. Purpose and Intent

Building entries are the front door of a building and provide a connection between the building interior and the outside, public activity. They also establish a clear hierarchy and focal point for the building. Entries should be scaled appropriately to the size of the building.

Photographs are provided as illustrations of intent, with no regulatory effect. They shall not imply that every element in the image is permitted. Refer to the standards on the following page for the specific requirements of this section.



Small Apartment Building with a clear entry



Small Apartment Building with a forecourt entry



Rowhouses with entry STOOPS



Urban General building entry with STOOP and CANOPY with BALCONY above.



Small Apartment Building with a FRONT PORCH entry

2. Applicability

The standards in this section apply to all building FACADE entries within a Character District.

3. Materials

Permitted materials for FRONT PORCHES, STOOPS, and other entry features: (For AWNING and CANOPY materials, see Section G. Awnings and Canopies, above.)

- a. Foundation walls and piers of stucco, stone, split-faced concrete, poured concrete with a smooth finish, or brick.
- b. Porch posts, piers, columns or pilasters of wood, or approved fiber cement product, stone, stucco, brick, or split-faced block.
- c. Balustrades of: wood, which must be finished (painted or stained, no raw lumber); large section aluminum; or Zoning Administrator approved synthetic, which must be paintable.
- d. Privacy lattice (max 1” openings) enclosing open foundations.
- e. Additional materials may be proposed to the Zoning Administrator and ZRC for review under the EQUIVALENT OR BETTER standard, see Section B.2.b above.

4. Configurations

Entries should be distinguished by variations in FACADE design, materials, and articulation that clearly identifies the entrance.

- a. Spacing between columns, piers or posts shall be no wider than 1.33 times their height (for example, 9’ tall posts can not be more than 12’ apart).
- b. All required FRONT PORCHES or STOOPS shall be roofed, with supporting posts, brackets, piers or columns and railings. STOOPS may alternately have a CANOPY or AWNING covering. The AWNING or CANOPY may be supported as described in a., above, or hung from the FACADE by chains or wires of not less than 3/8” diameter.
- c. The minimum dimension¹ or diameter for single columns or posts is 7”, 4” if paired/doubled, Turned posts are allowed to have portions with a diameter that are as much as 1/3rd below the minimum. Supporting masonry bases have a 8” minimum dimension, and pilasters must be at least 8” wide x 1” in depth from the FACADE.
- d. Pediments, or any other entry architectural detailing, must be at least 4” in depth from the facade and completely span the entry opening.
- e. CANOPIES must completely cover the STOOP they are overhanging.
- f. Balusters and railings shall be a minimum dimension of 1” (max. 4” dimension) with a max. 3” clear space between them. They must sit on and be attached to the FRONT PORCH or STOOP floor/platform’s top surface, they may not be attached to it’s joists or the side of the platform.
- g. FRONT PORCHES or STOOPS with railings/balustrades shall be at least 30” in height above their floor and fully surround the FRONT PORCHES or STOOP excepting a maximum 6 ft wide front opening and (separate) side opening for any side access.
- h. Porch screen frames may only be mounted behind the columns, posts or piers and intermediate screen supports not less than 3 feet apart.

5. Techniques

Required FRONT PORCHES or STOOPS may be open in any direction. The elevation facing the street(s) shall not be enclosed (except by insect screening) above a level of 40” above the FRONT PORCH or STOOP floor.



CANOPIES and AWNINGS



¹ Note to Staff: “Nominal” lumber dimensions satisfy these requirements.

K. Architectural Standards: Lighting and Mechanical

1. Purpose and Intent

These standards are intended to enhance the urban pedestrian context. Appropriate lighting is desirable for night-time visibility, safety, and decoration. However, lighting that is too bright or intense creates glare, hinders night vision, and creates light pollution. Restricting the location of mechanical equipment limits intrusions that would otherwise detract from the public realm. All street lights within a Character District should be pedestrian-scaled. Highway-scale, 'cobra-head,' fixtures are generally not appropriate for true urban contexts and should be limited to intersections where absolutely necessary.

2. Applicability

The standards in this section shall apply to all properties in a Character District. Exceptions may be made to comply with state highway standards where necessary.

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Not permitted, visible from the STREET-SPACE



Not permitted within the STREET-SPACE



Pedestrian-scale street lights



Not permitted, visible from the STREET-SPACE

The illustrations above are examples of mechanical equipment arrangements that are only acceptable away from and/or not visible from a STREET-SPACE (i.e. within an ALLEY or screened from view).

3. Exterior Lighting

a. Pedestrian-scale Streetlights should be:

- (i) coordinated by the Department of Public Works and Cedar Falls Utilities (CFU) and done in accordance with any adopted Streetscape Plan;
- (ii) located on each side of the STREET-SPACE; (See *Section 26-195. Public Realm Standards*) and
- (iii) coordinated with STREET TREE placement and located at least 10 feet apart from one another.

b. Site and Accent Lighting

These standards are intended to prevent light from one property extending beyond the property line onto adjacent properties. Compliance with this subsection is achieved with fixture shielding, directional control designed into the fixture, fixture location, fixture height, fixture aim, or a combination of these methods.

- (i) Site lighting shall be designed to illuminate only the lot. If mounted on poles, lights shall not be mounted higher than 25 feet above grade. An exterior lighting plan shall be approved as consistent with these standards by the Zoning Administrator in consultation with the ZRC.
- (ii) Floodlighting or directional lighting is prohibited except for lighting of loading and service areas, and on CIVIC BUILDINGS or monuments, to highlight architectural features (such as cupolas, towers, or courthouse domes¹), and shall not produce glare into neighboring windows or light trespass into neighboring properties. Floodlights are not permitted for parking lots or outdoor display/storage areas.
- (iii) All under-canopy lights or lights mounted in eaves must either be recessed into the canopy/eave and fully shielded or use flat lenses instead of drop lenses.
- (iv) Lights within ground floor commercial space or SHOPFRONTS shall be used to illuminate the interior space and/or window displays and shall not be directed outward into the STREET-SPACE.
- (v) Light fixtures used to illuminate flags, statues, or objects mounted on a pole or pedestal must use a narrow cone of light that does not extend beyond the illuminated object. Lights that are intended to architecturally highlight a building or its features must use a limited pattern of light that does not extend beyond the wall of the building.
- (vi) Floodlights, when permitted, must be aimed no higher than forty five degrees (45°) from vertical; be located and shielded such that the bulb is not directly visible from any adjacent residential use or public right of way.
- (vii) In Neighborhood Frontages, lighting used to illuminate outdoor private recreational facilities, such as swimming pools, tennis courts, and basketball courts, must be turned off by 10:00 PM. Underwater lighting in swimming pools and hot tubs are exempt from this provision.
- (viii) No lights may exceed 0.5 initial horizontal foot-candle and 2.0 initial maximum foot-candle as measured at any point along a property boundary that is adjacent to or across the street or ALLEY from Neighborhood frontages and properties outside the Character District that are zoned residential.
- (ix) Exterior lights on the building shall be shielded and downcast or must be frosted glass or be installed behind a translucent cover. Exterior lights shall be maximum 100-watt incandescent or maximum 1600 lumens. Lights on the FACADE shall be mounted between 8 feet and 12 feet above the adjacent sidewalk. These fixtures shall illuminate the DOORYARD and CLEAR SIDEWALK area. Lights on the ALLEY shall have a 12 foot maximum height. These fixtures shall illuminate the ALLEY and may also illuminate a portion of their own rear yard area. They shall not direct light or cause glare into neighboring lots.
- (x) High intensity discharge (HID) or fluorescent lights shall not be used on the exterior of buildings.
- (xi) Temporary holiday lighting is exempt from these regulations, in accordance with other City standards.

4. Mechanical Equipment

- a. All mechanical equipment located at grade (serving the building or tenant use) shall be placed behind and away from any REQUIRED BUILDING LINE and screened by a STREET WALL if necessary to prevent its being CLEARLY VISIBLE FROM THE STREET-SPACE.
- b. All mechanical equipment on a roof shall be screened, and all screening and penthouses placed on a roof shall be set back from the roof line by a distance at least equivalent to the height of the screening or penthouse in order to minimize visibility from surrounding streets and shall have a maximum height of 18 feet.

¹ Note of Intent: intent is to allow all CIVIC BUILDING towers such as bell towers, minarets, steeples, etc.

L. Architectural Standards: Signage

1. Purpose and Intent

Signs in Character Districts should be scaled and designed for these mixed-use, pedestrian-oriented areas and not for high speed automobile traffic. Signage along commercial and mixed-use frontages should be durable and is desirable for both informational purposes and as decoration. Signage that is too large creates distraction, intrudes into or lessens the district experience, and creates visual clutter.

Photographs are provided as illustrations of intent, with no regulatory effect. They shall not imply that every element in the image is permitted. Refer to the standards on the following page for the specific requirements of this section.



Parapet sign



Wall sign



Neon sign within the shopfront window



Horizontal blade sign



Window sign



Wall sign

2. Applicability

The standards in this section apply to any sign that is CLEARLY VISIBLE FROM THE STREET-SPACE in the frontages designated as General Urban or Storefront. Signs in the Neighborhood frontages are regulated according to the sign standards for the R-1 zoning districts.

3. General Standards for All Signs

All signage shall conform to the requirements of *Article IV of this chapter*, except as provided for below.

- a. Only sign types specified in this section are permitted.
- b. Prohibited: Billboards, roof signs, and mural signs painted on FACADES (except those existing prior to [date of code adoption]). Mural signs are permitted, subject to approval by the Zoning Administrator in consultation with the ZRC, on the other exterior walls (side, rear, and courtyard elevations).
- c. Signs may be illuminated externally from a constant light source. Signs may not be illuminated by flashing, traveling, animated, or intermittent lighting, whether such lighting is of temporary or long-term duration.
- d. Internally illuminated back-lit acrylic-faced cabinet signs and plastic-faced letterform signs are not permitted.
- e. Signs shall not include an Electronic Message Center (EMC) unless explicitly permitted below.

4. Wall Signs

- a. Except for approved 1st Street exceptions, are only permitted within the sign band—the horizontal area on the FACADE between the first floor ceiling and the second STORY floor line. For one-story buildings, the sign band shall be above the windows and below the cornice. In no case shall this band be higher than 20 feet or lower than 11 feet above the adjacent sidewalk.
- b. Shall not exceed 20 feet in length, 90% of the SHOPFRONT width, nor come closer than 2 feet to an adjacent COMMON LOT LINE.
- c. Sign area shall not exceed 1.5 times the SHOPFRONT width.
- d. Shall not extend over the architectural features of the building FACADE, such as cornices, pilasters, transoms, window trim, and similar.
- e. A masonry or bronze plaque may be placed in the building’s cornice or parapet wall or under the eaves, and above the upper STORY windows. Any such plaque shall be no larger than a rectangle of 18 square feet.

5. Projecting Signs are generally perpendicular to the REQUIRED BUILDING LINE. Projecting blade signs, marquee signs, and corner signs are permitted.

- a. One blade sign per SHOPFRONT is permitted. They:
 - (i) may project from the sign band, or be hung from a GROUND STORY overhang, CANOPY, or AWNING;
 - (ii) shall be no more than 6 square feet;
 - (iii) shall project from the building no more than 42 inches;
 - (iv) shall be a minimum of 8 feet clear above the sidewalk;



Wall sign within sign band



Vertical blade sign



Masonry parapet sign



Marquee sign

(v) shall be located no closer than 1 foot from a COMMON LOT LINE or adjacent SHOPFRONT space and no closer than 10 feet from any adjacent blade sign; and

(vi) shall not be internally illuminated.

b. Marquee signs are integrated with an entry CANOPY. They:

(i) are only permitted with a theater use;

(ii) may project to the far edge of the CLEAR SIDEWALK; and

(iii) may include an EMC within the sign band area.

c. Corner signs that are visible from two or more intersecting streets are permitted as long as:

(i) there is no more than one per BLOCK CORNER;

(ii) they are located above the GROUND STORY sign band and below the third STORY, or for a two-story building below the cornice line;

(iii) they do not exceed 40 square feet per sign face; and

(iv) the maximum projection from the corner is 5 feet.

6. Window Signs

a. Windows are measured as glass area including MUNTINS and similar framing elements with a dimension of less than one inch. Glazing separated by framing elements of greater than one inch are considered separate windows.

b. No more than 25% of any GROUND STORY window may be covered by signage, and such signage shall not be placed or adhered to the window in a manner that prevents views into the SHOPFRONT.

c. Neon signs are allowed within SHOPFRONT windows.

d. No more than 10% of any upper STORY window may be covered with signs.

7. Other Signs

a. Temporary sandwich board signs of up to 36" in height are permitted within the DOORYARD area. They may also be considered a permitted encroachment to the sidewalk or right-of-way, with prior approval from the City.

b. Awning signs are permitted. Sign copy on AWNINGS shall be limited to 6 inches in height on the outside edge/vertical face of the AWNING.

c. Canopy signs (not including marquee signs, which are regulated separately) are allowed on the canopy face or mounted upright along the top of the canopy with the bottom of the sign no more than 4" above the canopy. Canopy signs shall extend no more than 90% of the length of the canopy and be no more than 20 inches in height. Signs mounted on the face of a canopy must maintain a minimum of 3" spacing between the sign and the top and bottom of the canopy face. No more than 1 canopy sign is allowed per SHOPFRONT and a canopy sign is not allowed on a SHOPFRONT that has a marquee sign.

d. Directional signage as defined in this chapter is allowed for assisting traffic flow through allowed drive-through facilities.



Corner sign



Awning sign



Awning signs and wall signs

8. Freestanding Signs
 - a. No new freestanding signs are permitted after [date of code adoption].
 - b. Any property owner voluntarily removing a legally non-conforming freestanding sign may be allowed a bonus of up to one hundred fifty percent (150%) of the building signs allocated to the property. For example, if a property is allocated 40 square feet of building signs, the property may be allowed 60 square feet of buildings signs if a legally nonconforming freestanding sign is removed.
 - c. Bonus signage will still be required to meet the specific placement standards for the particular sign type(s) requested.
9. First Street Exceptions for multi-story buildings in the Urban General and Storefront frontages
An additional wall sign is permitted in a sign band located above the top story windows and below the cornice that has:
 - a. Square footage less than or equal to 1.5 times the length of the sign wall; and
 - b. Length no greater than 90% of the length of the sign wall.

Section 26-195 Public Realm Standards

195.1 Intent

These *Public Realm Standards* are designed to establish environments within Character Districts that encourage and facilitate pedestrian and bicycle activity by creating streets and other parts of the PUBLIC REALM that are comfortable, efficient, safe, and interesting.

- A. Although commonly thought of as just GREENS or parks, the *public realm* includes the complete STREET-SPACE—the space between the building FAÇADES: the sidewalks, street trees, SQUARES, GREENS, and the travel lanes.
- B. The STREET-SPACE is a community’s first and foremost public space and should be just as carefully designed and planned as any GREEN or CIVIC BUILDING. The character of the street—both its scale and its details—plays a critical role in determining the pedestrian quality of a place.
- C. The Public Realm Standards:
 1. Regulate the *pedestrian realm*, from the FACADE to the curb as well as any GREENS or SQUARES, in a Character District.
 2. Serve as guidance for the curb-to-curb street geometry of any new streets or street rebuilding, as well as the maintenance of existing streets in a Character District. Streets within Character Districts should not be thought of as “roads, highways, arterials, or collectors.” They should be developed to create people-oriented places balancing all transportation modes. The majority of streets in a Character District should be designed primarily for walkability and pedestrian comfort.
 3. Contribute to sustainability. Street trees and plants contribute to privacy, the reduction of noise and air pollution, shade, maintenance of the natural habitat, conservation of water, and storm-water management. Good STREET-SPACES promote more sustainable transportation options such as walking and bicycling.
 4. Work in concert with the property frontages. DOORYARDS and FACADES literally form the walls of the STREET-SPACE. They are regulated in *Section 26-193 Building Form Standards*.

D. Components

The Public Realm Standards include the following sections:

1. *195.2 General Standards*
2. *195.3 Public Open Space*
3. *195.4 Street Trees*
4. *195.5 Street Design in Character Districts*

Character District Sections: 26-191 to 26-198

- 191. Introduction & Definitions
- 192. Regulating Plans
- 193. Building Form Standards
- 194. Architectural Standards
- 195. Public Realm Standards**
- 196. Parking & Loading
- 197. Building Functions
- 198. Reserved
- 199. Reserved

195.2 General Standards

The following standards regulate the STREET-SPACE from the FACADE to the curb within a Character District.

A. DOORYARDS

1. All:
 - a. Thorny plants shall not be planted along the CLEAR SIDEWALK or entry walkways.
 - b. Noxious weeds, as defined by city ordinance, and invasive exotic species and are prohibited.
2. Urban General, Urban General 2, and Storefront frontages:
 - a. Must be planted or hard-surfaced with pervious pavers;
 - b. Any plantings/vegetation may not block any FENESTRATION nor extend over the CLEAR SIDEWALK.
3. Neighborhood (Medium and Small) frontages:
 - a. Must be planted at a minimum with grass, ground cover, or flowering vines that do not exceed a height of 8".
 - b. Shrubs or hedges (maximum height 40") may be planted within the DOORYARD.
 - c. Trees may be planted within the DOORYARD, but must be "limbed up" as they gain appropriate maturity so as to be minimum 7' clear over the CLEAR SIDEWALK.
 - d. Hard-surfaced walkway(s) must be provided between the CLEAR SIDEWALK and the building entry(s) in the FACADE. Such walkways are limited to 6' in width (perpendicular to the RBL) per FACADE entry.

B. The developer is required to install sidewalks that meet all City (and ADA) standards and specifications at the time of development. They shall provide a minimum CLEAR SIDEWALK as follows: 6' for all Urban General and Storefront frontages, 5' for all Urban General 2, and 4' for all Neighborhood frontages.

C. Tree Lawn: the area between the CLEAR SIDEWALK and the curb is used as the planting area for STREET TREES. It may also be used, in more intense pedestrian situations, as a pedestrian area with seating and cafe tables. The TREE LAWN is regulated in Section 195.4.

D. Street lighting:

1. At the time of development, the developer is required to install pedestrian-scale streetlights per City specifications according to any adopted streetscape plan, on any Urban General, Urban General 2, and Storefront frontage being developed.
2. ALLEY lighting: all lots with ALLEY access may have lighting fixtures illuminating the ALLEY, see the *Architectural Standards, Section 194.K.3.b.(v)*.

E. Street furniture is an element of the overall STREET-SPACE design. Street furnishings should be simple, functional, and durable. Placement will generally be within the TREE LAWN area. Any specific GREEN or SQUARE designs may specify different placement. All street furniture must meet City standards.

F. Private mechanical and electrical equipment is prohibited within any STREET-SPACE including the DOORYARD. This includes, but is not limited to, air compressors, pumps, exterior water heaters, water softeners, and private garbage cans. Public sidewalk waste bins and water pumps for public fountains or irrigation are not included in this prohibition. (Temporary placement of private garbage cans within the STREET-SPACE is allowed to accommodate scheduled pick-up.)

G. Public bicycle parking shall be provided in the STREET-SPACE, located in the TREE LAWN or DOORYARD area. (Bicycle racks must be either a city-specified model or be approved by the Zoning Administrator.)

195.3 Public Open Space

SQUARES and GREENS within a Character District are designated on the REGULATING PLAN.

A. Intent

Public Open Space is a key element of the quality of life within a Character District. Its trees and plants provide a landscape and civic architecture that complement the surrounding private building architecture. The SQUARES and GREENS will foster places for the social interaction, community gathering and family recreation of all age groups, all within a comfortable walking distance.

1. SQUARES are active pedestrian centers; GREENS are intended for less intensive foot traffic. Surface treatment is regulated accordingly.
2. Pervious paving materials (to allow oxygen for tree roots and absorb stormwater run-off) are encouraged, and the percentage of impervious paving material is limited. (See B.3. *Materials and Configurations*.)
3. These standards apply to those spaces that are designated on the REGULATING PLAN whether publicly owned or publicly accessible through an access easement.

B. General Standards

GREENS and SQUARES must be designed, planted and maintained according to the following requirements:

1. SQUARES and GREENS shall have at least 60 percent of their perimeter fronting public rights-of-way and they shall be surrounded by STREET TREES. Their dimensions shall be no narrower than a 1:5 ratio and no width or breadth dimension shall be less than 20’.
2. A clear view through the public open space (from 2’ to 7’ in height) is required, both for safety and urban design purposes. The foliage of newly planted trees may intrude into this area until the tree has sufficient growth to allow such a clear trunk height.
3. Materials and Configurations
 - a. The street frontages of SQUARES and GREENS within a Character District shall be configured consistently with the street or BLOCK which they are fronting in accordance with this section. However, the species of the trees surrounding a SQUARE or GREEN may be of a different species than the connecting streets.
 - b. The ground surface elevation shall be between -18” and +24” of the top of any curb within 10 feet.
 - c. The slope across any public SQUARE or GREEN shall not exceed ten percent.
 - d. SQUARES and GREENS shall not include active / formal recreation structures such as ball fields, but may include playground equipment.
 - e. Trees within a public open space may be selected from outside the Street Tree List but must be approved by the City Arborist (see 195.G. *Street Tree List* in this section).
 - f. Asphalt is prohibited within a SQUARE or GREEN.

C. Greens

GREENS should be designed with a low percentage of hard-surfaced area, appropriate to their less pedestrian-intensive character. Surface treatment and materials (within the area back-of-curb to back-of-curb area excluding any CIVIC USE building, public art or monument footprint) shall be a minimum 50 percent unpaved pervious surface area (such as turf, ground cover, soil or mulch).

D. Squares

SQUARES incorporate a higher percentage of hard-surfaced area, appropriate to their more pedestrian-intensive character. Surface treatment and materials (within the back-of-curb to back-of-curb area, excluding any CIVIC BUILDING, public art or monument footprint) shall be between 20 percent and 40 percent unpaved pervious surface (turf, ground cover, soil or mulch).

E. Pedestrian Pathway

A PEDESTRIAN PATHWAY shall be a public access easement or right-of-way and open to the sky. The width for these pathways must be not less than 20 feet with a hard-surfaced walkway not less than ten feet providing an unobstructed view through its entire length, except where otherwise specified on the REGULATING PLAN.

F. Parks and Preserve Areas

Any existing or newly created parklands and/or natural preserve areas larger than 2.5 acres should be located outside of, or at the edge of, neighborhoods within a Character District. Neighborhood GREENS and/ or SQUARES should be within a few minutes walk of all parts of a Character District.

195.4 Street Trees and Tree Lawns

STREET TREES are part of an overall STREET-SPACE plan designed to provide both canopy and shade and to give special character and coherence to each street.

A. Each STREET-SPACE must have STREET TREES planted generally in the centerline of the TREE LAWN or not less than 3' from the back of the curb, unless otherwise specified on the REGULATING PLAN, and at an average spacing not greater than 30' on center (average calculated per BLOCK face). Spacing allowances may be made to accommodate curb cuts and infrastructure elements; however, at no location may STREET TREE spacing exceed 45' on center except where necessary for ALLEYS, driveways, or transit stops.

B. Required STREET TREE planting area minimum specifications are as follows:

1. They shall be at grade or not greater than 6" above the sidewalk.
2. Soil surface area shall be no less than 110 square feet per isolated tree or 90 square feet per tree for connected (TREE LAWN) situations. (See *Diagrams A and B* at right).
3. No dimension of the soil surface area may be less than 5' unless otherwise specified in this ordinance.
4. A pervious paving strip, maximum 18" wide, may be placed at the back of the curb for access to on-street parking.
5. Neither the paving strip per 4 above, nor a City Arborist approved tree grate, will be measured against the minimum soil surface area in 2 and 3 above.

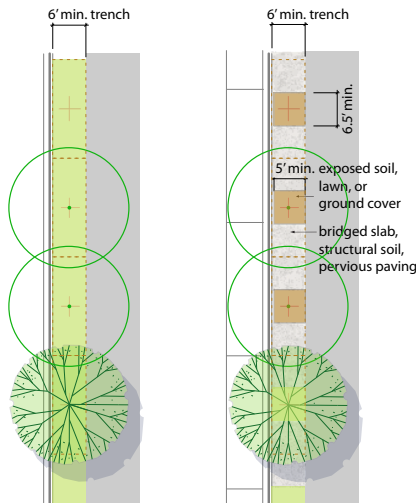
C. Street construction designs should incorporate street tree trenches (connected soil areas). The requirements in *B*, above may be met through the use of bridged slab, structural soil, or other techniques that clearly exceed these standards in the fostering of vital and long-lived STREET TREES.

D. At planting, STREET TREES shall be at least 3½" caliper, measured 4 feet above grade and at least ten feet in overall height. Species shall be selected from the *G. Street Tree List*, below. Consult with the Zoning Administrator/ City Forester for any designated tree species for a particular STREET-SPACE.

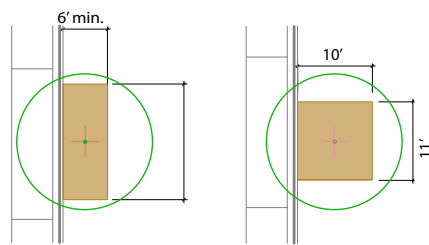
E. Any unpaved ground area shall be planted with ground cover, or flowering vegetation, not to exceed 8" in height unless approved by the Zoning Administrator as part of a streetscape plan. STREET TREES should be "limbed up" as they gain appropriate maturity so as to not interfere with pedestrian or truck travel (minimum 7' clear over the sidewalk and 14' over any travel lanes) and to maintain visibility.

F. Street Tree Specifications

1. Species in the Street Tree List are selected for their physical characteristics: size, habit of growth, and hardiness. The use of alternate species may be permitted, if approved by the City Arborist.
2. Noxious weeds, as defined by city ordinance, and invasive exotic species are not permitted and may not be used anywhere on private lots or other areas.



Continuous Tree Lawn Continuous Soil Area
Diagram A. Connected Situation



110 square feet minimum per tree
Diagram B. Isolated Tree Situation

3. The Street Tree list should be periodically reviewed and updated by the City Arborist. These are appropriate species, but there are many regional disease patterns over time, and this list will need to evolve with those changes. Inclusion in this list shall be based on the following criteria:
 - a. Structural – STREET TREES shape and subdivide the STREET-SPACE, increasing pedestrian comfort and adding (literal) value to the street/community. These are primarily “canopy shade tree” species that grow to heights in excess of 60’ and have a broad canopy—enabling them to clear auto and pedestrian traffic, form a ceiling-like enclosure, and open a clear view of the STREET-SPACE at eye-level.
 - b. Survivability – proper planting techniques and configurations provide a healthy environment in which the tree can thrive—this will ensure that the trees increase their value to the community as they grow.
 - c. Form and color – consistent species should be planted along a given STREET-SPACE to provide it with a distinct form and character. Species diversity is important, and a variety of appropriate STREET TREE species should be planted within the Character District, to provide a healthy bio-diversity.

G. Street Tree List

The following list contains all species approved for use as STREET TREES in a Character District. The list may include additional native and/or proven hardy adapted species approved by the City Arborist. Other species may be used for planting within a private lot. Species may also be placed within larger soil area locations such as parks, GREENS, or SQUARES.

<u>Street Tree List</u>	
(Large Canopy Trees – mature height 60 feet and above)	
Acer saccharum ‘Bailsta’	Fall Fiesta Maple
Acer saccharum ‘Green Mountain’	Green Mountain Maple
Betula nigra	River Birch
Celtis occidentalis	Common Hackberry
Carpinus caroliniana	American Hornbeam
Cercidiphyllum japonicum	Katsura Tree
Ginkgo biloba	Ginkgo (male only)
Gleditsia triacanthos var. inermis	Thornless Honey Locust
Gymnocladus dioicus	Kentucky Coffeetree
Liquidambar styraciflua “Rotundiloba’	Seedless Sweetgum
Liriodendron tulipifera	Tulip Tree
Nyssa Sylvatica	Black Tupelo
Ostrya virginiana	Eastern Hophornbeam
Platanus occidentalis	London Plane tree
Quercus bicolor	Swamp White Oak
Quercus coccinea	Scarlet Oak
Quercus falcata	Southern Red Oak
Quercus palustris	Pin Oak
Quercus rubra	Red Oak
Quercus shumardii	Shumard Oak
Quercus velutina	Black Oak
Tilia cordata ‘Greenspire’	Greenspire Littleleaf Linden
Tilia euchlora	Crimean Linden
Tilia tomentosa	Silver Linden
Ulmus americana - resistant to DED	various Elm
Ulmus ‘Morton Glossy	Triumph Elm
Ulmus ‘Morton	Accolade Elm

195.5 Street Design in Character Districts

A. Intent and Principles

1. In order to encourage and support pedestrian and bicycle activity in Character Districts, this section serves as guidance for the curb-to-curb street geometry of any new streets or street rebuilding, as well as the maintenance of existing streets.
2. Streets within Character Districts should not be thought of as “roads, highways, arterials, or collectors.” They should be developed to create people-oriented places balancing all transportation modes.
3. Street design should consider the needs of all forms of traffic—auto, transit, bicycle and pedestrian—to maximize mobility and convenience for all residents and users. Street character will vary depending on location: some streets will carry a large volume of traffic and provide a more active and intense urban pedestrian experience while others will provide a less active and more intimately scaled STREET-SPACE.
4. The majority of the streets within a Character District will have a lower intensity, and should be configured such that in-lane bicycle travel is encouraged and appropriate.

B. Principles for Street Design in Character Districts

The appropriate design of streets is one of the most important elements for a vital urban environment.

- Designing for continuous free-flowing traffic creates situations where vehicles will travel at speeds greater than desirable for pedestrians.
- With appropriate street designs, drivers choose slower speeds and less aggressive behavior, a feat typically not achieved through basic speed limit signage/postings.
- An interconnected street network allows traffic capacity to be diffused and maintained across numerous streets.
- Differences between “requirements” and “preferences” can be significant—increased lane width and the accompanying increased vehicle speed more often than not decreases the overall safety for pedestrians.
- On-street parking slows passing vehicular traffic and acts as a buffer between moving vehicles and pedestrians.
- Overall function, comfort, safety and aesthetics of a street are more important than efficiency alone.
- In a Character District, non-vehicular traffic should be provided with every practical advantage so long as safety is not adversely affected.
- Street design should take into consideration what is reasonably foreseeable, not every situation that is conceivably possible.
- Designing a street to facilitate (rather than accommodate) infrequent users may actually be the wrong design for the frequent users of the space.
- When the street design creates a conflict between the vehicular and non-vehicular user, it should be resolved in favor of the non-vehicular user.
- Emergency vehicle access must be maintained. With an interconnected street network, there will always be at least two routes of access to any lot or parcel.

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26-196. Character District Parking and Loading

A. Intent

1. Promote a “park once” environment within each Character District that will enable people to conveniently park and access a variety of commercial, residential, and civic enterprises in pedestrian friendly environments by encouraging SHARED PARKING.
2. Reduce fragmented, uncoordinated, inefficient, reserved single-purpose parking.
3. Avoid adverse parking impacts on neighborhoods adjacent to Character District mixed-use areas.
4. Utilize on-street parking.
5. Provide flexibility for redevelopment of small sites and for the preservation or reuse of historic buildings.
6. Increase visibility and accessibility of publicly available parking.
7. Support and encourage a multi-modal, bicycle and pedestrian-friendly environment.

B. Other Applicable Regulations

Pervious surfaces approved by the City Engineer are encouraged for surface parking lots.

C. General Urban, General Urban 2, and Storefront Frontages – Minimum Parking Requirements

1. Existing buildings fronting Main Street between 1st Street and 6th Street at the time of the Downtown Character District adoption are exempt from these minimum parking requirements, regardless of use.
2. There is no minimum parking requirement for:
 - a. ground floor commercial space;
 - b. the re-use or renovation of an existing structure, in addition to those on Main Street identified in Item C. 1. above, in which there is no gross floor area expansion and the use [is/remains] non-residential.
3. Minimum Reserved Parking
Reserved parking includes all parking that is NOT SHARED PARKING.
 - a. Commercial/civic uses: There is no minimum requirement for reserved parking.
 - b. Residential uses in mixed-use or multi-unit buildings—minimum reserved parking spaces per dwelling unit:

(i) Efficiency/1-bedroom	0.5 spaces/unit
(ii) 2 or more bedroom units	additional .5 spaces per bedroom

Note: In calculating the total number of minimum reserved spaces per building, any partial spaces .5 or above are rounded to the next whole number.
 - c. Residential uses in single-unit attached and detached, multi-unit ROWHOUSE, and two-unit configurations—minimum reserved parking spaces per dwelling unit:

(i) Owner-occupied	1 space/unit
(ii) Renter-occupied	1 space/unit + one space/per bedroom for each bedroom above 2
4. Minimum SHARED PARKING:
 - a. Commercial UPPER STORIES
 - (i) Under 5,000 square feet non-residential Gross Floor Area (GFA) has no minimum SHARED PARKING requirements.
 - (ii) 5,000 square feet or greater, non-residential GFA shall provide a minimum of 1.25 spaces per 1,000 square feet as SHARED PARKING.

Character District Sections: 26-191 to 26-198

- 191. Introduction & Definitions
- 192. Regulating Plans
- 193. Building Form Standards
- 194. Architectural Standards
- 195. Public Realm Standards
- 196. Parking & Loading**
- 197. Building Functions
- 198. Reserved
- 199. Reserved

- b. Residential uses—dwellings in mixed-use or multi-unit buildings
A minimum of .25 parking space per bedroom shall be provided as SHARED PARKING.
 - c. SHARED PARKING shall be accessible to the public and designated by appropriate signage and markings as determined by the Zoning Administrator in consultation with the ZRC.
5. Achieving parking requirements:
- a. Parking shall be located and configured in compliance with the PARKING SETBACK LINE or other regulations for the site on which it is located, as indicated on the applicable Character District REGULATING PLAN and/or BUILDING FORM STANDARD. (See Section 26-193.)
 - b. Required reserved parking spaces for General Urban, General Urban 2, and Storefront frontages shall only be permitted on-site or as an accessory use on an adjacent parcel or a parcel directly across an ALLEY from the development it is serving, if that parcel is also designated as a General Urban, General Urban 2, or Storefront frontage. Such reserved parking shall be subject to a long-term agreement acceptable to the City. Any such off-site surface spaces shall be located and configured as per Item a. above.
 - c. Minimum SHARED PARKING requirements may be met either on-site or within a 600-foot walking distance of the development.
 - d. Any time or hour of the day restrictions on SHARED PARKING shall be subject to approval by the Zoning Administrator in consultation with the ZRC. The Administrator may give approval based on a finding that:
 - (i) the parking is visibly designated and accessible to the public;
 - (ii) at least 12 hours of public parking are provided in any 24-hour period; and
 - (iii) that at least 8 of those hours are provided during either business or nighttime hours depending on whether the Administrator determines that the primary use will be for COMMERCIAL or RESIDENTIAL USES.
6. Bicycle Parking:
- a. For COMMERCIAL, the developer must provide 1 employee bicycle parking rack (2-bike capacity) per 5,000 square feet of commercial floor area and 1 visitor/customer bicycle parking rack (2-bike capacity) per 10,000 square feet of commercial floor area. The employee and visitor racks may be co-located.
 - b. For RESIDENTIAL, the developer must provide 1 tenant bicycle parking rack (2-bike capacity) per 5 units and 1 visitor bicycle parking rack (2-bike capacity) per 10 units. Projects under 5 units shall have no requirement. Required minimum tenant parking may be located within the building (but not within individual units) or in an otherwise secure location on-site.
 - c. Bicycle parking facilities shall be visible to, or clearly identified for, intended users. The bicycle parking facilities shall not encroach on the CLEAR WALKWAY nor shall they encroach on any required fire egress.
 - d. Bicycle parking spaces within the public right-of-way (typically along the street tree alignment line) may be counted toward the minimum visitor bicycle parking requirement. (For areas with constrained STREET-SPACE, an optional approach is to consolidate public bicycle parking in a single dedicated on-street parking space per BLOCK FACE. See Figure 26-196. A.)



Figure 26-196. A. Consolidated public bicycle parking

7. Permissive parking and loading facilities. Nothing in this ordinance shall be deemed to prevent the voluntary establishment of off-street parking or loading facilities to serve any existing use of land or buildings, in accordance with all regulations herein governing the location, design, and operation of such facilities.

D. Neighborhood Frontages – Minimum Parking Requirements

1. Minimum Reserved Parking:

Reserved parking includes all parking that is not SHARED PARKING.

- a. Minimum reserved parking spaces for multi-unit residential buildings:

- (i) Efficiency/1-bedroom units 0.75 spaces/unit
- (ii) 2 or more bedroom units additional .75 spaces per bedroom

Note: In calculating the total number of minimum reserved spaces per building, any partial spaces .5 or above are rounded to the next whole number.

- b. Minimum reserved parking spaces per dwelling unit in single-unit attached and detached, multi-unit ROWHOUSE, two-unit, and COTTAGE COURT configurations:

- (i) Owner-occupied 1 space/unit
- (ii) Renter-occupied 1 space/unit + one space/per bedroom for each bedroom above 2

- c. Minimum reserved parking spaces for non-residential uses is 1 space per 300 square feet.

2. Minimum SHARED PARKING for multi-unit residential buildings is .25 per unit.
3. Off-site parking is not permitted for any required reserved parking in Neighborhood frontages.

E. Special Parking Standards

1. On-Street Parking in all Character Districts

- a. A parking space located on a public street may be included in the calculation of SHARED PARKING requirements if it is adjacent to the building site (where more than 50% of the space is located within the street fronting the development parcel).
- b. Each on-street parking space may only be counted once.

F. Parking Lot Plantings for New Development

1. For any surface parking lot not separated from the STREET-SPACE by a building, the space between the REQUIRED BUILDING LINE and the PARKING SETBACK LINE shall be planted with canopy shade trees from the Tree Lists in *Section 26-195. Public Realm Standards*. Trees shall be planted at an average distance not to exceed 30 feet on center and aligned parallel 3 to 7 feet behind the REQUIRED BUILDING LINE/STREET WALL.
2. The edge of any General Urban or Storefront frontage surface parking lot adjacent to a Neighborhood frontage lot shall be screened according to the standards in *Section 26-193.1.F. Neighborhood Manners*.

G. Loading Facilities

1. No loading facilities are required.
2. Where loading facilities are provided, they shall be located to, and accessed from, the rear and/or ALLEY side of buildings.

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Section 26-197. Building Functions

A. Permitted Uses

1. All uses are classified and defined in *Sections 26-141*.
2. Permitted uses by BUILDING FORM STANDARD frontage are shown in *Section C. Use Table*, below. All uses not expressly permitted are prohibited.
3. All uses must meet the standards of the applicable BUILDING FORM STANDARD in *Section 26-193*. Any additional development or performance standards are indicated in the *Section C. Use Table* and provided in *Sections D.-H.* below.

A. Accessory Uses and Structures

1. Home occupations, as defined in this chapter, are permitted.
2. The following accessory uses are limited to owner-occupied single-unit dwellings, regardless of the applicable BUILDING FORM STANDARD frontage.
 - a. Accessory dwelling units (ADUs)
 - b. Bed & Breakfast Establishments
 - c. Day Care Homes
3. Accessory structures are permitted within the BUILDABLE AREA of the lot, as designated in the applicable individual BUILDING FORM STANDARD.
4. Parking is permitted within the location parameters identified on the REGULATING PLAN and applicable individual BUILDING FORM STANDARD.

Character District Sections: 26-191 to 26-198

- 191. Introduction
- 192. Regulating Plans
- 193. Building Form Standards
- 194. Architectural Standards
- 195. Public Realm Standards
- 196. Parking & Loading
- 197. Building Functions**
- 198. Reserved
- 199. Reserved

A. Use Table

This table identifies the categories of uses allowed in the GROUND STORY and upper STORIES for each BUILDING FORM STANDARD frontage; however, some specific uses may be restricted or prohibited. All uses must comply with any other applicable standards in this Zoning Code. Additional regulations specific to the Downtown Character District are referenced in the right-hand column.

DOWNTOWN CHARACTER DISTRICT USE TABLE											
USE CATEGORY	BUILDING FORM FRONTAGES										Additional Regulations
	General Urban		Storefront		General Urban 2		Neighborhood Medium		Neighborhood Small		
	Ground Story	Upper Story	Ground Story	Upper Story	Ground Story	Upper Story	Ground Story	Upper Story	Ground Story	Upper Story	
RESIDENTIAL											Section E.
Household Living	X	X	X	X	X	X	X	X	X	X	Sec. D. and E.1-4
Group Living	X	X	X	X	X	X	X	X	X	X	Sec. D. and E.1-6
COMMERCIAL											Section F.
Amusement & Recreation	X	X		X	X	X					Sec. D. and F.1.
Animal Sales & Service	X	X		X	X	X					Sec. D. and F.2.
Commerical Assembly	X	X	X	X	X	X					Sec. D. and F.1.
Eating & Drinking Establishments	X	X	X	X	X	X					Sec. D. and F.3.
Financial Services	X	X	X	X	X	X					Sec. D. and F.4.
Gas Station/Accessory Repair	X				X						Sec. D. and F.5.
Heavy Commercial	X	X	X	X	X	X					Sec. D. and F.6.
Lodging	X	X	X	X	X	X	X	X	X	X	Sec. D. and F.7.
Office	X	X	X	X	X	X					Sec. D. and F.8.
Parking, Commercial	X	X	X	X	X	X					Sec. D. and F.9.
Retail Sales & Service	X	X	X	X	X	X					Sec. D. and F.10.
Self-service storage		X		X		X					Sec. D. and F.5.
Vehicle Sales & Service	X	X		X	X	X					Sec. D. and F.4.
CIVIC & INSTITUTIONAL											Section G.
Civic & Cultural Assembly	X	X	X	X	X	X	X	X	X	X	Sec. D. and G.1.
Community Services											Sec. D.
Colleges & Unversities											Sec. D.
Day Care	X	X		X	X	X	X	X	X	X	Sec. D. and G.2.
Educational	X	X		X	X	X	X	X	X	X	Sec. D.
Government & Public Safety	X	X		X	X	X					Sec. D.
Health Care	X	X		X	X	X					Sec. D.
INDUSTRIAL, WHOLESALE, & STORAGE	X										Sec. D. and H.

Key: X= Permitted, Additional Regulations Apply Blank Cell = Not Permitted

B. General Development and Performance Standards

The following standards apply to all Character District frontages and use categories.

1. All permitted uses shall meet the *Section 26-193. Building Form Standard General Provisions* and those standards specified in the applicable individual BUILDING FORM STANDARD (BFS) pages.
2. No civic, commercial, or institutional use is permitted above a residential use.
3. Businesses providing drive-through services shall not have a drive-through lane or service window that abuts or faces a STREET-SPACE.
4. Drive-through services are prohibited in Storefront frontage sites.
5. For duplexes, multi-unit dwellings, and dwellings in mixed-use buildings, no more than three bedrooms are permitted per unit.
6. Notwithstanding the provisions of any other section of this article, no existing single-unit residential structure located in the Character District shall be converted or otherwise structurally altered or expanded for the purpose of accommodating the creation or establishment of a second separate dwelling unit within, around or adjacent to the original single-unit residential structure, except for ADUs, as defined and permitted herein.
7. All use-specific state or local certifications, permits, and licenses apply.
8. No smoke, radiation, vibration or concussion, excessive noise, heat or glare shall be produced that is perceptible outside a building, and no dust, fly ash or gas that is toxic, caustic or obviously injurious to humans or property shall be produced.

A. Residential Uses – Development and Performance Standards

1. See the General Urban and General Urban 2 BUILDING FORM STANDARD frontages for configuration requirements for GROUND STORY Residential uses.
2. A lobby serving an upper STORY Residential use is permitted on the GROUND STORY within the SHOPFRONT space of a Storefront frontage site.
3. Residential dwelling units are not permitted within the required minimum depth for the SHOPFRONT space in a Storefront frontage site.
4. Mobile home parks are prohibited.
5. Fraternity and Sorority uses are prohibited.
6. Group Homes and Assisted Group Living uses are subject to all Iowa law requirements and certifications.

A. Commercial Uses – Development and Performance Standards

1. Amusement and Recreation, Commercial Assembly
 - a. Only Indoor Amusement and Recreation uses are permitted.
 - b. Adult Entertainment is prohibited.
 - c. Theater, Auditorium, and Arena uses shall meet the GROUND STORY FENESTRATION requirements of the applicable BUILDING FORM STANDARD, but are exempt from the upper STORY FENESTRATION requirements.
 - d. The lobby serving a Commercial Assembly or Indoor Amusement and Recreation use is permitted in the SHOPFRONT area of a Storefront frontage.
2. Animal Sales and Service
No outdoor kennels, play, or exercise areas are permitted.
3. Eating and Drinking Establishments

- a. A restaurant use is permitted in the second STORY of a Storefront or General Urban frontage site provided it is an extension of the same restaurant and the second STORY floor area is equal to or less than the GROUND STORY floor area of the same use.
 - b. Outdoor areas for eating and drinking shall be allowed on the public sidewalk and in private outdoor service areas in General Urban and Storefront frontages, subject to the issuance of all applicable permits and licensing.
 - c. An Eating/Drinking Establishment is permitted on the top floor level or the rooftop of a Storefront frontage site or where otherwise designated on the REGULATING PLAN, where:
 - (i) the use is set back from any COMMON LOT LINE by at least 20 feet;
 - (ii) it is not above a residential use;
 - (iii) no amplified sound in outdoor seating area, except by special use permit;
 - (iv) the hours of operation of any rooftop seating area are limited to 8 a.m. to 10 p.m.; and
 - (v) subject to all applicable permits and licenses.
 - d. The sale and consumption of beer, wine, and liquor shall be subject to all existing permitting and licensing provisions, as applicable.
 - e. Live entertainment and drinking establishments are prohibited if the walls of the facility are within 100 feet of a Neighborhood frontage site within the Character District or a residentially zoned property which is outside of the Character District.
4. Financial Services
Only the retail banking services are permitted within the required minimum depth for the SHOPFRONT space in a Storefront frontage site.
5. Consumer Gas Stations, Vehicle Sales and Services
- a. Gas Stations are limited to two paired pumps within a single island with a single drive aisle allowed on either side of the island, all of which must be separated from the STREET-SPACE by a building.
 - b. Surface parking lots for vehicle sales or rental shall only be located and configured in compliance with the PARKING SETBACK LINE or other regulations for the site on which it is located, as indicated on the applicable Character District REGULATING PLAN and/or BUILDING FORM STANDARD. (See Section 26-193.)
 - c. Auto repair services are not allowed except as accessory to a gas station or vehicle sales, subject to the following:
 - (i) The property shall be at least 100 feet from any solely residential lot;
 - (ii) Overnight vehicular storage is not permitted, unless within an enclosed building;
 - (iii) The use shall not include the display and rental of cargo trailers, trucks, or similar vehicles;
 - (iv) Auto body repair is prohibited;
 - (v) The storage or junking of wrecked motor vehicles (whether capable of movement or not) is prohibited; and
 - (vi) Discarded and replacement vehicle parts and accessories shall be stored inside the main structure.
 - (vii) Upon the abandonment of the gas station or vehicle sales, the auto repair service shall terminate and all structures exclusively used in the business (including underground storage tanks), except buildings, shall be removed by the owner of the property. For the purpose of this subsection, the term "abandonment" shall mean non-operation as an auto repair for a period of 6 months after the retail services cease.
6. Heavy Commercial
- a. Self-storage uses are only permitted in the upper stories of the General Urban frontages.
 - b. Outdoor nursery and lumberyards are prohibited.
 - c. Freight-Oriented and Outdoor Display or Storage uses are prohibited.

7. Lodging

- a. GROUND STORY guest rooms are not permitted within the required minimum SHOPFRONT depth in a Storefront frontage site.
- b. GROUND STORY guest rooms abutting any REQUIRED BUILDING LINE (or street frontage) shall meet the configuration standards for GROUND STORY residential uses as specified in the General BFS.
- c. A lobby serving an upper STORY overnight lodging use is permitted on the GROUND STORY of any Storefront frontage site.
- d. Bed & Breakfast establishments are permitted as accessory uses to owner-occupied houses in Neighborhood frontages. No other overnight lodging is permitted in these frontages.

8. Office

- a. Office uses are not permitted within the required minimum depth for the SHOPFRONT space in a Storefront frontage site.
- b. Office uses that exist in Neighborhood frontages as of January 1, 2021 are permitted and considered conforming uses. Changes to existing uses shall be in compliance with the standards and requirements of this chapter. The establishment of new Office uses or structures not in association with an existing conforming use or structure is prohibited.

9. Parking, Commercial

Commercial parking lots and structures are required to meet all BUILDING FORM STANDARDS for the frontage sites on which they are located.

10. Retail Sales and Services

- a. A retail sales use is permitted in the second STORY of a Storefront or General Urban frontage site provided it is an extension equal to or less than the area of the same GROUND STORY use.
- b. No merchandise (including motorcycles, scooters, and automobiles) may be left within the DOORYARD when the business is not open.
- c. Only retail sales or gallery/showroom functions for Cottage Industries are permitted in the required minimum SHOPFRONT space of a Storefront frontage.

11. Vehicle Sales and Service (see Gas Stations, above)

A. Civic and Institutional Uses – Development and Performance Standards

1. CIVIC BUILDINGS designed for civic uses (as defined in *Section 26-191. Definitions*) that are located on sites specifically designated on the REGULATING PLAN are not subject to *Section 26-194. Architectural Standards* or *Section 26-193. Building Form Standards* except for *Section 26-193.1.E. Neighborhood Manners*.
2. Day Care
 - a. All day care facilities are subject to all permitting and licensing requirements under Iowa Law.
 - b. Only Day Care Homes are permitted as accessory uses in Neighborhood frontages.

A. Industrial, Wholesale, and Storage Uses – Development and Performance Standards

Industrial Manufacturing, Assembly, or Processing facilities that exist as of January 1, 2021 are permitted and considered conforming uses. Changes to existing uses shall be in compliance with the standards and requirements of this chapter. The establishment of new Industrial, Wholesale, and Storage uses or structures not in association with an existing conforming use or structure is prohibited.



DEPARTMENT OF COMMUNITY DEVELOPMENT

City of Cedar Falls
 220 Clay Street
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MEMORANDUM

Planning & Community Services Division

TO: Mayor Robert M. Green and City Council
FROM: Karen Howard, AICP, Planning & Community Services Manager
DATE: August 30, 2021
SUBJECT: Rezoning of Downtown Character District (Case #RZ21-004)

REQUEST: Rezone property from M-1, C-3, C-2, C-1, R4, R3, R-2, and A-1 to Downtown Character District (CD-DT)

PETITIONER: City of Cedar Falls

LOCATION: *Imagine Downtown! Vision Plan* study area

PROPOSAL

The proposal is to rezone all property located within the study area delineated in the adopted *Imagine Downtown! Vision Plan* to the new zoning designation, CD-DT Downtown Character District. The Downtown Character District Regulating Plan will then become the new zoning map for this area.

BACKGROUND

The *Imagine Downtown! Vision Plan* was adopted in November, 2019 as an integral part of the City of Cedar Falls Comprehensive Plan. Following adoption of the plan, consultants from Ferrell Madden and Community ReCode worked with City staff to draft a zoning ordinance as a primary tool for implementing the goals of the plan.

A public review draft of a new zoning code and zoning map for the Downtown Character District were presented during a special virtual Cedar Falls Planning and Zoning Commission meeting on February 17, 2021. Since that time, the proposed code and regulating plan map have been available for public review and comment on the project webpage. Over the last six months, consultants and staff have met virtually with the Planning and Zoning Commission at four special work sessions to discuss the various elements of the proposed code and regulating plan and answer questions from the Commission. Staff also provided opportunities for work session discussions with development professionals and with Community Main Street, and encouraged the public to view and submit questions or comments to the Planning Division. All property owners in the area were notified by mail of the public hearing date at Planning and Zoning and provided with instructions on how to participate. Notice was published in the Courier for both the

proposed new zoning code for Downtown and for the rezoning of property to the new designation of Downtown Character District (CD-DT), noting that the Downtown Character District Regulating Plan (attached) will be the new zoning map for the area.

ANALYSIS

CURRENT ZONING

The downtown study area is comprised of a mix of zoning districts, a portion of which is subject to the Central Business District Overlay.

- The downtown core is zoned C3, the highest density commercial zoning district. Development standards of this zone allow buildings up to 15 stories tall, with limited or no setbacks, and almost any type of commercial use with few restrictions. While the CBD Overlay has helped to temper the nearly unregulated nature of the C-3 District, each proposed development is subject to debate regarding the height and design of the building and how it relates to the existing downtown context, which has resulted in additional time and expense for developers and uncertainty for surrounding property owners and members of the community.
- There are several areas along the river and along edges of the study area zoned Industrial (M-1 and M-2), some of which still have manufacturing uses (Viking Pump), but many that are now devoted to other uses, or are ripe for redevelopment.
- The 1st Street corridor within the study area is largely zone C-2. The C-2 Zone allows a wide variety of commercial uses, but being an older zoning district has few development standards and no design standards that would ensure that new buildings fit into the context of the neighborhood.
- The C-1 Zoning District is located between the C-3 District and the residential districts to the west and south. However, the area is still largely residential in character with many existing owner-occupied single family homes and houses that have been converted to duplexes, multi-family, or offices. There has been a small amount of commercial infill in these areas. Other than limiting the height and establishing perimeter setback requirements, this zone also does not include any design standards to help the mix of uses allowed develop in a cohesive manner or address the potential adjacency between commercial buildings and the homes that remain the predominant use in this area.
- The other areas of the Downtown Character District are zoned R-3 and R-4 with just one block of R-2 zoning north of Lincoln Elementary School. These zones are also older zoning districts that allow a variety of residential uses and in the case of the R-4 District also allows some office and lower intensity commercial uses. Similar to the older commercial districts, these zones do not include design standards and have only a few basic dimensional standards, such a building height, lot area standards, and setbacks, so some infill has occurred that is not in keeping with the original residential character of these areas.
- The Central Business District Overlay covers the main downtown area from 1st to 7th Streets between Franklin Street and the Cedar River. While the Overlay establishes some design standards and a process for review of new development through the Planning and Zoning Commission and City Council, it leaves some issues open to interpretation, such as the height of new buildings. The rest of the study area outside the CBD Overlay has few standards to prevent out-of-character redevelopment with no review oversight by P&Z and Council.

PROPOSED ZONING

The Downtown Character District is established to implement the adopted *Imagine Downtown! Vision Plan*. It focuses on community character, through an emphasis on development character, intensity, and the physical form of the buildings. The emphasis is on the relationship between private development and public spaces (streets, parks, and open space) to promote an overall sense of place within the downtown area, while allowing a wide variety of land uses. The goal is to create walkable urban neighborhoods in close proximity to the downtown mixed-use center. The regulations establish requirements related to form, character and design that complement the established pattern of compact, well-connected blocks in the downtown core neighborhoods and work to preserve the historic character and sense of place that is the focus of the community's vision for the future of the downtown area.

COMPLIANCE WITH THE COMPREHENSIVE PLAN

The *Imagine Downtown! Vision Plan* was adopted in November 2019 as an integral part of the Cedar Falls Comprehensive Plan. The primary goal of that planning effort was to update the Comprehensive Plan for the downtown study area to ensure that future development is consistent with the community's vision. After adoption of the Vision Plan, new zoning regulations were drafted to implement the vision.

The Downtown Character Regulating Plan, which with this rezoning will be the new zoning map for the area, is consistent with the "character areas" identified in the *Imagine Downtown! Vision Plan* and help to establish a gradual transition between the higher intensity "Storefront" and "Urban General" frontages to the lower intensity mixed-use Urban General 2, and finally to the "Neighborhood Medium" and "Neighborhood Small" designations in the surrounding residential neighborhoods. These "Neighborhood" designations will allow for a variety of housing types for people of different ages and incomes that desire to live close to downtown, but at a scale that blends into the neighborhood context. The mixed-use Urban General 2 also extends west along 1st Street and also covers a mixed-use node near the intersection of 18th and Main Streets on the far southern boundary of the study area. The Regulating Plan also acknowledges and provides for future redevelopment for areas currently zoned Industrial at the far northwest corner of the character district and the areas on the east side of downtown. Maps illustrating the current zoning superimposed over the proposed zoning designations are attached to this report.

Since the proposed zoning has been specifically drafted to implement the adopted *Imagine Downtown! Vision Plan* as described above, staff finds that rezoning the properties within the downtown study area to CD-DT Downtown Character District is consistent with the Comprehensive Plan. Staff also notes that the Future Land Use Map should be updated to reflect the adopted Vision Plan.

ACCESS TO PUBLIC SERVICES

The study area is located within in a developed area of the city with access to all utilities and public services.

ACCESS TO ADEQUATE STREET NETWORK

The Downtown Character District is located in an area with short, well-connected blocks. The gridded street pattern with centrally spaced alleys lends itself well to the new zoning, which encourages buildings that frame the streets to create walkable urban neighborhoods with a mixed-use urban center.

PUBLIC NOTICE

Notice of the rezoning proposal was mailed to all property owners and the proposed zoning has been publicized widely in both print and social media and on television and radio. Public notice for the September 7 City Council hearing was published in the Waterloo-Cedar Falls Courier on August 27, 2021.

RECOMMENDATION

At their May 12 meeting, the Planning and Zoning Commission unanimously recommended approval of RZ21-004, a City-initiated request to rezone all property located within the *Imagine Downtown! Vision Plan* study area boundary, as shown on the attached Regulating Plan, from current zoning designations to CD-DT - Downtown Character District and to update the Future Land Use Map to reflect the adopted Imagine Downtown! Vision Plan.

PLANNING & ZONING COMMISSION

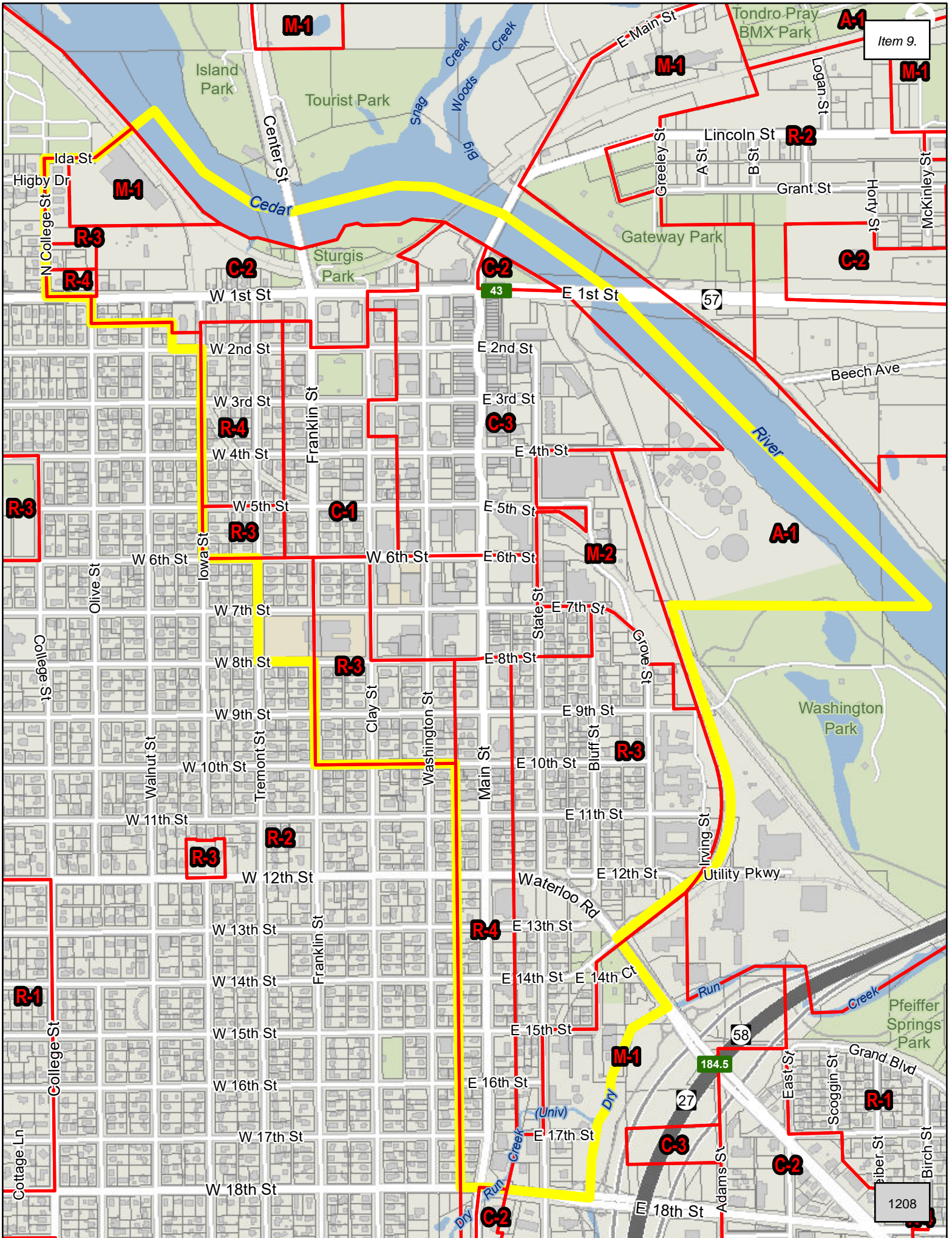
4/28/2021 Public hearing The next item for consideration by the Commission was rezoning of property in the proposed Downtown Character District. Chair Leeper introduced the matter and Ms. Howard provided background information. She explained that mailed notice of the rezoning was sent out to all property owners in the rezoning area and notice of the public hearing was also published in the Courier. The item is for initial discussion at this time and will be continued to the next meeting.

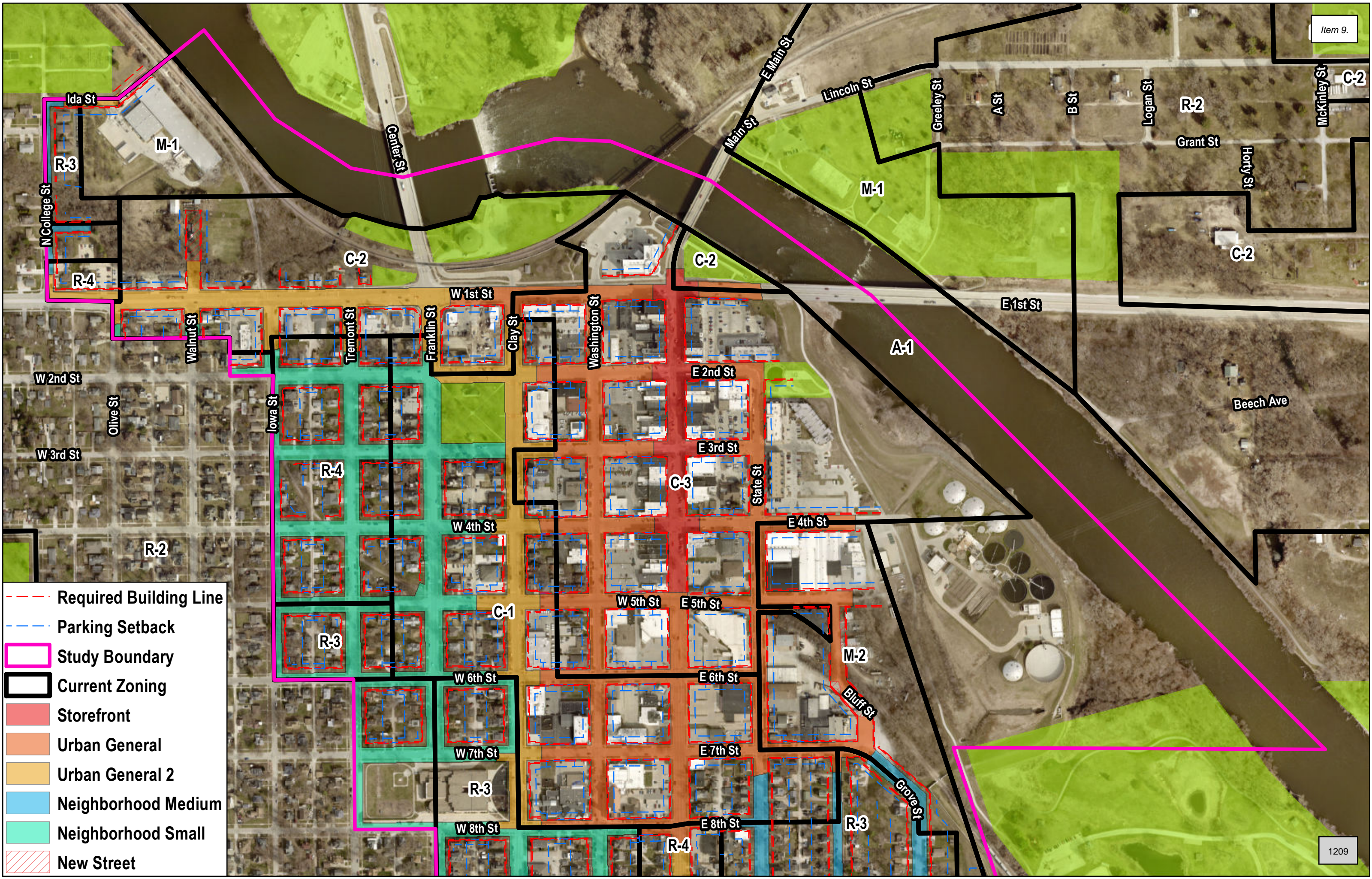
Public hearing Continued 5/12/2021 Discussion & Vote The next item of business was rezoning of property in the proposed Downtown Character District. Chair Leeper introduced the item and Ms. Howard provided background information. She spoke about the rezoning process and displayed the current zoning map for downtown. The boundaries were created to be consistent with the Downtown Vision Plan. She also discussed the current zoning throughout the area and explained the current rezoning proposal. Ms. Howard discussed compliance with the comprehensive plan, access to public services and adequate street network. Staff recommends approval of the rezoning of all the property within the boundaries of the Downtown Character District Regulating Plan to CD-DT – Downtown Character District and also to update the Future Land Use Map to reflect the adopted *Imagine Downtown! Vision Plan*.

Mr. Leeper thanked the consultants and staff and Ms. Lynch stated she is eager to see how it works. There were no public comments.

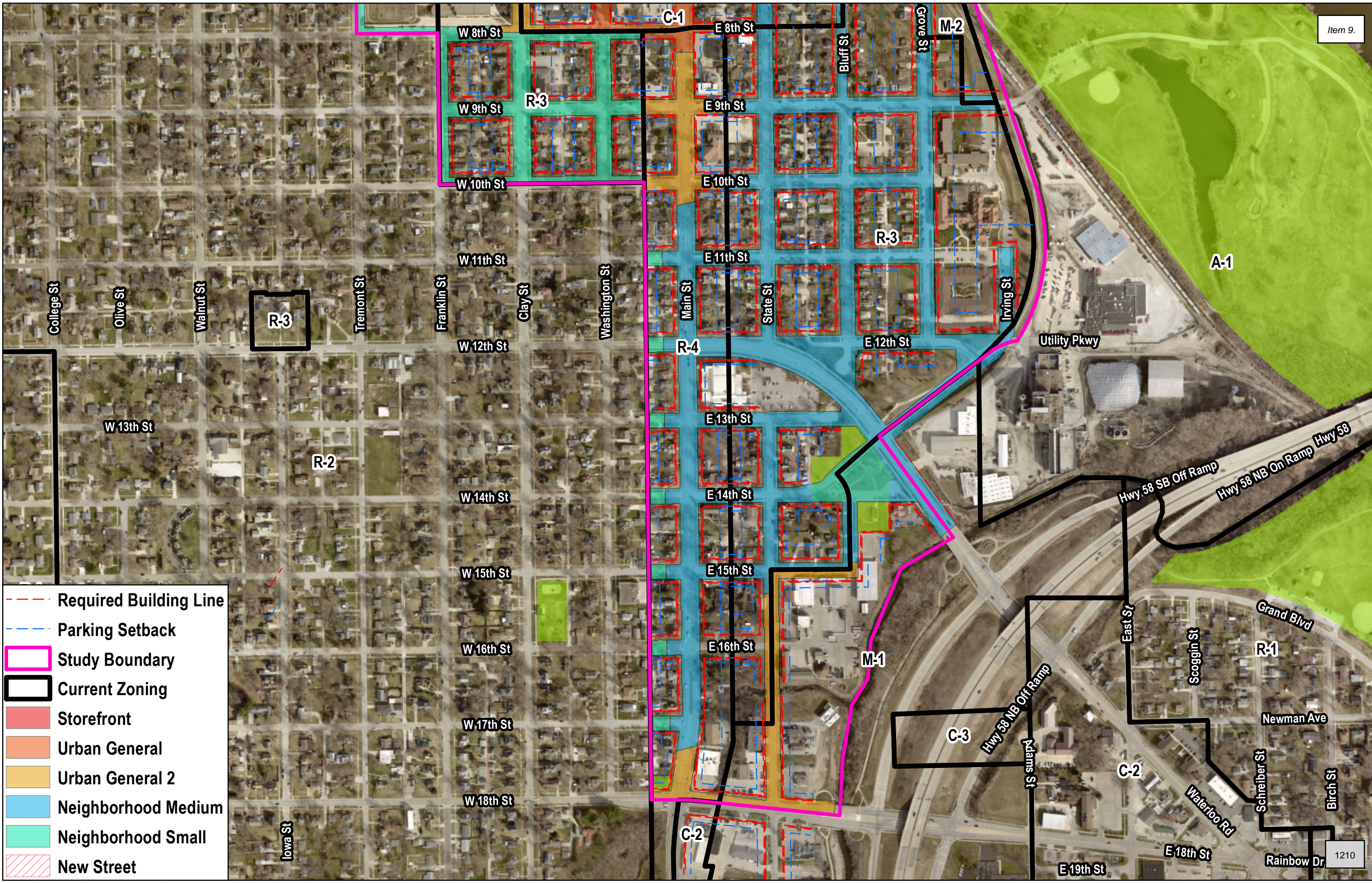
Ms. Lynch made a motion to approve the items as recommended by staff. Ms. Prideaux seconded the motion. The motion was approved unanimously with 6 ayes (Larson, Leeper, Lynch, Prideaux, Saul and Sears), and 0 nays.

- Attachments: Downtown Regulating Plan
Location map with study area boundary and existing zoning
Map overlaying proposed zoning over current zoning
Ordinance rezoning property to CD-DT Downtown Character District





- - - Required Building Line
- - - Parking Setback
- Study Boundary
- Current Zoning
- Storefront
- Urban General
- Urban General 2
- Neighborhood Medium
- Neighborhood Small
- New Street



- - - Required Building Line
- - - Parking Setback
- Study Boundary
- Current Zoning
- Storefront
- Urban General
- Urban General 2
- Neighborhood Medium
- Neighborhood Small
- New Street

Prepared by: Karen Howard, P&CS Manager, 220 Clay Street, Cedar Falls, IA 50613 (319) 273-8600

ORDINANCE NO. 2995

AN ORDINANCE AMENDING THE ZONING MAP OF THE CITY OF CEDAR FALLS FOR A CERTAIN DESCRIBED AREA, ALSO ILLUSTRATED ON THE DOWNTOWN CHARACTER DISTRICT REGULATING PLAN ATTACHED HERETO, REMOVING SAID AREA FROM ALL CURRENT ZONING DISTRICTS AND ADDING IT TO THE CD-DT DOWNTOWN CHARACTER DISTRICT AND ADOPTING THE DOWNTOWN CHARACTER DISTRICT REGULATING PLAN AS AN INTEGRAL PART OF THE ZONING MAP OF THE CITY OF CEDAR FALLS, IOWA.

WHEREAS, in November of 2019, the City Council of the City of Cedar Falls adopted the *Imagine Downtown! Vision Plan*, as an integral part of the Cedar Falls Comprehensive Plan; and

WHEREAS, in order to ensure future development and redevelopment is consistent with the adopted *Imagine Downtown! Vision Plan*, the City of Cedar Falls drafted new zoning regulations and an associated regulating plan for the downtown area covered by the *Imagine Downtown! Vision Plan*; and

WHEREAS, the new zoning regulations establish a new zoning district entitled, "Downtown Character District" abbreviated as "CD-DT," and an associated zoning map, referred to as the "Downtown Character District Regulating Plan;" and

WHEREAS, the City of Cedar Falls petitioned the Cedar Falls Planning and Zoning Commission to change the zoning of all properties within the area legally described below to CD-DT: Downtown Character District; and

WHEREAS, the Planning and Zoning Commission found that the rezoning (Case #RZ21-004) is consistent with the adopted Comprehensive Plan of the City of Cedar Falls and therefore has recommended to the City Council of the City of Cedar Falls, Iowa, that all that area within the boundary described in the body of the ordinance below, and including all street and alley rights-of-way within and abutting said area, shall be removed from the current zoning district designations and placed in the CD-DT Downtown Character District; and

WHEREAS, the City Council of the City of Cedar Falls, Iowa, deems it to the best interests of the City of Cedar Falls, Iowa, that said proposal be made and approved; and

WHEREAS, Section 26-118, District Boundaries of Division I, Generally, of Article III, Districts and District Regulations, of Chapter Twenty-six (26), Zoning, of the Code of Ordinances of the City of Cedar Falls, Iowa, provides that the zoning map of the City of Cedar Falls, Iowa, is incorporated into and made a part of said Ordinance by reference; and

WHEREAS, the said amended Section 26-118, District Boundaries of Division I, Generally, of Article III, Districts and District Regulations, of Chapter Twenty-six (26), Zoning, of the Code of Ordinances of the City of Cedar Falls, Iowa, provides that the boundaries of each Character District shall be indicated on the zoning map of the City and shall be governed by the associated Regulating Plan, which shall be the zoning map for each said Character District and shall be made a part of this article by reference; and said Downtown Character District Regulating Plan is attached hereto as Exhibit A; and

WHEREAS, notice of public hearing has been published, as provided by law, and such hearing held on the proposed amendment.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CEDAR FALLS, IOWA:

Section 1. That the following described area, which is also illustrated on the attached Exhibit A: Downtown Character District Regulating Plan, be and the same is hereby removed from all current zoning districts and added to the CD-DT Downtown Character District:

Beginning at the midpoint of a line between the Southwest corner of Lot No. 4, Block No. 21, and Southeast corner of Lot No. 5, Block No. 21, "J. R. and S. Cameron's Second Addition" to the City of Cedar Falls, Black Hawk County, Iowa; thence North along the centerline of the alley in said Block No. 21 to the midpoint of a line between the Northwest corner of Lot No. 1, Block No. 21, and Northeast corner of Lot No. 8, Block No. 21; thence North to the midpoint of a line between the Southwest corner of Lot No. 4, Block No. 20, and Southeast corner of Lot No. 5, Block No. 20, "J. R. and S. Cameron's Second Addition" to the City of Cedar Falls, Black Hawk County, Iowa; thence North along the centerline of the alley in said Block No. 20 to the midpoint of a line between the Northwest corner of Lot No. 1, Block No. 20, and Northeast corner of Lot No. 8, Block No. 20; thence North to the midpoint of a line between the Southwest corner of Lot No. 4, Block No. 13, and Southeast corner of Lot No. 5, Block No. 13, "J. R. and S. Cameron's Second Addition" to the City of Cedar Falls, Black Hawk County, Iowa; thence North along the centerline of the alley in said Block No. 13 to the midpoint of a line between the Northwest corner of Lot No. 1, Block No. 13, and Northeast corner of Lot No. 8, Block No. 13; thence North to the midpoint of a line between the Southwest corner of Lot No. 4, Block No. 12, and Southeast corner of Lot No. 5, Block No. 12, "J. R. and S. Cameron's Second Addition" to the City of Cedar Falls, Black Hawk County, Iowa; thence North along the centerline of the alley in said Block No. 12 to the midpoint of a line between the Northwest corner of Lot No. 1, Block No. 12, and Northeast corner of Lot No. 8, Block No. 12; thence North to the midpoint of a line between the Southwest corner of Lot No. 4, Block No. 2, and the Southeast corner of Lot No. 5, Block No. 2, "J. R. and S. Cameron's Addition" to the City of Cedar Falls, Black Hawk County, Iowa; thence North along the centerline of the alley in Block No. 2 to the midpoint of a line between the Northwest corner of Lot No. 1 said Block No. 2 and the Northeast corner of Lot No. 8 said Block No. 2; thence North to the midpoint of a line between the Southwest corner of Lot No. 2, Block No. 1, and the Southeast corner of Lot No. 3, Block No. 1, "J. R. and S. Cameron's Addition" to the City of Cedar Falls, Black Hawk County, Iowa; thence North along the centerline of the alley in Block No. 1 to the midpoint of a line between the Northwest corner of

Lot No. 1 said Block No. 1 and the Northeast corner of Lot No. 4 said Block No. 1; thence North along the centerline of the alley in “Auditors Plat #8”, City of Cedar Falls, Black Hawk County, Iowa to the midpoint of a line between the Northwest corner of Lot No. 1 and the Northeast corner of Lot No. 5 in “Auditors Plat #8”; thence North to the midpoint of a line between the Southwest corner of Lot No. 5 and the Southeast corner of Lot No. 6, in Block No. 4, “R. P. Speers Addition”, City of Cedar Falls, Black Hawk County, Iowa; thence along the centerline of the alley in said Block No. 4 to the midpoint of a line between the Northwest corner of Lot No. 1, Block No. 4 and the Northeast corner of Lot No. 10, Block No. 4; thence North to the midpoint of a line between the Southwest corner of Lot No. 4, Block No. 3 and the Southeast corner of Lot No. 5, Block No. 3 in “R. P. Speers Addition”, City of Cedar Falls, Black Hawk County, Iowa; thence along the centerline of the alley in said Block No. 3 to the midpoint of a line between the Northwest corner of Lot No. 1, Block No. 3 and the Northeast corner of Lot No. 8, Block No. 3; thence North along the Northerly extension of said alley centerline to the centerline of West 10th Street; thence West along said centerline of West 10th Street to the centerline of Franklin Street; thence North along said centerline of Franklin Street to the centerline of West 8th Street; thence West along said centerline of West 8th Street to the centerline of Tremont Street; thence North along said centerline of Tremont Street to the centerline of West 6th Street; thence West along said centerline of West 6th Street to the centerline of Iowa Street; thence North along said centerline of Iowa Street to the centerline of West 2nd Street; thence West along said centerline of West 2nd Street to the Southerly extension of Lots Nos. 5 and 6, Block No. 29, “Original Town of Cedar Falls”, City of Cedar Falls, Black Hawk County, Iowa; thence North along said Southerly extension and along the West line of said Lots Nos. 5 and 6, Block No. 29 to the Northeast corner of said Lot No. 6, Block No. 29; thence West along the North line of said Lot No. 6, Block No. 29 to the Northwest corner of said Lot No. 6, Block No. 29; thence West to the Northeast corner of Lot No. 3, Block No. 38, “Original Town of Cedar Falls”, City of Cedar Falls, Black Hawk County, Iowa; thence West along the North line of said Lot No. 3, Block No. 38 to the Northeast corner of said Lot No. 3; thence West to the Northeast corner of Lot No. 6, said Block No. 38; thence West along the North line of said Lot No. 6 and its Westerly extension to the centerline of Olive Street; thence North along said centerline of Olive Street to the centerline of West 1st Street; thence West along said centerline of West 1st Street to the centerline of North College Street; thence North along said centerline of North College Street to the North line of Ida Street; thence East along the North line of said Ida Street to the Northeast corner of said Ida Street; thence Northeasterly along the Southeasterly line of Auditor’s Parcel #8914-12-101-003 and its Northeasterly extension to the thread of the Cedar River; thence Southeasterly along said thread of the Cedar River to the Easterly extension of the centerline of East 7th Street North of Block 1, “Garrison’s Addition” to the City of Cedar Falls, Black Hawk County, Iowa; thence West along said Easterly extension of the centerline of East 7th Street to the Northwesterly extension of the centerline of Iowa Northern Railroad tracks lying West of the main office of the Cedar Falls Utilities; thence Southeasterly along said Northwesterly extension and Southerly and Southwesterly along the centerline of Iowa Northern Railroad tracks lying West of the main office of the Cedar Falls Utilities to the centerline of Utility Parkway; thence Southwesterly along said centerline of Utility Parkway and its Southwesterly extension to the centerline of Waterloo Road; thence Southeasterly along said centerline of Waterloo Road to the thread of Dry Run Creek; thence Southwesterly along said thread of Dry Run Creek to the centerline of East 18th Street; thence Northwesterly along said centerline of East 18th Street to the East extension of the centerline of West 18th Street; thence

West along said Easterly extension and said centerline of West 18th Street to the Southerly extension of the centerline of the alley in Block No. 21, "J. R. and S. Cameron's Second Addition" to the City of Cedar Falls, Black Hawk County, Iowa; thence North along said Southerly extension to the point of beginning; and including all street and alley rights-of-way within and abutting said area.

Section 2. That the zoning map of the City of Cedar Falls, Iowa, be and the same is hereby amended to show the property described in Section 1, above, as now being in the CD-DT Downtown Character District, and the amended map as well as the Downtown Character District Regulating Plan attached hereto and incorporated herein as Exhibit A, is hereby ordained to be the zoning map of the City of Cedar Falls, Iowa, as amended.

INTRODUCED: _____ September 7, 2021

PASSED 1ST CONSIDERATION: _____ September 7, 2021

PASSED 2ND CONSIDERATION: _____

PASSED 3RD CONSIDERATION: _____

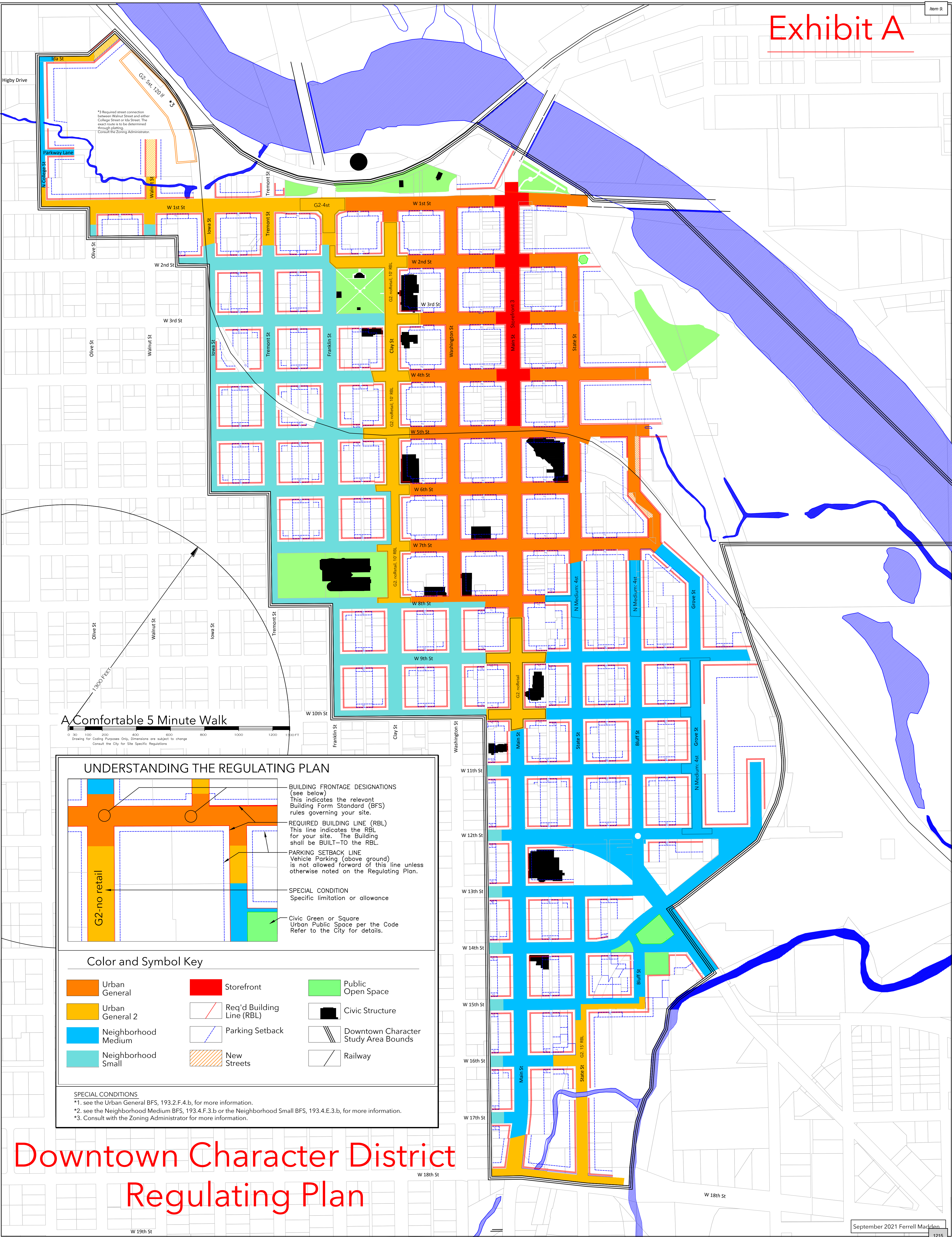
ADOPTED: _____

Robert M. Green, Mayor

ATTEST:

Jacqueline Danielsen, MMC, City Clerk

Exhibit A



*3 Required street connection between Walnut Street and either College Street or 1st Street. The exact route is to be determined through platting. Consult the Zoning Administrator.

A Comfortable 5 Minute Walk

0 300 600 900 1200 1500 FT
Drawing for Coding Purposes Only. Dimensions are subject to change. Consult the City for Site Specific Regulations.

UNDERSTANDING THE REGULATING PLAN

BUILDING FRONTAGE DESIGNATIONS
(see below)
This indicates the relevant Building Form Standard (BFS) rules governing your site.

REQUIRED BUILDING LINE (RBL)
This line indicates the RBL for your site. The Building shall be BUILT-TO the RBL.

PARKING SETBACK LINE
Vehicle Parking (above ground) is not allowed forward of this line unless otherwise noted on the Regulating Plan.

SPECIAL CONDITION
Specific limitation or allowance

Civic Green or Square
Urban Public Space per the Code Refer to the City for details.

Color and Symbol Key

Urban General	Storefront	Public Open Space
Urban General 2	Req'd Building Line (RBL)	Civic Structure
Neighborhood Medium	Parking Setback	Downtown Character Study Area Bounds
Neighborhood Small	New Streets	Railway

SPECIAL CONDITIONS

*1. see the Urban General BFS, 193.2.F.4.b, for more information.
 *2. see the Neighborhood Medium BFS, 193.4.F.3.b or the Neighborhood Small BFS, 193.4.E.3.b, for more information.
 *3. Consult with the Zoning Administrator for more information.

Downtown Character District Regulating Plan



DEPARTMENT OF COMMUNITY DEVELOPMENT

City of Cedar Falls
 220 Clay Street
 Cedar Falls, Iowa 50613
 Phone: 319-273-8600
 Fax: 319-273-8610
 www.cedarfalls.com

MEMORANDUM

Planning & Community Services Division

TO: Mayor Robert M. Green and City Council
FROM: Chris Sevy, Planner I
DATE: September 27, 2021
SUBJECT: Rezoning Request – Creekside Condos

REQUEST: Amend Future Land Use Map from Office & Business Park to Medium Density Residential (Case #LU21-001) and to rezone property from C-1 Commercial District to R-P Planned Residence District. (Case #RZ21-005)

PETITIONER: Dan Levi; Levi Architecture

LOCATION: Hanna Park Commercial Addition Lots 1, 2 & 3 and P A Hanna Addition Lot 4; Northwest corner of Cedar Heights Drive and Valley High Drive

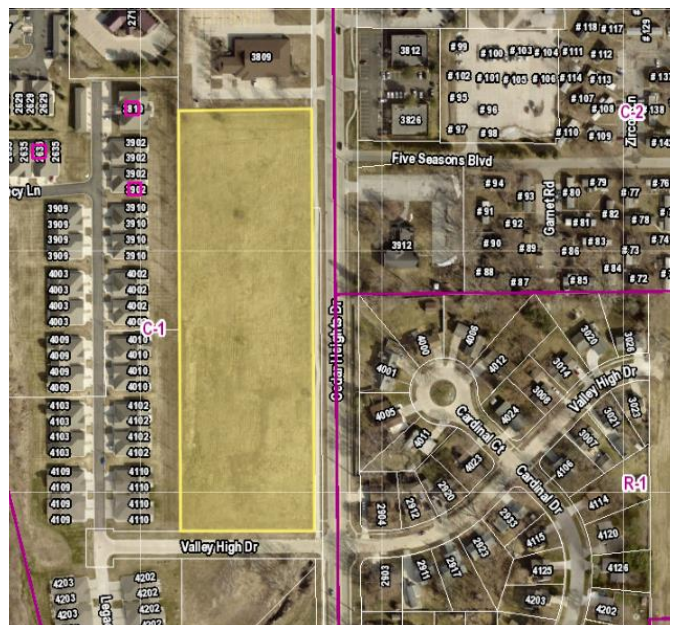
PROPOSAL

The applicant is seeking to build a medium density residential condominium development along Cedar Heights Drive north of Valley High Drive. Residential is only allowed conditionally in the C-1 district which also has a two-story 35-foot height limitation. That limitation precludes the proposed three-story 42-foot buildings from being built. Therefore, the applicant is requesting to rezone this property to an R-P Planned Residence District where a planned condominium development can be built.

Since one of the primary considerations of a rezoning is whether the rezoning request is consistent with the Comprehensive Plan, staff notes that an amendment to the Comprehensive Plan will be required in order to consider approval of the rezoning.

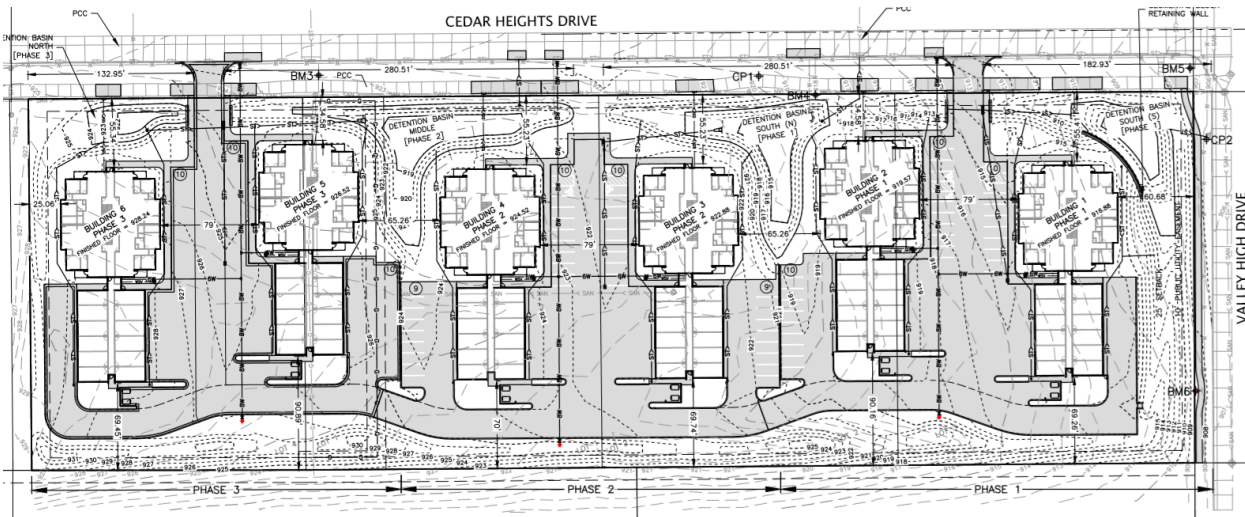
BACKGROUND

The four parcels in question and the surrounding area on three sides were zoned



C-1 Commercial in 2005. The northernmost parcel was platted in 1990 and the other three were platted in 2007 with the intent to allow commercial development. Staff notes that demand and interest for commercial development in this location has been limited as residential development has filled in around these parcels and they have remained vacant. There is considerable commercial development along University Avenue, which carries more traffic than Cedar Heights Drive, and is therefore more attractive to commercial development.

The applicant has provided a development plan for the site where six 12-plex buildings would go. This proposal is also going through a subdivision process to combine lots and reconfigure the utility easements that were previously platted. If rezoned from C-1 Commercial to an R-P Planned Residence District, it will be the lone R-P district in that immediate neighborhood. However, residential uses would border three sides of the development area.



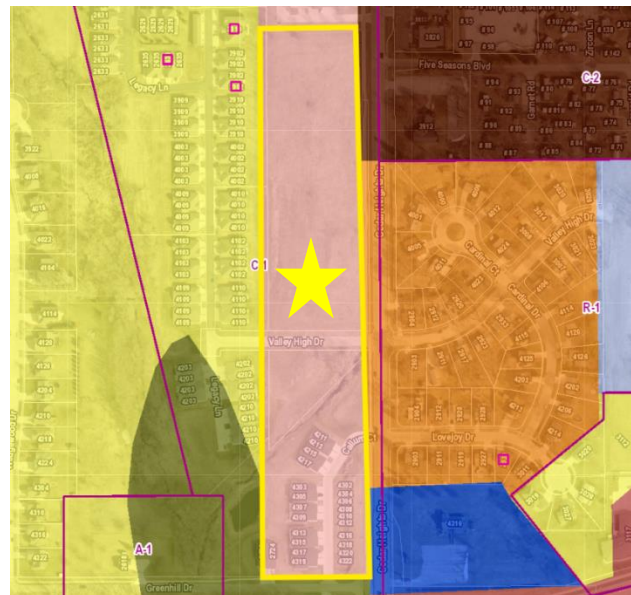
MINIMUM CRITERIA AND LAND USE MAP AMENDMENT

The following criteria are the minimum consideration for a rezone:

- 1) *Is the rezoning request consistent with the Future Land Use Map and the Comprehensive Plan?*

Not at this time. A land use map amendment is required and must be considered prior to consideration of the rezoning request. The Future Land Use Map shades this property in pink which is for Office and Business Park uses. The area outlined in yellow to the right (marked by a star) will need to be amended to "Medium Density Residential" to allow the proposed project. The area on the east side of Cedar Heights Drive is also designated as Medium Density Residential, shown shaded in orange, so a change on the west side of the street would create consistency in the type of development in the area.

Office and Business Park uses here on the



Future Land Use Map may not be a practical expectation at this point. In recent history there has not been interest or demand for further office spaces or commercial development along Cedar Heights Drive as there are more prominent commercial corridors nearby along University Avenue and Viking Road. Office and business park development has also agglomerated in the industrial land further to the west. Principles of land-use planning would concentrate commercial uses in nodes that are appropriately sized. Staff finds that the amount of commercial and office indicated on the Future Land Use Map along this corridor may be excessive given the lower traffic volume and more attractive locations for such development in other areas of the city. Also, additional residential development will provide needed housing in the community and help create more demand for nearby retail and commercial services. Staff recommends amending the Future Land Use Map changing the area outlined in yellow above to Medium Density Residential. Staff also suggests including the parcels south of Valley High Drive, which have largely been developed as residential. If the Land Use Map is amended as recommended, the rezoning request would then meet the test for a rezoning.

2) *Is the property readily accessible to sanitary sewer service?*

Yes, all utilities are readily available to the site.

3) *Does the property have adequate roadway access?*

Yes, the property borders Cedar Heights Drive and Valley High Drive.

ANALYSIS OF THE PROPOSED RP PLAN

The intent of the C-1 Commercial District is to border residential neighborhoods and provide for the “daily local business needs” of those neighborhoods. In the immediate area, most of the C-1 District has been developed as residential while the commercial amenities in the neighborhood include a dental office, a credit union, and a school district office for programs that help students transition to college and the work force. Residential uses are only allowed in C-1 with approval by the City Council. The applicant is requesting to rezone the property to R-P in order to cluster the residential development in 3-story buildings, which would not be allowed in the C-1 Zone.

This 6.38 acre property is bordered by a variety of uses: 4-plex condominium buildings to the west and south, a single family neighborhood and a church on the east, and the School District Educational Support Center on the north.

Staff finds that, for the surrounding residents, this rezone provides a more reliable expectation regarding what will be developed, how the buildings will be placed on the lot and how they will be designed to create a quality neighborhood. If demand changes and if left as C-1, many commercial uses such as retail, restaurants, and gas stations would be allowed with few restrictions or standards and would not be subject to review by the Planning and Zoning Commission and City Council.

The purpose of the R-P Planned Residence District is to provide for the orderly planned growth of residential developments in larger tracts of land. These larger tracts are more typically defined as being 10 acres or more, though this is not a hard number. For the sake of limiting the use and having assurance of how the parcels in question will be developed, City Staff finds that the R-P District is appropriate. An RP rezoning request must be accompanied by a master development plan and a developmental procedures agreement must be approved by City Council to ensure that the area is developed according to the plan.

The following is an analysis of the proposed development plan and an outline of specific requirements to inform conditions of the rezoning:

- Below is a table of the spatial requirements that would apply to this project along with the proposed figures (including C-1 requirements for comparison):

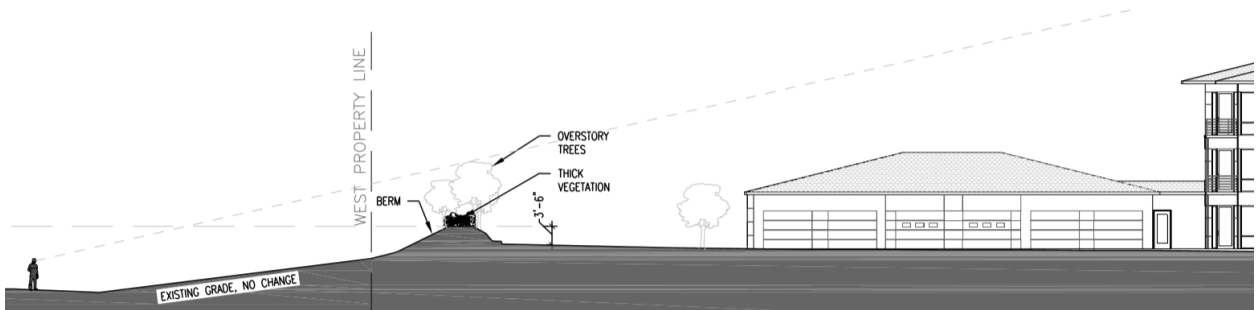
	<u>Required in C-1</u>	<u>Required in R-P</u>	<u>Proposed</u>
Front Yard Setback:	25 Feet	20 feet	34 feet (closest building); 55 feet (furthest building)
Rear Yard Setback:	10 feet	35 feet	69 feet (closest building); 90 feet (furthest building)
Side Yard Setback:	None	10 feet (25 feet total of both sides)	25 feet on north and 60 feet on south
Lot area minimum:	None	14,800 square feet per 12-plex	46,391 square feet per 12-plex
Height:	2 stories; 35 feet	N/A	3 stories; 42 feet

While the above figures are minimum requirements, the placement, design and height of the buildings will have to be substantially consistent with what is shown on the submitted master plan and outlined in the development procedures agreement. The setbacks, density and building height of the proposed development are listed in the column on the right. When a site plan application is submitted, it will need to be substantially consistent with these dimensional standards.

Concern about the height and number of units has been expressed by some of the neighboring residents to the west. The applicant seems to adequately address these concerns by having the buildings set back a minimum of 69 feet. The garages proposed at that setback are only 1 story and the 3-story 42-foot residential buildings are approximately 150 feet from the west property line. In contrast, the C-1 District would allow a 35-foot tall two-story building at a 10-foot setback with no mandatory review by the Commission or Council. Also, screening or fencing may not be required on property lines between two developments that are zoned C-1.

- Since Cedar Heights Drive is an arterial street and previous plats limit the number of driveways, only two access points will be allowed to ensure a smooth traffic flow. The applicant's proposal shows two access points, both on Cedar Heights Drive. A third access point may be allowed on Valley High Drive, however the applicant has opted not to provide that access point due to slope and elevation issues.
- Required landscaping and screening will be largely determined by the parking code as there are no landscape standards outlined in the R-P District (nor the C-1 District). The proposed plan features a 3.5 to 6-foot berm along the west edge of the property with trees, shrubs, and other plants on top of it. Below is an exhibit that was created to demonstrate to the neighbors how this will soften the view from their rear yards and

effectively screen the taller buildings from view. Staff finds that this is a good solution to help screen and separate the lower intensity residential development to the west and the taller buildings proposed with this development. During site plan review, the applicant will need to provide more details on how this berm and landscaping will provide an effective screen that is at minimum 6 feet tall to meet zoning code requirements.



4. Below is the provided landscape plan. The placement and number of trees and landscaping will be reviewed in detail when an application for site plan review is being considered. Note that the stormwater is being directed to the east to a series of landscaped basins. It should be noted that with development the stormwater from the proposed development will be managed in contrast to the uncontrolled run-off from what is currently a vacant lot.



A notice was mailed to property owners within 300 feet of the parcels under consideration on August 17, 2021 regarding this rezoning request. Notice was also published in the Courier on September 1, 2021.

Public comments have been received and are included as attachments:

- The Legacy HOA’s attorney filed a statement
- The neighboring Legacy HOA has submitted a petition signed in May of 2020 outlining concerns.
 - Since May of 2020, the applicant has held meetings and negotiations to improve the design and address concerns of neighbors.
- In an email the applicant has outlined the measures for addressing neighbor concerns. Many who signed the petition have expressed that they are now in support of the project.

- A neighbor to the west who originally signed the petition filed an official comment supporting the rezone while expressing concerns about flooding on their properties.
- Attendees of the last P&Z meeting requested that we include pictures of flooding on the properties to the west.

As is standard, proper stormwater management will be required of the applicant as part of the site plan approval process. This will include directing stormwater landing on impervious surfaces to basins bordering closer to Cedar Heights which will release water off the property at a slower rate than it would today in its undeveloped state. As such, the highlighted flooding issues may improve depending on where the flooding is coming from.

STAFF RECOMMENDATION

The Community Development Department recommends approval of the proposed amendment to the Future Land Use Map LU21-001 changing the designation north of Greenhill Road and west of Cedar Heights Drive from “Office and Business Park” to “Medium Density Residential” as outlined in this staff report; and

The Community Development Department recommends approval of RZ21-005, a request to rezone property from C-1, Commercial District to R-P, Planned Residence District, subject to a developmental procedures agreement that addresses the specific issues outlined in the staff report with regard to the proposed R-P plan, staff recommendations, access points, and landscaping.

The Community Development Department recommends approval of the Developmental Procedures Agreement which is included as an attachment.

At their meeting on September 8, 2021, on a vote of 7-0 (1 abstain), the Planning and Zoning Commission recommended approval of both the proposed amendment to the Future Land Use Map (LU21-001) as described above and the proposed rezoning (RZ21-005).

PLANNING & ZONING COMMISSION

Introduction 8/25/2021 The next item of business was a land use map amendment and rezoning request for the northwest corner of the intersection of Cedar Heights Drive and Valley High Drive. Chair Leeper introduced the item and Mr. Larson recused himself. Mr. Sevy provided background information, explaining that the applicant would like to rezone 6.38 acres from C-1, Commercial to RP, Planned Residence. It is proposed to build six 12-plex units, and the request involves an amendment to approximately 12.5 acres of the Future Land Use Map. The item is currently for discussion and setting a public hearing.

Mr. Sevy provided a rendering of the current Future Land Use Map and noted that interest and demand for Office/Business Park uses have been limited in the location and that the rezoning would help with housing needs. Staff recommends gathering comments from the Commission and public relating to the request, and scheduling a public hearing for September 8, 2021.

John Lane, 3909 Legacy Lane #1, shared personal concerns, including a letter

from Trent Law Firm. He noted concerns with who the developer is going to be. Kyle Larson met with Mr. Lane as the builder and Mr. Lane asks that specific details regarding a drain issue that is alleged to be fixed. He also noted concerns with the potential phasing, as well as the height of the building being three stories instead of two.

Steve Umthum, 4102 Legacy Lane #4, thanked the Commission for their work and mentioned concerns from the letter that was submitted before the meeting from Trent Law Firm. As the Commission has not had time to read the letter, he spoke to his questions and comments but noted that he is aware that this may be better for discussion at a future meeting. He mentioned proper stormwater detention and flooding mitigation and provided his concerns and suggestions. Development design and traffic, as well as buffering and privacy, were also discussed in the letter and Mr. Umthum outlined his concerns.

Dan Levi, Levi Architecture, 1009 Technology Parkway, spoke to the project and explained who the developers and owners are and answered questions that had been asked.

Ms. Howard clarified that the discussion is still just referring to the land use map amendment and noted that Mr. Sevy has more information about the rezoning.

Mr. Sevy spoke about the primary criteria for rezoning and explained that they are met, and discussed the conditions for the rezoning. Staff recommends gathering comments from the Commission and the public relating to the request, and scheduling a public hearing for September 8, 2021.

Mr. Holst asked how comfortable staff is with changing from commercial to residential and if there has been negative response from neighbors. Mr. Sevy explained that it appears to be a positive reaction as the rezoning is from a less restrictive zone to a more restrictive zone.

Ms. Lynch made a motion to set a public hearing for the next meeting. Ms. Sears seconded the motion. The motion was approved unanimously with 5 ayes (Holst, Leeper, Lynch, Prideaux and Sears), 1 abstention (Larson) and 0 nays.

Discussion
and Vote
9/8/2021

Chair Leeper introduced the item and Mr. Larson recused himself from the discussion and vote. Mr. Sevy explained that the request is to rezone the property from C-1, Commercial to RP, Planned Residential to allow for six, 12-plex units and to amend the future land use map. The item is being brought before the Commission for a public hearing. Staff finds that the amount of commercial and office use indicated on the land use map may be excessive given the lower traffic volume and more attractive locations for such development in other areas of the City. Additional residential development will also create more demand for nearby retail and commercial services. Staff feels that it would be appropriate to change the area to Medium Density Residential.

Mr. Sevy discussed the rezoning criteria, which includes consistency with the Future Land Use Map, utilities that are readily available to the site and access to Cedar Heights and Valley High Drives. All criteria are met. He discussed

neighborhood concerns and how each will be addressed. He also noted that concessions have been made since the signing of petitions in May of 2020, and that the petition may not accurately represent the current sentiment of all who signed it over a year ago. Mr. Sevy provided reasons why staff feels this zoning change would be a better fit in this area and the conditions of the rezoning. He provided a rendering of the developer's plans to address line of site issues as well as plans to manage stormwater. Staff recommends approval of the amendment of the Future Land Use Map and the rezoning of the property.

Dan Levi, Levi Architecture, 1009 Technology Parkway, stated that issues that were brought forward fourteen months ago have been addressed. He provided information about the developer and their standards for the developments. He also explained that these will not be apartments or rentals, but will be condos that are owner occupied, and addressed site line and stormwater concerns.

Richard Pint, 2629 Orchard Drive, Apt. 2, spoke regarding the need for higher quality housing.

Brian Page, 3325 Waterbury Drive, spoke as a real estate broker to the need for affordable high quality housing in Cedar Falls. He feels the project could only improve the community.

Steve Umthun, 4102 Legacy Lane, Unit 4, thanked the Commission for their work. He asked if there would be a chance for input with regard to the site plan at a later date. Mr. Leeper clarified that there would.

John Lane, 3909 Legacy Lane, stated that Mr. Sevy did a phenomenal job and that he answered most of the questions he's had. He asked if he would be dealing with LGC or Heartland Development if there are problems. Mr. Sevy clarified that Heartland Development is the seller of the property and LGC is the applicant for the project and will be the builder. Mr. Lane also stated that he believes that the majority of people who signed the petition have changed their minds and are in support of the project, but he wants assurances that if the project is not done as promised he knows who is legally responsible.

Juble Sloan, HOA president of the Valley High Condo association, stated that he is happy with the work the developer has done to accommodate neighbors and he is in support of the project.

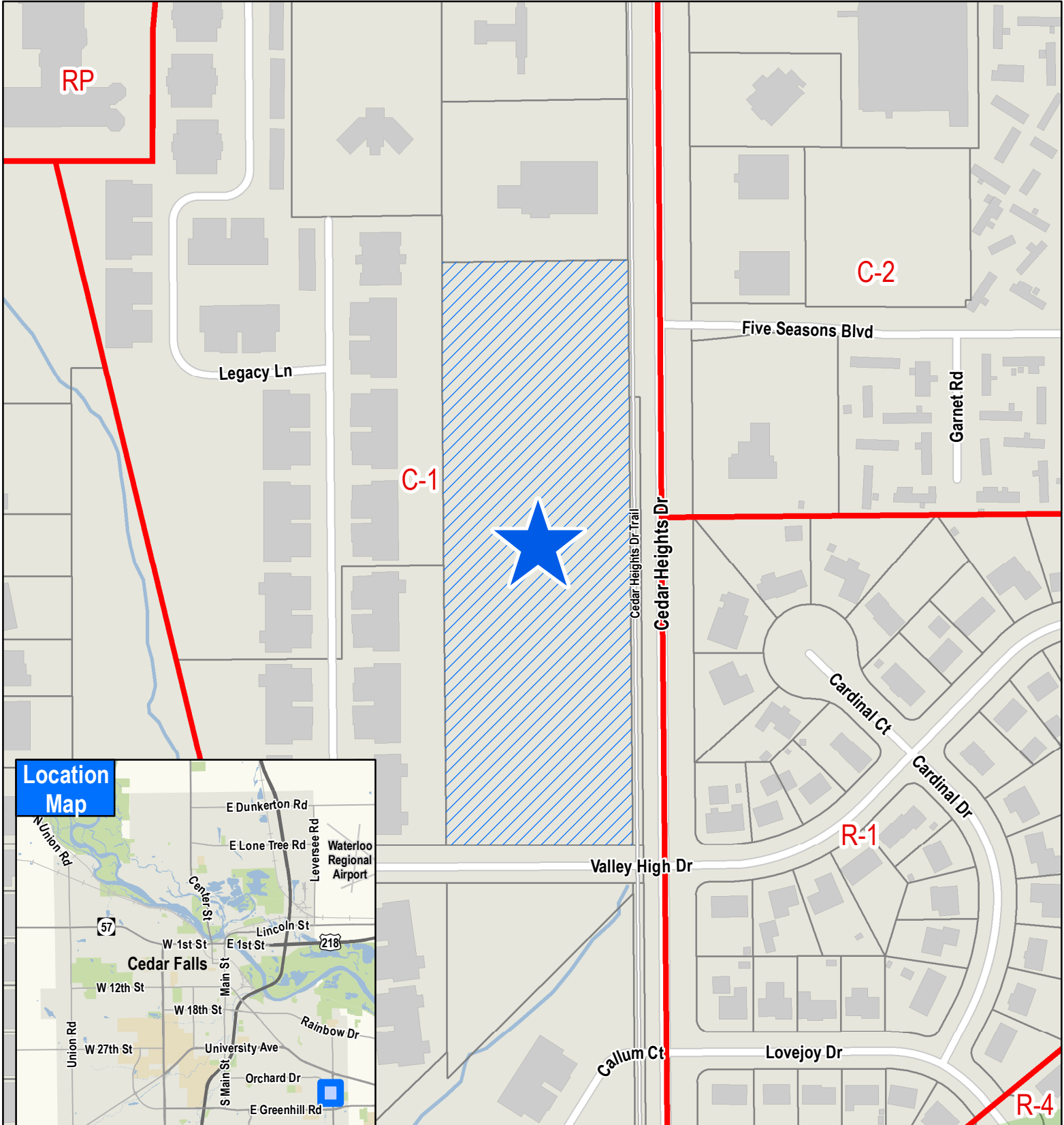
Ms. Saul made a motion to approve the item. Ms. Lynch seconded the motion. The motion was approved with 7 ayes (Hartley, Leeper, Lynch, Prideaux, Saul, Schrad and Sears), and 0 nays and 1 abstention (Larson).

Attachments: Location Map
LUMA Resolution
LUMA Exhibit
Rezone Ordinance
Rezone Exhibit
Resolution accepting the Developmental Procedures Agreement
Developmental Procedures Agreement and Exhibits

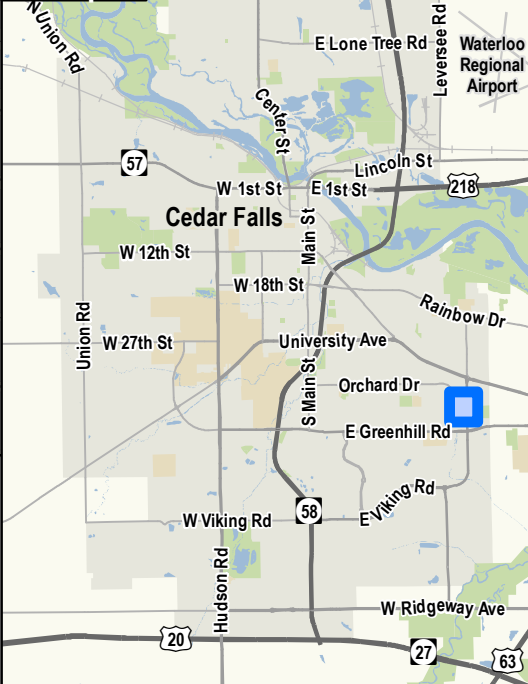
Renderings Provided by Applicant
Site Section with Building
Letter to Adjacent Property Owners
Public Comments Filed

Cedar Falls Planning & Zoning Commission August 25, 2021

Item 10.



Location Map



**Rezoning from C-1 to R-P
Northwest Corner of Cedar Heights
Drive and Valley High Drive**

1225

Prepared by: Chris Sevy, Planner I, City of Cedar Falls, 220 Clay Street, Cedar Falls, IA 50613 (319) 273-8600

ORDINANCE NO. 2996

AN ORDINANCE AMENDING THE ZONING MAP OF THE CITY OF CEDAR FALLS, IOWA FOR APPROXIMATELY 6.38 ACRES OF LAND DESCRIBED HEREIN, REMOVING SAID AREA FROM THE C-1, COMMERCIAL DISTRICT AND ADDING IT TO THE RP, PLANNED RESIDENCE DISTRICT

WHEREAS, a proposal was submitted to the Cedar Falls Planning and Zoning Commission to rezone approximately 6.38 acres of property from C-1 Commercial District to R-P, Planned Residence District, more specifically described below; and

WHEREAS, the Future Land Use Map of the Cedar Falls Comprehensive Plan has been amended (LU21-001) to be consistent with the residential uses and densities allowed in said R-P, Planned Residence District; and

WHEREAS, the Planning and Zoning Commission considered the rezoning request and proposed R-P Development Plan and associated developmental procedures agreement and find that said rezoning and Development Plan are consistent with the City of Cedar Falls Comprehensive Plan, as amended, and the intent of the R-P Planned Residence District; and

WHEREAS, the City Planning and Zoning Commission of the City of Cedar Falls, Iowa, finds that the rezoning (Case #RZ21-005) is consistent with the adopted Comprehensive Plan of the City of Cedar Falls and therefore has recommended to the City Council of the City of Cedar Falls, Iowa, that the property described below shall be removed from the C-1 Commercial District and placed in the R-P, Planned Residence District; and

WHEREAS, the City Council of the City of Cedar Falls, Iowa, deems it to be in the best interests of the City of Cedar Falls, Iowa, that said proposal be made and approved; and

WHEREAS, the said Section 26-118, District Boundaries of Division I, Generally, of Article III, Districts and District Regulations, of Chapter Twenty-Six (26), Zoning, of the Code of Ordinances of the City of Cedar Falls, Iowa, provides that the zoning map of the City of Cedar Falls, Iowa, attached thereto, is incorporated into and made a part of said Ordinance;

WHEREAS, notice of public hearing has been published, as provided by law, and such hearing held on the proposed amendment; now, therefore,

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CEDAR FALLS, IOWA:

Section 1. That the following described real estate, be and the same is hereby removed from the C-1 Commercial District and added to the R-P, Planned Residence District:

Legal Description

LOTS 1, 2, & 3, OF HANNA PARK COMMERCIAL ADDITION, & LOT 4 (EXCEPT THE NORTH 15 FEET THEREOF), OF P.A. HANNA ADDITION TO THE CITY OF CEDAR FALLS, ALL IN THE CITY OF CEDAR FALLS, BLACK HAWK COUNTY, IOWA

Section 2. That the zoning map of the City of Cedar Falls, Iowa, be and the same is hereby amended to show the property described in Section 1, above, as now being in the R-P, Planned Residence District, and the amended map is hereby ordained to be the zoning map of the City of Cedar Falls, Iowa, as amended.

INTRODUCED: _____ October 4, 2021 _____

PASSED 1ST CONSIDERATION: _____ October 4, 2021 _____

PASSED 2ND CONSIDERATION: _____

PASSED 3RD CONSIDERATION: _____

ADOPTED: _____

ATTEST:

Robert M. Green, Mayor

Jacqueline Danielsen, MMC, City Clerk



ROBERT M. GREEN

CITY OF CEDAR FALLS, IOWA
220 CLAY STREET
CEDAR FALLS, IOWA 50613
319-273-8600

MEMORANDUM

Office of the Mayor

FROM: Mayor Robert M. Green
TO: City Administrator
DATE: October 11, 2021
SUBJECT: Creation of the Cedar Falls Sister Cities Committee

REF: (a) Code of Ordinances, City of Cedar Falls §2-187(c): Mayor Powers and Duties
(b) Future-Forward 2025: the Cedar Falls Community-Wide Strategic Plan

1. *Assignment.* In keeping with reference (a), I hereby create the Cedar Falls Sister Cities Committee as a sub-committee of the Cedar Falls Art and Culture Board.
2. *Background.*
 - a. Strategy 15b of reference (b) states that the Cedar Falls Mayor's Office will "*Pursue official international 'sister community' relationships to expand high school and college student exchanges and learning opportunities.*"
 - b. In 2020 the Cedar Falls City Council approved a Sister City partnership with Ferizaj, Kosovo by resolution; this relationship is being directly pursued by the Mayor and Cultural Programs Supervisor through "Iowa Sister States" and the Consulate of Kosovo in Des Moines.
 - c. With the Ferizaj relationship established, Cedar Falls has an excellent opportunity to evaluate the feasibility of additional Sister City partnerships on other continents through the "Iowa Sister States" organization in the years ahead. These relationships will increase Cedar Falls' global engagement for education, manufacturing, business, trade, and cultural competency.
 - d. The Sister Cities effort will require deliberate, long-term planning and investment to fully realize the benefits of global sister city connectivity. A standing committee of interested and engaged residents, supported by the City of Cedar Falls, will be a practical way to ensure the long-term success of the program.
3. *Charge.* The Cedar Falls Sister Cities Committee will develop strategic directives and relationships for activities related to the Sister Cities program, with support from the Cultural Programs Supervisor. Specific activities of the committee shall include (but not be limited to):

- a. Develop long-range goals, intermediate objectives, and short-term strategies for the Sister City program.
 - b. Collaborate with cultural exchange stakeholder groups, such as service clubs, schools, cultural organizations, and businesses to capitalize on existing Sister City partnerships.
 - c. Participate directly in Sister City activities and events as goodwill ambassadors of the City and People of Cedar Falls.
 - d. Make individual and corporate effort to build community understanding and appreciation of Cedar Falls' Sister Cities, including their history, heritage, economy, language, and culture.
 - e. Identify and pursue additional Sister Cities relationships, with an emphasis on geographic diversity and locations with strong existing ties to Cedar Falls through UNI, service clubs, churches, businesses, or other historical connections, or through established regional or state relationships.
4. *Governance.* The governing documents for the Sister Cities Committee, including membership requirements and officer responsibilities, shall be developed and approved by the Art and Culture Board prior to the first meeting of the Sister Cities Committee. The committee shall be comprised of no more than ten (10) members.
 5. *Annual Report.* The Chair of the Sister Cities Committee shall be prepared to provide a brief presentation to the City Council as needed, to detail Cedar Falls' engagement in Sister Cities partnerships.
 6. *Committee Duration.* This group will be a standing committee and shall exist until disestablished by the Mayor.

XC: Director of Community Development
 Cultural Programs Supervisor
 City Council

###

From: Mario Basurto

Sent: Monday, October 11, 2021 5:16 PM

To: Brenda Balvanz

Cc: Dave Kivett; Eashaan Vajpeyi; Jordyn Beranek; Melissa Heston; Spencer Luvert; Susan Langan; Teri Jorgensen; Rebecca Whitaker; Mario Basurto; Amy Eggleston; S Langan; Jennifer Rodenbeck; Bailey Schindel; Rob Green; Andy Milone

Subject: Re: Monday, 10/11 HRC Agenda & Materials - Please RSVP

CAUTION: This email originated outside the City of Cedar Falls email system.
Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good Evening,

After careful consideration, I have decided to step-down from my Human Rights Commission position. I strongly feel that there is no sense of direction, relevance, or leadership within the Commission structure. As a strong Mexican-American, my time will be better utilized in continuing my personal and professional mission in assisting those who look to me to go against the establishment. By continuing to participate in this Commission, I would be turning my back on my own philosophy. I stand with the minority community of Cedar Falls, and now more than ever, I know that Cedar Falls is a blind contributor to ethnocentrism and only cares to empower those who do not oppose the establishment upon which privileged white individuals control.

Mario A. Basurto

----- Forwarded message -----

From: **Cynthia Snell** <
Date: Fri, Oct 8, 2021 at 2:54 PM
Subject: resignation
To: Kelly Stern <director@cedarfallslibrary.org>

Friday October 8, 2021

Kelly, I have to resign as a Board of Trustee for the library for personal reasons. It has been my privilege to serve these last few years.

Cindy Snell

Committee of the Whole
Cedar Falls Council Chambers
October 4, 2021

The Committee of the Whole met at City Hall at 5:50 p.m. on October 4, 2021, with the following Committee persons in attendance: Mayor Robert Green and Councilmembers Frank Darrah, Susan deBuhr, Kelly Dunn, Simon Harding, Daryl Kruse, Mark Miller and Dave Sires. Staff members from all City Departments and members of the community attended in person and teleconferenced in.

Mayor Green called the meeting to order and introduced the only item on the agenda, Downtown Zoning Code – Private Parking Requirements. Mayor Green introduced Planning and Community Services Manager Karen Howard. Ms. Howard stated that the proposed private parking requirements are for new developments only and no change is required for existing development; and there is no requirement for existing properties to share their existing parking. She also noted that this discussion is not about the City-owned public parking lots or whether to build or how to fund a parking ramp. Ms. Howard provided an overview of the proposed private parking requirements in the new Downtown Zoning Code: the background and intent of the proposed private parking requirements; data from a parking study in 2018; a summary of the current parking requirements; a summary of the proposed parking requirements; the definition, goal, and examples of shared parking; a comparison between current and proposed parking requirements using two examples, a 3 story commercial building and a 3 story residential building; and the costs versus benefits of keeping high private parking requirements. Ms. Howard provided a re-cap of the presented information and stated that the proposal would be the minimum requirement; developers can choose to add more parking based on the project.

Mayor Green opened for questions from the Council. Councilmember Harding asked if sale/transfer of property, renovation of property, and damage to property/rebuilding cause the new code to apply; Ms. Howard stated that sale/transfer of a property would not by itself trigger the new requirements. The requirements only apply if a new building was proposed, the use changed to a use that requires more parking, a renovation was proposed that expanded the square footage of the building, or if damage to structure was more than 50% of its value and the owner proposed to rebuild.

Councilmember deBuhr stated shared parking is an infringement on the owner and asked if it has been challenged in court. Ms. Howard stated not that she is aware of. Councilmember deBuhr asked for the numbers from the parking study for private lot utilization both day and night; Ms. Howard did not have the data at hand but stated that she believed that the slide showing the evening peak time on a Friday was the highest count.

Councilmember Sires asked how shared time is decided and about how shared parking would work during the pandemic with elevated work-from-home numbers; Ms. Howard stated the property owner determines the time(s) for shared parking, and work-from-home numbers would be speculation at this time.

Mayor Green opened for comments and questions from the public. T.J. Frein, 1319 Austin Way, asked who is liable during shared time; who enforces shared parking; how does this account for turnover in downtown residential area(s); can the 12 shared hours be split up; he stated the City should be making more effort towards agreements similar to the one with Viking Pump. City Attorney Rogers stated for a moving violation the motorist is liable; the owner is liable if it's proven to be due to condition of property. As an example, Ms. Howard stated that

this would be similar to the liability that Hy-Vee has for its parking lot. Mr. Rogers agreed. Ms. Howard stated the owner and/or developer will have the most insight to the best time(s) to share parking, the requirement is flexible but 8 hours must be provided during business or nighttime hours dependent on the primary use, but it can be split, and only a designated portion is shared; enforcement would be by signage. Eashaan Vajpeyi, 3831 Convair Lane, asked for definition of “business” and “nighttime” hours and where the code states that the sale/transfer doesn’t trigger this new code; he stated the language of the code is too ambiguous; he requested a new parking study due to the pandemic and work-from-home numbers. Ms. Howard stated it is standard that zoning codes are not simply triggered at sale or transfer of a property. If use changes or a renovation with expansion occurs, those would be triggers for any changes in zoning requirements to apply.

Jim Benda, 1816 Valley High Drive, asked what are parking requirements for proposed row houses, specifically visitor; is the Downtown Vision Plan intended to be a solution for parking, and how were requirements determined; were downtown character district parking requirements based on parking study or housing types from other communities with available mass transit; does the proposed code factor in downtown population data. Ms. Howard stated the proposed code does not require shared parking for row houses and street parking is available for visitors. She noted the proposed parking requirements in the zoning code are not the sole solution for parking downtown. The parking study recommended a number of solutions, but one of the parking study solutions was to “right-size” parking requirements in the zoning code. She noted that over-prescribing private parking leads to unnecessary and unused parking lots. The parking study results, observed parking counts, and discussions with community members and stakeholders were accounted for when creating proposed parking requirements. She noted that these requirements are an incremental change from current code.

Kevin Harberts, 1715 Whispering Pines Circle, asked if future population projections are included in the plan, without projections how can the consultant determine how many people will walk to downtown; he requested a survey of the downtown to track number of bedrooms, commercial square footage, and occupancy. Ms. Howard stated the proposed code anticipates that new developments will require new things, including parking, but can’t predict how quickly development might occur.

Councilmember deBuhr asked if restaurant occupancy limits are accounted for in the requirements. Ms. Howard stated first floor commercial use has no required parking; however, she cautioned that if a new requirement were added for restaurants based on occupancy, then if, for example, a retail shop moved out and a restaurant moved in, then additional parking would be required, since restaurants typically generate higher parking demand than a retail shop. She stated the best way to avoid unnecessary, under-utilized private parking lots is to focus efforts on a shared public parking system, as has been in place since 2004, when the Central Business District Overlay was adopted that exempted commercial uses from having to build private off-street parking.

Kyle Dehmlow, 2113 Vera Way, asked about businesses open more than 12 hours requiring shared parking and how that affects shared time(s); shared parking requirements for second/third story commercial use and a trend away from single-story commercial use towards multi-level. Ms. Howard stated for multi-level commercial space, there is no parking requirement for the first floor and the requirement for upper level(s) would be dependent on the amount of square footage proposed for the use. If less than 5,000 square feet on upper floors, then it would also be exempt from providing parking.

Councilmember Miller asked if there is a move away from first-floor commercial space; Ms. Howard responded no, first-floor commercial space is desired in Downtown. Mayor Green asked about shared parking time(s). Ms. Howard responded new developments would potentially require some shared parking for upper floor uses and the owner would have to proposed shared time(s), most likely when their parking demand is lowest. Julie Shimek, 104 Main Street, stated the focus should be on the revenue to Downtown instead of the cost of parking.

Mayor Green closed public comment and re-opened to Council discussion. Councilmember Kruse requested a definition of "business hours" and stated 600' is too far for shared parking; Ms. Howard stated the goal with zoning regulations is to create a balance between providing some flexibility versus establishing very strict, prescriptive standards. With the shared parking requirements, the City is trying to provide flexibility to owners to determine what times works best for their development within the bounds of the requirements. Councilmember Kruse stated the concept of remote shared parking is misguided. Councilmember deBuhr asked about using whole numbers instead of percentages to calculate space requirements instead of shared parking; Ms. Howard stated parking is calculated in ratio then rounded. Councilmember Sires stated shared parking is taking of private property and proposed requirements are unfair. Councilmember Harding stated that it is really matter of what kind of Downtown is envisioned for Cedar Falls; shared parking seems a possible creative solution to some of the concerns expressed. Councilmember Miller agreed and requested an additional parking conversation about public parking, while moving the proposed code forward, which was focused on development and parking on private lots. He made a motion to move forward with the 2nd consideration at the October 18th Council meeting. Councilmember Darrah seconded. Councilmember Kruse asked to discuss a parking ramp as it is part of the Vision Plan; he moved to amend the motion to include 1 space per bedroom with shared spaces not more than 600' away; Mayor Green stated that is not the motion on the floor. Councilmember Harding asked if additional parking discussions are planned. Councilmember Miller moved to amend the motion to add a Committee of the Whole meeting prior to the formal Council meeting on October 18th to discuss public parking; Councilmember Harding seconded. Councilmember Dunn requested businesses/citizens bring alternative solutions to the October 18th Committee of the Whole meeting. The Mayor called for a vote on the amendment to add a Committee of the Whole for public parking discussion on October 18th, 2021; aye: 5, nay: 2; motion carried. Mayor called for a vote on the motion to have the 2nd reading of the proposed zoning code at the October 18th, 2021 Council meeting; aye: 4, nay: 3; motion carried.

There being no further discussion, Mayor Green adjourned the meeting at 7:14 p.m.

Minutes by Katie Terhune, Administrative Assistant

CIVIL SERVICE COMMISSION
City of Cedar Falls
CEDAR FALLS, IOWA

October 6, 2021


Honorable Mayor Green and City Council
City Hall, 220 Clay Street
Cedar Falls, IA 50613

Mayor Green and City Council Members:

The Civil Service Commission of the City of Cedar Falls, Iowa approved of and authorized administration of a testing process and instruments for the position of Code Enforcement Officer. Listed below are the names of the top ranked candidates with their combined average test scores and applicable Veteran's Preference points. Tied scores are presented in alphabetical order, if applicable.

Rank	Name	Combined Averaged Score	Veteran's Preference Points	Total Points With Preference
1	Adam Spray	287		287
2	Gregory Kemp	233	32	265
3	Daniel Corrigan	255		255
4	Brian Wirtz	241		241
5	Mariah Fordyce	232		232
6	James Lind	229		229
7	Victoria Satterlee	228		228
8	Christina Bonnette	225		225

Respectfully Submitted,



Paul Lee, Commission Chairperson



Crystal Ford, Commissioner



Cathy Showalter, Commissioner

Orig: Jacque Danielsen, City Clerk
Cc: Stephanie Sheetz, Director of Community Development; Jamie Castle, Building Official
Civil Service Records



310 East 4th Street
Cedar Falls, IA 50613

Phone: 319-277-0213
www.communitymainstreet.org

October 1, 2021

Ms. Jacque Danielsen
City Clerk
City of Cedar Falls
220 Clay Street
Cedar Falls, IA 50613

**2021-2022
Board of Directors:**

Lexie Heath - President
Darin Beck
Natalie Brown
Ann Eastman
Crystal Ford
Brent Johnson
Audrey Kittrell
Jenny Leeper
Helen Pearce
Clark Rickard
Mark Showalter
Brad Strouse

Ex-officio
Wynette Froehner
Stephanie Houk-Sheetz

Re: Downtown Cedar Falls Self-Supported Municipal Improvement District

Dear Ms. Danielsen:

Enclosed, please find information pertaining to the creation of the Self-Supported Municipal Improvement District (SSMID) in the downtown area. The downtown SSMID was originally established in 1987 and its purpose is to provide funding for the continuation of the Community Main Street, Inc. (CMS). The proposed district is to be established for the period commencing July 1, 2022, and ending June 30, 2027. The provisions for enabling the enactment of the SSMID are addressed in the Code of Iowa, Chapter 386. Specifics are outlined as follows.

The CMS Board of Directors has collected property owners' signatures on the SSMID petition. Renewal requires supporting documents and signed petitions representing at least 25% of the taxable valuation and 25% of the downtown property owners. Included in this packet are signed petition forms representing 61% of the taxable valuation and 47% of the downtown property owners, exceeding the minimum requirements for renewal.

CMS would propose that these petitions and other documentation be submitted to the Planning and Zoning Commission for consideration and recommendation at their October 27, 2021, meeting. Based on the recommendation from the Planning and Zoning, the request would then follow the standard procedure of conducting a Public Hearing and adopting an Ordinance to establish said district. An updated copy of the 2016 ordinance is included with this letter.

The provisions of the Ordinance do comply with the necessary guidelines or establishing a district as addressed in Chapter 386 of the Code, herein referred to as the Act.



386.3 Establishment

- 1a. Be comprised of contiguous property wholly within the boundaries of the City. The area designed is contiguous and is defined on the attached map and legally described to include said property.
- b. Be given a descriptive name. The name of the district shall be "Downtown Cedar Falls Self-Supported Municipal Improvement District."
- c. Be comprised of property related in some manner. The property described is physically located in the downtown district and participates in the Community Main Street, Inc. program to enable downtown revitalization. Zoning is currently C-1, C-2 and C-3, appropriate for said District.

2a. The signatures of at least 25% of all owners of property within the proposed district. These signatures must together represent ownership of property with an assessed value of 25% or more of the assessed value of all of the property in the proposed district.

Sections 2b, c, d, e, and f of 386.3 are included in the ordinance that is included with this letter.

Please feel free to contact me at 319-277-0213 if you have any questions. Thank you.

Kind regards,



Kim Bear
Executive Director
Community Main Street

Deed Holder	Property Address	Taxable Value
305 MAIN STREET LLC	305 MAIN ST	229,992
323 PROPERTIES LLC	517 WASHINGTON ST	340,398
ADW LLC	102 MAIN ST	175,001
ARABELLA LLC	102 CLAY ST	1,615,653
ARABELLA LLC	200 W 1ST ST	1,975,566
ARABELLA LLC		102,636
AVAN PROPERTIES LLC	108 MAIN ST	147,821
B J S HOLDINGS LLC	311 MAIN ST	294,741
BLACK HAWK HOTEL MOTOR LODGE LLC	122 WASHINGTON ST	340,911
BLACKHAWK HOTEL LLC		53,541
BT HOLDINGS LLC	122 MAIN ST	310,968
CEDAR FALLS COMMUNITY CR UNION	123 W 4TH ST	1,048,806
COMMUNITY NATIONAL BANK	312 W 1ST ST	658,890
D SQUARED II LLC	109 E 4TH ST	108,387
D SQUARED II LLC	402 MAIN ST	459,387
D SQUARED II LLC	406 MAIN ST	227,423
DOLLYS RENTALS LLC	604 CLAY ST	1,325,826
EQUITY REAL ESTATES INVESTMENTS	111 MAIN ST	227,157
FARMERS STATE BANK	515 MAIN ST	2,537,982
FARRIS, DAVID	116 MAIN ST	201,978
FARRIS, DAVID	118 MAIN ST	228,426
FARRIS, DAVID A	209 STATE ST	294,975
FENCL, DANIEL D TRUST	422 MAIN ST	456,111
FENCL, DANIEL D TRUST		163,152
FIRST NATIONAL BANK OF CF	602 MAIN ST	1,842,795
FIRST NATIONAL BANK OF CF		112,518
FIRST NATIONAL BANK OF CF		90,414
FIRST NATIONAL BANK OF CF		45,486
FRANKLIN STREET PROPERTY L C	415 CLAY ST	715,113
FRANKLIN STREET PROPERTY L C		41,463
FRANKLIN STREET PROPERTY L C		31,752
FRANKLIN STREET PROPERTY L C		6,057
GREAT WESTERN BANK	205 W 2ND ST	904,590
HI YIELD LLC	123 W 7TH ST	509,481
HI YIELD LLC		50,742
HI YIELD LLC		31,851
IEHL, CALVIN R		874,917
JJ LAND L C	110 E 3RD ST	199,089
JJ LAND L C	222 MAIN ST	265,113
JJ LAND L C	224 MAIN ST	212,742
K GROUP L C	226 MAIN ST	232,902
KEL MAR LC	600 STATE ST	380,781
KEL MAR LC	521 CLAY ST	104,160
KNUTSON, AARON M	622 MAIN ST	294,705
LINDERBAUM REAL ESTATE LLC	115 E 2ND ST	295,749
MAIN STREET HOTELS LC	115 MAIN ST	1,027,413
MAIN STREET HOTELS LC	119 MAIN ST	305,757

MARSH, JEFFREY J	412 MAIN ST	167,148
NAB INVESTMENTS LLC	315 MAIN ST	622,883
NAB INVESTMENTS LLC	317 MAIN ST	257,345
NELSON FUNERAL HOME INC	613 MAIN ST	417,632
OVERMAN NORTH PARTNERS LC	323 W 2ND ST	132,966
PANTHER BUILDERS LLC	616 CLAY ST	498,942
PARK PLACE PROPERTIES	324 W 3RD ST	131,697
PC REAL ESTATE LLC	310 MAIN ST	230,760
PC REAL ESTATE LLC	312 MAIN ST	298,134
PC REAL ESTATE LLC	316 MAIN ST	495,864
PRESTIGE WW LLC	205 MAIN ST	443,547
RICHARDSON FUNERAL HOME INC	616 WASHINGTON ST	49,684
RICHARDSON FUNERAL HOME INC		48,456
RIVER PLACE PROPERTIES II LC	123 E 3RD ST	62,982
RIVER PLACE PROPERTIES II LC	302 MAIN ST	184,338
RIVER PLACE PROPERTIES LC		149,454
SC AND B PROPERTIES LLC	318 MAIN ST	284,691
SHIMEK, ANDREW	109 MAIN ST	119,511
SHIMEK, ANDREW D	104 MAIN ST	230,735
SHIMEK, ROBERTA M	107 MAIN ST	239,083
SIMPLE AS 128 LLC	128 MAIN ST	320,225
SRE HOLDINGS LLC		57,033
SRE HOLDINGS LLC	201 WASHINGTON ST	587,376
SRE HOLDINGS LLC	403 WASHINGTON ST	195,651
STATE STREET MIXED USE II LC	100 E 2ND ST	5,915,120
STATE STREET MIXED USE LC	200 STATE ST	5,558,276
STATE STREET RESIDENCES LC		417,915
STONE AND TERRACE LLC	108 E 4TH ST	250,110
STONE AND TERRACE LLC		87,471
VIKING PUMP INC	222 E 7TH ST	220,230
VIKING PUMP INC	406 STATE ST	1,094,040
VIKING PUMP INC		48,303
VIKING PUMP INC		540

Petition for Renewal of the
5th Suggested Municipal Improvement District (SMID)
2022

Use the designated address regarding the 5th Suggested Municipal Improvement District (SMID) for the
Cedar Falls, Iowa, Improvement District. The 5th Suggested Municipal Improvement District (SMID) is
ending June 30, 2022. The district will be renewed for a term of 5 years beginning July 1, 2022. The
the following property included in the district. The district will be renewed for a term of 5 years beginning
through Cedar Falls, Iowa. The district will be renewed for a term of 5 years beginning July 1, 2022.
It is requested that the City of Cedar Falls

NAME	ADDRESS	PHONE
<i>[Signature]</i>	<i>322 East 10th St</i>	<i>319-462-5703</i>
	<i>Cedar Falls</i>	
1		
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Petition for Renewal of the
Self-Supported Municipal Improvement District (SSMID)
2022

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	NAME	ADDRESS	PHONE
1.	<i>Roberta Schuck</i>	<i>107 main / 1504 Howard</i>	<i>233 6813</i>
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	NAME	ADDRESS	PHONE
1.	Brian Wiegert (SRE HOLDINGS)	408 Washington	319 404 4884
2.	" " "	(Stone & Terrace) 108 E 4th	" " "
3.	" " "	201 Washington	" " "
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	NAME	ADDRESS	PHONE
1.	 Brad Leeper	205 Main St., CF	319-239-5496
2.	 Jenny Leeper	205 main St., CF	319-239-7176
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	NAME	ADDRESS	PHONE
1.	Farmers State Bank	515 main st	319 874 4345
2.		Cedar Falls	
3.	Natalie Brown	315 Main St, CF	319 240 0232
4.	Natalie Brown	317 Main St, CF	319 240 0232
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	NAME	ADDRESS	PHONE
1.	Viking Pump, Inc -	222 E 7th St. 406 State St., Cedar Falls, IA 50613	319-273-8166
2.	(Connie Guhring on behalf of Josh Stiever)		
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	NAME	ADDRESS	PHONE
1.	Cedar Falls Community Cn. by Helen. Pano, CEO	133 W 4 th St	319-266-7531
2.	Dawn Wilson	102 Main Street Cedar Falls, IA	319-404-5468
3.	Julie Shumek	104 Main St Cedar Falls	319-230-9775
4.	Julie Shumek	109 Main St Cedar Falls	319-230-9775
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	NAME	ADDRESS	PHONE
1.	<i>Ambrosio</i>	<i>222, 224 Main St 110 E 3rd</i>	<i>3194043330</i>
2.	<i>Kate Dunning</i>	<i>517 Washington St, CF</i>	<i>319.290.1198</i>
3.	<i>Debra Kroll</i>	<i>108 Main St. CF</i>	<i>319 240-3962</i>
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	NAME	ADDRESS	PHONE
1.	Brent Johnson	122/124 Main	515-290-1008
2.	Brent Dahlstrom	604 Clay St	319-505-3609
3.		200 W. 15th St	
4.		102 Clay St	
5.		123 W. 7th St	
6.		616 Clay St	
7.		406 Main St	
8.		109 E. 4th St	
9.		402 Main St	
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	NAME	ADDRESS	PHONE
1.	<i>Raymond Loring</i>	<i>205 W. 2nd St. CF</i>	<i>319-429-4796</i>
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	NAME	ADDRESS	PHONE
1		Thomas R. Penaluna	111 Main Street, Cedar Falls, Iowa 50613 319-833-1234
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	NAME	ADDRESS	PHONE
1.	Redfern Law Firm / Franklin Street Property LLC	415 Clay St.	277-6830
2.	First Bank by [Signature]	602 Main St	247-7928
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4.	[Signature]	622 Main Street	266-1838
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	NAME	ADDRESS	PHONE
1 .	Jessica & Jeff Marsh	408-412 Main Street	319-269-8309
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	NAME	ADDRESS	PHONE
1.	Jay Knapik/Gary Kelley	226 ^{Thurs north Drive} MAIN ST, CF.	319-404-4210
2.	Wendy Wray (ex. spouse)	28 ^{Drummet - bradshaw/way} MAIN ST, CF.	319-404-8550
3.	Brian Brunner	318 ^{Penny Leates} MAIN ST, CF.	319-266-2604
4.	John Peterson	311 ^{ICM Financial} MAIN ST, CF.	319-290-2212
5.	Jim Earl	422 ^{Rechtford Court} MAIN ST	319-230-7112
6.	Mike Silantzi	613-616 ^{Rechtford Court} MAIN ST, CF.	319-266-3525
	James Allen	201 ^{North} MAIN ST	319-261-0828
	James Strub	401 ^{North} MAIN ST	319-504-1016
9.	Thomas Kelly	600 State 521 ^{Clay} CLAY	319-277-9355
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	NAME	ADDRESS	PHONE
1.		100 E. 2nd	319-277-0007
2.	Frige, New District	200 5th	
3.	"	250 5th	
4.	"	300 5th	
5.	"	302 Main	
6.	"	123 W. 3rd	
7.	"	115-119 Main	
8.	"	112 Washington	
9.	"	313 W. 2nd	
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	NAME	ADDRESS	PHONE
1.	 PC Real Estate, LLC	310 Main Street	
2.	 PC Real Estate, LLC	312 Main Street	
3.	 PC Real Estate, LLC	314-316 Main Street	
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	NAME	ADDRESS	PHONE
1 .	Ann Eastman	827 Westwood Drive CF	319-269-7766
2 .		365 main Street	
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	NAME	ADDRESS	PHONE
1.	Mimi A Rice	116 & 118 Main St	(319) 961-0856
2.	DAVID FARRIS	209 STATE ST	319 961-8078
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	NAME	ADDRESS	PHONE
1.	Community Bank Trust	312 W 1st St.	319-433-6111
2.	by Steven Bentley, Pres/CEO		
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CODE OF ORDINANCES CITY OF CEDAR FALLS, IOWA

• ARTICLE X. - *MUNICIPAL IMPROVEMENT DISTRICTS*[\[10\]](#)

• • DIVISION 1. - DOWNTOWN CEDAR FALLS *SELF-SUPPORTED MUNICIPAL IMPROVEMENT DISTRICT*

•

• Sec. 2-676. - Created; purpose.

• There is hereby created in the city a *self-supported municipal improvement district* as defined in Chapter 386 of the 2015 Code of Iowa (referred to in this article as "the Act"), the name of which *district* shall be the "Downtown Cedar Falls *Self-Supported Municipal Improvement District*" (sometimes referred to in this article as the "*district*"), the purposes of which *district* are the undertaking of actions and the design and construction of any and all *improvements* authorized by the Act, and the performance of administration, redevelopment and revitalization of the *district*, as authorized by the Act.

(Ord. No. 2759, § 1, 2-27-12; Ord. No. 2894, § 1, 2-20-17)

• Sec. 2-677. - Boundaries.

• The *district* shall include all property within the following described boundaries:

That part of [Section 12](#), Township 89 North, Range 14 West of the Fifth P.M. in the City of Cedar Falls, Black Hawk County Iowa described as beginning on the centerline of Franklin Street at its intersection with the southerly bank of the Cedar River; thence southerly along said centerline of Franklin Street to the centerline of 6th Street; thence easterly along said centerline of 6th Street to the centerline of Clay Street; thence southerly along said centerline of Clay Street to the centerline of 7th Street; thence easterly along said centerline of 7th Street to the former westerly right of way line of the former Chicago and North Western Transportation Company; thence northerly along said former westerly right of way line to the centerline of 4th Street; thence easterly along said centerline of 4th Street to the westerly bank of the Cedar River; thence northerly and westerly along the westerly and southerly bank of the Cedar River to the point of beginning.

(Ord. No. 2759, § 1, 2-27-12; Ord. No. 2894, § 1, 2-20-17)

• Sec. 2-678. - Benefit determined; location in C-1, C-2, C-3, and M-2 zoning *districts*.

• It is found and determined that the owners of all of the property within the *district* have a present and potential benefit from the condition, development and maintenance of the *district* and that all of the property within the *district* is related by virtue of its location within the C-1, C-2, C-3, or M-2 Zoning *Districts* of the city.

(Ord. No. 2759, § 1, 2-27-12; Ord. No. 2894, § 1, 2-20-17)

• Sec. 2-679. - Operation fund created; purpose.

• Pursuant to the provisions of Section 8 of the Act, there is established and created a *self-supported improvement district* operation fund, which shall be known as the "Downtown Cedar Falls *Self-Supported Municipal Improvement District* Operation Fund" (and which is referred to in this article as the "operation fund"), for which operation fund the city may certify taxes (the "operation tax") each year commencing with the levy of taxes for collection in the fiscal year beginning July 1, 2017, and continuing through the fiscal year ending June 30, 2022, for the purpose of paying such expenses of the *district* as are authorized

by the Act, including, but not limited to, the administrative expenses of the *district* and part or all of the maintenance expenses of *improvements* or *self-liquidating improvements*, as defined by the Act, for a period of five years.

(Ord. No. 2759, § 1, 2-27-12; Ord. No. 2894, § 1, 2-20-17)

- Sec. 2-680. - Operation tax.
- The operation tax levied in any one year, as provided in [section 2-679](#), shall be at a rate not to exceed five dollars and eighty-three cents (\$5.83) per one thousand dollars (\$1,000.00) of taxable value of the property within the *district*.

(Ord. No. 2759, § 1, 2-27-12; Ord. No. 2894, § 1, 2-20-17)

- Sec. 2-681. - Copies on file.

The city clerk shall cause a copy of the ordinance codified in this article to be filed in the office of the Black Hawk County Recorder and in the office of the Black Hawk County Treasurer.

(Ord. No. 2759, § 1, 2-27-12; Ord. No. 2894, § 1, 2-20-17)



CITY OF CEDAR FALLS, IOWA
 PUBLIC SAFETY – FIRE RESCUE DIVISION
 4600 South Main Street
 Cedar Falls, Iowa 50613
 Phone: 319-273-8690
 Fax: 319-268-5196



MEMORANDUM

To: Honorable Mayor Green and Cedar Falls City Council
 CC: Jeff Olson, Public Safety Director
 From: John Bostwick, Fire Chief
 Date: October 8, 2021
 Re: Holiday Hoopla Fireworks Show

J & M Displays has contacted Cedar Falls Fire Rescue requesting a permit to provide a fireworks display on Friday November 26, 2021, at approximately 7:45 pm in the area south of Gateway Park. This fireworks permit is for a display for Holiday Hoopla.

I have discussed the event with J & M Displays and the following has been agreed to and will abide by:

J & M Displays will fully comply with N.F.P.A. 1123, State of Iowa Chapter 727, and all applicable codes and regulations.

J & M Displays will provide a minimum one million dollar insurance policy. A copy of this policy will be forwarded to Cedar Falls Fire Rescue prior to the event.

J & M Displays will submit a site plan for approval to Cedar Falls Fire Rescue prior to the event.

All personnel operating fireworks display equipment will be qualified to operate equipment.

There will be proper margin of safety for spectators and personnel.

Cedar Falls Fire Rescue will inspect and approve site for safety on the date of the display.

Appropriate fees will be submitted previous to the event.

I respectfully request that this application for a fireworks display permit be granted.

**DEPARTMENT OF PUBLIC SAFETY SERVICES**

POLICE OPERATIONS
CITY OF CEDAR FALLS
4600 SOUTH MAIN STREET
CEDAR FALLS, IOWA 50613

319-273-8612

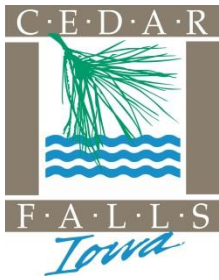
MEMORANDUM

To: Mayor Green and City Councilmembers
From: Jeff Olson, Public Safety Services Director
Craig Berte, Police Chief
Date: October 11, 2021
Re: Beer/Liquor License Applications

Police Operations has received applications for liquor licenses and/ or wine or beer permits. We find no records that would prohibit these license and permits and recommend approval.

Name of Applicants:

- a) Hampton Inn & Suites, 101 West 1st Street, Class C beer & Class B wine - renewal.
- b) Peppers Grill & Sports Pub, 620 East 18th Street, Class C liquor - renewal.
- c) SingleSpeed Brewing Co., 128 Main Street, Class C liquor & outdoor service - renewal.
- d) Fareway Store, 4500 South Main Street, Class E liquor - renewal
- e) G Corner, 2125 College Street, Class E liquor – new.



MAYOR ROBERT M. GREEN

CITY OF CEDAR FALLS, IOWA
 220 CLAY STREET
 CEDAR FALLS, IOWA 50613
 PHONE 319-273-8600
 FAX 319-268-5126
 www.cedarfalls.com

FROM: Mayor Robert M. Green

TO: City Council

DATE: October 11, 2021

SUBJECT: Home Base Iowa Community Resolution of Support

REF: (1) Home Base Iowa website - <https://www.homebaseiowa.gov/>

1. **Purpose.** I respectfully request that the City Council approve a resolution of support for Cedar Falls' participation in the Home Base Iowa (HBI) initiative.

2. **Background.**

- a. The Home Base Iowa Act was signed into state law in 2014, and is an initiative of the Governor's Office to "*connect Iowa businesses with qualified veterans and their spouses looking for career opportunities. The program also provides resources to help connect veterans and their families with education and in transitioning to a new community*" (Reference (a)).
- b. While Black Hawk County was designated as an HBI County in March 2018, no city in Black Hawk County has yet been recognized as an official HBI City until now.
- c. Waterloo and Cedar Falls are each pursuing HBI City designations, which require:
 - At least 10% of eligible local businesses to support the hiring of veterans (which is already the case in Cedar Falls);
 - Offering of incentives to veterans for relocation (which we already provide, to a small degree, which qualifies us);
 - Agreement to display a Home Base Iowa street sign (which we will once we receive our designation); and
 - A resolution of support issued by the local government (this current request).

3. Next Steps.

- a. If approved, I will forward your resolution of support to the Home Base Iowa coordinator as the last component for our city designation.
- b. I am currently working with the City of Waterloo, the University of Northern Iowa, Hawkeye Community College, Grow Cedar Valley, and the Black Hawk County Veterans Affairs office for a joint signing ceremony to induct our communities as Home Base Iowa cities. The plan is for this to occur on Veterans Day (November 11) at an appropriate location. I will provide details when available.
- c. Longer term, I will seek a council discussion on potential on the potential for incentives that the city can provide to veterans locating to Cedar Falls after discharge from the Armed Forces. Such incentives are offered by other Iowa cities, and I believe this merits council discussion.

4. Please contact me with any questions or concerns about this resolution request.

Encl: Home Base Iowa Community Support Resolution

Xc: City Administrator

###

RESOLUTION NO. _____**RESOLUTION OF SUPPORT FOR THE HOME BASE IOWA INITIATIVE**

WHEREAS, Home Base Iowa is an initiative of the Office of the Governor of Iowa launched in 2014 to match military veterans with jobs available across Iowa; and

WHEREAS, the Home Base Iowa initiative consists of two programs: *Home Base Iowa Businesses* and *Home Base Iowa Communities*; and

WHEREAS, Governor Reynolds has requested Iowa businesses and communities to support the Home Base Iowa initiative, and designation as Home Base Iowa Community requires that the local government adopt a resolution of general support for the initiative; and

WHEREAS, the City Council of the City of Cedar Falls recognizes that there is a workforce shortage in the Cedar Valley, and the Home Base Iowa program will serve as an additional tool to grow the pool of qualified applicants for our area employers; and

WHEREAS, long-term collaboration between the City of Cedar Falls, the City of Waterloo, the Black Hawk County Veterans Affairs Office, Grow Cedar Valley, the University of Northern Iowa and Hawkeye Community College to recruit, educate and employ military veterans in the Cedar Valley will benefit our entire community; and

WHEREAS, the City Council of the City of Cedar Falls finds it in the best interest of Cedar Falls and veterans everywhere to support the Home Base Iowa initiative and adopt this resolution.

NOW, THEREFORE, be it resolved by the City Council of the City of Cedar Falls, Iowa as follows:

Section 1: The City Council of the City of Cedar Falls hereby proclaims its support for the Home Base Iowa initiative and encourages its residents to take whatever actions are necessary for the City of Cedar Falls to become and remain a Home Base Iowa Community.

Section 2. The City Council of the City of Cedar Falls also encourages local businesses to take whatever actions are necessary to become and remain a Home Base Iowa Business.

Section 3. The Mayor and City Administrator of the City of Cedar Falls are authorized to take such further action as may be necessary to carry out the intent and purpose of this resolution.

Section 4. All resolutions, orders, or parts thereof, in conflict herewith are, to the extent of such conflict, hereby repealed, and this resolution shall be in full force and effect immediately upon its adoption and approval.

PASSED AND ADOPTED this 18th day of October, 2021.

Robert M. Green, Mayor

ATTEST:

Jacqueline Danielsens, MMC, City Clerk



310 East 4th Street
Cedar Falls, IA 50613

Phone: 319-277-0213
www.communitymainstreet.org

**2021-2022
Board of Directors:**

Lexie Heath - Chair
Darin Beck
Natalie Brown
Ann Eastman
Crystal Ford
Wynette Froehner
Brent Johnson
Audrey Kittrell
Jenny Leeper
Helen Pearce
Clark Rickard
Stephanie Sheetz
Mark Schowalter
Brad Strouse

September 16, 2021

Ms. Jacque Danielsen
City Clerk
City of Cedar Falls
220 Clay Street
Cedar Falls, IA 50613

Re: Downtown Cedar Falls Self-Supported Municipal Improvement District

Dear Ms. Danielsen:

The Downtown SSMID was originally established in 1987 with the purpose to provide funding for Community Main Street, Inc. (CMS). Downtown property owners have opted to renew SSMID, as required by the State statute, every five years since inception with the intent to continue financial support of CMS.

Community Main Street has initiated the renewal process to continue the established SSMID. Pending the renewal, provisions of the SSMID for the period of July 1, 2022, and ending June 30, 2027, Cedar Falls Community Main Street is responsible to determine the SSMID millage rate each year. CMS would propose that the SSMID collected for the 2022/2023 fiscal year at the rate of \$3.89 per \$1000 of assessed property value for commercial properties within the district. This rate provides funding equal to the previous SSMID period.

Please feel free to contact Community Main Street if you have any questions.

Best regards,

Kim Bear, on behalf of the Community Main Street Board of Directors
Executive Director
Community Main Street




DEPARTMENT OF PUBLIC WORKS

City of Cedar Falls
 220 Clay Street
 Cedar Falls, Iowa 50613
 Phone: 319-268-5161
 Fax: 319-268-5197
 www.cedarfalls.com

MEMORANDUM
Engineering Division

TO: Honorable Mayor Robert Green and City Council

FROM: Luke Andreasen, PE, Principal Engineer

DATE: October 4, 2021

SUBJECT: Professional Services Agreement
 Park Drive Lift Station I&I Reduction Program
 WHKS & Company
 Project No. SA-000-3291

Please find attached the Professional Services Agreement with WHKS & Company which outlines the scope of services and costs for the Park Drive Lift Station I&I Reduction Program.

This project is to identify sources of Inflow and Infiltration into the sanitary sewer system that overloads the Park Drive Lift Station during rain events. This will be done using smoke testing and scheduled home inspections. Any roof drain, sump pump, tile drain etc. connections to the sanitary sewer will be disconnected and rerouted during the street reconstruction in this area that will take place over the next five (5) years.

The enclosed agreement with WHKS & Company provides for the inspection and documentation services. The fees of this agreement are based on hourly rates and fixed expenses and shall not exceed the total amount of \$70,000.

This project was programmed in the CIP to be carried out in FY 2021. The project is currently budgeted at \$85,000. Programmed funds are from sewer revenue bonds.

The Engineering Division of the Public Works Department requests your consideration and approval of this Professional Service Agreement with WHKS & Company for the Park Drive Lift Station I&I Reduction Program.

If you have any questions or comments, feel free to contact me.

xc: Chase Schrage, Director of Public Works
 David Wicke, City Engineer
 Mike Nyman, Water Reclamation Manager



DEPARTMENT OF PUBLIC WORKS

ENGINEERING DIVISION
220 CLAY STREET
319-268-5161
FAX 319-268-5197

OPERATIONS & MAINTENANCE DIVISION
2200 TECHNOLOGY PKWY
319-273-8629
FAX 319-273-8632

WATER RECLAMATION DIVISION
501 E. 4TH STREET
319-273-8633
FAX 319-268-5566

PROFESSIONAL SERVICE AGREEMENT

**Park Drive Lift Station I&I Reduction Program
Cedar Falls, Iowa
City Project Number: 3291**

This Agreement is made and entered by and between WHKS & Co., 1421 South Bell Avenue Suite 103, Ames, Iowa 50010, hereinafter referred to as "CONSULTANT" and City of Cedar Falls, 220 Clay Street, Cedar Falls, Iowa, hereinafter referred to as "CLIENT."

IN CONSIDERATION of the covenants hereinafter set forth, the parties hereto mutually agree as follows:

I. SCOPE OF SERVICES

CONSULTANT shall perform professional Services (the "Services") in connection with CLIENT's facilities in accordance with the Scope of Services set forth in Exhibit A attached hereto.

II. CONSULTANT'S RESPONSIBILITIES

CONSULTANT shall, subject to the terms and provisions of this Agreement:

- (a) Appoint one or more individuals who shall be authorized to act on behalf of CONSULTANT and with whom CLIENT may consult at all reasonable times, and whose instructions, requests, and decisions will be binding upon CONSULTANT as to all matters pertaining to this Agreement and the performance of the parties hereunder.
- (b) Use all reasonable efforts to complete the Services within the time period mutually agreed upon, except for reasons beyond its control, as set forth in Exhibit A.
- (c) Perform the Services in accordance with generally accepted professional engineering standards in existence at the time of performance of the Services. If during the two year period following the completion of Services, it is shown that there is an error in the Services solely as a result of CONSULTANT's failure to meet these standards, CONSULTANT shall re-perform such substandard Services as may be necessary to remedy such error at no cost to CLIENT. Since CONSULTANT has no control over local conditions, the cost of labor and materials, or over competitive bidding and market conditions, CONSULTANT does not guarantee the accuracy of any construction cost estimates as compared to contractor's bids or the actual cost to the CLIENT. CONSULTANT makes no other warranties either express or implied and the parties' rights, liabilities, responsibilities and remedies with respect to the quality of Services, including claims alleging negligence, breach of warranty and breach of contract, shall be exclusively those set forth herein.

- (d) CONSULTANT shall, if requested in writing by CLIENT, for the protection of CLIENT, require from all vendors and subcontractors from which CONSULTANT procures equipment, materials or services for the project, guarantees with respect to such equipment, materials and services. All such guarantees shall be made available to CLIENT to the full extent of the terms thereof. CONSULTANT's liability with respect to such equipment, and materials obtained from vendors or services from subcontractors, shall be limited to procuring guarantees from such vendors or subcontractors and rendering all reasonable assistance to CLIENT for the purpose of enforcing the same.
- (e) CONSULTANT will be providing estimates of costs to the CLIENT covering an extended period of time. CONSULTANT does not have control over any such costs, including, but not limited to, costs of labor, material, equipment or services furnished by others or over competitive bidding, marketing or negotiating conditions, or construction contractors' methods of determining their prices. Accordingly, it is acknowledged and understood that any estimates, projections or opinions of probable project costs provided herein by CONSULTANT are estimates only, made on the basis of CONSULTANT's experience and represent CONSULTANT's reasonable judgment as a qualified professional. CONSULTANT does not guarantee that proposals, bids or actual project costs will not vary from the opinions of probable costs prepared by CONSULTANT, and the CLIENT waives any and all claims that it may have against CONSULTANT as a result of any such variance.

III. **CLIENT'S RESPONSIBILITIES**

CLIENT shall at such times as may be required for the successful and expeditious completion of the Services:

- (a) Provide all criteria and information as to CLIENT's requirements; obtain all necessary approvals and permits required from all governmental authorities having jurisdiction over the project; and designate a person with authority to act on CLIENT's behalf on all matters concerning the Services.
- (b) Furnish to CONSULTANT all existing studies, reports and other available data pertinent to the Services, and obtain additional reports, data and services as may be required for the project. CONSULTANT shall be entitled to rely upon all such information, data and the results of such other services in performing its Services hereunder.

IV. **INSURANCE REQUIREMENTS FOR CONTRACTORS FOR THE CITY OF CEDAR FALLS**

The provisions of the document entitled, "Insurance Requirements for Contractors for the City of Cedar Falls," dated December 13, 2011 as revised January 31, 2017 consisting of 11 pages, which are attached hereto, marked Exhibit B, are hereby made a part of this Agreement as if set out word for word herein.

CONSULTANT shall furnish to CLIENT a certificate or certificates of insurance containing all coverages, endorsements and other provisions required by the Insurance Requirements set forth in Exhibit B. In the event of any conflict between the provisions of Exhibit B and the other terms of this Agreement, the provisions of Exhibit B shall control.

CONSULTANT shall obtain and maintain an insurance policy or policies that meet the provisions set out in the Insurance Requirements for Contractors for the City of Cedar Falls, attached hereto and marked Exhibit B.

V. STANDARD TERMS AND CONDITIONS FOR CONTRACTS BETWEEN CONTRACTORS WHO PERFORM PROFESSIONAL SERVICES AND THE CITY OF CEDAR FALLS

The provisions of the documents entitled "Standard Terms and Conditions for Contracts Between Contractors Who Perform Professional Services and the City of Cedar Falls," consisting of two pages are incorporated into this Agreement by the Client and attached as Exhibit C.

VI. COMPENSATION AND TERMS OF PAYMENT

Compensation for the services shall be on an hourly basis in accordance with the hourly fees and other direct expenses in effect at the time the services are performed. Total compensation is a not to exceed a fee of seventy thousand dollars (\$70,000.00).

Engineering Analysis Services \$70,000.00

CONSULTANT may bill the CLIENT monthly for services completed at the time of billing. CLIENT agrees to pay CONSULTANT the full amount of such invoice within thirty (30) days after receipt thereof. In the event CLIENT disputes any invoice item, CLIENT shall give CONSULTANT written notice of such disputed item within ten (10) days after receipt of invoice and shall pay to CONSULTANT the undisputed portion of the invoice according to the provisions hereof. CLIENT agrees to abide by any applicable statutory prompt pay provisions currently in effect.

VII. TERMINATION

CLIENT may, with or without cause, terminate the Services at any time upon fourteen (14) days written notice to CONSULTANT. The obligation to provide further Services under this Agreement may be terminated by either party upon fourteen (14) days' written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof through no fault of the terminating party, providing such defaulting party has not cured such failure, or, in the event of a non-monetary default, commenced reasonable actions to cure such failure. In either case, CONSULTANT will be paid for all expenses incurred and Services rendered to the date of the termination in accordance with compensation terms of Article VI.

VIII. OWNERSHIP OF DOCUMENTS

(a) Sealed original drawings, specifications, final project specific calculations and other instruments of service which CONSULTANT prepares and delivers to CLIENT pursuant to this Agreement shall become the property of CLIENT when CONSULTANT has been compensated for Services rendered. CLIENT shall have the right to use such instruments of service solely for the purpose of the construction, operation and maintenance of the Facilities. Nothing contained in this paragraph shall be construed as limiting or depriving CONSULTANT of its rights to use its basic knowledge and skills to design or carry out other projects or work for itself or others, whether or not such other projects or work are similar to the work to be performed pursuant to this Agreement. CONSULTANT shall not be liable for any unauthorized reuse or modification of its work product.

(b) Any files delivered in electronic medium may not work on systems and software different than those with which they were originally produced and CONSULTANT makes no warranty as to the compatibility of these files with any other system or software. Because of the potential degradation of electronic medium over time, in the event of a conflict between the sealed original drawings and the electronic files, the sealed drawings will govern.

IX. MEANS AND METHODS

(a) CONSULTANT shall not have control or charge of and shall not be responsible for

construction means, methods, techniques, sequences or procedures, or for safety measures and programs including enforcement of Federal and State safety requirements, in connection with construction work performed by CLIENT's construction contractors. Nor shall CONSULTANT be responsible for the supervision of CLIENT's construction contractors, subcontractors or of any of their employees, agents and representatives of such contractors; or for inspecting machinery, construction equipment and tools used and employed by contractors and subcontractors on CLIENT's construction projects and shall not have the right to stop or reject work without the thorough evaluation and approval of the CLIENT. In no event shall CONSULTANT be liable for the acts or omissions of CLIENT's construction contractors, subcontractors or any persons or entities performing any of the construction work, or for the failure of any of them to carry out construction work under contracts with CLIENT.

X. INDEPENDENT CONTRACTOR

CONSULTANT shall be an independent contractor with respect to the Services to be performed hereunder. Neither CONSULTANT nor its subcontractors, nor the employees of either, shall be deemed to be the servants, employees, or agents of CLIENT.

XI. PRE-EXISTING CONDITIONS

Anything herein to the contrary notwithstanding, CONSULTANT shall have no legal responsibility or liability for any and all pre-existing contamination. "Pre-existing contamination" is any hazardous or toxic substance present at the site or sites concerned which was not brought onto such site or sites by CONSULTANT. CLIENT agrees to release CONSULTANT from and against any and all liability to the CLIENT which may in any manner arise in any way directly or indirectly caused by such pre-existing contamination except if such liability arises from CONSULTANT's sole negligence or willful misconduct.

CLIENT shall, at CLIENT's sole expense and risk, arrange for handling, storage, transportation, treatment and delivery for disposal of pre-existing contamination. CLIENT shall be solely responsible for obtaining a disposal site for such material. CLIENT shall look to the disposal facility and/or transporter for any responsibility or liability arising from improper disposal or transportation of such waste. CONSULTANT shall not have or exert any control over CLIENT in CLIENT's obligations or responsibilities as a generator in the storage, transportation, treatment or disposal of any pre-existing contamination. CLIENT shall complete and execute any governmentally required forms relating to regulated activities including, but not limited to generation, storage, handling, treatment, transportation, or disposal of pre-existing contamination.

For CONSULTANT's Services requiring drilling, boring, excavation or soils sampling, CLIENT shall approve selection of the contractors to perform such services, all site locations, and provide CONSULTANT with all necessary information regarding the presence of underground hazards, utilities, structures and conditions at the site.

XII. DISPUTE RESOLUTION

If a dispute arises out of, or relates to, the breach of this Agreement and if the dispute cannot be settled through negotiation, then the CONSULTANT and the CLIENT agree to submit the dispute to mediation. In the event CONSULTANT or the CLIENT desires to mediate any dispute, that party shall notify the other party in writing of the dispute desired to be mediated. If the parties are unable to resolve their differences within 10 days of the receipt of such notice, such dispute shall be submitted for mediation in accordance with the procedures and rules of the American Arbitration Association (or any successor organization) then in effect. The deadline for submitting the dispute to mediation can be changed if the parties mutually agree in writing to extend the time between receipt of notice and submission to mediation. The expenses of the mediator shall be shared 50 percent by CONSULTANT and 50 percent by the CLIENT. This requirement to seek mediation shall

be a condition required before filing an action at law or in equity. However, prior to or during the negotiations or the mediation either party may initiate litigation that would otherwise be barred by a statute of limitations, and CONSULTANT may pursue any property liens or other rights it may have to obtain security for the payment of its invoices.

This Agreement shall be governed by the laws of the State of Iowa and any action at law or other judicial proceeding arising from this Agreement shall be instituted in Black Hawk County District Court, Waterloo, Iowa.

XIII. MISCELLANEOUS

- (a) This Agreement constitutes the entire agreement between the parties hereto and supersedes any oral or written representations, understandings, proposals, or communications heretofore entered into by or on account of the parties and may not be changed, modified, or amended except in writing signed by the parties hereto. In the event of any conflict between this contract document and any of the exhibits hereto, the terms and conditions of Exhibit C shall control. In the event of any conflict among the exhibits, Exhibit C shall control.
- (b) This Agreement shall be governed by the laws of the State of Iowa.
- (c) CONSULTANT may subcontract any portion of the Services to a subcontractor approved by CLIENT. In no case shall CLIENT's approval of any subcontract relieve CONSULTANT of any of its obligations under this Agreement.
- (d) In the event CLIENT uses a purchase order form to administer this Agreement, the use of such form shall be for convenience purposes only, and any typed provision in conflict with the terms of this Agreement and all preprinted terms and conditions contained in or on such forms shall be deemed stricken and null and void.
- (e) This Agreement gives no rights or benefits to anyone other than CLIENT and CONSULTANT and does not create any third party beneficiaries to the Agreement.
- (f) Except as may be explicitly set forth above, nothing contained in this Agreement or its exhibits limits the rights and remedies, including remedies related to damages, of either party that are available to either party under the law.

IN WITNESS WHEREOF, the parties hereto have executed this agreement on the day and year written below.

APPROVED FOR CLIENT

APPROVED FOR CONSULTANT

By: _____

By:  _____

Printed Name: Robert M. Green

Printed Name: Derek J. Thomas

Title: Mayor of Cedar Falls

Title: Vice President

Date: _____

Date: September 20, 2021

Exhibit A to Professional Services Agreement

A. Project Description

The City of Cedar Falls owns and maintains in excess of 200 miles of gravity sanitary sewer mains within the city limits. Along with gravity flow, wastewater is also pumped in some locations by means of lift stations and force mains. One such lift station is located along Park Drive about 1,000 feet northeast of Lookout Park. During heavy rain events the flows exceed the capacity of the lift station due to inflow and infiltration (I&I).

The proposed Project will identify I&I problems and develop a plan to reduce the I&I flowing to the Park Drive Lift Station from identified problem areas. The Project will consist of private sector inspections, and public sector smoke & dye testing within the target area.

Private sector inspections will include a Council session, public workshop, support for ordinance modifications, scheduling and conducting of inspections, re-inspections, support of sewer bill surcharge lists, maintenance of a project website through the duration of the project, and final reporting.

Public sector smoke and dye testing will include smoke testing of all sanitary sewer gravity main in the target area, and dye tests of selected smoke test defects to identify potential sources of I&I in the public sanitary sewer collection system.

Inventory data from private sector inspections and smoke testing will be summarized in a Final Report. The report will contain recommendations to prioritize and correct the I&I issues found during the project. Supporting files will be provided in digital format.

For scoping purposes, the following quantities of homes and sewer mains are included in the Program:

Area	Length of Gravity Sewer Mains	Size of Gravity Sewer Mains	Number of Properties for Inspection
Park Drive L.S.	14,664 L.F.	8" – 15"	140

The inspection program field activities are expected to take place from Spring of 2022 to Fall of 2022. Program initiation and support are expected to take place from Fall of 2021 through the duration of the project.

B. Scope of Services Provided Under This Agreement:

1. Project Management

- Perform general project administrative duties including supervision and coordination of the project team, review of project costs and billings, prepare invoices using Consultant's standard forms, preparation of monthly status reports, and general administrative activities.
- Advise the Client of the necessity of obtaining Special Engineering Services as described in Paragraph D., and act as the Client's representative in connection with any such services not actually performed by WHKS.

2. Sump Pump and Lateral Inspection Program Setup

This task will review and refine the proposed inspection methodology with the City and provide recommendations for policy and/or ordinance modifications to support the inspections.

- Policy Consultation. Provide consultation with regard to methods, policy options, and guidance relative to implementation of private sector aspects of I/I identification and control. Consultation will include reviewing the City's ordinance and recommended revisions as needed. It is assumed that City's legal staff will review and provide final commentary for ordinance modifications.
- Meetings. Includes one (1) Council Kickoff meeting (workshop) and one (1) additional public meeting to inform the public about the project scope of services and desired outcome. Public involvement will include education on the benefits of eliminating clear water from the system including reduction of backups, improved public health, and extending the service life of the sanitary sewer collection system and treatment plant. WHKS will emphasize the benefits to residents and presenting it in an educational and non-punitive manner.
- Prepare Notification Letters. WHKS will prepare and mail notification letters to homeowners in the target area for the public informational meeting.
- Sump Pump Project Support and Administration. Project administration services, including setup of initial inspection list, refinement of proposed inspection methodology, quality assurance / quality control of inspection data, maintenance of monthly sewer surcharge lists, and coordination with the City. WHKS will also provide the Client access to the project website, if Client desires.

3. Sump Pump and Lateral Inspections

This task is inspection and reinspection of properties to identify cross connections between sump pumps, beaver drains, roof drains, pits, and footing drain lateral connections, to the sanitary sewer.

- Schedule Inspections. WHKS will schedule all inspections. WHKS will develop and maintain a project website for use in scheduling and reporting inspections. WHKS will provide inspection reports to residents. Up to three (3) notification letters per property for notifications are included in this scope.
- Conduct Initial Inspections. Inspections will be conducted for all properties with active sewer accounts, including commercial and industrial properties. Inspections will be completed between the hours of 7:00 am and 7:00 pm, Monday through Friday. Inspection fee includes conducting inspections, travel time, receiving resident phone calls to schedule inspections, data entry, per diem, mileage, and expenses.
- Sump Pump Inspections: The inspections will consist of observing the discharge location and discharge pipe materials of any sump pumps and pits and any beaver drains (seepage collection system) and visible pits inside the basement area. WHKS will photograph the interior plumbing and exterior of the home with permission of the Owner. WHKS will also record grading that is sloped towards the buildings and building roof drain/downspout locations. Inspections will not include dye tracing to determine sump pump discharge point. If a sump pump or roof drain discharge location cannot be determined by visual inspection, it will be noted, and the appropriate City personnel will become responsible for making the final determination.
- Lateral Inspections: WHKS will inspect accessible sanitary sewer laterals with a Closed-Circuit-Television (CCTV) push camera to identify foundation drain connections. WHKS will perform inspections using a camera with locator head owned by WHKS.
- A two-person WHKS crew will perform the inspections.

- An attempt will be made by WHKS to televise all sanitary sewer services from inside the building, but some will be inaccessible due to location within the house or plumbing that does not permit entry. The percentage of homes in the target area with inaccessible laterals is not known.
- **In the scenario of inaccessible laterals, the inspection will not include lateral inspection.** WHKS will document the inspection as “Inaccessible Lateral – City Follow-up Required”. Time for the WHKS inspection will be billed at the normal rate for the sump and lateral inspection task. WHKS will not conduct a follow-up inspection. The appropriate City personnel will become responsible for making the final determination of lateral condition.
- WHKS will attempt to identify footing drains during the inspection based on CCTV evidence of pipe connection distance to foundation walls. Water may be run at an outside hose bibb and/or toilets flushed indoors to aid in confirming foundation taps. If a footing drain is identified through the inspection process, but through the subsequent repair it is found to not be a footing drain, WHKS will not be liable for any repair costs. WHKS will attempt to avoid getting the camera stuck in the service lateral. In the event that the camera becomes stuck in a service line the City will provide or pay for excavation and restoration services to retrieve the camera.
- QA/QC. WHKS will review inspections for completeness and for obvious errors or inaccuracies.
- Resident Reports. WHKS will provide a copy of completed inspection form to homeowner following each inspection.

4. Re-Inspection (Sump Pump Only)

This task is re-inspection by WHKS of all failed inspections for sump pumps, beaver drains, roof drain/downspouts, and pits after correction by the homeowner. This task does not include re-inspection of service laterals.

For scoping purposes, we assume that 10% of properties (quantity 14) will require a Reinspection (Sump Pump Only).

- Schedule Re-Inspections. WHKS will schedule all re-inspections using the project website described in Item 3. Scheduling information will be provided to property owners at the time of failed initial inspection. No notification letters are included in this scope.
- Conduct Re-Inspections. WHKS will conduct re-inspections after correction by the property owner. Re-Inspections will be completed between the hours of 7:00 am and 7:00 pm, Monday through Friday. WHKS will not provide corrective plumbing services. Re-Inspection fee includes conducting re-inspections, travel time, receiving resident phone calls to schedule re-inspections, data entry, per diem, mileage, and expenses.
- A one-person WHKS crew will perform the re-inspections.
- Resident Reports. WHKS will provide a copy of completed re-inspection form to property owner following each re-inspection.
- Where properties have both a defective sump pump and defective service lateral, WHKS will conduct the Re-inspection (Sump Pump Only) after the sump has been corrected by homeowner and will provide a report to the property owner that documents that sump pump deficiencies have been corrected but service lateral corrections still must be made.
- **Re-Inspection (Sump Pump and Lateral) will not be conducted.**

It is anticipated that service lateral re-inspections will be conducted by the City during a future street reconstruction, or by a licensed plumber hired by the property owner during repair of the defective lateral.

5. Smoke and Dye Testing

This task consists of smoke and dye testing of public sanitary sewer gravity mains within the target area.

- Smoke Testing Procedures. WHKS will discuss and refine smoke testing methodology with the Client prior to commencing field work. Methodology includes discussion of public notices, staffing, weather and ground conditions, timeframe, any sensitive areas to avoid, etc.
- Prepare Smoke Test Information Material. WHKS will provide public notice templates for newspaper, cable TV, and/or City website for the Client's publication and distribution. WHKS will distribute one set of door hangers prior to conducting smoke testing.
- Prepare Smoke and Dye Test Database, and Reporting Forms. Inspection forms, databases and reports will follow WHKS format and may incorporate special City codes as requested by the Client.
- Conduct Smoke Testing. The smoke testing program will force non-toxic smoke into the sewer pipes with a mechanical blower and observe the areas from which the smoke appears. While the blower is running, crews will travel throughout the area taking photographs of problem areas. The smoke is non-toxic, leaves no residue, and creates no fire hazard. The white smoke should appear from vent pipes on the roofs of buildings and may appear from defects in the collection system in areas such as storm sewer intakes, roof drains, etc. We provide the smoke canisters and blower. We will provide a WHKS crew chief and two WHKS crew members to conduct the smoke testing. Defects are marked with white paint and/or flags. A digital photograph of the defect and coordinates will be recorded. All observations will be recorded in an Access database suitable for use with the City's Geographic Information System (GIS).
- Dyed Water Rainfall Simulation to Verify Cross Connections ("Dye Testing"). Public sector dye testing will be conducted as part of this project. Line segments requiring dyed water flooding will be identified based on smoke test results. Typically, dye testing is performed to confirm the locations and severities of suspected cross connections identified through smoke testing. Prior to initiating dyed water flooding, a list of line segments recommended for dyed water flooding will be provided to the City for review and approval. The line segments on the list will be annotated as to the priority and reason for recommendation. The dyed water will be induced into the line by flooding storm sewers and drainage ditches. Sufficient time will be allowed for the source to activate at which time the television inspection equipment will be introduced into the line segment. Flow quantification by "eyeball" estimates will be performed on high rate I/I sources. We will provide a WHKS crew chief and dye. This task will require assistance from City to access water hydrants and to perform CCTV of sewer pipes during dye testing.
- QA/QC. Field data will be reviewed for completeness and for obvious errors or inaccuracies.

6. Long-Term I&I Planning Consultation

Based on the findings of the Project, WHKS can provide long-term planning consultation for reducing I&I in the collection system Citywide.

Typical services may include review of prior reports and studies, flow metering data, repair projects, data gaps, applicable cost-effective repair technologies, and grant/loan funding

sources. Services may include preparation of recommendations, budgeting items, assistance with conducting Council Worksessions and travel time, and documentation in memorandum form.

For scoping purposes, up to forty (40) hours of planning consultation is included to be performed as directed by the Client.

7. Final Report

WHKS will provide the City with monthly reports on the progress of the program.

At the completion of the program, WHKS will provide a Final Report that will include statistics and maps showing the private sector inspections passed, failed, and unresolved, and the findings of the public sector smoke and dye testing. The report will be provided in electronic table (Excel, Access, CSV) and GIS shapefile formats.

C. Items to be Provided by Client:

We request the following from the Client as needed to complete this work:

- Sanitary and storm sewer electronic base maps
- Publishing of public notices for smoke testing, if desired by Client
- Water, sandbags, mainline CCTV camera, and televising crew assistance for public sector dye testing.
- Property owner names, sewer account numbers, and addresses for sump pump inspections.
- Parcel GIS file, or assistance obtaining parcel GIS from County.
- Envelopes with City Return Address and Logo (if desired for use in homeowner mailings).
- City sewer surcharges. We will rely on City to apply surcharges to unresponsive and non-compliant properties based on WHKS sump pump inspection results. Failure to apply surcharges may result in lower resolution rates, or request for additional fee to extend the duration of the inspection program.
- Dye test follow-ups for undetermined sump pump discharges or footing drain cross connections.

D. Special Engineering Services:

Special Engineering Services are those services not listed above but may be required or advisable to accomplish the Project. Special Engineering Services shall be performed when authorized by the Client for additional fees, to be determined at the time authorized. Special Engineering Services include:

- Lateral re-inspections
- Inspection and analysis of areas other than as identified above
- Manhole inspections
- CCTV inspection of sanitary sewer collection system
- Flow Monitoring
- Sewer Modeling
- Investigation of private commercial/industrial facilities other than as identified above
- Piezometer, rain gauge, and/or river gauge installation and monitoring
- Wet weather observations
- Lift Station analysis

- Force main analysis
- Storm sewer system analysis
- Plans and Specifications for repair/rehabilitation projects
- Construction phase engineering services, including construction administration, staking, construction observation, preparation of record drawings and project close-out services
- Post mitigation analysis

Exhibit B

WHKS & Co. Fee Schedule

Park Drive Lift Station I&I Reduction Program

Schedule of Hourly Billing Rates

Project Manager	\$155.00
Design Engineer	\$105.00
Inspector/Field Technician	\$95.00
Principal QA/QC	\$195.00
Clerical	\$65.00

Reimbursable expenses include mileage at the current IRS mileage rate; actual cost of reproduction and printing; and actual out-of-pocket expenses such as field supplies, cost of recording documents, permit fees, etc.

2021 rates for reimbursable expenses:

IRS mileage rate = \$0.56/mile

Per Diem = \$50/day/person

Lodging = \$111/day/person

**NOTE: Time and a half pay applies for overtime, if applicable*

Exhibit B

**Park Drive Lift Station I&I Reduction Program
Cedar Falls, Iowa
City Project Number SA-000-3291**

Original 12/13/11
Revision 01/31/2017

INSURANCE REQUIREMENTS FOR CONTRACTORS FOR THE CITY OF CEDAR FALLS

*** This document outlines the insurance requirements for all Contractors who perform work for the City of Cedar Falls. The term “contractor” as used in this document shall be defined as the general contractor, artisan contractor, or design contractor that will be performing work for the City of Cedar Falls under contract.

1. All policies of insurance required hereunder shall be with an insurer authorized by law to do business in Iowa. All insurance policies shall be companies satisfactory to the City and have a rating of A-, VII or better in the current A.M. Best Rating Guide.
2. All Certificates of Insurance required hereunder shall include the Cancellation & Material Change Endorsement. A copy of this endorsement is attached in Exhibit 1.
3. Contractor shall furnish a signed Certificate of Insurance to the City of Cedar Falls, Iowa for the coverage required in Exhibit 1. Such Certificates shall include copies of the following endorsements:
 - a) Commercial General Liability policy is primary and non-contributing
 - b) Commercial General Liability additional insured endorsement – See Exhibit 1
 - c) Governmental Immunities Endorsement – See Exhibit 1

Copies of additional insured endorsements, executed by an authorized representative from an Insurer duly authorized to transact business at the location of the jobsite, must be provided prior to the first payment.

Contractor shall, upon request by the City, provide Certificates of Insurance for all subcontractors and sub-sub contractors who perform work or services pursuant to the provisions of this contract.

4. Each certificate shall be submitted to the City of Cedar Falls.

Park Drive Lift Station I&I Reduction Program
Cedar Falls, Iowa
City Project No. SA-000-3291

5. Failure to provide minimum coverage shall not be deemed a waiver of these requirements by the City of Cedar Falls. Failure to obtain or maintain the required insurance shall be considered a material breach of this agreement.
6. Failure of the Contractor to maintain the required insurance shall constitute a default under this Contract, and at City's option, shall allow City to terminate this Contract for cause and/or purchase said insurance at Contractor's expense.
7. Contractor shall be required to carry the following minimum coverage/limits or greater, if required by law or other legal agreement; as per Exhibit 1:
- This coverage shall be written on an occurrence, not claims made form. All deviations or exclusions from the standard ISO commercial general liability form CG 001 shall be clearly identified and shall be subject to the review and approval of the City.
 - Contractor shall maintain ongoing CGL coverage for at least 2 years following substantial completion of the Work to cover liability arising from the products-completed operations hazard and liability assumed under an insured contract.
 - Governmental Immunity endorsement identical or equivalent to form attached.
 - Additional Insured Requirement – See Exhibit 1.
The City of Cedar Falls, including all its elected and appointed officials, all its employees, its boards, commissions and/or authorities and their board members, employees shall be named as an additional insured on General Liability Policies for all classes of contractors.

Contractors shall include coverage for the City of Cedar Falls as an additional insured including ongoing and completed operations coverage equivalent to: ISO CG 20 10 07 04* and ISO CG 20 37 07 04**

* ISO CG 20 10 07 04 "Additional Insured – Owners, Lessees or Contractors – Scheduled Person or Organization"

** ISO CG 20 37 07 04 "Additional Insured – Owners, Lessees or Contractors – Completed Operations"

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8. **Errors & Omissions:** If the contract's scope of services includes design work or other professional services, then Contractor shall maintain insurance coverage for errors, omissions and other negligent acts or omissions (except for intentional acts or omissions), arising out of the professional services performed by Contractor. Contractor shall maintain continuous Errors & Omissions coverage for a period commencing no later than the date of the contract, and continuing for a period of no less than 2 years from the date of completion of all work completed or services performed under the contract. The limit of liability shall not be less than \$1,000,000.
9. **Separation of Insured's Provision:** If Contractor's liability policies do not contain the standard ISO separation of insured's provision, or a substantially similar clause, they shall be endorsed to provide cross-liability coverage.
10. **Limits:** By requiring the insurance as set out in this Contract, City does not represent that coverage and limits will necessarily be adequate to protect Contractor and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities provided to City in this Contract. The City will have the right at any time to require liability insurance greater than that otherwise specified in Exhibit 1. If required, the additional premium or premiums payable shall be added to the bid price.
11. **Indemnification (Hold Harmless) Provision:** To the fullest extent permitted by law, the Contractor agrees to defend (for all non-professional claims), indemnify, and hold harmless the City of Cedar Falls, Iowa, its elected and appointed officials, directors, employees, and agents working on behalf of the City of Cedar Falls, Iowa against any and all claims, demands, suits or loss, including any and all outlay and expense connected therewith, and for damages which may be asserted, claimed or recovered against or from the City of Cedar Falls, Iowa, its elected and appointed officials, directors, employees, and agents working on behalf of the City of Cedar Falls, Iowa, including, but not limited to, damages arising by reason of personal injury, including bodily injury or death, and property damages, which arises out of or is in any way connected or associated with the work and/or services provided by the Contractor to the City of Cedar Falls, Iowa pursuant to the provisions of this contract to the extent arising out of the errors, omissions or negligent acts of the Contractor, its agents, employees, subcontractors or others working on behalf of the Contractor. It is the intention of the parties that the City of Cedar Falls, Iowa, its elected and appointed officials, directors, employees, and agents working on behalf of the City of Cedar Falls, Iowa shall not be liable or in any way responsible for the injury, damage, liability, loss or expense incurred by the Contractor, its officers, employees, subcontractors, and others affiliated with the Contractor due to accidents, mishaps, misconduct, negligence or injuries either in person or property resulting from the work and/or services performed by the Contractor

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pursuant to the provisions of this contract, except for and to the extent caused by the negligence of the City of Cedar Falls, Iowa.

The Contractor expressly assumes full responsibility for damages or injuries which may result to any person or property by reason of or in connection with the work and/or services provided by the Contractor to the City of Cedar Falls, Iowa pursuant to this contract to the extent arising out of the errors, omissions or negligent acts of the Contractor, its agents, employees, subcontractors or others working on behalf of the Contractor, and agrees to pay the City of Cedar Falls, Iowa for all damages caused to the City of Cedar Falls, Iowa premises resulting from the work and/or services of the Contractor, its officers, employees, subcontractors, and others affiliated with the Contractor to the extent arising out of such errors, omissions or negligent acts.

The Contractor represents that its activities pursuant to the provisions of this contract will be performed and supervised by adequately trained and qualified personnel, and the Contractor will observe, and cause its officers, employees, subcontractors and others affiliated with the Contractor to observe all applicable safety rules.

12. Waiver of Subrogation: To the extent permitted by law, Contractor hereby releases the City of Cedar Falls, Iowa, its elected and appointed officials, its directors, employees, and agents working on behalf of the City of Cedar Falls, Iowa, from and against any and all liability or responsibility to the Contractor or anyone claiming through or under the Contractor by way of subrogation or otherwise, for any loss or damage to property caused by fire or any other casualty and for any loss due to bodily injury to Contractor's employees. This provision shall be applicable and in full force and effect only with respect to loss or damage occurring during the time of this contract or arising out of the work performed under this contract. The Contractor's policies of insurance (except for Professional Liability) shall contain a clause or endorsement to the effect that such release shall not adversely affect or impair such policies or prejudice the right of the Contractor to recover thereunder.

Completion Checklist

- Certificate of Liability Insurance (2 pages)
- Additional Insured CG 20 10 07 04
- Additional Insured CG 20 37 07 04
- Governmental Immunities Endorsement

Park Drive Lift Station I&I Reduction Program
 Cedar Falls, Iowa
 City Project No. SA-000-3291

EXHIBIT 1 – INSURANCE SCHEDULE

General Liability (Occurrence Form Only):

Commercial General Liability	
General Aggregate	\$2,000,000
Products-Completed Operations Aggregate Limit	\$2,000,000
Personal and Advertising Injury Limit	\$1,000,000
Each Occurrence Limit	\$1,000,000
Fire Damage Limit (any one occurrence)	\$ 50,000
Medical Payments	\$ 5,000

Automobile: *(Combined Single Limit)* \$1,000,000

If the Contractor does not own any vehicles, coverage is required on non-owned and hired vehicles.

Standard Workers Compensation

Statutory for Coverage A	
Employers Liability:	
Each Accident	\$ 500,000
Each Employee – Disease	\$ 500,000
Policy Limit – Disease	\$ 500,000

Umbrella: \$3,000,000

The Umbrella/Excess Insurance shall be written on a per occurrence basis and if the Umbrella/Excess is not written on a follow form basis it shall have the same endorsements as required of the primary policy(ies).

Errors & Omissions: \$1,000,000

**CITY OF CEDAR FALLS, IOWA
ADDITIONAL INSURED ENDORSEMENT**

The City of Cedar Falls, Iowa, including all its elected and appointed officials, all its employees, its boards, commissions and/or authorities and their board members, employees, are included as Additional Insureds, including ongoing operations CG 2010 07 04 or equivalent, and completed operations CG 2037 07 04 or equivalent. See Specimens.

This coverage shall be primary to the Additional Insureds, and not contributing with any other insurance or similar protection available to the Additional Insureds, whether other available coverage be primary, contributing or excess.

**GOVERNMENTAL IMMUNITIES ENDORSEMENT
(For use when including the City as an Additional Insured)**

1. Nonwaiver of Government Immunity. The insurance carrier expressly agrees and states that the purchase of this policy and the including of the City of Cedar Falls, Iowa as an Additional Insured does not waive any of the defenses of governmental immunity available to the City of Cedar Falls, Iowa under Code of Iowa Section 670.4 as it now exists and as it may be amended from time to time.
2. Claims Coverage. The insurance carrier further agrees that this policy of insurance shall cover only those claims not subject to the defense of governmental immunity under the Code of Iowa Section 670.4 as it now exists and as it may be amended from time to time.
3. Assertion of Government Immunity. The City of Cedar Falls, Iowa shall be responsible for asserting any defense of governmental immunity, and may do so at any time and shall do so upon the timely written request of the insurance carrier. Nothing contained in this endorsement shall prevent the carrier from asserting the defense of governmental immunity on behalf of the City of Cedar Falls, Iowa.
4. Non-Denial of Coverage. The insurance carrier shall not deny coverage under this policy and the insurance carrier shall not deny any of the rights and benefits accruing to the City of Cedar Falls, Iowa under this policy for reasons of governmental immunity unless and until a court of competent jurisdiction has ruled in favor of the defense(s) of governmental immunity asserted by the City of Cedar Falls, Iowa.

Park Drive Lift Station I&I Reduction Program
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5. No Other Change in Policy. The insurance carrier and the City of Cedar Falls, Iowa agree that the above preservation of governmental immunities shall not otherwise change or alter the coverage available under the policy.

CANCELLATION AND MATERIAL CHANGES ENDORSEMENT

Thirty (30) days Advance Written Notice of Cancellation, Non-Renewal, Reduction in coverage and/or limits and ten (10) days written notice of non-payment of premium shall be sent to: Risk Management Office, City of Cedar Falls, City Hall, 220 Clay Street, Cedar Falls, Iowa 50613. This endorsement supersedes the standard cancellation statement on the Certificate of Insurance to which this endorsement is attached. Contractor agrees to furnish the City with 30 days advance written notice of cancellation, non-renewal, reduction in coverage and/or limits, and 10 days advance written notice of non-payment of premium.



ADDITIONAL REMARKS SCHEDULE

AGENCY Edwards-Brandt & Associates		NAMED INSURED WHKS & CO PO Box 1467 Mason City, IA 50402-1467	
POLICY NUMBER SEE PAGE 1		EFFECTIVE DATE: SEE PAGE 1	
CARRIER SEE PAGE 1	NAIC CODE SEE P 1		

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,
FORM NUMBER: ACORD 25 FORM TITLE: Certificate of Liability Insurance

**Description of Operations/Locations/Vehicles:
and Additional Insured; Workers Compensation WC000313 Waiver of Subrogation; Umbrella Policy attached EU0001 7-16; 30 day
notice of cancellation has been requested**

Additional Information for Insurance

From: Craw, Cindy <cindy@edwards-brandt.com>
Sent: Monday, September 27, 2021 8:28 AM
To: Carol Nauman <CNauman@Whks.com>
Cc: Angie Kolz <AKolz@Whks.com>
Subject: RE: City of Cedar Falls - Park Drive LS I&I

Good Morning, Per the form CGD469 that was attached to the certificate and mentioned in the forms attached to the certificate - this is the language, I believe it should take care of their question:

Aggregate per project **CG D4 69 with the language below added for the Blanket Per Project aggregate:**

Designated Projects:

Each "project" for which you have agreed, in a written contract which is in effect during this policy period, to provide a separate General Aggregate Limit, provided that the contract is signed and executed by you before the "bodily injury" or "property damage" occurs.

Let me know if more is needed.

Thanks,

Cindy Craw

Account Manager | Edwards-Brandt & Associates
p: 641-201-7037 | f: 641-423-2441 | e: cindy@edwards-brandt.com
toll free: 800-373-7000
2007 4th Street SW, Mason City, IA 50401

Visit us at www.edwards-brandt.com



EDWARDS-BRANDT & ASSOCIATES
INSURANCE

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Consultant
Program
Project No. 9378

Park Drive Lift Station I&I Reduction
Cedar Falls, Iowa
City Project No. SA-000-3291

Exhibit C

**Park Drive Lift Station I&I Reduction Program
Cedar Falls, Iowa
City Project Number SA-000-3291**

2/9/12

**STANDARD TERMS AND CONDITIONS FOR CONTRACTS BETWEEN
CONTRACTORS WHO PERFORM PROFESSIONAL SERVICES AND THE CITY OF
CEDAR FALLS**

This document outlines the Standard Terms and Conditions for all Contractors who perform work or services for the City of Cedar Falls under a contract. The term, "Contractor," as used in this document, includes an engineer, an architect, and any other design professional providing professional services to the City of Cedar Falls, Iowa, under a contract (but excludes construction contractors).

1. This Contract may not be modified or amended except by a writing signed by an authorized representative of the City of Cedar Falls and of the Contractor.
2. Time is of the essence of this Contract.
3. Contractor shall be an independent contractor with respect to the services to be performed under this Contract. Neither Contractor nor its subcontractors, agents, or employees, shall be deemed to be employees or agents of the City.
4. Contractor shall perform all duties in accordance with all applicable federal, state and local laws and regulations.
5. If Contractor breaches this Contract, the City shall have all remedies available to it at law or in equity.
6. Severability. If any provision of this Contract is declared invalid, illegal, or incapable of being enforced by any court of competent jurisdiction, all of the remaining provisions of this Contract shall nevertheless continue in full force and effect, and no provision shall be deemed dependent upon any other provision unless so expressed herein.
7. Assignment. Contractor may not assign this Contract or any of its rights or obligations hereunder, without the prior written consent of the City, which consent may be withheld in the sole and absolute discretion of the City.
8. Survival of Obligations. All obligations and duties which by their nature extend beyond the term of this Contract shall survive the expiration or termination of this Contract.

Consultant

Park Drive Lift Station I&I Reduction

Program

Project No. 9378

Cedar Falls, Iowa

City Project No. SA-000-3291

9. Governing Law; Jurisdiction; Venue and Trial. This Contract shall be construed in accordance with, and all disputes hereunder shall be governed by, the laws of the State of Iowa, excluding its conflicts of law rules. The parties hereto agree that the exclusive jurisdiction and venue shall be in the Iowa District Court for Black Hawk County, and in no other jurisdiction or location, and shall not be removed to federal court. The parties hereby agree to waive the right to trial by jury and agree to submit all disputes to a trial by judge alone. The parties agree that no disputes under this Contract shall be submitted to binding arbitration, but may be submitted to mediation by mutual consent of both parties.

10. Any failure of Contractor to comply with the Insurance Requirements for Contractors for the City of Cedar Falls set forth on Attachment A, shall constitute a default under this Contract.

11. Attorneys' Fees. In the event of litigation, the City shall under no circumstances be obligated for payment of any attorneys' fees of Contractor or any other party, arising out of such litigation.

12. Payment. Payment of Contractor's invoices shall be due no sooner than thirty (30) days from the date of invoice. In the event any invoices are not paid within thirty (30) days, the City shall pay interest thereon at the rate provided for by Section 668.13(3), Code of Iowa, computed monthly.

13. The City shall not be obligated to maintain confidentiality of Contractor documents or records that are furnished to the City if such documents are public records under the Iowa Open Records Law, Chapter 22, Code of Iowa, and the City shall have no responsibility to Contractor for disclosure of such records.

14. Under no circumstances shall the City waive any damages against the Contractor or any other party arising out of any breach of this Contract, whether consequential, indirect, special, or punitive damages.

15. Under no circumstances shall the Contractor's liability to the City be limited to any specific amount or sum, whether that amount is the compensation paid by the City to the Contractor under this Contract, or the dollar amount of coverage provided for in the Insurance Requirements for Contractors for the City of Cedar Falls, Attachment A.

16. No waiver of the City's subrogation rights against the Contractor or any other party shall conflict with the provisions of the City Insurance Requirements, Attachment A.

17. Limitations Period. There shall be no limitation, except as provided for by Iowa law, on the period of time within which the City may make any claim against the Contractor or other party under the provisions of this Contract.

18. This Contract shall not be binding on the City unless and until approved by the City Council of the City at a duly constituted meeting, and signed by the Mayor and City Clerk of the City.

Consultant
Program
Project No. 9378

Park Drive Lift Station I&I Reduction
Cedar Falls, Iowa
City Project No. SA-000-3291

19. Warranties. Contractor represents and warrants that all services furnished to the City under this Contract shall be furnished in a skilled and workmanlike manner, in accordance with the degree of skill and care that is required by current, good and sound practices applicable to the Contractor's industry or profession, and as otherwise required by applicable law.

20. Force Majeure. Neither party to this Contract shall be liable to the other party for delays in performing the services, or for the direct or indirect cost resulting from such delays, that may result from acts of God, acts of governmental authorities, extraordinary weather conditions or other natural catastrophes, or any other cause beyond the reasonable control or contemplation of either party. Each party will take reasonable steps to mitigate the impact of any force majeure.

**DEPARTMENT OF PUBLIC WORKS**

City of Cedar Falls
220 Clay Street
Cedar Falls, Iowa 50613
Phone: 319-268-5161
Fax: 319-268-5197
www.cedarfalls.com

MEMORANDUM
Engineering Division

TO: Honorable Mayor Robert Green and City Council

FROM: Luke Andreasen, PE, Principal Engineer

DATE: October 4, 2021

SUBJECT: Quit Claim Deed
Iowa DOT Highway 58/Ridgeway Avenue Project

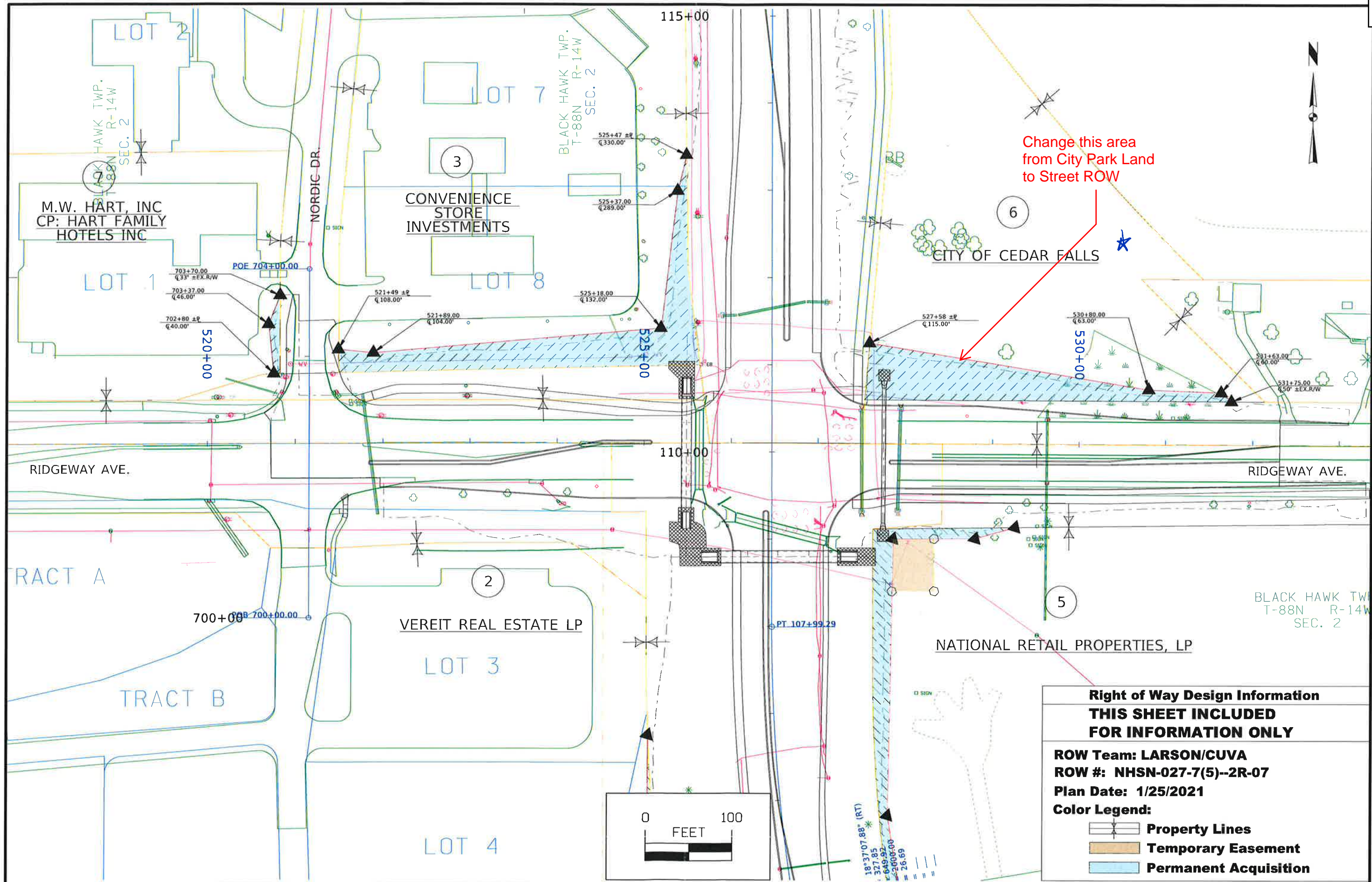
The Iowa DOT has an upcoming project that includes improvements to the Ridgeway Avenue/Highway 58 intersection. To accommodate these improvements, a small part of city-owned land will need to be changed to Right-of-Way (ROW) for Ridgeway Avenue. The City will still own this land. It will just change from park land to street ROW.

This change is necessary in case this parcel of city land ever changes ownership, the part separated as ROW will protect the drainage structures and drainage patterns associated with the upcoming intersection improvements from being tampered with intentionally or unintentionally by a new landowner.

The Engineering Division, in coordination with the Iowa DOT, requests your consideration and approval of this Quit Claim Deed.

If you have any questions or comments, feel free to contact me.

xc: Chase Schrage, Director of Public Works
David Wicke, City Engineer



Change this area
from City Park Land
to Street ROW

Right of Way Design Information	
THIS SHEET INCLUDED FOR INFORMATION ONLY	
ROW Team: LARSON/CUVA	
ROW #: NHSN-027-7(5)--2R-07	
Plan Date: 1/25/2021	
Color Legend:	
	Property Lines
	Temporary Easement
	Permanent Acquisition



QUIT CLAIM DEED
THE IOWA STATE BAR ASSOCIATION
Official Form No. 106
Recorder's Cover Sheet

Preparer Information: (Name, address and phone number)

Kevin Rogers, 220 Clay Street, Cedar Falls, Iowa 50613
Phone: (319) 273-8600

Taxpayer Information: (Name and complete address)

City Clerk, City of Cedar Falls, 220 Clay Street, Cedar Falls, Iowa 50613

Return Document To: (Name and complete address)

City Clerk, City of Cedar Falls, 220 Clay Street, Cedar Falls, Iowa 50613

Grantors:

City of Cedar Falls, Iowa

Grantees:

City of Cedar Falls, Iowa

Legal description: See Page 2

Document or instrument number of previously recorded documents:

LEGAL DESCRIPTION**RIGHT-OF-WAY ACQUISITION**

BEGINNING AT THE INTERSECTION OF THE EAST RIGHT-OF-WAY LINE OF STATE HIGHWAY 58 AND THE NORTH RIGHT-OF-WAY LINE OF RIDGEWAY AVENUE; THENCE NORTH $04^{\circ}58'43''$ EAST, 65.21 FEET ALONG SAID STATE HIGHWAY 58 RIGHT-OF-WAY LINE; THENCE SOUTH $80^{\circ}26'34''$ EAST, 326.41 FEET; THENCE SOUTH $87^{\circ}32'22''$ EAST, 83.05 FEET; THENCE SOUTH $49^{\circ}21'09''$ EAST, 15.72 FEET; THENCE NORTH $89^{\circ}35'16''$ WEST, 422.46 FEET ALONG SAID RIDGEWAY AVENUE RIGHT-OF-WAY LINE TO THE POINT OF BEGINNING, CONTAINING 13,785 SQUARE FEET OR 0.32 ACRES MORE OR LESS.



DEPARTMENT OF COMMUNITY DEVELOPMENT

VISITORS, TOURISM AND CULTURAL PROGRAMS
 6510 HUDSON ROAD
 CEDAR FALLS, IOWA 50613
 PH: 319-268-4266
 FAX: 319-277-9707

MEMORANDUM

TO: The Honorable Mayor Green and City Council
FROM: Heather Skeens, Cultural Programs Supervisor
DATE: October 18, 2021
SUBJECT: Propel Nonprofits / Art & Culture Board Strategic Planning

Summary: The Cedar Falls Art & Culture Board seeks to combine the board's annual strategic planning work with a study conducted by Propel Nonprofits, which will assess and further define future building and programmatic goals for the planned Hearst expansion. The overarching goal for engaging with Propel Nonprofits is to align the Art & Culture Board, Friends of the Hearst, stakeholders and staff on a strategic roadmap toward an updated vision for Hearst programs and facilities, with a specific interest in the financial implications and/or opportunities of that vision.

If the contract is approved, a small committee will work with Propel Nonprofits staff over the next three or four months to share goals and review plans. The proposed committee--or "Organizational Learning Team (OLT)" referenced in the proposal--will consist of Stephanie Sheetz, Jennifer Pickar, Heather Skeens, Kate Brennan Hall (ACB President), and a representative from Friends of the Hearst. Propel Nonprofits staff will provide a final report in mid-February, which will be presented to the Art and Culture Board, Friends of the Hearst, select stakeholders and staff. A detailed timeline and scope of services is available in Exhibit A, attached.

Background: Hearst staff worked with Propel Nonprofits via a grant-funded strategic planning process coordinated by the Iowa Arts Council in 2018. At that time, a good rapport was established. Staff has also attended free trainings from Propel Nonprofits since 2018. References from two nonprofit organizations that have worked with Propel on strategic services were recently vetted and both provided positive feedback.

Funding: Funding for the project will be provided by the Art & Culture Board. The \$4,500.00 expenditure was approved by the board at their meeting on Wednesday, September 22, 2021. Funding held by the board has been generated over several years of annual campaigns and charitable giving, and is held for the benefit of Hearst Center programming, collections, and facility needs.

Please reach out if you have any questions.

CC: Stephanie Sheetz, Director of Community Development
 Jennifer Pickar, Tourism and Cultural Programs Manager

CITY OF CEDAR FALLS, IOWA
GENERAL TERMS AND CONDITIONS
SERVICE/PRODUCT AGREEMENTS

This Agreement is by and between Propel Nonprofits ("Contractor") and the City of Cedar Falls, Iowa ("City"), and is to be effective on the date last signed by the Contractor or the City below.

1.0. Contractor's Services

1.1. Contractor's services shall consist only of the those services and/or products provided or supplied by Contractor as defined in this Agreement and as listed on Exhibit "A" attached. ("Services" or "Scope of Services")

1.2. Contractor shall not commence or perform any work outside the Scope of Services unless and until authorized in writing by the City. No changes to the Scope of Services shall be valid unless agreed to by both the Contractor and the City in writing. Any work performed or expenses incurred by the Contractor shall be conclusively presumed to be part of the Scope of Services unless a written change order covering such work, and the cost of such work, has been agreed to in advance. If Exhibit "A" includes provisions for contingent services, such services shall not be performed until written authorization is given by the City.

1.3. Contractor shall assign qualified and experienced personnel to perform the Services, and Contractor hereby warrants to the City that Contractor has sufficient experience and financial resources to complete the Services required by this Agreement. Where the Scope of Services identifies particular personnel who shall perform the Services, such personnel shall remain assigned to provide the Services throughout the term of this Agreement, unless otherwise approved in writing by the City. In the event that such particular personnel must be replaced, Contractor agrees to replace such particular personnel with persons of equivalent or better qualifications, as approved by the City.

1.4. Contractor shall perform the Services in a timely manner and in accordance with any schedule set forth in Exhibit "A". The Contractor and the City agree that time is of the essence with respect to Contractor's performance under this Agreement.

1.5. Contractor warrants that its fulfillment of this Agreement will not infringe on or misappropriate the rights of any third party, and that the Contractor has the complete right and full authority to convey ownership of the Services to the City. Contractor shall obtain all required governmental and third-party licenses, approvals and permits for the provision of Services, at Contractor's cost.

1.6. The person signing this Agreement on behalf of the Contractor represents and warrants that the person has full and sufficient authority to execute this Agreement on behalf of the Contractor.

2.0. Compensation

2.1. All bids and prices shall be shown in U.S. Dollars. All prices must remain firm for the duration of this Agreement.

2.2. After inspection (if applicable) and acceptance by the City of Services, City shall pay Contractor in accordance with the payment terms set forth in Exhibit "A". The maximum amount of all payments for Services shall be the amount set forth in Exhibit "B", unless additional Services are agreed upon as set forth in Section 1.2, in which case the maximum amount of all payments shall be adjusted accordingly.

2.3. Following acceptance of Services by the City, payment shall be made to the Contractor within thirty (30) days of receipt of a proper invoice. The invoice shall include, at a minimum, the name and address of the Contractor, the invoice number, the date services were performed or goods were shipped, a general description of the services or

goods, total amount to be paid, any discounts or credits, and the net amount to be paid. The invoice shall be mailed or emailed to the authorized representative of the City listed below, at the address listed below.

2.4. Expenses shall not be reimbursed to the Contractor unless specifically described in Exhibit "A".

2.5. If services in addition to the Scope of Services are agreed upon as set forth in Section 1.2, Contractor must provide a separate invoice for such additional services before payment will be made.

2.6. If the City fails to make any payment when due to the Contractor, the Contractor may charge the City interest on the unpaid balance at the rate of 5% per annum until paid. In addition, Contractor may, after giving at least seven (7) days written notice to the City, suspend services under this Agreement until such unpaid balance is paid in full.

2.7. Notwithstanding anything to the contrary in this Agreement, the City may withhold payment to Contractor for faulty Services, or if the City is advised of liens or other claims against any Services, including products.

3.0. Taxes.

3.1. The City is exempt from all federal, State of Iowa, and other states' taxes on the purchase of products and services used by the City within the State of Iowa. The City shall provide tax exemption certification as requested.

3.2. Any charges for taxes from which the City is exempt will be deducted from invoices before payment is made.

4.0. Ownership and Use of Documents

4.1. All Services to be provided under this Agreement, and any invention, improvement, discovery, or innovation (whether or not patentable) made, conceived or actually reduced to practice by Contractor in the performance of the Scope of Services in this Agreement will be owned exclusively by the City, including all proprietary and intellectual property rights. To the extent not automatically vested in the City, Contractor hereby assigns to the City all right, title and interest in and to the Services, including, without limitation, copyright, patent and trade secret rights. Upon the City's request, Contractor shall execute any additional documents necessary for the City to perfect such ownership rights.

4.2. Notwithstanding Section 4.1, Contractor retains ownership of its pre-existing and proprietary materials and other intellectual property that may be incorporated into the Services.

4.3. Copies of City furnished data that may be relied upon by Contractor are limited to the printed copies (also known as hard copies) that are delivered to the Contractor. Files in electronic media format of text, data, graphics, or of other formats that are furnished by the City to the Contractor are only for the convenience of the Contractor. Any conclusion or information obtained or derived from such electronic files will be at the Contractor's sole risk.

4.4. During the term of this Agreement and following completion or termination of the Agreement, the Contractor and any authorized Subcontractors shall maintain all accounting records and other documentation generated in providing Services under this Agreement. The City or its designee shall be allowed to have access to such information for the purpose of inspection, audit and copying during normal business hours for a period of five (5) years after the final payment by the City, termination of this Agreement, or resolution of all matters under this Agreement, whichever date is latest. No additional compensation shall be paid to Contractor for such retention or inspection by the City or designee.

5.0. Termination.

5.1. The City may terminate this Agreement at any time for its convenience by giving written notice to the Contractor of such termination and specifying the effective date of the termination, at least thirty (30) calendar days before the effective date of termination. In that event, all finished or unfinished Services, reports and materials prepared or furnished by the Contractor shall, at the option of the City, become the City's property. If the Agreement is terminated by the City as provided herein, the Contractor shall be paid for all Services which have been authorized,

approved and provided up to the effective date of termination. The City will not be subject to any termination fees from the Contractor.

5.2. Either party may terminate this Agreement upon seven (7) calendar days written notice in the event that the other party fails to substantially perform in accordance with the terms of this Agreement through no fault of the party initiating the termination.

6.0. Warranties.

6.1. Contractor represents and warrants that Services shall be performed in a manner consistent with the standard of care of other professional service providers in a similar industry and application.

6.2. Contractor represents and warrants that products delivered as part of the Scope of Services, including each component, shall be free of defects and shall conform to the quality standards of the applicable industry and shall meet in all respects the requirements of the Scope of Services. If any defect or sign of deterioration is identified by the City within one year after delivery which is not due to the acts or omissions of the City, Contractor shall, within 15 days after notification by the City, at Contractor's expense, repair, adjust or replace such items to the complete satisfaction of the City.

6.3. Contractor shall be responsible for the quality, technical accuracy, completeness and coordination of all Services under this Agreement. Contractor shall promptly and without charge, provide all corrective work necessary as a result of Contractor's acts, errors or omissions with respect to the quality and accuracy of Contractor's Services.

6.4. Contractor shall be responsible for any and all damages to property or persons as a result of Contractor's acts, errors or omissions in performing the Services under this Agreement, and for any losses or costs to repair or remedy any Services undertaken by the City as a result of any such acts, errors or omissions.

6.5. Contractor's obligations shall exist without regard to, and shall not be construed to be waived by, the availability or unavailability of any insurance, either by the City or by the Contractor. None of the provisions of this Agreement shall be construed as a limitation on the City's right to seek recovery of damages it suffers as a result of Contractor's fault or breach.

7.0. Warranties – Intellectual Property.

7.1. Contractor represents and warrants that the Services produced or provided to the City do not infringe upon any copyright, trademark, trade name, trade dress patent, statutory, common law or any other right of any person or entity.

7.2. Contractor represents and warrants that the Services, and the City's use of the same, and the exercise by the City of the rights granted by this Agreement, shall not infringe upon any other work or violate the rights of publicity or privacy of, or constitute a libel or slander against, any person or entity.

7.3. Contractor represents and warrants that it is the owner of or otherwise has the right to use and distribute the Services contemplated by this Agreement.

8.0. Disputes.

8.1. Should any dispute arise with respect to this Agreement, the parties agree to act immediately to resolve such dispute. Time is of the essence in the resolution of disputes.

8.2. Contractor agrees that, the existence of a dispute notwithstanding, it will continue without delay to carry out all of its responsibilities under this Agreement that are not affected by the dispute and the City shall continue to make payment for all Services that are performed in conformance with this Agreement. Should the Contractor fail to continue to perform its responsibilities regarding all non-disputed Services, without delay, any additional costs incurred by the City or the Contractor as a result of such failure to proceed shall be borne by the Contractor.

8.3. Should any dispute between the parties remain unresolved, the parties mutually agree to engage in mediation prior to the filing of suit by either party. The cost of mediation shall be divided equally between the parties except that each party shall be responsible for that party's own expenses and attorney fees associated with mediation. The City shall not engage in arbitration of any dispute.

9.0. Indemnification.

9.1. Contractor (including, for purposes of this Section, Contractor's agents, employees, subcontractors or others working on behalf of Contractor) shall indemnify, defend and hold harmless the City and its elected and appointed officers, its employees, and agents working on behalf of the City, from any and all liability, loss, cost, damage and expense (including reasonable attorney fees and court costs) resulting from, arising out of, or related in any way to any claims, demands, actions or suits based upon or alleging personal injury, including bodily injury or death, and property damages, arising out of or in any way connected or associated with the Contractor's performance under this Agreement.

9.2. Contractor's duty of indemnification and to hold harmless includes, but is not limited to, Contractor's breach or alleged breach of the warranties found in Sections 6.0 and 7.0 above, and shall survive the termination of this Agreement.

9.3. It is specifically agreed between the parties that this Agreement is not intended to create in the public or any member of the public, any third party beneficiary status or to authorize anyone not a party to this Agreement to maintain a suit for personal injuries or property damage.

10.0. Insurance.

Contractor shall at all times during the performance of this Agreement maintain insurance as set forth in Exhibit "B" unless this insurance requirement is waived by the City in this Section.

Insurance requirement waived: Henriksen Cultural Programs (Signature and title of authorized City employee or officer) Supervisor

Per Risk Management Committee approval on 10/6/21: Additional Insured and Non-waiver of Governmental Immunity are waived; approval of umbrella limit at \$1 million.

The City may at any time during the term of this Agreement require proof of such insurance.

11.0. Compliance with Laws and Regulations.

11.1. Contractor certifies that in performing this Agreement it will comply with all applicable provisions of federal, state and local laws, ordinances, rules, licenses and regulations.

11.2. Contractor is responsible for determining which products are considered to be hazardous chemicals under applicable standards and to provide the most current Safety Data Sheet ("SDS") with the initial shipment of such chemicals. Failure by Contractor to do so may be considered by the City to be delivery of a defective product and its delivery may be refused. It is also the Contractor's responsibility to provide to the City any updated or revised SDS as it becomes available for any such hazardous chemicals sold and delivered to the City.

12.0. Independent Contractor.

Both parties shall act in their individual capacities in the performance of this Agreement and not as agents, employees, partners, joint ventures or associates of one another. The employees or agents of one party shall not be deemed or construed to be the employees or agents of the other for any purpose whatsoever.

13.0. Non-Collusion.

13.1. Neither the Contractor, nor anyone acting on behalf of Contractor, has employed any person to solicit or procure this Agreement, nor will the Contractor make any payment or agreement for payment of any compensation in connection with the solicitation or procurement of this Agreement.

13.2. Contractor agrees that there is no agreement, arrangement or understanding expressed or implied, contemplating any division of compensation for Services provided under this Agreement, or in the participation in such Services, directly or indirectly, by any person or entity, except as provided in this Agreement.

13.3. Neither the Contractor, nor anyone acting on behalf of Contractor, has either directly or indirectly entered into any agreement, arrangement or understanding to collude or otherwise take any action in restraint of free competitive procurement in connection with this Agreement.

14.0. Nondiscrimination and Equal Opportunity.

14.1. Contractor will not in the performance of this Agreement unlawfully discriminate against any employee or applicant for employment because of race, sex, color, creed, national origin, marital or familial status, religion, age, disability, sexual orientation, gender identity, genetic information or veteran status, or any other classification protected by federal, state, or local law.

14.2. Contractor shall inform all subcontractors and agents performing under this Agreement of this nondiscrimination and equal opportunity requirement and shall take reasonable steps to ensure their compliance with the same.

15.0. No Conflict of Interest.

Contractor represents, warrants and covenants that no relationship exists or will exist during the term of this Agreement that is a conflict of interest under Iowa law. No employee, officer or agent of the Contractor shall participate in the procurement or performance of this Agreement if a conflict of interest exists as to such person. Should a conflict of interest arise during the term of this Agreement for Contractor or any employee, officer or agent of Contractor, Contractor shall immediately notify the City, in which case this Agreement may be terminated and any additional costs incurred by the City due to such termination shall be paid by Contractor or deducted from any sums yet due to Contractor.

16.0. Force Majeure.

16.1. Force majeure shall be any of the following events: acts of God or the public enemy; compliance with any order, rule, regulation, decree, or request of any governmental authority or agency or person purporting to act as such; acts of war, public disorder, rebellion, terrorism, or sabotage; floods, hurricanes, or other storms; strikes or labor disputes; public health emergency; or any other cause, whether or not of the class or kind specifically named or referred to in this Agreement which is not within the reasonable control of the party affected. A delay in or failure of performance by either party shall not constitute a default in performance nor be the basis for, or give rise to, any claim for damages, if and to the extent such delay or failure is caused by force majeure.

16.2. The party who is prevented from performing by force majeure shall be obligated, within a period not to exceed fourteen (14) calendar days after the occurrence or detection of any such event, to provide notice to the other party setting forth in reasonable detail the nature thereof and the anticipated extent of the delay, and shall remedy such cause as soon as reasonably possible, as mutually agreed between the parties.

16.3. If a remedy to an event of force majeure cannot be agreed upon within a reasonable amount of time, this Agreement may be terminated by either party.

17.0. Assignment.

No rights under this Agreement may be assigned or transferred by Contractor without the prior written consent of the City. The benefits of this Agreement may inure to Contractor's assigns, transferees, or successors in interest if approved by the City in writing in advance, and if such assignee, transferees or successors agree in writing to be bound by the terms of this Agreement.

18.0. Governing Law.

18.1. This Agreement shall be governed, interpreted and enforced in accordance with the laws of the State of Iowa, regardless of choice of law principles.

18.2. Venue for any dispute under this Agreement shall be the District Court in and for Black Hawk County, Iowa.

19.0. Discrepancy.

In the event that there are any discrepancies or differences between any terms or conditions of the Contractor's bid or quote and this Agreement, this Agreement shall prevail, even if the Contractor's bid or quote is incorporated into this Agreement.

20.0 Public Record.

20.1. This Agreement as well as Contractor's bid or quote and all documents submitted with any such bid or quote shall become public documents subject to Iowa Code Chapter 22, the Iowa Open Records Law. By submitting the bid or quote or any document to the City in connection with such bid or quote, the submitting party recognizes this and waives any claim against the City, its elected and appointed officers, and its employees, and agents working on behalf of the City, relating to the release of any bid or document submitted.

20.2. Each submitting party shall hold the City and its elected and appointed officers, and its employees, and agents working on behalf of the City, harmless from any claims arising from the release of any document or information made available to the City related to or arising from the bidding or quoting process.

20.3. Notwithstanding Sections 20.1 and 20.2, protection from disclosure may apply to those elements of any submittal that may be a trade secret, or confidential or proprietary information. Should the submitting party wish to designate submittals as such, they must be clearly and prominently marked. The City shall make no determination as to whether or not such documents are protected from disclosure under Iowa Code Chapter 22. Rather, the City shall endeavor to notify the submitter of any request for such information and the submitter shall be solely responsible for asserting exemption from disclosure by obtaining a court order. As long as the City makes a good faith effort to notify the submitter of a request for such information, the City and the City's elected and appointed officers, the City's employees, and agents working on behalf of the City, shall not be liable for any damages resulting from such disclosure, whether such disclosure is deemed required by law, by an order of court or administrative agency, or occurs through inadvertence, mistake, or negligence.

21.0. Debarment.

21.1. Contractor hereby certifies, pursuant to 48 CFR Part 9, that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this Agreement by any federal agency.

21.2. Contractor further certifies that it is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in any contracts with the City or with the State of Iowa.

22.0 Confidentiality of Shared Information.

No information shared between Contractor and the City in the performance of this Agreement shall be deemed confidential unless clearly designated as such in writing by the party seeking confidentiality at the time of sharing. If designated as confidential the parties agree to maintain the confidentiality of such information except as necessary for performance under this Agreement, unless or until written authorization for disclosure is given by the designating party, or as required by law, or by an order of court or administrative agency. In the event of a dispute over the confidentiality of shared information, the parties agree to maintain the confidentiality of the designated information until the issue of confidentiality is resolved. The duty to maintain the confidentiality of such information shall survive the termination of this Agreement.

23.0. Entire Agreement.

23.1. This Agreement, and Exhibits, which are incorporated into this Agreement by this reference, contains the entire agreement and understanding by and between the parties with respect to the subject matter, and no representations, promises, agreements, or understandings, written or verbal, not contained in this Agreement, shall be of any force or effect.

23.2. No change, modification or waiver of this Agreement shall be valid or binding unless the same is in writing and signed by the party against whom such change, modification or waiver is sought to be enforced.

24.0. Additional Terms.

25.0. Notices.

Any notice required to be given under this Agreement and any authorization required to be provided shall be given or provided to:

City:

Contractor:

Heather Skeens
Cultural Programs Supervisor
Hearst Center for the Arts
304 West Seerley Boulevard
Cedar Falls, IA 50613
319-273-8641
heather.skeens@cedarfalls.com

Leah Porter
Strategic Services Consultant
Propel Nonprofits
1 Main Street SE, Suite 600
Minneapolis, MN 55414
612-249-6700
LPorter@propelnonprofits.org

In Witness Whereof, the City and the Contractor have caused this Agreement to be executed as of the last date listed below.

CONTRACTOR

Propel Nonprofits

By: Leah Porter

Its: Strategic Services Consultant

Date: 10/04/2021

CITY OF CEDAR FALLS, IOWA

By: _____

Robert M. Green, Mayor

Attest: _____

Jacqueline Danielsen, MMC, City Clerk

Date: _____

Exhibit A

Proposed Project Agreement: Organizational Impact

Hearst Center for the Arts | 9/28/21



Contact Information

Client Organization	Hearst Center for the Arts 304 West Seerley Blvd., Cedar Falls, IA 50613
Primary Client Contact	Heather Skeens Cultural Programs Supervisor 319.268.5550 heather.skeens@cedarfalls.com
Primary Propel Contact	Leah Porter Strategic Services Consultant 612-249-6659 lporter@propelnonprofits.org
Secondary Propel Contact	Mario Hernandez Strategic Services Director 612-249-6688 mhernandez@propelnonprofits.org One Main Street SE, Suite 600 Minneapolis, MN 55414-1036

Hearst Center for the Arts

The Hearst Center for the Arts is a community arts center that is owned and operated by the City of Cedar Falls, Iowa. The center was founded when farmer-poet James Hearst bequeathed his home to the City of Cedar Falls in 1983 and asked that it be used as an arts center for the community. In 1986, as a result of this gift, the Cedar Falls Art & Culture Board was established by the City of Cedar Falls to oversee the operation of the City's Cultural Division, which includes the James & Meryl Hearst Center for the Arts. The Art & Culture Board raised funds and in 1988-1989, the poet's home was reconstructed into what is now the community's own 12,000-square-foot arts center, complete with two galleries, three classrooms, a sculpture garden, two meeting rooms, office space, and a performing arts facility. More than two million visitors have walked through the doors of the Hearst Center for the Arts since they were opened on May 13, 1989.

The Hearst Center receives 100% of its funding from the City of Cedar Falls with supplemental support from a separate 501(c)(3), Friends of the Hearst.

Situational Analysis

As a result of the COVID pandemic, the Hearst Center is reconsidering plans to expand and move its physical space to a new, downtown location. Instead, it is considering expanding and/or making improvements to its current location, a project called Hearst 2.0. With any major project, the organization will need to identify and assess the financial, programmatic, and operational implications of the proposed physical expansion. Propel understands the organization's need to develop a vision and plan for Hearst 2.0 that addresses community needs; includes financial, programmatic, and operational components; and can be sustained through existing revenue structures.

Propel understands that this process will need to work from a shared understanding that the Hearst Center:

- Seeks Propel's assistance in creating a vision for future programs and operations for Hearst 2.0 and understanding the financial implications of that vision
- Has a set operating budget from the City with specific funding streams restricted to specific uses
- Needs to be as cost-effective as possible in its use of operating funds
- Desires to be sustainable both financially and operationally
- Will need buy-in and support of a plan from key stakeholders, including the City of Cedar Falls and Friends of the Hearst

Project Outcomes

The described operations planning process will result in:

- Development of financial scenarios for the Hearst's future programs and operations in an expanded space
- Financial analysis of those scenarios with pros/cons of each and a staff-recommended course of action
- Presentation to board of a plan with high-level financial implications given the organization's revenue mix

Approach

When working on an organization impact project with Propel Nonprofits, our consultants utilize a method that leverages an Organizational Learning Team (OLT). The OLT is comprised of a representative group of the executive director and 1-5 additional staff or board members. In the case of the Hearst Center, we could have the Cultural Programs Supervisor, board chair, and 1-3 additional board member make up this OLT. The role of the OLT is to champion the process within your organization and drive the process forward with the consultant, engaging with the correct broader set of stakeholders, and accomplish pre-work necessary to have powerful and informed engagements. In partnership with the OLT, Propel will provide an integrated solution which will include:

Facilitated working sessions and OLT meetings

A short series of meetings with the OLT will:

- Gather background financial documents and understand revenue mix
- Facilitate the OLT's development of expanded program scenario(s) and associated operating costs
- Provide clarification/input/feedback on documents developed by Propel

Financial Scenarios

Propel will develop financial scenario(s) that:

- Envision expanded program growth and identify the key financial levers that impact these scenarios
- Based on these financial levers and scenarios, a recommended course of action will emerge from the OLT

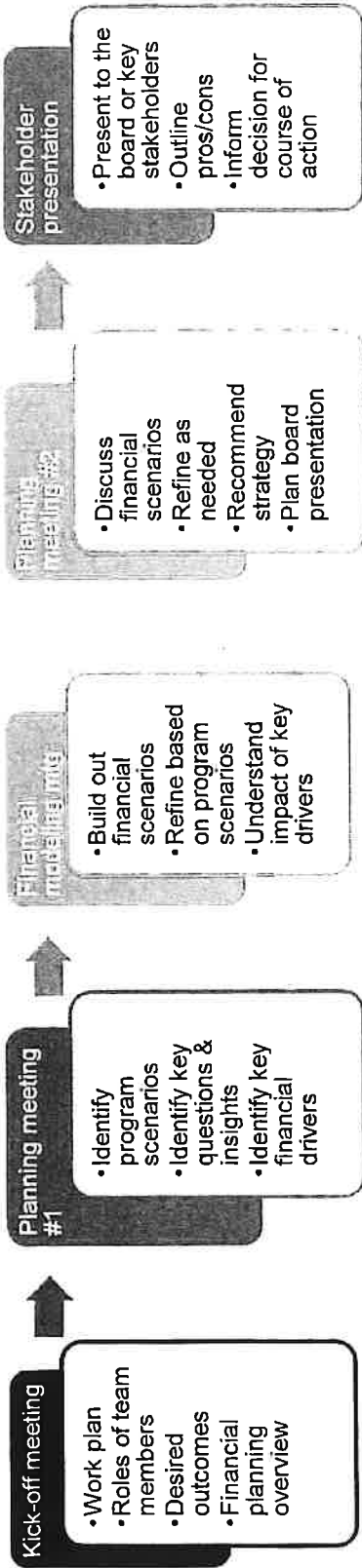
Presentation to Stakeholders

- Propel will present to the board and/or other key stakeholders the results of the financial planning process and scenarios, informing the board's decision of how to proceed.

The following section provides more details on this scope. All work done under this contract will be conducted virtually using Zoom (videoconferencing).

High Level Work Plan

Below is a high-level workplan for the operations planning part of the project. Propel consultants will work with Hearst Center for the Arts to refine this plan before commencing.



Kick-off meeting

- Work plan
- Roles of team members
- Desired outcomes
- Financial planning overview

Planning meeting #1

- Identify program scenarios
- Identify key questions & insights
- Identify key financial drivers

Financial modeling

- Build out financial scenarios
- Refine based on program scenarios
- Understand impact of key drivers

Planning meeting #2

- Discuss financial scenarios
- Refine as needed
- Recommend strategy
- Plan board presentation

Stakeholder presentation

- Present to the board or key stakeholders
- Outline pros/cons
- Inform decision for course of action

Oct - Nov 2021

Dec 2021 - Jan 2022

Feb 2022

Deliverables

- Documentation of key financial drivers
- Documentation of key strategic insights and questions
- Meeting notes

Deliverables

- Financial scenarios reflecting proposed program expansion, with pros/cons identified for each
- Recommendation of scenario
- Presentation to board/stakeholders
- Scenario tool

Roles & Responsibilities

Propel Nonprofits' responsibility: Consultant will come to agreement with the client as to how its needs can best be met within the scope of the contract and will work with client in making adjustments as needed during the process. Consultant will provide overall project management, design, preparation, training, coaching, and facilitation duties. Propel will handle contracting, invoicing, and fee collection, and will conduct follow-up evaluation. At all times consultants will uphold the highest possible standards of professional ethics.

Client responsibility: Client will work with consultant in refining process and will provide any materials or information that consultant may request in order to execute the contract. Client will communicate with key stakeholders about time, place, and nature of consulting, and will do everything possible to achieve high attendance. Client will provide appropriate facility for the project, including any equipment required, and any food/beverages it may want to offer participants.

Fee and Billing

- The fee for this engagement is \$4,500. This is calculated by the number of hours meeting with the client and allowing 2 hours of consultant prep per client hour with the client and additional time for developing the financial scenario tool and presentation (deliverable).
- Materials such as flipcharts and copies are included with this fee.
- Propel does not charge clients for travel within the Twin Cities metro area.
- An invoice for 50% of the fee will be sent after this agreement is signed. An invoice for 25% of the fee will be sent at the mid-point of this engagement. The final invoice for the remaining 25% of the fee will be sent at completion of the project.

About Propel Nonprofits

Propel Nonprofits fuels the impact and effectiveness of nonprofits with guidance, expertise, and capital. We provide loans, finance, strategy and governance services. Our vision is a diverse network of mission-driven nonprofits building a healthy, vibrant, and more just community. We provide leadership in the nonprofit sector, with research and reports on issues and topics that impact the sustainability and effectiveness of nonprofit organizations.

Nonprofits Assistance Fund and MAP for Nonprofits merged Jan. 1, 2017 and officially became Propel Nonprofits on Oct. 7, 2017. This merged organization offers a holistic approach to services to meet a larger set of nonprofits' needs, including the ability to more closely link strategy, governance, and finance. Visit www.propelnonprofits.org for more information.

Experience and Qualifications



Leah Porter, Strategic Services Consultant, Propel Nonprofits

Leah has nearly 20 years of experience as a strategic leader in the nonprofit sector. Her work has focused on developing new and/or improved ways of meeting community needs, which has included program development, business and financial planning, stakeholder engagement, and change management. She has developed innovative and award-winning programs for various organizations as a consultant, employee, and volunteer. Most recently, she founded and led the Twin Cities Mobile Market, an award-winning program that increased access

to healthy, affordable food for thousands living in low-income neighborhoods. Today, Leah helps organizations re-think their work in the ever-changing world, and she brings a financial lens to help translate the theoretical into the practical.

Leah has worked with both grassroots and large organizations, urban and rural, in fields such as food access, older adults/aging, social enterprise, advocacy/organizing, mental health, early childhood education, healthcare, agriculture, and youth development, among others. She has master's in Nonprofit Management.



Mario Hernandez, Strategic Services Director, Propel Nonprofits

Mario brings several years of experience leading local nonprofits and serving on nonprofit boards to his consultancy practice. Mario led a Latino immigrant focused youth development organization in the early 2000's, and most recently led a Latino immigrant focused workforce and economic development organization. He has led organizations through high growth periods and periods of programmatic change. Mario recently managed the for-profit business ventures of a local nonprofit and used his creative, entrepreneurial, strategy development, and analytical skills to lead those ventures to profitability.

Mario's experience includes creating organizational strategy, converting strategy into implementation plans, and aligning board effectiveness with the current needs of an organization. Since joining Propel, Mario has worked with organizations such as Teach for America, the Lao Assistance Center of Minnesota, Quality Education Services, and CLUES on topics such as strategy development, board development, financial sustainability, and organizational change.

References

Patti Totozintle

Chief Executive Officer
Esperanza United (formerly Casa de Esperanza)
PO Box 40115
St. Paul, MN 55104
651-646-5553, extension 307
PTotozintle@casadeesperanza.org
www.casadeesperanza.org
www.nationallatinonetwork.org

Strategic Services project: Strategic plan refresh

Jody Nelson

Executive Director
Guadalupe Alternative Programs
381 E. Robie
St. Paul, MN 55107
612-581-9811
JNelson@gapschool.org

Strategic Services project: Full strategic planning process with financial strategy component (in process)

Exhibit B

Exhibit B

**Hearst Center Organizational Impact Planning with Propel Nonprofits
Cedar Falls, Iowa
City Project Number _____**

03-27-2019

**INSURANCE REQUIREMENTS FOR
CONTRACTORS FOR THE CITY OF CEDAR FALLS**

*** This document outlines the insurance requirements for all Contractors who perform work for the City of Cedar Falls. The term "contractor" as used in this document shall be defined as the general contractor, artisan contractor, or design contractor that will be performing work for the City of Cedar Falls under contract.

1. All policies of insurance required hereunder shall be with an insurer authorized by law to do business in Iowa. All insurance policies shall be companies satisfactory to the City and have a rating of A-, VII or better in the current A.M. Best Rating Guide.
2. All Certificates of Insurance required hereunder shall include the Cancellation & Material Change Endorsement. A copy of this endorsement is attached in Exhibit 1.
3. Contractor shall furnish a signed Certificate of Insurance to the City of Cedar Falls, Iowa for the coverage required in Exhibit 1. Such Certificates shall include copies of the following endorsements:
 - a) Commercial General Liability policy is primary and non-contributing
 - b) Commercial General Liability additional insured endorsement – See Exhibit 1
 - c) Governmental Immunities Endorsement – See Exhibit 1

Copies of additional insured endorsements, executed by an authorized representative from an Insurer duly licensed to transact business at the location of the jobsite, must be provided prior to the first payment.

Contractor shall, upon request by the City, provide Certificates of Insurance for all subcontractors and sub-sub contractors who perform work or services pursuant to the provisions of this contract.

4. Each certificate shall be submitted to the City of Cedar Falls.

Hearst Center Org Impact Planning / Propel Nonprofits
 Cedar Falls, Iowa
 City Project No. _____

5. Failure to provide minimum coverage shall not be deemed a waiver of these requirements by the City of Cedar Falls. Failure to obtain or maintain the required insurance shall be considered a material breach of this agreement.

6. Failure of the Contractor to maintain the required insurance shall constitute a default under this Contract, and at City's option, shall allow City to terminate this Contract for cause and/or purchase said insurance at Contractor's expense.

7. Contractor shall be required to carry the following minimum coverage/limits or greater, if required by law or other legal agreement; as per Exhibit 1:

- This coverage shall be written on an occurrence, not claims made form. Form CG 25 03 03 97 "Designated Construction Project(s) General Aggregate Limit" shall be included. All deviations or exclusions from the standard ISO commercial general liability form CG 001 shall be clearly identified and shall be subject to the review and approval of the City.
- Contractor shall maintain ongoing CGL coverage for at least 2 years following substantial completion of the Work to cover liability arising from the products-completed operations hazard and liability assumed under an insured contract.
- Governmental Immunity endorsement identical or equivalent to form attached.
- Additional Insured Requirement – See Exhibit 1.
 The City of Cedar Falls, including all its elected and appointed officials, all its employees and volunteers, all its boards, commissions and/or authorities and their board members, employees and volunteers shall be named as an additional insured on General Liability Policies for all classes of contractors.

Contractors shall include coverage for the City of Cedar Falls as an additional insured including ongoing and completed operations coverage equivalent to: ISO CG 20 10 07 04* and ISO CG 20 37 07 04**

* ISO CG 20 10 07 04 "Additional Insured – Owners, Lessees or Contractors – Scheduled Person or Organization"

** ISO CG 20 37 07 04 "Additional Insured – Owners, Lessees or Contractors – Completed Operations"

9. Separation of Insured's Provision: If Contractor's liability policies do not contain the standard ISO separation of insured's provision, or a substantially similar clause, they shall be endorsed to provide cross-liability coverage.
10. Limits: By requiring the insurance as set out in this Contract, City does not represent that coverage and limits will necessarily be adequate to protect Contractor and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities provided to City in this Contract. The City will have the right at any time to require liability insurance greater than that otherwise specified in Exhibit 1. If required, the additional premium or premiums payable shall be added to the bid price.
11. Performance and Payment Bonds: The City shall have the right to require the Contractor to furnish performance and payment bonds for the full amount of the Contract price. The Contractor shall furnish, by a surety and in a form satisfactory to the City, such bonds to the City, prior to the start of Contractor's Work, covering the performance of the Contractor and the payment of all obligations arising hereunder. The Contractor, upon receipt of the bonds and invoice from the surety, shall pay for the cost of said bonds. Additional bond premium costs due to modifications to the Contract, shall be included in the modification amount submitted by Contractor, and paid by Contractor.
12. Indemnification (Hold Harmless) Provision: To the fullest extent permitted by law, the Contractor agrees to defend, pay on behalf of, indemnify, and hold harmless the City of Cedar Falls, Iowa, its elected and appointed officials, directors, employees, agents and volunteers working on behalf of the City of Cedar Falls, Iowa against any and all claims, demands, suits or loss, including any and all outlay and expense connected therewith, and for damages which may be asserted, claimed or recovered against or from the City of Cedar Falls, Iowa, its elected and appointed officials, directors, employees, agents and volunteers working on behalf of the City of Cedar Falls, Iowa, including, but not limited to, damages arising by reason of personal injury, including bodily injury or death, and property damages, which arises out of or is in any way connected or associated with the work and/or services provided by the Contractor to the City of Cedar Falls, Iowa pursuant to the provisions of this contract to the extent arising out of the errors, omissions or negligent acts of the Contractor, its agents, employees, subcontractors or others working on behalf of the Contractor. It is the intention of the parties that the City of Cedar Falls, Iowa, its elected and appointed officials, directors, employees, agents and volunteers working on behalf of the City of Cedar Falls, Iowa shall not be liable or in any way responsible for the injury, damage, liability, loss or expense incurred by the Contractor, its officers, employees, subcontractors, and others affiliated with the Contractor due to accidents, mishaps, misconduct, negligence or injuries either in person or property resulting from the work and/or services performed by the

Hearst Center Org Impact Planning / Propel Nonprofits
 Cedar Falls, Iowa
 City Project No. _____

Contractor pursuant to the provisions of this contract, except for and to the extent caused by the negligence of the City of Cedar Falls, Iowa.

The Contractor expressly assumes full responsibility for damages or injuries which may result to any person or property by reason of or in connection with the work and/or services provided by the Contractor to the City of Cedar Falls, Iowa pursuant to this contract to the extent arising out of the errors, omissions or negligent acts of the Contractor, its agents, employees, subcontractors or others working on behalf of the Contractor, and agrees to pay the City of Cedar Falls, Iowa for all damages caused to the City of Cedar Falls, Iowa premises resulting from the work and/or services of the Contractor, its officers, employees, subcontractors, and others affiliated with the Contractor to the extent arising out of such errors, omissions or negligent acts.

The Contractor represents that its activities pursuant to the provisions of this contract will be performed and supervised by adequately trained and qualified personnel, and the Contractor will observe, and cause its officers, employees, subcontractors and others affiliated with the Contractor to observe all applicable safety rules.

13. Waiver of Subrogation: To the extent permitted by law, Contractor hereby releases the City of Cedar Falls, Iowa, its elected and appointed officials, its directors, employees, agents and volunteers working on behalf of the City of Cedar Falls, Iowa, from and against any and all liability or responsibility to the Contractor or anyone claiming through or under the Contractor by way of subrogation or otherwise, for any loss or damage to property caused by fire or any other casualty and for any loss due to bodily injury to Contractor's employees. This provision shall be applicable and in full force and effect only with respect to loss or damage occurring during the time of this contract or arising out of the work performed under this contract. The Contractor's policies of insurance shall contain a clause or endorsement to the effect that such release shall not adversely affect or impair such policies or prejudice the right of the Contractor to recover thereunder.

Completion Checklist

- Certificate of Liability Insurance (2 pages)
- Designated Construction Project(s) General Aggregate Limit CG 25 03 03 97 (2 pages)
- Additional Insured CG 20 10 07 04
- Additional Insured CG 20 37 07 04
- Governmental Immunities Endorsement

Hearst Center Org Impact Planning / Propel Nonprofits
 Cedar Falls, Iowa
 City Project No. _____

EXHIBIT 1 – INSURANCE SCHEDULE

General Liability (Occurrence Form Only):

Commercial General Liability	
General Aggregate	\$2,000,000
Products-Completed Operations Aggregate Limit	\$2,000,000
Personal and Advertising Injury Limit	\$1,000,000
Each Occurrence Limit	\$1,000,000
Fire Damage Limit (any one occurrence)	\$ 50,000
Medical Payments	\$ 5,000

Automobile:

(Combined Single Limit) \$1,000,000

If the Contractor does not own any vehicles, coverage is required on non-owned and hired vehicles.

Standard Workers Compensation

Statutory for Coverage A	
Employers Liability:	
Each Accident	
Each Employee – Disease	\$ 500,000
Policy Limit – Disease	\$ 500,000
	\$ 500,000

Umbrella:

\$3,000,000

The Umbrella/Excess Insurance shall be written on a per occurrence basis and if the Umbrella/Excess is not written on a follow form basis it shall have the same endorsements as required of the primary policy(ies).

Errors & Omissions:

\$1,000,000



Hearst Center Org Impact Planning / Propel Nonprofits
 Cedar Falls, Iowa
 City Project No. _____

**CITY OF CEDAR FALLS, IOWA
 ADDITIONAL INSURED ENDORSEMENT**

The City of Cedar Falls, Iowa, including all its elected and appointed officials, all its employees and volunteers, all its boards, commissions and/or authorities and their board members, employees, and volunteers, are included as Additional Insureds, including ongoing operations CG 2010 07 04 or equivalent, and completed operations CG 2037 07 04 or equivalent. See Specimens.

This coverage shall be primary to the Additional Insureds, and not contributing with any other insurance or similar protection available to the Additional Insureds, whether other available coverage be primary, contributing or excess.

**GOVERNMENTAL IMMUNITIES ENDORSEMENT
 (For use when including the City as an Additional Insured)**

1. Nonwaiver of Government Immunity. The insurance carrier expressly agrees and states that the purchase of this policy and the including of the City of Cedar Falls, Iowa as an Additional Insured does not waive any of the defenses of governmental immunity available to the City of Cedar Falls, Iowa under Code of Iowa Section 670.4 as it now exists and as it may be amended from time to time.
2. Claims Coverage. The insurance carrier further agrees that this policy of insurance shall cover only those claims not subject to the defense of governmental immunity under the Code of Iowa Section 670.4 as it now exists and as it may be amended from time to time.
3. Assertion of Government Immunity. The City of Cedar Falls, Iowa shall be responsible for asserting any defense of governmental immunity, and may do so at any time and shall do so upon the timely written request of the insurance carrier. Nothing contained in this endorsement shall prevent the carrier from asserting the defense of governmental immunity on behalf of the City of Cedar Falls, Iowa.
4. Non-Denial of Coverage. The insurance carrier shall not deny coverage under this policy and the insurance carrier shall not deny any of the rights and benefits accruing to the City of Cedar Falls, Iowa under this policy for reasons of governmental immunity unless and until a court of competent jurisdiction has ruled in favor of the defense(s) of governmental immunity asserted by the City of Cedar Falls, Iowa.
5. No Other Change in Policy. The insurance carrier and the City of Cedar Falls, Iowa agree that the above preservation of governmental immunities shall not otherwise change or alter the coverage available under the policy.

Hearst Center Org Impact Planning / Propel Nonprofits
Cedar Falls, Iowa
City Project No. _____

CANCELLATION AND MATERIAL CHANGES ENDORSEMENT

Thirty (30) days Advance Written Notice of Cancellation, Non-Renewal, Reduction in coverage and/or limits and ten (10) days written notice of non-payment of premium shall be sent to: Risk Management Office, City of Cedar Falls, City Hall, 220 Clay Street, Cedar Falls, Iowa 50613. This endorsement supersedes the standard cancellation statement on the Certificate of Insurance to which this endorsement is attached. Contractor agrees to furnish the City with 30 days advance written notice of cancellation, non-renewal, reduction in coverage and/or limits, and 10 days advance written notice of non-payment of premium.

CG 25 03 03 97

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

DESIGNATED CONSTRUCTION PROJECT(S) GENERAL AGGREGATE LIMIT

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Designated Construction Projects:

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

A. For all sums which the insured becomes legally obligated to pay as damages caused by "occurrences" under **COVERAGE A (SECTION I)**, and for all medical expenses caused by accidents under **COVERAGE C (SECTION I)**, which can be attributed only to ongoing operations at a single designated construction project shown in the Schedule above:

1. A separate Designated Construction Project General Aggregate Limit applies to each designated construction project, and that limit is equal to the amount of the General Aggregate Limit shown in the Declarations.
2. The Designated Construction Project General Aggregate Limit is the most we will pay for the sum of all damages under **COVERAGE A**, except damages because of "bodily injury" or "property damage" included in the "products-completed operations hazard", and for medical expenses under **COVERAGE C** regardless of the number of:
 - a. Insureds;
 - b. Claims made or "suits" brought; or
 - c. Persons or organizations making claims or bringing "suits".
3. Any payments made under **COVERAGE A** for damages or under **COVERAGE C** for medical expenses shall reduce the Designated Construction Project General Aggregate Limit for that designated construction project. Such payments shall not reduce the General Aggregate Limit shown in the Declarations nor shall they reduce any other

Designated Construction Project General Aggregate Limit for any other designated construction project shown in the Schedule above.

4. The limits shown in the Declarations for Each Occurrence, Fire Damage and Medical Expense continue to apply. However, instead of being subject to the General Aggregate Limit shown in the Declarations, such limits will be subject to the applicable Designated Construction Project General Aggregate Limit.

B. For all sums which the insured becomes legally obligated to pay as damages caused by "occurrences" under **COVERAGE A (SECTION I)**, and for all medical expenses caused by accidents under **COVERAGE C (SECTION I)**, which cannot be attributed only to ongoing operations at a single designated construction project shown in the Schedule above:

1. Any payments made under **COVERAGE A** for damages or under **COVERAGE C** for medical expenses shall reduce the amount available under the General Aggregate Limit or the Products-Completed Operations Aggregate Limit, whichever is applicable; and
2. Such payments shall not reduce any Designated Construction Project General Aggregate Limit.

CG 25 03 03 97

- C. When coverage for liability arising out of the "products-completed operations hazard" is provided, any payments for damages because of "bodily injury" or "property damage" included in the "products-completed operations hazard" will reduce the Products-Completed Operations Aggregate Limit, and not reduce the General Aggregate Limit nor the Designated Construction Project General Aggregate Limit.
- D. If the applicable designated construction project has been abandoned, delayed, or abandoned and then restarted, or if the authorized contracting parties deviate from plans, blueprints, designs, specifications or timetables, the project will still be deemed to be the same construction project.
- E. The provisions of Limits Of Insurance (SECTION III) not otherwise modified by this endorsement shall continue to apply as stipulated.

Copyright, Insurance Services Office, Inc., 1996

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY
CG 20 10 07 04

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

**ADDITIONAL INSURED – OWNERS, LESSEES OR
CONTRACTORS – SCHEDULED PERSON OR
ORGANIZATION**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s):
Location(s) Of Covered Operations
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.

A. Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This Insurance does not apply to "bodily injury" or "property damage" occurring after:

1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional Insured(s) at the location of the covered operations has been completed; or
2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

All terms and conditions of this policy apply unless modified by this endorsement.

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY
CG 20 37 07 04

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

**ADDITIONAL INSURED – OWNERS, LESSEES OR
CONTRACTORS – COMPLETED OPERATIONS**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s):
Location And Description Of Completed Operations
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.

Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at

the location designated and described in the schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

All terms and conditions of this policy apply unless modified by this endorsement.



DEPARTMENT OF COMMUNITY DEVELOPMENT

City of Cedar Falls
 220 Clay Street
 Cedar Falls, Iowa 50613
 Phone: 319-273-8600
 Fax: 319-273-8610
 www.cedarfalls.com

MEMORANDUM *Planning & Community Services Division*

TO: Honorable Mayor Robert M. Green and City Council
FROM: Thomas A. Weintraut, AICP, Planner III
DATE: October 11, 2021
SUBJECT: Cedar River Recreational Improvement Project
 Riverwise Engineering

Please find attached the Supplemental Agreement No. 3 with Riverwise Engineering for construction services for the Cedar River recreational improvement project.

The original agreement with Riverwise was approved by the City Council on September 5, 2017 which included 30% preliminary design and agency coordination for the in-river and riverbank improvements from the upstream side of the Main Street Bridge to the downstream side of the W. 1st Street Bridge. Supplemental Agreement No. 1 was approved by the City Council on July 16, 2018 that included design services from preliminary design through agency permitting and final design. Supplemental Agreement No. 2 was approved by the City Council on May 5, 2019 for the bathymetric survey services around the low head dam upstream of the 1st Street Bridge.

The general scope of services outlined in this supplemental agreement includes the following:

- Assisting with the preparation of bid documents, attendance at a pre-bid meeting, and responding to requests for information.
- Pre-Construction meeting with selected contractor.
- Onsite construction administration for the project.
- Coordination with contractors to answer questions, concerns, and comments during the construction process.
- Onsite testing of the in-river elements.
- Onsite visit after first hydrograph event to review any impact the event may have had on the project.

The consultant has completed all design work and construction plans associated with the project and the project has gone to bid. The cost for the associated construction services is \$83,550. An additional \$9,760 in construction specialist site visits is listed as an optional service, at the City's discretion. This would provide an option for support on value engineering, contractor interface for design and construction principles or best management practices, safety protocols for construction, recreational feature optimization and safety for river users, if additional inspection expertise is needed beyond City Engineering staff that will be inspecting the project as construction occurs. It is anticipated the construction of the project will start in November 2021.

The Department of Community Development requests your consideration and approval of the construction services Supplemental Agreement No. 3 with Riverwise Engineering for the construction phase of the project.

If you have any questions or need additional information, please feel free to contact me at this office.

xc: Stephanie Houk Sheetz, Director of Community Development
David Wicke, PE, City Engineer



DEPARTMENT OF COMMUNITY DEVELOPMENT

City of Cedar Falls
 220 Clay Street
 Cedar Falls, Iowa 50613
 Phone: 319-273-8600
 Fax: 319-273-8610
 www.cedarfalls.com

MEMORANDUM
Planning & Community Services Division

SUPPLEMENTAL AGREEMENT NO. # 3

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project Number FL-033-3088

WHEREAS, a Professional Services Agreement was entered into by the City of Cedar Falls, Iowa (CLIENT) and Riverwise Engineering, LLC, (CONSULTANT), PO Box 706, Durango, CO 81301, dated September 5, 2017 for 30% preliminary design, instream and upland (riverbank) drawings, cost estimating, and project reporting as part of the Cedar River Recreational Improvement Project (Agreement); and

WHEREAS, the CLIENT and CONSULTANT have entered into Supplemental Agreement 1, dated July 16, 2018, for 60% preliminary design, permitting, final design and bid letting services; and

WHEREAS, the CLIENT and CONSULTANT have entered into Supplemental Agreement 2, dated May 6, 2019, for bathymetric survey services, and

WHEREAS, the CLIENT and CONSULTANT desire to enter into this Supplemental Agreement No. 3 for the construction phase services.

NOW THEREFORE, it is mutually agreed to amend the Agreement to add construction management services:

I. SCOPE OF SERVICES

CONSULTANT shall perform additional professional Services (the "Services") in connection with the Cedar River Recreational Improvement Project in accordance with the Scope of Services set forth in Exhibit A attached hereto.

II. COMPENSATION

Compensation for the above Services will be a direct expense in accordance with Part VI

of the Agreement. The fee for these services is Eighty-Three Thousand Five Hundred and Fifty Dollars (\$83,550). An additional \$9,760 in construction specialist site visits will be optional, at the City's discretion, as needed.

- III. In all other respects, the obligations of the CLIENT and CONSULTANT shall remain as specified in the Agreement or as specified in Supplemental Agreement 2, if applicable.

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement No. 3 as of the dates shown below:

CITY OF CEDAR FALLS

RIVERWISE ENGINEERING, LLC

By: _____

By: Shane Sigle

Printed Name: Robert M. Green

Name: Shane Sigle

Title: Mayor

Title: Principal

Date: _____

Date: 10/11/2021

Attest: _____

Exhibit A

**Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project Number FL-033-3088**

10/11/2021

SCOPE OF SERVICES

*** This document outlines the scope of services specific for the Cedar River Recreational Improvement Project. The term "CONSULTANT" as used in this document shall be defined as the design contractor (Riverwise Engineering, LLC) that will be performing work for the City of Cedar Falls under contract, hereinafter, the "CITY", under contract.

A. Project Description

The CONSULTANT will assist the CITY in managing the construction of the in stream and river bank improvement. This phase will also involve the necessary coordination with bid document preparation, responses to prospective contractors, and maintenance following the first hydrograph.

B. General Scope of Work

The Scope of Services for this project under this Supplemental Agreement will encompass and include work, services, materials, equipment, personnel and supplies necessary to provide the construction improvements for the project.

The Scope of Services is further defined as follows:

Task 1: Bidding Assistance.

- 1.1 Bid Documents Preparation: Assist the City with completion of a bid package consistent with the City of Cedar Falls bidding process and engineering standards. Includes any special provisions, contractor experience requirements, bid tabulations, and subcontractor requirements. Does not include distribution and administering of the bid process, nor legal review, insurance and liability specifications, bonding information, etc. that should be included in the City contracting forms.
- 1.2 Attend Pre-Bid Meeting: Includes one Riverwise Engineering Inc. (RWE) representative and one ALIGN representative on-site to lead the pre-bid meeting, provide clarification, and answer questions posed during the meeting.
- 1.3 Responding to Request for Information's (RFI's): Includes written response to all questions posed by prospective contractors billed on an hourly basis. Does not include additional studies, or drawings.

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088

- 1.5 Expenses: Includes costs associated with travel, phone, office, printing, and media.

Task II: Upland Preliminary and Final Design

- 2.1 Pre-Construction Meeting: Includes one RWE and one Align representative on-site to assist or lead the pre-construction meeting with the chosen contractor, all relevant stakeholders, and subcontractors. The meeting will be held at City Hall.
- 2.2 RWE On Site Construction Administration (assumes six visits of two days each): Includes one RWE project manager on-site for six visits of two days to provide construction observations and work with chosen contractor to complete project based on engineered design and construction standards. RWE will visit to observe structural boulder and concrete placement and layout, safety improvements, hazard mitigation, recreational amenity creation, material placing for public access, and to troubleshoot foundation issues, structural issues, grading, slope, trail, and recreational whitewater related issues. Includes value engineering options and suggestions during construction, as available

RWE will have available, at the City's request, support from a construction specialist for value engineering, contractor interface to convey design and construction principles, best management practices, techniques, safety protocols for construction, recreational feature optimization, safety protocols for structure performance, and safety for river users. If needed, City will contact RWE for construction specialist support.

2.2A ALIGN On Site Construction Administration

Specialty Stone Work: Quarry site: Architect to select layout on site and number stones for placement and shipping, Turtle head (Structure #6) observations and submittal approval, Vertical wall setting, Stone seat wall setting

Shoreline Stone: Stone setting and walkways 2 hrs. daily during upland set-up times.

Concrete: Schedule on site concrete color consultant to instruct on Turtle back landing surface prep, forming, edge coloring, stamping and post surface decoration. Upper Plaza surface decoration layout assistance. Resin bound paving and glow stone placement

Plumbing: Initial layout of pipe runs, quick coupler boxes and shower installation. Post season winterization meeting.

Synthetic Turf: Drainage and form approval Benches: Layouts and stone approval
Bridges: Three mounting

Lighting: General layout and mounting prepare and attend 2 night time lighting observation, aiming and mounting.

Planting: Layout of small plants and grid protected planting.

- 2.3 Responding to RFI's, Review Material Submittals, Remote Inspection: Includes coordination with comments during the construction process. Includes RWE and Align review of material submittals and coordination with the City on options available.

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088

- 2.4 Initial Product Testing and Hydraulic Optimization Site Visit. Included one RWE representative on-site to test six hydraulic drop structures and associated in-stream elements for optimal performance. Ideally, site visit will include subsequent observations during dewatering and modification of drop structures, as needed.
- 2.5 First Hydrograph Maintenance Site Visit: Includes one RWE representative on-site to test six hydraulic drop structures and associated in-stream elements for optimal performance. Ideally, site visit will include subsequent observations during watering and modifications of drop structures, as needed.
- 2.8 Expenses: Includes costs associated with travel, phone, office, printing, and media.
- 2.9 Subconsultant Contract Administration:

C. Project Team

Consultant
Riverwise Engineering, LLC

Scope
Project Management and Lead Designer responsible for coordination subcontractors

ALIGN Architects

Sub consultant responsible for the riverbank construction and coordination with subcontractors

D. Schedule

The construction is anticipated to be completed within eight (8) months following selection of a contractor, or approximately June 30, 2022. The first hydrograph maintenance site visit will be dependent on river conditions.

E. Deliverables

The scope of services shall be considered to be complete upon completion and delivery of the following items to the satisfaction of the City:

- The construction of the seven deflectors in the river channel and the removal of all in-river associate construction related items as shown on the construction plans.
- The hardscape elements associated with the riverbank improvements, as shown on the construction plans, have been completed.
- The landscaping materials associated with the riverbank improvements, as shown on the construction plans, have been installed.
- The construction staging areas have been cleaned up and repaired to the pre-construction condition.
- All signage associated with construction plans has been installed.
- The first hydrograph maintenance site visit has been satisfactorily completed.

F. Additional Services

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088

Additional services may be added as extra work by Supplemental Agreement No. 3 when appropriate to the project schedule.

Cedar River Recreational Improvement Project
 Cedar Falls, Iowa
 City Project No. FL-033-3088



**Cedar River Recreational Improvements Project,
 Cedar Falls, Iowa, Construction Phase Services**

Riverwise Engineering, LLC
 10/7/2021 (rev2)

TASK		Subtotal	Task Subtotal
Task 1: Bidding Assistance			\$ 10,040
1.1	Bid Documents Preparation: Assist the City with completion of a bid package consistent with the City of Cedar Falls bidding process and engineering standards. Includes any special provisions, contractor experience requirements, bid tabulations, and subcontractor requirements. Does not include distribution and administering of the bid process, nor legal review, insurance and liability specifications, bonding information, etc. that should be included in the City contracting forms.	\$ 3,840	
1.2	Attend Pre-Bid Meeting: Includes one RWE representative and one Align representative on-site to lead the pre-bid meeting, provide clarification, and answer questions posed during the meeting.	\$ 2,480	
1.3	Responding to Request for Information's (RFI's): Includes written response to all questions posed by prospective contractors billed on an hourly basis. Does not include additional studies, or drawings. Cost is an estimate.	\$ 1,920	
1.5	Expenses: Includes costs associated with travel, phone, office, printing, and media.	\$ 1,800	
Task 2: Construction Services			\$ 73,510
2.1	Pre-Construction Meeting: Includes one RWE and one Align representative on-site to assist or lead the pre-construction meeting with the chosen contractor, all relevant stakeholders, and subcontractors. The meeting will be held at City Hall.	\$ 2,620	
2.2	RWE On Site Construction Administration (assumes six visits of two days each): Includes one RWE project manager (Shane Sigle, Mike Harvey, or Riley Gelatt) on-site for six visits of two days to provide construction observations and work with chosen contractor to complete project based on engineered design and construction standards. Staff will visit to observe structural boulder and concrete placement and layout, safety improvements, hazard mitigation, recreational amenity creation, material placing for public access, and to troubleshoot foundation issues, structural issues, grading, slope, trail, and recreational whitewater related issues. Includes value engineering options and suggestions during construction, as available. The six project manager visits will focus on observations during creation of the six recreational instream structures.	\$ 26,720	

Riverwise Engineering, LLC
 PO Box 706
 Durango, CO 81301
 info@riverwise.org

ckd by SAS
 10/8/2021

Cedar River Recreational Improvement Project
 Cedar Falls, Iowa
 City Project No. FL-033-3088



TASK		Subtotal
2.2A	<p>ALIGN On Site Construction Administration (estimate) Specialty Stone Work: Quarry site: Architect to select layout on site and number stones for placement and shipping, Turtle head (Structure #6) observations and submittal approval, Vertical wall setting, Stone seat wall setting Shoreline Stone: Stone setting and walkways 2 hrs. daily during upland set-up times. Estimated at \$3,450 Concrete: Schedule on site concrete color consultant to instruct on Turtle back landing surface prep, forming, edge coloring, stamping and post surface decoration. Upper Plaza surface decoration layout assistance Resin bound paving and glow stone placement Plumbing: Initial layout of pipe runs, quick coupler boxes and shower installation. Post season winterization meeting. Synthetic Turf: Drainage and form approval Benches: Layouts and stone approval Bridges: Three mounting Lighting: General layout and mounting prepare and attend 2 night time lighting observation, aiming and mounting. Planting: Layout of small plants and grid protected planting.</p>	\$ 17,050
2.3	<p>Responding to RFI's, Review Material Submittals, Remote Inspection: Includes coordination with contractor to answer questions, concerns, and comments during the construction process. Includes RWE and Align review of material submittals and coordination with the City on options available. This is an estimate.</p>	\$ 6,800
2.4	<p>Initial Product Testing and Hydraulic Optimization Site Visit: Includes one RWE representative on-site to test six hydraulic drop structures and associated instream elements for optimal performance. Ideally, site visit will include subsequent observations during dewatering and modification of drop structures, as needed.</p>	\$ 4,000
2.5	<p>First Hydrograph Maintenance Site Visit: Includes one RWE representative on-site to review areas requiring modifications resulting from the river's impact following the first hydrograph. Deliverables include a memo summarizing findings and recommendations.</p>	\$ 2,400
2.8	<p>Expenses: Includes costs associated with travel, phone, office, printing, and media.</p>	\$ 12,900
2.9	<p>Subconsultant Contract Administration: 6% of subconsultant costs</p>	\$ 1,020
Total for Task 1 and 2:		\$ 83,550

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088



Notes:

- 1) Does not include additional surveying following construction nor any permit conditions or requests from permitting agencies. Does not include wetland, archaeological, cultural, or any biological surveys that may be requested during permitting.
- 2) Does not include additional local permits that may be necessary prior to construction.
- 3) Does not include pay application review and approval, quantity verifications, weather monitoring and recording, daily reports, SWWWP management or coordination, staging area coordination, river level monitoring or recording, demobilization plans, timing, and coordination, and federal and state agency coordination and reporting.
- 4) Does not include project layout and timing planning, construction order related to structures, remote construction oversight and contractor questions regarding pay items, construction techniques, construction phasing, and permit condition interpretation and compliance.
- 5) Does not include Items 1.4, 2.6 and 2.7 originally proposed by RWE. These tasks are shown below. Additional work related to these tasks will be billed on an hourly basis.
 - 1.4 **Review Bid Submittals and Provide Recommendations:** Includes a memo stating RWE's recommended contractor.
 - 2.6 **Contract Administration:** Includes review and approval of invoices, and recommendations to the City during the contractor payment process. Includes on-site review of work completed when the site visit is coupled with the on-site contract administration visits.
 - 2.7 **Project Management/Coordination:** Coordination between City staff, contractor, permitting agencies, and relevant stakeholders during construction observations.
- 6) Assumes City of Cedar Falls staff will perform the following tasks deleted from the original proposal: The visits by the construction specialist will focus on value engineering, contractor interface to convey design and construction principles, best management practices, techniques, safety protocols for construction, recreational feature optimization, safety protocols for structure performance, and safety for river users.

Hourly Rates Schedule

Riverwise Engineering, LLC

- Principal: \$185/hr.
- Project Engineer: \$140/hr.
- Construction Specialist: \$90/hr.
- Engineering technician: \$90/hr.
- AutoCAD/Civil3D: \$105/hr.
- Administrative: \$70/hr.

Align Architects

- Principal Architect \$130.00/hr.
- Preservation Architect \$120.00/hr.
- Landscape Architect \$115.00/hr.
- Registered Architect \$105.00/hr.
- Draftsperson \$70.00/hr.
- Office Administration \$45.00/hr.

Riverwise Engineering, LLC
PO Box 706
Durango, CO 81301
info@riverwise.org

ckd by SAS
10/8/2021

Exhibit B

**Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project Number FL-033-3088**

03-27-2019

**INSURANCE REQUIREMENTS FOR
CONTRACTORS FOR THE CITY OF CEDAR FALLS**

*** This document outlines the insurance requirements for all Contractors who perform work for the City of Cedar Falls. The term "contractor" as used in this document shall be defined as the general contractor, artisan contractor, or design contractor that will be performing work for the City of Cedar Falls under contract.

1. All policies of insurance required hereunder shall be with an insurer authorized by law to do business in Iowa. All insurance policies shall be companies satisfactory to the City and have a rating of A-, VII or better in the current A.M. Best Rating Guide.
2. All Certificates of Insurance required hereunder shall include the Cancellation & Material Change Endorsement. A copy of this endorsement is attached in Exhibit 1.
3. Contractor shall furnish a signed Certificate of Insurance to the City of Cedar Falls, Iowa for the coverage required in Exhibit 1. Such Certificates shall include copies of the following endorsements:
 - a) Commercial General Liability policy is primary and non-contributing
 - b) Commercial General Liability additional insured endorsement – See Exhibit 1
 - c) Governmental Immunities Endorsement – See Exhibit 1

Copies of additional insured endorsements, executed by an authorized representative from an Insurer duly licensed to transact business at the location of the jobsite, must be provided prior to the first payment.

Contractor shall, upon request by the City, provide Certificates of Insurance for all subcontractors and sub-sub contractors who perform work or services pursuant to the provisions of this contract.

4. Each certificate shall be submitted to the City of Cedar Falls.
5. Failure to provide minimum coverage shall not be deemed a waiver of these requirements by the City of Cedar Falls. Failure to obtain or maintain the required insurance shall be considered a material breach of this agreement.

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088

6. Failure of the Contractor to maintain the required insurance shall constitute a default under this Contract, and at City's option, shall allow City to terminate this Contract for cause and/or purchase said insurance at Contractor's expense.

7. Contractor shall be required to carry the following minimum coverage/limits or greater, if required by law or other legal agreement; as per Exhibit 1:

- This coverage shall be written on an occurrence, not claims made form. All deviations or exclusions from the standard ISO commercial general liability form CG 001 shall be clearly identified and shall be subject to the review and approval of the City.
- Contractor shall maintain ongoing CGL coverage for at least 2 years following substantial completion of the Work to cover liability arising from the products-completed operations hazard and liability assumed under an insured contract.
- Governmental Immunity endorsement identical or equivalent to form attached.
- Additional Insured Requirement – See Exhibit 1.
The City of Cedar Falls, including all its elected and appointed officials, all its employees and volunteers, all its boards, commissions and/or authorities and their board members, employees and volunteers shall be named as an additional insured on General Liability Policies for all classes of contractors.

Contractors shall include coverage for the City of Cedar Falls as an additional insured including ongoing and completed operations coverage equivalent to: ISO CG 20 10 07 04* and ISO CG 20 37 07 04**

* ISO CG 20 10 07 04 "Additional Insured – Owners, Lessees or Contractors – Scheduled Person or Organization"

** ISO CG 20 37 07 04 "Additional Insured – Owners, Lessees or Contractors – Completed Operations"

8. Errors & Omissions: If the contract's scope of services includes design work or other professional services, then Contractor shall maintain insurance coverage for errors, omissions and other wrongful acts or omissions (except for intentional acts or omissions), arising out of the professional services performed by Contractor. Contractor shall maintain continuous Errors & Omissions coverage for a period commencing no later than the date of the contract, and continuing for a period of no less than 2 years from the date of completion of all work completed or services performed under the contract. The limit of liability shall not be less than \$1,000,000.

9. Separation of Insured's Provision: If Contractor's liability policies do not contain the standard ISO separation of insured's provision, or a substantially similar clause, they shall be endorsed to provide cross-liability coverage.

10. Limits: By requiring the insurance as set out in this Contract, City does not represent that coverage and limits will necessarily be adequate to protect Contractor and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities provided to City in this Contract. The City will have the right at any time to

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088

require liability insurance greater than that otherwise specified in Exhibit 1. If required, the additional premium or premiums payable shall be added to the bid price.

11. Indemnification (Hold Harmless) Provision: To the fullest extent permitted by law, the Contractor agrees to defend, pay on behalf of, indemnify, and hold harmless the City of Cedar Falls, Iowa, its elected and appointed officials, directors, employees, agents and volunteers working on behalf of the City of Cedar Falls, Iowa against any and all claims, demands, suits or loss, including any and all outlay and expense connected therewith, and for damages which may be asserted, claimed or recovered against or from the City of Cedar Falls, Iowa, its elected and appointed officials, directors, employees, agents and volunteers working on behalf of the City of Cedar Falls, Iowa, including, but not limited to, damages arising by reason of personal injury, including bodily injury or death, and property damages, which arises out of or is in any way connected or associated with the work and/or services provided by the Contractor to the City of Cedar Falls, Iowa pursuant to the provisions of this contract to the extent arising out of the errors, omissions or negligent acts of the Contractor, its agents, employees, subcontractors or others working on behalf of the Contractor. It is the intention of the parties that the City of Cedar Falls, Iowa, its elected and appointed officials, directors, employees, agents and volunteers working on behalf of the City of Cedar Falls, Iowa shall not be liable or in any way responsible for the injury, damage, liability, loss or expense incurred by the Contractor, its officers, employees, subcontractors, and others affiliated with the Contractor due to accidents, mishaps, misconduct, negligence or injuries either in person or property resulting from the work and/or services performed by the Contractor pursuant to the provisions of this contract, except for and to the extent caused by the negligence of the City of Cedar Falls, Iowa.

The Contractor expressly assumes full responsibility for damages or injuries which may result to any person or property by reason of or in connection with the work and/or services provided by the Contractor to the City of Cedar Falls, Iowa pursuant to this contract to the extent arising out of the errors, omissions or negligent acts of the Contractor, its agents, employees, subcontractors or others working on behalf of the Contractor, and agrees to pay the City of Cedar Falls, Iowa for all damages caused to the City of Cedar Falls, Iowa premises resulting from the work and/or services of the Contractor, its officers, employees, subcontractors, and others affiliated with the Contractor to the extent arising out of such errors, omissions or negligent acts.

The Contractor represents that its activities pursuant to the provisions of this contract will be performed and supervised by adequately trained and qualified personnel, and the Contractor will observe, and cause its officers, employees, subcontractors and others affiliated with the Contractor to observe all applicable safety rules.

12. Performance and Payment Bonds: The City shall have the right to require the Contractor to furnish performance and payment bonds for the full amount of the Contract price. The Contractor shall furnish, by a surety and in a form satisfactory to the City, such bonds to the City, prior to the start of Contractor's Work, covering the performance of the Contractor and the payment of all obligations arising hereunder. The Contractor, upon receipt of the bonds and invoice from the surety, shall pay for the cost of said bonds. Additional bond premium costs due to modifications to the Contract shall be included in the modification amount submitted by Contractor, and paid by Contractor.

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088

13. Waiver of Subrogation: To the extent permitted by law, Contractor hereby releases the City of Cedar Falls, Iowa, its elected and appointed officials, its directors, employees, agents and volunteers working on behalf of the City of Cedar Falls, Iowa, from and against any and all liability or responsibility to the Contractor or anyone claiming through or under the Contractor by way of subrogation or otherwise, for any loss or damage to property caused by fire or any other casualty and for any loss due to bodily injury to Contractor's employees. This provision shall be applicable and in full force and effect only with respect to loss or damage occurring during the time of this contract or arising out of the work performed under this contract. The Contractor's policies of insurance shall contain a clause or endorsement to the effect that such release shall not adversely affect or impair such policies or prejudice the right of the Contractor to recover thereunder.

Completion Checklist

- Certificate of Liability Insurance (2 pages)
- Additional Insured CG 20 10 07 04
- Additional Insured CG 20 37 07 04
- Governmental Immunities Endorsement

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088

EXHIBIT 1 – INSURANCE SCHEDULE

General Liability (Occurrence Form Only):

Commercial General Liability	
General Aggregate	\$2,000,000
Products-Completed Operations Aggregate Limit	\$2,000,000
Personal and Advertising Injury Limit	\$1,000,000
Each Occurrence Limit	\$1,000,000
Fire Damage Limit (any one occurrence)	\$ 50,000
Medical Payments	\$ 10,000

Automobile: *(Combined Single Limit)* \$1,000,000

If the Contractor does not own any vehicles, coverage is required on non-owned and hired vehicles.

Standard Workers Compensation

Statutory for Coverage A	
Employers Liability:	
Each Accident	\$ 500,000
Each Employee – Disease	\$ 500,000
Policy Limit – Disease	\$ 500,000

Umbrella: \$3,000,000

The Umbrella/Excess Insurance shall be written on a per occurrence basis and if the Umbrella/Excess is not written on a follow form basis it shall have the same endorsements as required of the primary policy(ies).

Errors & Omissions: \$2,000,000

**CITY OF CEDAR FALLS, IOWA
ADDITIONAL INSURED ENDORSEMENT**

The City of Cedar Falls, Iowa, including all its elected and appointed officials, all its employees and volunteers, all its boards, commissions and/or authorities and their board members, employees, and volunteers, are included as Additional Insureds, including ongoing operations CG 2010 07 04 or equivalent, and completed operations CG 2037 07 04 or equivalent. See Specimens.

This coverage shall be primary to the Additional Insureds, and not contributing with any other insurance or similar protection available to the Additional Insureds, whether other available coverage be primary, contributing or excess.

**GOVERNMENTAL IMMUNITIES ENDORSEMENT
(For use when including the City as an Additional Insured)**

1. Nonwaiver of Government Immunity. The insurance carrier expressly agrees and states that the purchase of this policy and the including of the City of Cedar Falls, Iowa as an Additional Insured does not waive any of the defenses of governmental immunity available to the City of Cedar Falls, Iowa under Code of Iowa Section 670.4 as it now exists and as it may be amended from time to time.
2. Claims Coverage. The insurance carrier further agrees that this policy of insurance shall cover only those claims not subject to the defense of governmental immunity under the Code of Iowa Section 670.4 as it now exists and as it may be amended from time to time.
3. Assertion of Government Immunity. The City of Cedar Falls, Iowa shall be responsible for asserting any defense of governmental immunity, and may do so at any time and shall do so upon the timely written request of the insurance carrier. Nothing contained in this endorsement shall prevent the carrier from asserting the defense of governmental immunity on behalf of the City of Cedar Falls, Iowa.
4. Non-Denial of Coverage. The insurance carrier shall not deny coverage under this policy and the insurance carrier shall not deny any of the rights and benefits accruing to the City of Cedar Falls, Iowa under this policy for reasons of governmental immunity unless and until a court of competent jurisdiction has ruled in favor of the defense(s) of governmental immunity asserted by the City of Cedar Falls, Iowa.
5. No Other Change in Policy. The insurance carrier and the City of Cedar Falls, Iowa agree that the above preservation of governmental immunities shall not otherwise change or alter the coverage available under the policy.

CANCELLATION AND MATERIAL CHANGES ENDORSEMENT

Thirty (30) days Advance Written Notice of Cancellation, Non-Renewal, Reduction in coverage and/or limits and ten (10) days written notice of non-payment of premium shall be sent to: Risk Management Office, City of Cedar Falls, City Hall, 220 Clay Street, Cedar Falls, Iowa 50613. This endorsement supersedes the standard cancellation statement on the Certificate of Insurance to which this endorsement is attached. Contractor agrees to furnish

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088

the City with 30 days advance written notice of cancellation, non-renewal, reduction in coverage and/or limits, and 10 days advance written notice of non-payment of premium.

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
10/07/2021

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Fenner & Esler Agency, Inc 467 Kinderkamack Road P. O. Box 60 Oradell NJ 07649-0060	CONTACT NAME: certs@fenner-esler.com PHONE (A/C, No, Ext): (201) 262-1200 FAX (A/C, No): (201) 262-7810 E-MAIL ADDRESS: kesler@fenner-esler.com																					
INSURED Riverwise Engineering, LLC PO Box 706 Durango CO 81302	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">INSURER(S) AFFORDING COVERAGE</th> <th style="text-align: center;">NAIC #</th> </tr> <tr> <td style="width: 50%;">INSURER A:</td> <td>Valley Forge Insurance Company</td> <td style="text-align: center;">20508</td> </tr> <tr> <td>INSURER B:</td> <td>Continental Casualty Company</td> <td style="text-align: center;">20443</td> </tr> <tr> <td>INSURER C:</td> <td></td> <td></td> </tr> <tr> <td>INSURER D:</td> <td></td> <td></td> </tr> <tr> <td>INSURER E:</td> <td></td> <td></td> </tr> <tr> <td>INSURER F:</td> <td></td> <td></td> </tr> </table>	INSURER(S) AFFORDING COVERAGE		NAIC #	INSURER A:	Valley Forge Insurance Company	20508	INSURER B:	Continental Casualty Company	20443	INSURER C:			INSURER D:			INSURER E:			INSURER F:		
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INSURER C:																						
INSURER D:																						
INSURER E:																						
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COVERAGES **CERTIFICATE NUMBER:** Master 21-22 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:			6021521711	05/11/2021	05/11/2022	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 300,000 MED EXP (Any one person) \$ 10,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COM/PROP AGG \$ 2,000,000
A	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO OWNED AUTOS ONLY <input checked="" type="checkbox"/> HIRED AUTOS ONLY <input checked="" type="checkbox"/> SCHEDULED AUTOS NON-OWNED AUTOS ONLY			6021521711	05/11/2021	05/11/2022	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
B	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED <input checked="" type="checkbox"/> RETENTION \$ 10,000			B6050307661	05/11/2021	05/11/2022	EACH OCCURRENCE \$ 3,000,000 AGGREGATE \$ 3,000,000
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N	N/A				PER STATUTE OTH-ER E.L. EACH ACCIDENT \$ E.L. DISEASE - EA EMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$
B	Professional Liability			EEH288374317	04/23/2021	04/23/2024	Per Claim Limit \$2,000,000 Aggregate Limit \$2,000,000 Per Claim Deductible \$1,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
 Additional Insured - Certificate Holder as respects general liability where required by written contract. General and Excess Liability Additional Insured is primary and non-contributory where required by written contract.

CERTIFICATE HOLDER City of Cedar Falls 220 Clay Street Cedar Falls IA 50613	CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE
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Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088

SB300120C 0611

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Riverwise Engineering, LLC
Policy #6021521711

**THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.
ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS –
SCHEDULED PERSON OR ORGANIZATION - WITH PRODUCTS
COMPLETED OPERATIONS COVERAGE**

This endorsement modifies insurance provided under the following:

BUSINESSOWNERS LIABILITY COVERAGE FORM

SCHEDULE*

<p>Name Of Person Or Organization:</p> <p>City of Cedar Falls</p>
<p>* Information required to complete this Schedule, if not shown on this endorsement, will be shown in the Declarations.</p>

A. The following is added to Paragraph C. Who Is An Insured:

- 4. Any person(s) or organization(s) shown in the Schedule is also an additional insured, but only with respect to liability for "bodily injury," "property damage" or "personal and advertising injury," caused, in whole or in part, by:
 - a. Your acts or omissions; or
 - b. The acts or omissions of those acting on your behalf in the performance of your ongoing operations for the additional insured(s); at the location(s) designated above; or
 - c. "Your work" that is included in the "products-completed operations hazard" and performed for the additional insured, but only if this Policy provides such coverage, and only if the written contract or written agreement requires you to provide the additional insured such coverage.

B. The insurance provided to the additional insured does not apply to "bodily injury," "property damage," or "personal and advertising injury" arising out of:

- 1. The rendering of, or the failure to render any professional architectural, engineering, or surveying services, including:
 - (a) The preparing, approving, or failing to prepare or approve maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; and
 - (b) Supervisory, inspection, architectural or engineering activities.
- 2. "Bodily Injury," "property damage," or "personal and advertising injury" arising out of any premises or work for which the additional insured is specifically listed as an additional insured on another endorsement attached to this Policy.

C. The following is added to Paragraph H. of the Businessowners Common Policy Conditions:

H. Other Insurance

This insurance is excess over any other insurance naming the additional insured as an insured whether primary, excess, contingent or on any other basis unless a written contract or written agreement specifically requires that this insurance be either primary or primary and noncontributing.

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088

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Riverwise Engineering, LLC
Policy #6021521711



IOWA GOVERNMENTAL IMMUNITIES ENDORSEMENT

It is understood and agreed that this endorsement amends the BUSINESSOWNERS LIABILITY COVERAGE FORM as follows:

SCHEDULE

City or Organization:	City of Cedar Falls
--------------------------	---------------------

1. **Non-Waiver of Government Immunity**
We expressly agree and state that the purchase of this policy by the City or Organization specified in the Schedule above (hereafter referred to as "the City"), or the including of the City as an Additional Insured on this policy, does not waive any of the defenses of governmental immunity available to the City under Code of Iowa Section 670.4 as it now exists and as it may be amended from time to time.
2. **Claims Coverage**
Subject to paragraph 4. below, we expressly further agree that this policy of insurance does not cover claims subject to the defense of governmental immunity under Code of Iowa 670.4 as it now exists and as it may be amended from time to time. Claims not subject to Code of Iowa 670.4 shall be subject to the terms and conditions of this insurance policy.
3. **Assertion of Governmental Immunity**
The City shall be responsible for asserting any defense of governmental immunity, and may do so at any time and shall do so upon our timely written request. Nothing contained in this endorsement shall prevent us from asserting the defense of governmental immunity on behalf of the City.
4. **Non-Denial of Coverage**
We shall not deny coverage otherwise available under this policy, nor deny any of the rights and benefits accruing to the City under this policy, for reasons of governmental immunity unless and until a court of competent jurisdiction has ruled in favor of the defenses of governmental immunity asserted by the City.

All other terms and conditions of the Policy remain unchanged.

Exhibit C

**Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project Number FL-033-3088**

10/8/21

**STANDARD TERMS AND CONDITIONS FOR CONTRACTS BETWEEN
CONTRACTORS WHO PERFORM PROFESSIONAL SERVICES AND THE CITY
OF CEDAR FALLS**

This document outlines the Standard Terms and Conditions for all Contractors who perform work or services for the City of Cedar Falls under a contract. The term, "Contractor," as used in this document, includes an engineer, an architect, and any other design professional providing professional services to the City of Cedar Falls, Iowa, under a contract (but excludes construction contractors).

1. This Contract may not be modified or amended except by a writing signed by an authorized representative of the City of Cedar Falls and of the Contractor.
2. Time is of the essence of this Contract.
3. Contractor shall be an independent contractor with respect to the services to be performed under this Contract. Neither Contractor nor its subcontractors, agents, or employees, shall be deemed to be employees or agents of the City.
4. Contractor shall perform all duties in accordance with all applicable federal, state and local laws and regulations.
5. If Contractor breaches this Contract, the City shall have all remedies available to it at law or in equity.
6. Severability. If any provision of this Contract is declared invalid, illegal, or incapable of being enforced by any court of competent jurisdiction, all of the remaining provisions of this Contract shall nevertheless continue in full force and effect, and no provision shall be deemed dependent upon any other provision unless so expressed herein.
7. Assignment. Contractor may not assign this Contract or any of its rights or obligations hereunder, without the prior written consent of the City, which consent may be withheld in the sole and absolute discretion of the City.
8. Survival of Obligations. All obligations and duties which by their nature extend beyond the term of this Contract shall survive the expiration or termination of this Contract.

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088

9. Governing Law; Jurisdiction; Venue and Trial. This Contract shall be construed in accordance with, and all disputes hereunder shall be governed by, the laws of the State of Iowa, excluding its conflicts of law rules. The parties hereto agree that the exclusive jurisdiction and venue shall be in the Iowa District Court for Black Hawk County, and in no other jurisdiction or location, and shall not be removed to federal court. The parties hereby agree to waive the right to trial by jury and agree to submit all disputes to a trial by judge alone. The parties agree that no disputes under this Contract shall be submitted to binding arbitration, but may be submitted to mediation by mutual consent of both parties.

10. Any failure of Contractor to comply with the Insurance Requirements for Contractors for the City of Cedar Falls set forth on Attachment A, shall constitute a default under this Contract.

11. Attorneys' Fees. In the event of litigation, the City shall under no circumstances be obligated for payment of any attorneys' fees of Contractor or any other party, arising out of such litigation.

12. Payment. Payment of Contractor's invoices shall be due no sooner than thirty (30) days from the date of invoice. In the event any invoices are not paid within thirty (30) days, the City shall pay interest thereon at the rate provided for by Section 668.13(3), Code of Iowa, computed monthly.

13. The City shall not be obligated to maintain confidentiality of Contractor documents or records that are furnished to the City if such documents are public records under the Iowa Open Records Law, Chapter 22, Code of Iowa, and the City shall have no responsibility to Contractor for disclosure of such records.

14. Under no circumstances shall the City waive any damages against the Contractor or any other party arising out of any breach of this Contract, whether consequential, indirect, special, or punitive damages.

15. Under no circumstances shall the Contractor's liability to the City be limited to any specific amount or sum, whether that amount is the compensation paid by the City to the Contractor under this Contract, or the dollar amount of coverage provided for in the Insurance Requirements for Contractors for the City of Cedar Falls, Attachment A.

16. No waiver of the City's subrogation rights against the Contractor or any other party shall conflict with the provisions of the City Insurance Requirements, Attachment A.

17. Limitations Period. There shall be no limitation, except as provided for by Iowa law, on the period of time within which the City may make any claim against the Contractor or other party under the provisions of this Contract.

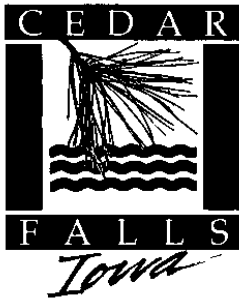
18. This Contract shall not be binding on the City unless and until approved by the City Council of the City at a duly constituted meeting, and signed by the Mayor and City Clerk of the City.

19. Warranties. Contractor represents and warrants that all services furnished to the City under this Contract shall be furnished in a skilled and workmanlike manner, in

Cedar River Recreational Improvement Project
Cedar Falls, Iowa
City Project No. FL-033-3088

accordance with the degree of skill and care that is required by current, good and sound practices applicable to the Contractor's industry or profession, and as otherwise required by applicable law.

20. Force Majeure. Neither party to this Contract shall be liable to the other party for delays in performing the services, or for the direct or indirect cost resulting from such delays, that may result from acts of God, acts of governmental authorities, extraordinary weather conditions or other natural catastrophes, or any other cause beyond the reasonable control or contemplation of either party. Each party will take reasonable steps to mitigate the impact of any force majeure.



DEPARTMENT OF COMMUNITY DEVELOPMENT

City of Cedar Falls
 220 Clay Street
 Cedar Falls, Iowa 50613
 Phone: 319-268-5161
 Fax: 319-268-5197
 www.cedarfalls.com

MEMORANDUM

Inspection Services Division

TO: Honorable Mayor Robert Green & City Council

FROM: Jamie Castle, AIA
 Building Official

DATE: October 8, 2021

SUBJECT: Set Public Hearing Date for Condemnation of Property
 710 W 13th Street

On October 8, 2021 the Condemnation Committee, selected by Mayor Green, inspected 710 W 13th Street as per City Code Ordinance 7-20(14) IBC 116.3 *Procedure for Condemnation and Removal*. Per the ordinance, the Mayor shall appoint three council members to inspect along with the building official, fire chief, and county health officer and report their findings to the City Council. If the Committee reports the building is unsafe or dangerous the matter shall be set down for hearing at the next regular meeting of the Council.

The appointed Committee consisted of Council members Susan deBuhr, Mark Miller, and Frank Darrah, as well as Building Official Jamie Castle, Fire Chief John Bostwick, and County Health Officer Eric Heinen. Also at the inspection were Community Development Director Stephanie Houk Sheetz, Councilman Dave Sires (on site for a short period), Mayor Rob Green, and Public Works Supervisor Mike Soppe. The inspection occurred under an administrative search warrant at 11:00 am on October 8, 2021.

Nuisance history of 710 W 13th:

- Complaints regarding the property submitted to Inspection Services in September 2020.
- September 15, 2020 a nuisance notice was sent to the property to remove two inoperable vehicles along with the junk and debris in the front of the property.
- Over the following 3 months, the city was in contact with the conservator who promised to clean the property.
- April 12, 2021 a second nuisance notice was sent as no progress had been made in cleaning up the property.

- May 14, 2021 the City received a notice from the conservator informing city staff that Lloyd Hodges was deceased.
- The property continued to deteriorate while the city worked to find whoever was legally in charge of the property.
- Multiple complaints continued to be submitted to Inspection Services, Councilmembers, and the Mayor.
- August 30, 2021 city staff responded to a complaint regarding the nuisance and a smoke alarm. City staff inspected and found there was no concern of fire, but the nuisance was significant.
- Building Official, Jamie Castle, met with the neighbors at 713 W 14th Street. The neighbor allowed access to view 710 W 13th. From the adjacent property the storage issues were viewable but extent of the problem couldn't be determined.
- City Staff contacted Black Hawk County Health to seek assistance with determining the extent of the nuisance and public health concerns.
- October 3, 2021 a similar complaint to the August 30th one was submitted to Fire Rescue Division. Again, there was no concern of fire but continued concern regarding the nuisance.
- October 6, 2021 the city requested and received a warrant to investigate the property for health, safety, and nuisance issues.
- October 6, 2021 at recommendation of the Community Development Department, Mayor Green appointed the Condemnation Committee.
- October 8, 2021 Committee inspected the property.

Results of Condemnation Inspection:

Exterior:

- 4 inoperable and unregistered vehicles on the property. Violation of Code of Ordinances §15-35
- 7 dead trees, 3 of which are Ash trees have been deemed an immediate hazard to the adjacent structures and are to be removed immediately. Violation of §15-2(20)
- Multiple dead animals, trash, and other debris. The debris under the porch is piled almost 6'-0" high. Violation of §15-2(2)
- Multiple containers filled with stagnant water. Violation of §15-2(5)
- Dense growth of noxious weeds throughout the entire backyard and side yard. Violation of §15-2(18) and §15-2(21)
- Evidence of vermin, including but not limited to mice and raccoons. Violation of §15-2(19)
- Excessive amounts of storage in the backyard and side yard. This includes refrigerators, building supplies, tires, animal cages, construction equipment and supplies. Violation of §15-2(22)

Interior:

- The property has been neglected and is beginning to deteriorate. Violation of §15-2(24)

- The home is insanitary. Violation of §7-20(14)
 - Garbage was strewn throughout the house. Most floors, counters, and furnishings were covered in garbage. Some was rotting food.
 - Animal feces were found from multiple animals including mice and raccoons.
 - Bathrooms and kitchen are inaccessible and fixtures were covered and unusable.
- The home is unsafe. Violation of §7-20(14)
 - The home is filled with no clear path of egress to any door within the home. Violation of IRC R311.1
 - Floors have deteriorated. Multiple areas had holes through the floor sheathing.
 - Several of the doors and windows were blocked and not operable or egressable. Violation of IRC R310 and IRC R311 and §15-2(31)(g)
 - Stairs to upper floor and basement were filled with debris and storage blocking the egress path. Violation R311.7
 - Storage of items on second floor is excessive and almost touches the ceiling. Violation of IFC 315.3

Accessory buildings:

- All accessory buildings were packed full of trash and storage. Violation of IFC 315.3
- The exterior of the buildings are damaged, deteriorating, in need of repair. Violation of §15-2(31)(h) and §15-2(31)(j)

710 W 13th Street Photos:

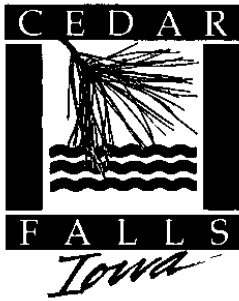






Recommendation:

The Department of Community Development requests a public hearing be scheduled for November 1, 2021 to address the proposed condemnation of 710 W 13th Street. During the public hearing, the owner(s) or person in possession shall be given the opportunity to show cause why the dwelling and accessory buildings should not be declared a nuisance for demolition. If the City Council decides that the building is dangerous, is a fire hazard, is unfit for human habitation, or is dangerous to life and health, then Council may declare the building to be a nuisance and order it to be abated within a specified time. Staff's recommendation is to demolish the home and accessory structures due to the extended vacancy and the resulting disrepair, and the structural deficiencies viewed while onsite. Council's determination is related to the structure only as the condemnation ordinance is specific to the structures on the property. The exterior storage will be addressed through the normal nuisance procedure. The costs for abatement, legal expenses, and staff time would be assessed to the property.



DEPARTMENT OF COMMUNITY DEVELOPMENT

City of Cedar Falls
 220 Clay Street
 Cedar Falls, Iowa 50613
 Phone: 319-268-5161
 Fax: 319-268-5197
 www.cedarfalls.com

MEMORANDUM

Inspection Services Division

TO: Honorable Mayor Robert Green & City Council

FROM: Jamie Castle, AIA
 Building Official

DATE: October 8, 2021

SUBJECT: Set Public Hearing Date for Condemnation of Property
 1303 Walnut Street

On October 8, 2021 the Condemnation Committee, selected by Mayor Green, inspected 1303 Walnut Street as per City Code Ordinance 7-20(14) IBC 116.3 Procedure for Condemnation and Removal. Per the ordinance, the Mayor shall appoint three council members to inspect along with the building official, fire chief, and county health officer and report their findings to the City Council. If the Committee reports the building is unsafe or dangerous the matter shall be set down for hearing at the next regular meeting of the Council.

The appointed Committee consisted of Council members Susan deBuhr, Mark Miller, and Frank Darrah, as well as Building Official Jamie Castle, Fire Chief John Bostwick, and County Health Officer Eric Heinen. Also at the inspection were Community Development Director Stephanie Houk Sheetz, Mayor Rob Green, and Public Works Supervisor Mike Soppe. The inspection occurred under an administrative search warrant at 11:00 am on October 8, 2021.

Nuisance history of 1303 Walnut Street:

- 2017 – Nuisance letter sent regarding building maintenance, junk cars and illegal exterior storage.
- 2019 – Nuisance letter sent regarding trash, illegal exterior storage, junk cars. (Pictures show the property in the same condition as 2017.)
- Complaints regarding the property submitted to Inspection Services in September 2020.
- July 7, 2020 a nuisance notice was sent to the property regarding grass and weeds and excessive overgrowth. Additional notice sent 7/22/2020 and 7/29/2020

- After no response, the City's contractor mowed and trimmed trees on August 6, 2020.
- September 15, 2020 a nuisance notice was sent for illegal exterior storage and junk vehicles.
- Over the following 3 months, the city was in contact with the conservator who promised to clean and repair the property.
- April 12, 2021 a second nuisance notice was sent as no progress had been made in cleaning up the property.
- May 14, 2021 the City received a notice from the conservator informing city staff that Lloyd Hodges was deceased.
- The property continued to deteriorate while the city worked to find whoever was legally in charge of the property.
- Multiple complaints continued to be submitted to Inspection Services, Councilmembers, and the Mayor.
- August 30, 2021 city staff responded to a complaint regarding the nuisance at the adjacent property and reviewed the property at 1303 Walnut Street at the same time.
- Building Official, Jamie Castle, met with the neighbors at 713 W 14th Street. The neighbor allowed access to view 710 W 13th. From the adjacent property the storage issues were viewable but extent of the problem couldn't be determined.
- City Staff contacted Black Hawk County Health to seek assistance with determining the extent of the nuisance and public health concerns.
- October 6, 2021 the city requested and received a warrant to investigate the property for health, safety, and nuisance issues.
- October 6, 2021 at recommendation of the Community Development Department, Mayor Green appointed the Condemnation Committee.
- October 8, 2021 Committee inspected the property.

Results of Condemnation Inspection:

Exterior:

- 3 inoperable and unregistered vehicles on the property. Violation of §15-35
- 7 dead trees, 3 of which are Ash trees have been deemed an immediate hazard to the adjacent structures and are to be removed immediately. Violation of §15-2(20)
- Front porch roof and soffit are damaged and deteriorating. Violation of §15-2(31)(a) and §15-2(31)(g)
- Multiple dead animals, trash, and other debris. Violation of §15-2(2)
- Multiple containers filled with stagnant water. Violation of §15-2(5)
- Dense growth of noxious weeds throughout the entire backyard and side yard. Violation of §15-2(18) and §15-2(21)
- Evidence of vermin, including but not limited to mice and raccoons. Violation of §15-2(19)

- Excessive amounts of storage in the backyard and side yard. This includes refrigerators, building supplies, tires, animal cages, construction equipment and supplies. Violation of §15-2(22)

Interior:

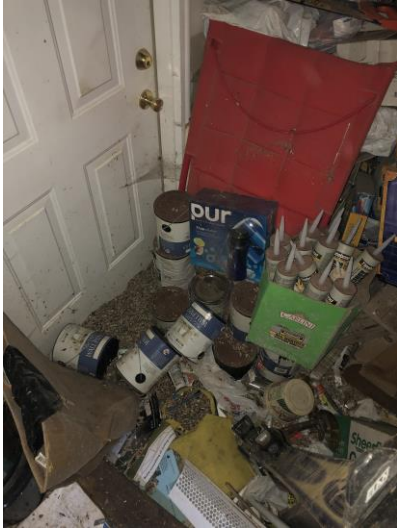
- The property has been neglected and is beginning to deteriorate. Violation of §15-2(24)
- The home is insanitary. Violation of §7-20(14)
 - The small area staff was able to view had garbage on the floor and stairs. Including spilled and chewed on animal food bags. Animal feces were found from multiple animals including mice and raccoons.
 - Staff was only able to access a small portion of the home as there was a large amount of storage and debris blocking the doors. Violation of IRC R311.1
- The home is unsafe. Violation of §7-20(14)
 - The home is filled with no clear path of egress to any door within the home. Violation of IRC R311.1
 - Stairs were inaccessible due to storage and debris on them. Structural stability questionable and to be reviewed closer. Violation R311.7
 - Most of the doors and windows were blocked and not operable nor was there ability for egress. Violation of IRC R310 and IRC R311 and §15-2(31)(g)
 - Storage of items on second floor is excessive and almost touches the ceiling. Violation of IFC 315.3

Accessory buildings:

- All accessory buildings were packed full of trash and storage. Violation of IFC 315.3
- The exterior of the buildings are damaged, deteriorating, in need of repair. Violation of §15-2(31)(h) and §15-2(31)(j)

1303 Walnut Street Photos:





Recommendation:

The Department of Community Development requests a public hearing be scheduled for November 1, 2021 to address the proposed condemnation of 1303 Walnut Street. During the public hearing, the owner(s) or person in possession shall be given the opportunity to show cause why the dwelling and accessory buildings should not be declared a nuisance for demolition. If the City Council decides that the building is dangerous, is a fire hazard, is unfit for human habitation, or is dangerous to life and health, then Council may declare the building to be a nuisance and order it to be abated within a specified time. Staff's recommendation is to demolish the home and accessory structures due to the extended vacancy and the resulting disrepair, and the structural deficiencies viewed while onsite. Council's determination is related to the structure only as the condemnation ordinance is specific to the structures on the property. The exterior storage will be addressed through the normal nuisance procedure. The costs for abatement, legal expenses, and staff time would be assessed to the property.

Daily Invoices for Council Meeting 10/18/21

Item 26.

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 CITY OF CEDAR FALLS

ACCOUNT ACTIVITY LISTING

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GROUP NBR	PO NBR	ACCTG PER.	CD	----TRANSACTION---- DATE	NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE	POST DT
FUND 101 GENERAL FUND										
101-1028-441.64-02		INSURANCE / HEALTH		INS. REIMBURSEMENT						
403		03/22 AP		09/23/21	0005813	ISOLVED BENEFIT SERVICES, INC	5.83			10/04/21
				HEALTH INS. REIMBURSEMENT						
ACCOUNT TOTAL							5.83	.00	5.83	
101-1028-441.89-17 MISCELLANEOUS SERVICES / BANK SERVICE CHARGES										
403		03/22 AP		09/30/21	0005803	FARMERS STATE BANK	12.00			10/04/21
				INCOMING WIRE FEE		COMMUNITY BANK & TRUST CD				
403		03/22 AP		09/24/21	0005802	FARMERS STATE BANK	20.00			10/04/21
				VOYA OUTGOING WIRE FEE		09/24/21 PAYROLL				
403		03/22 AP		09/08/21	0005801	FARMERS STATE BANK	20.00			10/04/21
				VOYA OUTGOING WIRE FEE		09/10/21 PAYROLL				
ACCOUNT TOTAL							52.00	.00	52.00	
101-1028-441.89-82 MISCELLANEOUS SERVICES / SECTION 105										
403		03/22 AP		09/08/21	0005812	ISOLVED BENEFIT SERVICES, INC	707.25			10/04/21
				CAFE ADMIN FEE-AUG '21						
ACCOUNT TOTAL							707.25	.00	707.25	
101-1038-441.81-32 PROFESSIONAL SERVICES / TUITION ASSISTANCE										
543		04/22 AP		10/04/21	0396231	GETZ, JOSH	705.00			10/06/21
				TUITION REIMBURSEMENT		ENG.COMP./AMERICAN HIST.				
ACCOUNT TOTAL							705.00	.00	705.00	
101-1060-423.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES										
447		04/22 AP		09/22/21	0396255	OFFICE EXPRESS OFFICE PRODUCT	43.76			09/30/21
				POP-UP NOTES (3 X 3") (X2)						
357		04/22 AP		09/08/21	0396255	OFFICE EXPRESS OFFICE PRODUCT	229.64			09/30/21
				AA&AAA BATTERIES, 3/4"		REM. TAPE, ENVELOPE MOIST				
357		04/22 AP		08/27/21	0396248	LAMINATOR.COM	126.49			09/30/21
				LAMINATOR FILM		3748201EZ				
357		04/22 AP		08/25/21	0396255	OFFICE EXPRESS OFFICE PRODUCT	95.07			09/30/21
				CORRECTION TAPE & LETTER-		SIZE PAPER (3 BOXES)				
ACCOUNT TOTAL							494.96	.00	494.96	
101-1060-423.72-76 OPERATING SUPPLIES / PUBLIC RELATIONS										
357		04/22 AP		09/02/21	0396252	MOTION PICTURE LICENSING CORP	202.90			09/30/21
				SITE LICENSE RENEW 1 YEAR		11/01/21-11/01/22				
ACCOUNT TOTAL							202.90	.00	202.90	

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GROUP NBR	PO NBR	ACCTG PER.	CD	DATE	TRANSACTION NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE	POST DT
FUND 101 GENERAL FUND										
101-1060-423.72-99 OPERATING SUPPLIES / POSTAGE										
357		04/22 AP		08/27/21	0396259	QUADIENT FINANCE USA, INC. POSTAGE	300.00			09/30/21
ACCOUNT TOTAL							300.00	.00	300.00	
101-1060-423.81-91 PROFESSIONAL SERVICES / LICENSES & SERVICE CONTRT										
447		04/22 AP		09/13/21	0396244	GORDON FLESCH COMPANY INC COPIER CONTRACT 015-1483981-000	874.89			09/30/21
ACCOUNT TOTAL							874.89	.00	874.89	
101-1060-423.85-01 UTILITIES / UTILITIES										
357		04/22 AP		09/05/21	0396240	CEDAR FALLS UTILITIES LIBRARY UTILITIES	9,446.62			09/30/21
ACCOUNT TOTAL							9,446.62	.00	9,446.62	
101-1060-423.86-01 REPAIR & MAINTENANCE / REPAIR & MAINTENANCE										
447		04/22 AP		09/17/21	0396236	ARAMARK LIBRARY MAT SERVICE	15.70			09/30/21
357		04/22 AP		09/10/21	0396236	ARAMARK LIBRARY MAT SERVICE	15.70			09/30/21
357		04/22 AP		09/03/21	0396236	ARAMARK LIBRARY MAT SERVICE	15.70			09/30/21
403		03/22 AP		09/02/21	0005821	PROFESSIONAL SOLUTIONS AUGUST CREDIT CARD FEES	51.80			10/04/21
ACCOUNT TOTAL							98.90	.00	98.90	
101-1060-423.89-20 MISCELLANEOUS SERVICES / ADULT BOOKS										
357		04/22 AP		08/25/21	0396261	WATERLOO PUBLIC LIBRARY ADULT BOOKS	22.00			09/30/21
ACCOUNT TOTAL							22.00	.00	22.00	
101-1060-423.89-33 MISCELLANEOUS SERVICES / FRIENDS SUPPORTED PROGRAM										
447		04/22 AP		09/22/21	0396255	OFFICE EXPRESS OFFICE PRODUCT FOTL:YA-AA BATTERIES	49.96			09/30/21
447		04/22 AP		09/22/21	0396246	HENDRIX, GRADY REIMBURSEMENT	133.28			09/30/21
447		04/22 AP		09/21/21	0396241	CENGAGE LEARNING INC BOOKS	26.59			09/30/21
447		04/22 AP		09/17/21	0396238	BAKER & TAYLOR BOOKS FOTL:ADULT-ADULT BOOKS	72.96			09/30/21

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GROUP NBR	PO NBR	ACCTG PER.	CD	DATE	-----TRANSACTION----- NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE POST DT	
FUND 101 GENERAL FUND										
101-1060-423.89-33 MISCELLANEOUS SERVICES / FRIENDS SUPPORTED PROGRAM						continued				
357		04/22 AP		09/14/21	0396238	BAKER & TAYLOR BOOKS	198.95		09/30/21	
		FOTL:ADULT-ADULT BOOKS								
357		04/22 AP		09/04/21	0396253	NISSEN, THOMAS	670.00		09/30/21	
		FOTL:YA-MINECRAFT PASS								
357		04/22 AP		09/03/21	0396245	GREEN, JOCELYN	300.00		09/30/21	
		FOTL:ADULT-FROM FIRE TO FAIR PROGRAM FEE								
357		04/22 AP		08/30/21	0396238	BAKER & TAYLOR BOOKS	67.99		09/30/21	
		FOTL:ADULT-ADULT CD BOOKS								
		ACCOUNT TOTAL						1,519.73	.00	1,519.73
101-1060-423.89-34 MISCELLANEOUS SERVICES / ENDOWMENT SUPPORTED PROG.										
447		04/22 AP		09/17/21	0396262	YE OLDE STRIPPERY	124.00		09/30/21	
		BLDNG. 2 RMB REUPHOLSTERY 1 CHAIR								
357		04/22 AP		09/09/21	0396249	LIBRARY FURNITURE INTERNATION	32,081.00		09/30/21	
		BERG 2 RMB YOUTH BROWSING BINS-DEPOSIT								
		ACCOUNT TOTAL						32,205.00	.00	32,205.00
101-1061-423.71-11 OFFICE SUPPLIES / TECHNICAL PROCESSING SUPP										
357		04/22 AP		09/07/21	0396260	RAINBOW PRINTING	1,151.50		09/30/21	
		LIBRARY CARDS								
		ACCOUNT TOTAL						1,151.50	.00	1,151.50
101-1061-423.81-91 PROFESSIONAL SERVICES / LICENSES & SERVICE CONTRT										
357		04/22 AP		09/01/21	0396254	OCLC, INC.	743.86		09/30/21	
		CATALOG AND METADATA SUBSCRIPTION								
		ACCOUNT TOTAL						743.86	.00	743.86
101-1061-423.89-20 MISCELLANEOUS SERVICES / ADULT BOOKS										
447		04/22 AP		09/23/21	0396238	BAKER & TAYLOR BOOKS	478.57		09/30/21	
		ADULT BOOKS								
447		04/22 AP		09/20/21	0396238	BAKER & TAYLOR BOOKS	285.27		09/30/21	
		ADULT BOOKS								
447		04/22 AP		09/17/21	0396238	BAKER & TAYLOR BOOKS	120.14		09/30/21	
		ADULT BOOKS								
357		04/22 AP		09/14/21	0396238	BAKER & TAYLOR BOOKS	411.28		09/30/21	
		ADULT BOOKS								
357		04/22 AP		09/13/21	0396238	BAKER & TAYLOR BOOKS	233.58		09/30/21	
		ADULT BOOKS								
357		04/22 AP		09/09/21	0396238	BAKER & TAYLOR BOOKS	203.53		09/30/21	
		ADULT BOOKS								
357		04/22 AP		09/08/21	0396238	BAKER & TAYLOR BOOKS	254.46		09/30/21	

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GROUP NBR	PO NBR	ACCTG PER.	CD	DATE	TRANSACTION NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE	POST DT
FUND 101 GENERAL FUND										
101-1061-423.89-20 MISCELLANEOUS SERVICES / ADULT BOOKS						continued				
357				04/22	AP 09/02/21 0396238	ADULT BOOKS BAKER & TAYLOR BOOKS	175.59			09/30/21
357				04/22	AP 09/02/21 0396238	ADULT BOOKS BAKER & TAYLOR BOOKS	146.95			09/30/21
357				04/22	AP 09/01/21 0396238	ADULT BOOKS BAKER & TAYLOR BOOKS	334.42			09/30/21
357				04/22	AP 08/30/21 0396238	ADULT BOOKS BAKER & TAYLOR BOOKS	432.12			09/30/21
357				04/22	AP 08/30/21 0396238	ADULT BOOKS BAKER & TAYLOR BOOKS	42.61			09/30/21
357				04/22	AP 08/26/21 0396238	ADULT BOOKS BAKER & TAYLOR BOOKS	304.31			09/30/21
357				04/22	AP 08/25/21 0396238	ADULT BOOKS BAKER & TAYLOR BOOKS	235.59			09/30/21
357				04/22	AP 08/24/21 0396238	ADULT BOOKS BAKER & TAYLOR BOOKS	342.78			09/30/21
357				04/22	AP 08/19/21 0396238	ADULT BOOKS BAKER & TAYLOR BOOKS	174.84			09/30/21
ACCOUNT TOTAL							4,176.04	.00	4,176.04	
101-1061-423.89-21 MISCELLANEOUS SERVICES / YOUNG ADULT BOOKS										
447				04/22	AP 09/23/21 0396238	YOUNG ADULT BOOKS BAKER & TAYLOR BOOKS	394.61			09/30/21
447				04/22	AP 09/20/21 0396238	YOUNG ADULT BOOKS BAKER & TAYLOR BOOKS	26.56			09/30/21
447				04/22	AP 09/17/21 0396238	YOUNG ADULT BOOKS BAKER & TAYLOR BOOKS	83.54			09/30/21
357				04/22	AP 09/14/21 0396238	YOUNG ADULT BOOKS BAKER & TAYLOR BOOKS	113.74			09/30/21
357				04/22	AP 09/13/21 0396238	YOUNG ADULT BOOKS BAKER & TAYLOR BOOKS	171.41			09/30/21
357				04/22	AP 09/09/21 0396238	YOUNG ADULT BOOKS BAKER & TAYLOR BOOKS	13.59			09/30/21
357				04/22	AP 09/08/21 0396238	YOUNG ADULT BOOKS BAKER & TAYLOR BOOKS	47.66			09/30/21
357				04/22	AP 09/01/21 0396238	YOUNG ADULT BOOKS BAKER & TAYLOR BOOKS	41.24			09/30/21
357				04/22	AP 08/30/21 0396238	YOUNG ADULT BOOKS BAKER & TAYLOR BOOKS	12.32			09/30/21
357				04/22	AP 08/30/21 0396238	YOUNG ADULT BOOKS BAKER & TAYLOR BOOKS	361.69			09/30/21
357				04/22	AP 08/26/21 0396238	YOUNG ADULT BOOKS BAKER & TAYLOR BOOKS	21.26			09/30/21
357				04/22	AP 08/25/21 0396238	YOUNG ADULT BOOKS BAKER & TAYLOR BOOKS	34.64			09/30/21
357				04/22	AP 08/24/21 0396238	YOUNG ADULT BOOKS BAKER & TAYLOR BOOKS	63.22			09/30/21

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GROUP NBR	PO NBR	ACCTG PER.	CD	DATE	TRANSACTION NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE	POST DT
FUND 101 GENERAL FUND										
101-1061-423.89-21 MISCELLANEOUS SERVICES / YOUNG ADULT BOOKS						continued				
357				04/22	AP 08/19/21 0396238	BAKER & TAYLOR BOOKS	26.13			09/30/21
ACCOUNT TOTAL							1,411.61	0.00	1,411.61	
101-1061-423.89-22 MISCELLANEOUS SERVICES / YOUTH BOOKS										
447				04/22	AP 09/23/21 0396238	BAKER & TAYLOR BOOKS	126.49			09/30/21
447				04/22	AP 09/22/21 0396238	BAKER & TAYLOR BOOKS	720.08			09/30/21
447				04/22	AP 09/20/21 0396238	BAKER & TAYLOR BOOKS	23.34			09/30/21
447				04/22	AP 09/17/21 0396238	BAKER & TAYLOR BOOKS	144.69			09/30/21
357				04/22	AP 09/14/21 0396238	BAKER & TAYLOR BOOKS	99.15			09/30/21
357				04/22	AP 09/13/21 0396238	BAKER & TAYLOR BOOKS	241.21			09/30/21
357				04/22	AP 09/09/21 0396238	BAKER & TAYLOR BOOKS	147.19			09/30/21
357				04/22	AP 09/08/21 0396238	BAKER & TAYLOR BOOKS	185.26			09/30/21
357				04/22	AP 09/01/21 0396238	BAKER & TAYLOR BOOKS	72.00			09/30/21
357				04/22	AP 09/01/21 0396238	BAKER & TAYLOR BOOKS	1,366.33			09/30/21
357				04/22	AP 08/30/21 0396238	BAKER & TAYLOR BOOKS	33.94			09/30/21
357				04/22	AP 08/30/21 0396238	BAKER & TAYLOR BOOKS	10.23			09/30/21
357				04/22	AP 08/26/21 0396238	BAKER & TAYLOR BOOKS	28.89			09/30/21
357				04/22	AP 08/25/21 0396238	BAKER & TAYLOR BOOKS	133.01			09/30/21
357				04/22	AP 08/24/21 0396238	BAKER & TAYLOR BOOKS	147.20			09/30/21
357				04/22	AP 08/19/21 0396238	BAKER & TAYLOR BOOKS	75.77			09/30/21
ACCOUNT TOTAL							3,554.78	0.00	3,554.78	
101-1061-423.89-23 MISCELLANEOUS SERVICES / LARGE PRINT BOOKS										
447				04/22	AP 09/21/21 0396241	CENGAGE LEARNING INC	23.09			09/30/21
447				04/22	AP 09/21/21 0396241	CENGAGE LEARNING INC	21.69			09/30/21

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GROUP NBR	PO NBR	ACCTG PER.	CD	DATE	TRANSACTION NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE	POST DT	
FUND 101 GENERAL FUND											
101-1061-423.89-23	MISCELLANEOUS SERVICES / LARGE PRINT BOOKS									continued	
447		04/22 AP		09/21/21	0396241	CENGAGE LEARNING INC	76.27			09/30/21	
		LARGE PRINT BOOKS									
447		04/22 AP		09/20/21	0396241	CENGAGE LEARNING INC	25.19			09/30/21	
		LARGE PRINT BOOKS									
447		04/22 AP		09/17/21	0396238	BAKER & TAYLOR BOOKS	118.88			09/30/21	
		LARGE PRINT BOOKS									
357		04/22 AP		09/01/21	0396242	CENTER POINT LARGE PRINT	46.74			09/30/21	
		LARGE PRINT BOOKS									
357		04/22 AP		08/30/21	0396238	BAKER & TAYLOR BOOKS	21.65			09/30/21	
		LARGE PRINT BOOKS									
357		04/22 AP		08/24/21	0396238	BAKER & TAYLOR BOOKS	18.59			09/30/21	
		LARGE PRINT BOOKS									
357		04/22 AP		08/19/21	0396238	BAKER & TAYLOR BOOKS	16.80			09/30/21	
		LARGE PRINT BOOKS									
		ACCOUNT TOTAL						368.90	.00		368.90
101-1061-423.89-24	MISCELLANEOUS SERVICES / ADULT AUDIO										
447		04/22 AP		09/22/21	0396239	BAKER & TAYLOR ENTERTAINMENT	85.17			09/30/21	
		ADULT CD MUSIC									
447		04/22 AP		09/20/21	0396238	BAKER & TAYLOR BOOKS	16.50			09/30/21	
		ADULT CD BOOKS									
447		04/22 AP		09/14/21	0396239	BAKER & TAYLOR ENTERTAINMENT	11.01			09/30/21	
		ADULT CD MUSIC									
357		04/22 AP		09/08/21	0396238	BAKER & TAYLOR BOOKS	19.24			09/30/21	
		ADULT CD BOOKS									
357		04/22 AP		09/02/21	0396239	BAKER & TAYLOR ENTERTAINMENT	19.09			09/30/21	
		ADULT CD MUSIC									
357		04/22 AP		09/01/21	0396238	BAKER & TAYLOR BOOKS	21.99			09/30/21	
		ADULT CD BOOKS									
357		04/22 AP		08/31/21	0396239	BAKER & TAYLOR ENTERTAINMENT	10.28			09/30/21	
		ADULT CD MUSIC									
357		04/22 AP		08/30/21	0396238	BAKER & TAYLOR BOOKS	24.20			09/30/21	
		ADULT CD BOOKS									
357		04/22 AP		08/27/21	0396239	BAKER & TAYLOR ENTERTAINMENT	12.48			09/30/21	
		ADULT CD MUSIC									
357		04/22 AP		08/25/21	0396238	BAKER & TAYLOR BOOKS	24.75			09/30/21	
		ADULT CD BOOKS									
357		04/22 AP		08/24/21	0396238	BAKER & TAYLOR BOOKS	22.00			09/30/21	
		ADULT CD BOOKS									
357		04/22 AP		08/23/21	0396239	BAKER & TAYLOR ENTERTAINMENT	61.68			09/30/21	
		ADULT CD MUSIC									
357		04/22 AP		08/19/21	0396238	BAKER & TAYLOR BOOKS	41.23			09/30/21	
		ADULT CD BOOKS									
		ACCOUNT TOTAL						369.62	.00		369.62

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FUND 101 GENERAL FUND										
101-1061-423.89-25 MISCELLANEOUS SERVICES / ADULT VIDEO										
447		04/22	AP	09/20/21	0396239	BAKER & TAYLOR ENTERTAINMENT	100.63			09/30/21
						ADULT VIDEOS				
447		04/22	AP	09/18/21	0396239	BAKER & TAYLOR ENTERTAINMENT	65.22			09/30/21
						ADULT VIDEOS				
447		04/22	AP	09/18/21	0396239	BAKER & TAYLOR ENTERTAINMENT	112.33			09/30/21
						ADULT VIDEOS				
447		04/22	AP	09/14/21	0396239	BAKER & TAYLOR ENTERTAINMENT	167.40			09/30/21
						ADULT VIDEOS				
447		04/22	AP	09/14/21	0396239	BAKER & TAYLOR ENTERTAINMENT	18.11			09/30/21
						ADULT VIDEOS				
357		04/22	AP	09/13/21	0396239	BAKER & TAYLOR ENTERTAINMENT	14.13			09/30/21
						ADULT VIDEOS				
357		04/22	AP	09/09/21	0396239	BAKER & TAYLOR ENTERTAINMENT	10.87			09/30/21
						ADULT VIDEOS				
357		04/22	AP	09/09/21	0396251	MIDWEST TAPE, LLC	22.49			09/30/21
						ADULT VIDEOS				
357		04/22	AP	09/09/21	0396239	BAKER & TAYLOR ENTERTAINMENT	53.61			09/30/21
						ADULT VIDEOS				
357		04/22	AP	09/08/21	0396239	BAKER & TAYLOR ENTERTAINMENT	34.05			09/30/21
						ADULT VIDEOS				
357		04/22	AP	08/31/21	0396239	BAKER & TAYLOR ENTERTAINMENT	152.18			09/30/21
						ADULT VIDEOS				
357		04/22	AP	08/30/21	0396239	BAKER & TAYLOR ENTERTAINMENT	21.71			09/30/21
						ADULT VIDEOS				
357		04/22	AP	08/30/21	0396239	BAKER & TAYLOR ENTERTAINMENT	21.70			09/30/21
						ADULT VIDEOS				
357		04/22	AP	08/27/21	0396239	BAKER & TAYLOR ENTERTAINMENT	18.10			09/30/21
						ADULT VIDEOS				
357		04/22	AP	08/24/21	0396239	BAKER & TAYLOR ENTERTAINMENT	149.25			09/30/21
						ADULT VIDEOS				
						ACCOUNT TOTAL	961.78	.00	961.78	
101-1061-423.89-26 MISCELLANEOUS SERVICES / NON-PRINT RESOURCES										
447		04/22	AP	09/22/21	0396247	INGRAM ENTERTAINMENT INC.	46.99			09/30/21
						YOUNG ADULT VIDEO GAMES				
447		04/22	AP	09/22/21	0396247	INGRAM ENTERTAINMENT INC.	56.99			09/30/21
						YOUNG ADULT VIDEO GAMES				
357		04/22	AP	09/10/21	0396247	INGRAM ENTERTAINMENT INC.	66.99			09/30/21
						ADULT VIDEO GAMES				
357		04/22	AP	09/08/21	0396247	INGRAM ENTERTAINMENT INC.	190.97			09/30/21
						YOUNG ADULT VIDEO GAMES				
357		04/22	AP	09/01/21	0396247	INGRAM ENTERTAINMENT INC.	46.99			09/30/21
						YOUNG ADULT VIDEO GAMES				
357		04/22	AP	08/31/21	0396247	INGRAM ENTERTAINMENT INC.	66.99			09/30/21
						YOUNG ADULT VIDEO GAMES				
357		04/22	AP	08/31/21	0396247	INGRAM ENTERTAINMENT INC.	66.99			09/30/21
						YOUNG ADULT VIDEO GAMES				

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FUND 101 GENERAL FUND										
101-1061-423.89-26 MISCELLANEOUS SERVICES / NON-PRINT RESOURCES						continued				
357		04/22	AP	08/31/21	0396247	INGRAM ENTERTAINMENT INC. ADULT VIDEO GAMES	66.99			09/30/21
357		04/22	AP	08/25/21	0396247	INGRAM ENTERTAINMENT INC. ADULT VIDEO GAMES	46.99			09/30/21
357		04/22	AP	08/20/21	0396247	INGRAM ENTERTAINMENT INC. ADULT VIDEO GAMES	46.99			09/30/21
ACCOUNT TOTAL							703.88	.00	703.88	
101-1061-423.89-31 MISCELLANEOUS SERVICES / PERIODICALS										
357		04/22	AP	09/22/21	0396256	OLD HOUSE JOURNAL	31.00			09/30/21
357		04/22	AP	09/10/21	0396257	OUR IOWA MAGAZINE OUR IA FY22 SUBSCRIPTION	19.98			09/30/21
ACCOUNT TOTAL							50.98	.00	50.98	
101-1061-423.89-35 MISCELLANEOUS SERVICES / YOUTH AUDIO										
447		04/22	AP	09/17/21	0396238	BAKER & TAYLOR BOOKS YOUTH CD BOOKS	33.53			09/30/21
447		04/22	AP	09/15/21	0396243	FINDAWAY WORLD LLC YOUTH PLAYAWAYS	228.70			09/30/21
357		04/22	AP	09/08/21	0396238	BAKER & TAYLOR BOOKS YOUTH CD BOOKS	41.24			09/30/21
357		04/22	AP	09/01/21	0396238	BAKER & TAYLOR BOOKS YOUTH CD BOOKS	55.00			09/30/21
ACCOUNT TOTAL							358.47	.00	358.47	
101-1061-423.89-36 MISCELLANEOUS SERVICES / YOUTH VIDEO										
447		04/22	AP	09/17/21	0396251	MIDWEST TAPE, LLC YOUTH VIDEOS	67.47			09/30/21
447		04/22	AP	09/17/21	0396251	MIDWEST TAPE, LLC YOUTH VIDEOS	28.49			09/30/21
357		04/22	AP	09/09/21	0396251	MIDWEST TAPE, LLC YOUTH VIDEOS	51.72			09/30/21
357		04/22	AP	09/03/21	0396251	MIDWEST TAPE, LLC YOUTH VIDEOS	17.24			09/30/21
357		04/22	AP	08/27/21	0396251	MIDWEST TAPE, LLC YOUTH VIDEOS	29.98			09/30/21
357		04/22	AP	08/19/21	0396251	MIDWEST TAPE, LLC YOUTH VIDEOS	82.46			09/30/21
ACCOUNT TOTAL							277.36	.00	277.36	

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FUND 101 GENERAL FUND									
101-1061-423.89-37					MISCELLANEOUS SERVICES / YOUNG ADULT AUDIO				
357		04/22 AP		09/09/21 0396238	BAKER & TAYLOR BOOKS	21.99		09/30/21	
					YOUNG ADULT CD BOOKS				
357		04/22 AP		09/08/21 0396238	BAKER & TAYLOR BOOKS	19.22		09/30/21	
					YOUNG ADULT CD BOOKS				
357		04/22 AP		08/26/21 0396238	BAKER & TAYLOR BOOKS	15.94		09/30/21	
					YOUNG ADULT CD BOOKS				
357		04/22 AP		08/19/21 0396238	BAKER & TAYLOR BOOKS	24.74		09/30/21	
					YOUNG ADULT CD BOOKS				
					ACCOUNT TOTAL	81.89	.00	81.89	
101-1061-423.89-42 MISCELLANEOUS SERVICES / ADULT E-MATERIALS									
357		04/22 AP		09/09/21 0396258	OVERDRIVE, INC.	317.94		09/30/21	
					ADULT E-BOOKS				
357		04/22 AP		08/31/21 0396258	OVERDRIVE, INC.	269.48		09/30/21	
					ADULT E-BOOKS				
357		04/22 AP		08/31/21 0396258	OVERDRIVE, INC.	530.50		09/30/21	
					ADULT E-BOOKS				
357		04/22 AP		08/23/21 0396258	OVERDRIVE, INC.	216.56		09/30/21	
					ADULT E-BOOKS				
					ACCOUNT TOTAL	1,334.48	.00	1,334.48	
101-1061-423.89-44 MISCELLANEOUS SERVICES / YOUNG ADULT E-MATERIALS									
357		04/22 AP		09/11/21 0396258	OVERDRIVE, INC.	862.19		09/30/21	
					YOUNG ADULT E-BOOKS				
					ACCOUNT TOTAL	862.19	.00	862.19	
101-1061-423.89-46 MISCELLANEOUS SERVICES / YOUTH E-MATERIALS									
357		04/22 AP		09/03/21 0396258	OVERDRIVE, INC.	878.64		09/30/21	
					YOUTH E-BOOKS				
357		04/22 AP		08/31/21 0396258	OVERDRIVE, INC.	191.56		09/30/21	
					YOUTH E-BOOKS				
					ACCOUNT TOTAL	1,070.20	.00	1,070.20	
101-1118-441.83-05 TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)									
512		03/22 AP		09/23/21 0396217	GAINES, RON	187.04		09/30/21	
					RMB:MILEAGE-7/22-9/23/21				
512		03/22 AP		07/22/21 0396217	GAINES, RON	201.04		09/30/21	
					RMB:MILEAGE-5/27-7/22/21				
					ACCOUNT TOTAL	388.08	.00	388.08	

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								POST DT	
FUND 101 GENERAL FUND									
101-1199-441.81-03 PROFESSIONAL SERVICES / RECORDING FEES									
584		04/22 AP		10/08/21	0396278 BLACK HAWK CO.RECORDER	17.00		10/12/21	
		RCD:ORDINANCE NO.2989							
584		04/22 AP		10/08/21	0396278 BLACK HAWK CO.RECORDER	52.00		10/12/21	
		RCD:NTC.FNL.ASSESS.PROC. M.CAMPBELL-1305 W.19TH ST							
584		04/22 AP		10/08/21	0396278 BLACK HAWK CO.RECORDER	52.00		10/12/21	
		RCD:NTC.FNL.ASSESS.PROC. M.BONORDEN-2012 VINE ST.							
584		04/22 AP		10/08/21	0396278 BLACK HAWK CO.RECORDER	52.00		10/12/21	
		RCD:NTC.FNL.ASSESS.PROC. D.AREND-2404 ROYAL DRIVE							
		ACCOUNT TOTAL					173.00	.00	173.00
101-1199-441.89-13 MISCELLANEOUS SERVICES / CONTINGENCY									
403		03/22 AP		09/02/21	0005820 PROFESSIONAL SOLUTIONS	64.27		10/04/21	
		AUGUST CREDIT CARD FEES							
		ACCOUNT TOTAL					64.27	.00	64.27
101-2235-412.89-15 MISCELLANEOUS SERVICES / CREDIT CARD CHARGES									
403		03/22 AP		09/02/21	0005826 PROFESSIONAL SOLUTIONS	566.50		10/04/21	
		AUGUST CREDIT CARD FEES							
403		03/22 AP		09/02/21	0005827 PROFESSIONAL SOLUTIONS	395.30		10/04/21	
		AUGUST CREDIT CARD FEES							
		ACCOUNT TOTAL					961.80	.00	961.80
101-2253-423.89-04 MISCELLANEOUS SERVICES / SALES TAX									
403		03/22 AP		09/23/21	0005808 IOWA DEPT.OF REVENUE	548.68		10/04/21	
		SEMI MONTHLY SALES TAX RECREATION							
403		03/22 AP		09/09/21	0005807 IOWA DEPT.OF REVENUE	3,195.78		10/04/21	
		SEMI MONTHLY SALES TAX RECREATION							
		ACCOUNT TOTAL					3,744.46	.00	3,744.46
101-2253-423.89-15 MISCELLANEOUS SERVICES / CREDIT CARD CHARGES									
403		03/22 AP		09/08/21	0005794 COMMUNITY BANKERS MERCHANT SV	226.64		10/04/21	
		AUGUST CREDIT CARD FEES							
403		03/22 AP		09/08/21	0005834 VANTIV INTEGRATED PAYMENT SOL	50.00		10/04/21	
		GATEWAY FEES 08/01-08/31/21							
403		03/22 AP		09/02/21	0005823 PROFESSIONAL SOLUTIONS	449.73		10/04/21	
		AUGUST CREDIT CARD FEES							
403		03/22 AP		09/02/21	0005824 PROFESSIONAL SOLUTIONS	18.95		10/04/21	
		AUGUST CREDIT CARD FEES							
403		03/22 AP		09/02/21	0005829 PROFESSIONAL SOLUTIONS	396.64		10/04/21	
		AUGUST CREDIT CARD FEES							
403		03/22 AP		09/02/21	0005830 PROFESSIONAL SOLUTIONS	925.80		10/04/21	

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FUND 101 GENERAL FUND										
101-2253-423.89-15 MISCELLANEOUS SERVICES / CREDIT CARD CHARGES continued										
AUGUST CREDIT CARD FEES										
ACCOUNT TOTAL							2,067.76	.00	2,067.76	
101-2280-423.89-15 MISCELLANEOUS SERVICES / CREDIT CARD CHARGES										
403		03/22 AP		09/10/21	0005791	CLOVER APP	1.01			10/04/21
MERCHANT SUBSCRIPTION FEE										
403		03/22 AP		09/10/21	0005791	CLOVER APP	5.24			10/04/21
MERCHANT SUBSCRIPTION FEE										
403		03/22 AP		09/08/21	0005794	COMMUNITY BANKERS MERCHANT SV	73.39			10/04/21
AUGUST CREDIT CARD FEES										
403		03/22 AP		09/02/21	0005822	PROFESSIONAL SOLUTIONS	57.91			10/04/21
AUGUST CREDIT CARD FEES										
ACCOUNT TOTAL							137.55	.00	137.55	
101-4511-414.64-02 INSURANCE / HEALTH INS. REIMBURSEMENT										
403		03/22 AP		09/23/21	0005813	ISOLVED BENEFIT SERVICES, INC	11.70			10/04/21
HEALTH INS. REIMBURSEMENT										
ACCOUNT TOTAL							11.70	.00	11.70	
101-4511-414.83-05 TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)										
534		04/22 AP		08/29/21	0396223	SCHMIDT, LUCAS	23.43			10/04/21
RMB:MEALS-FIRE INSTRUCT.1										
OTTUMWA										
534		04/22 AP		08/22/21	0396223	SCHMIDT, LUCAS	26.19			10/04/21
RMB:MEALS-FIRE INSTRUCT.1										
OTTUMWA										
ACCOUNT TOTAL							49.62	.00	49.62	
101-4511-414.85-01 UTILITIES / UTILITIES										
568		04/22 AP		09/15/21	0396266	CEDAR FALLS UTILITIES	4,608.70			10/08/21
UTILITIES THRU 09/15/21										
ACCOUNT TOTAL							4,608.70	.00	4,608.70	
101-5521-415.64-02 INSURANCE / HEALTH INS. REIMBURSEMENT										
403		03/22 AP		09/23/21	0005813	ISOLVED BENEFIT SERVICES, INC	51.83			10/04/21
HEALTH INS. REIMBURSEMENT										
403		03/22 AP		09/23/21	0005813	ISOLVED BENEFIT SERVICES, INC	10.00			10/04/21
HEALTH INS. REIMBURSEMENT										
ACCOUNT TOTAL							61.83	.00	61.83	

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FUND 101 GENERAL FUND									
101-5521-415.72-01 OPERATING SUPPLIES / OPERATING SUPPLIES									
568		04/22 AP		09/15/21 0396266	CEDAR FALLS UTILITIES	70.20		10/08/21	
				UTILITIES THRU 09/15/21					
403		03/22 AP		09/02/21 0005819	PROFESSIONAL SOLUTIONS	25.18		10/04/21	
				AUGUST CREDIT CARD FEES					
				ACCOUNT TOTAL		95.38	.00	95.38	
101-5521-415.72-20 OPERATING SUPPLIES / OFFICERS EQUIPMENT									
568		04/22 AP		10/05/21 0396263	ABBOTT, MARISSA	140.26		10/08/21	
				RMB:OPT.EQUIP-TACO POUCHS	HIGH SPEED GEAR				
568		04/22 AP		09/22/21 0396269	MCNAMARA, SHEA	32.74		10/08/21	
				RMB:OPT.EQUIP-RADIO POUCH	THE FIRE STORE				
568		04/22 AP		09/12/21 0396268	MARCOTTE, MIKE	175.00		10/08/21	
				RMB:OPT.EQUIP.-FLASHLIGHT	CABELAS				
				ACCOUNT TOTAL		348.00	.00	348.00	
101-5521-415.83-05 TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)									
543		04/22 AP		09/17/21 0396234	RUSSELL, PRESTON	231.82		10/06/21	
				RMB:TRAVEL-BASIC SNIPER	ST. CLOUD, MN				
543		04/22 AP		09/17/21 0396232	MARCOTTE, MIKE	199.94		10/06/21	
				RMB:MEALS-BASIC SNIPER	ST. CLOUD, MN				
				ACCOUNT TOTAL		431.76	.00	431.76	
101-5521-415.85-01 UTILITIES / UTILITIES									
568		04/22 AP		09/15/21 0396266	CEDAR FALLS UTILITIES	4,116.88		10/08/21	
				UTILITIES THRU 09/15/21					
				ACCOUNT TOTAL		4,116.88	.00	4,116.88	
101-5521-415.86-05 REPAIR & MAINTENANCE / EQUIPMENT REPAIRS									
568		04/22 AP		09/15/21 0396266	CEDAR FALLS UTILITIES	108.62		10/08/21	
				UTILITIES THRU 09/15/21					
				ACCOUNT TOTAL		108.62	.00	108.62	
101-5521-415.89-40 MISCELLANEOUS SERVICES / UNIFORM ALLOWANCE									
534		04/22 AP		09/21/21 0396224	SCHWAN, KENDALL	66.90		10/04/21	
				RMB:UNIFORM ALLOWANCE	KORE ESSENTIALS				
534		04/22 AP		09/16/21 0396224	SCHWAN, KENDALL	160.50		10/04/21	
				RMB:UNIFORM ALLOWANCE	VON MAUR				
534		04/22 AP		07/28/21 0396220	JOHANNSEN, BRIAN	62.44		10/04/21	
				RMB:UNIFORM ALLOWANCE	GALLS				

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FUND 101 GENERAL FUND											
101-5521-415.89-40 MISCELLANEOUS SERVICES / UNIFORM ALLOWANCE							continued				
ACCOUNT TOTAL							289.84	.00	289.84		
101-6613-433.85-01 UTILITIES / UTILITIES											
568		04/22 AP		09/15/21	0396266	CEDAR FALLS UTILITIES	413.28			10/08/21	
UTILITIES THRU 09/15/21											
ACCOUNT TOTAL							413.28	.00	413.28		
101-6616-446.85-01 UTILITIES / UTILITIES											
568		04/22 AP		09/15/21	0396266	CEDAR FALLS UTILITIES	794.26			10/08/21	
UTILITIES THRU 09/15/21											
ACCOUNT TOTAL							794.26	.00	794.26		
101-6625-432.64-02 INSURANCE / HEALTH INS. REIMBURSEMENT											
403		03/22 AP		09/23/21	0005813	ISOLVED BENEFIT SERVICES, INC	15.40			10/04/21	
HEALTH INS. REIMBURSEMENT											
ACCOUNT TOTAL							15.40	.00	15.40		
101-6633-423.85-01 UTILITIES / UTILITIES											
568		04/22 AP		09/15/21	0396266	CEDAR FALLS UTILITIES	814.80			10/08/21	
UTILITIES THRU 09/15/21											
ACCOUNT TOTAL							814.80	.00	814.80		
FUND TOTAL							83,809.61	.00	83,809.61		
FUND 203 TAX INCREMENT FINANCING											
FUND 206 STREET CONSTRUCTION FUND											
206-0000-371.01-00 MISCELLANEOUS / MISCELLANEOUS RECEIPTS											
403		03/22 AP		09/24/21	0005813	ISOLVED BENEFIT SERVICES, INC		500.00		10/04/21	
CREDIT HEALTH INS. REIMB.											
586		03/22 AP		09/24/21	0005813	ISOLVED BENEFIT SERVICES, INC	500.00			10/12/21	
ACCOUNT CORRECTION											
CREDIT HEALTH INS.REIMB.											
ACCOUNT TOTAL							500.00	500.00	.00		
206-6637-436.64-02 INSURANCE / HEALTH INS. REIMBURSEMENT											
586		03/22 AP		09/24/21	0005813	ISOLVED BENEFIT SERVICES, INC		500.00		10/12/21	
CREDIT HEALTH INS.REIMB.											

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FUND 206 STREET CONSTRUCTION FUND										
206-6637-436.64-02 INSURANCE / HEALTH INS. REIMBURSEMENT							continued			
ACCOUNT TOTAL							0.00	500.00	500.00-	
206-6637-436.85-01 UTILITIES / UTILITIES										
568		04/22 AP		09/15/21	0396266	CEDAR FALLS UTILITIES UTILITIES THRU 09/15/21	2,627.83		10/08/21	
ACCOUNT TOTAL							2,627.83	0.00	2,627.83	
206-6647-436.85-01 UTILITIES / UTILITIES										
568		04/22 AP		09/15/21	0396266	CEDAR FALLS UTILITIES UTILITIES THRU 09/15/21	2,329.37		10/08/21	
ACCOUNT TOTAL							2,329.37	0.00	2,329.37	
FUND TOTAL							5,457.20	1,000.00	4,457.20	
FUND 215 HOSPITAL FUND										
FUND 216 POLICE BLOCK GRANT FUND										
FUND 217 SECTION 8 HOUSING FUND										
217-2214-432.89-61 MISCELLANEOUS SERVICES / HOUS.ASSIST PMTS-OCCUPIED										
511		04/22 AP		10/01/21	0037892	BAUCH, JAMES C	421.00		09/30/21	
		HAP_Prior D 102021								
511		04/22 AP		10/01/21	0037946	RINNELS, DOUGLAS G.	253.00		09/30/21	
		HAP_Wierck L 102021								
511		04/22 AP		10/01/21	0037897	CHESTNUT, SHAWN	502.00		09/30/21	
		HAP_Chestnut N 102021								
511		04/22 AP		10/01/21	0037958	WEVERINK, TOM	503.00		09/30/21	
		HAP_Stewart J 102021								
511		04/22 AP		10/01/21	0037910	EXCEPTIONAL PERSONS, INC.	433.00		09/30/21	
		HAP_Blake M 102021								
511		04/22 AP		10/01/21	0037910	EXCEPTIONAL PERSONS, INC.	196.00		09/30/21	
		HAP_Houdek C 102021								
511		04/22 AP		10/01/21	0037910	EXCEPTIONAL PERSONS, INC.	320.00		09/30/21	
		HAP_Poldberg J 102021								
511		04/22 AP		10/01/21	0037910	EXCEPTIONAL PERSONS, INC.	388.00		09/30/21	
		HAP_Nissen A 102021								
511		04/22 AP		10/01/21	0037910	EXCEPTIONAL PERSONS, INC.	424.00		09/30/21	
		HAP_Myers J 102021								
511		04/22 AP		10/01/21	0037910	EXCEPTIONAL PERSONS, INC.	190.00		09/30/21	
		HAP_Anderson B 102021								
511		04/22 AP		10/01/21	0037918	GOLD FALLS VILLA	474.00		09/30/21	
		HAP_Shuman J 102021								
511		04/22 AP		10/01/21	0037918	GOLD FALLS VILLA	416.00		09/30/21	
		HAP_Jenkins D 102021								

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FUND 217 SECTION 8 HOUSING FUND										
217-2214-432.89-61 MISCELLANEOUS SERVICES / HOUS.ASSIST PMTS-OCCUPIED						continued				
511		04/22 AP		10/01/21	0037912	FORTSCH, ALEX E.	989.00			09/30/21
		HAP_Guzzle T 102021								
511		04/22 AP		10/01/21	0037957	WEVERINK, RANDY	725.00			09/30/21
		HAP_Archer D 102021								
511		04/22 AP		10/01/21	0037914	GEELAN, JOSEPH N.	369.00			09/30/21
		HAP_Juhl A 102021								
511		04/22 AP		10/01/21	0037914	GEELAN, JOSEPH N.	368.00			09/30/21
		HAP_Becker T 102021								
511		04/22 AP		10/01/21	0037939	MERSHON, MARK E.	420.00			09/30/21
		HAP_Holden K 102021								
511		04/22 AP		10/01/21	0037899	CLARK ENTERPRISES LLC	181.00			09/30/21
		HAP_Bachman K 102021								
511		04/22 AP		10/01/21	0037899	CLARK ENTERPRISES LLC	465.00			09/30/21
		HAP_Galvez Munguia 102021								
511		04/22 AP		10/01/21	0037899	CLARK ENTERPRISES LLC	451.00			09/30/21
		HAP_Hord B 102021								
511		04/22 AP		10/01/21	0037890	BARTELT PROPERTIES L.C.	1,100.00			09/30/21
		HAP_Avino G 102021								
511		04/22 AP		10/01/21	0037890	BARTELT PROPERTIES L.C.	558.00			09/30/21
		HAP_Woodward C 102021								
511		04/22 AP		10/01/21	0037907	EDGE MANAGEMENT GROUP, LLC	850.00			09/30/21
		HAP_Young C 102021								
511		04/22 AP		10/01/21	0037907	EDGE MANAGEMENT GROUP, LLC	1,142.00			09/30/21
		HAP_Gibson T 102021								
511		04/22 AP		10/01/21	0037902	COOK CO.HOUSING AUTHORITY	184.00			09/30/21
		HAP_Goldstein K 102021								
511		04/22 AP		10/01/21	0037944	PURDY PROPERTIES, LLC	710.00			09/30/21
		HAP_Schmidt D 102021								
511		04/22 AP		10/01/21	0037944	PURDY PROPERTIES, LLC	896.00			09/30/21
		HAP_Cummings A 102021								
511		04/22 AP		10/01/21	0037905	D & J PROPERTIES	668.00			09/30/21
		HAP_Redd S 102021								
511		04/22 AP		10/01/21	0037905	D & J PROPERTIES	509.00			09/30/21
		HAP_Grant F 102021								
511		04/22 AP		10/01/21	0037905	D & J PROPERTIES	314.00			09/30/21
		HAP_Rogers S 102021								
511		04/22 AP		10/01/21	0037905	D & J PROPERTIES	538.00			09/30/21
		HAP_Bell M 102021								
511		04/22 AP		10/01/21	0037905	D & J PROPERTIES	685.00			09/30/21
		HAP_Keys A 102021								
511		04/22 AP		10/01/21	0037905	D & J PROPERTIES	616.00			09/30/21
		HAP_Terry M 102021								
511		04/22 AP		10/01/21	0037904	CV PROPERTIES, LLC	509.00			09/30/21
		HAP_Langel A 102021								
511		04/22 AP		10/01/21	0037904	CV PROPERTIES, LLC	387.00			09/30/21
		HAP_Barr G 102021								
511		04/22 AP		10/01/21	0037950	STANDARD FAMILY ASSIST.LIVING	221.00			09/30/21
		HAP_Refshauge T 102021								
511		04/22 AP		10/01/21	0037895	CEDAR APARTMENTS LLC	409.00			09/30/21

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FUND 217 SECTION 8 HOUSING FUND										
217-2214-432.89-61 MISCELLANEOUS SERVICES / HOUS.ASSIST PMTS-OCCUPIED										
						continued				
511				04/22	AP 10/01/21 0037895	CEDAR APARTMENTS LLC	158.00			09/30/21
511				04/22	AP 10/01/21 0037921	HAUS TO HOME INVESTMENTS	285.00			09/30/21
511				04/22	AP 10/01/21 0037933	KYLER, DEBRA K.	302.00			09/30/21
511				04/22	AP 10/01/21 0037948	SCHUERMAN PROPERTIES, LLC	583.00			09/30/21
511				04/22	AP 10/01/21 0037948	SCHUERMAN PROPERTIES, LLC	1,000.00			09/30/21
511				04/22	AP 10/01/21 0037948	SCHUERMAN PROPERTIES, LLC	835.00			09/30/21
511				04/22	AP 10/01/21 0037952	SWEETING, LARRY	753.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	402.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	263.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	491.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	444.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	236.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	435.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	212.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	405.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	479.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	448.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	227.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	495.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	236.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	223.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	394.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	134.00			09/30/21
511				04/22	AP 10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L	150.00			09/30/21

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FUND 217 SECTION 8 HOUSING FUND									
217-2214-432.89-61 MISCELLANEOUS SERVICES / HOUS.ASSIST PMTS-OCCUPIED					continued				
511		04/22 AP		10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L HAP Shelton S 102021	458.00		09/30/21	
511		04/22 AP		10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L HAP Greene L 102021	414.00		09/30/21	
511		04/22 AP		10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L HAP Lenz J 102021	218.00		09/30/21	
511		04/22 AP		10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L HAP Garvis C 102021	171.00		09/30/21	
511		04/22 AP		10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L HAP Stevens R 102021	257.00		09/30/21	
511		04/22 AP		10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L HAP Vognsen P 102021	280.00		09/30/21	
511		04/22 AP		10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L HAP Graves D 102021	499.00		09/30/21	
511		04/22 AP		10/01/21 0037954	THUNDER RIDGE SR.APARTMENTS L HAP Wright S 102021	358.00		09/30/21	
511		04/22 AP		10/01/21 0037917	GLENN, MATTHEW HAP Clayton R 102021	300.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Clark T 102021	610.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Brandt D 102021	428.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Greene D 102021	327.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Moore D 102021	428.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Dixon S 102021	155.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Harper S 102021	678.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Bradley J 102021	216.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Porter J 102021	276.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Havlik C 102021	237.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Henderson D 102021	680.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Aswegan J 102021	258.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Temple S 102021	422.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Gordon Jr. T 102021	428.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Smith T 102021	500.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT HAP Vaughn S 102021	237.00		09/30/21	
511		04/22 AP		10/01/21 0037955	VILLAGE I AT NINE23 APARTMENT	469.00		09/30/21	

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FUND 217 SECTION 8 HOUSING FUND										
217-2214-432.89-61 MISCELLANEOUS SERVICES / HOUS.ASSIST PMTS-OCCUPIED										
						continued				
511				04/22 AP 10/01/21	0037955	VILLAGE I AT NINE23 APARTMENT	435.00			09/30/21
HAP_Nelson B 102021										
511				04/22 AP 10/01/21	0037955	VILLAGE I AT NINE23 APARTMENT	287.00			09/30/21
HAP_Redd A 102021										
511				04/22 AP 10/01/21	0037955	VILLAGE I AT NINE23 APARTMENT	116.00			09/30/21
HAP_Ford D 102021										
511				04/22 AP 10/01/21	0037955	VILLAGE I AT NINE23 APARTMENT	599.00			09/30/21
HAP_Duesenberg J 102021										
511				04/22 AP 10/01/21	0037955	VILLAGE I AT NINE23 APARTMENT	425.00			09/30/21
HAP_Fry S 102021										
511				04/22 AP 10/01/21	0037955	VILLAGE I AT NINE23 APARTMENT	503.00			09/30/21
HAP_Smith W 102021										
511				04/22 AP 10/01/21	0037955	VILLAGE I AT NINE23 APARTMENT	579.00			09/30/21
HAP_Prior L 102021										
511				04/22 AP 10/01/21	0037955	VILLAGE I AT NINE23 APARTMENT	401.00			09/30/21
HAP_Ducharme T 102021										
511				04/22 AP 10/01/21	0037955	VILLAGE I AT NINE23 APARTMENT	368.00			09/30/21
HAP_Aswegan S 102021										
511				04/22 AP 10/01/21	0037955	VILLAGE I AT NINE23 APARTMENT	705.00			09/30/21
HAP_Cameron J 102021										
511				04/22 AP 10/01/21	0037955	VILLAGE I AT NINE23 APARTMENT	454.00			09/30/21
HAP_Ambrose A 102021										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	47.00			09/30/21
HAP_Swartley J 102021										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	22.00			09/30/21
Young 1995063175										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	91.00			09/30/21
Henderson 9651433829										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	273.00			09/30/21
Jurries 7681775462										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	38.00			09/30/21
Carlyle 7760305177										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	28.00			09/30/21
Gilmore 7082884787										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	4.00			09/30/21
Mullins 9837918987										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	124.00			09/30/21
Avino 591464234										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	37.00			09/30/21
Ross 3100498948										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	78.00			09/30/21
Rule 9816666531										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	154.00			09/30/21
BALM 4535924167										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	39.00			09/30/21
Bracelly 9823574708										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	100.00			09/30/21
Keys 7930305447										
511				04/22 AP 10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8				
Ambrose 9075028799										

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FUND 217 SECTION 8 HOUSING FUND										
217-2214-432.89-61 MISCELLANEOUS SERVICES / HOUS.ASSIST PMTS-OCCUPIED continued										
511		04/22 AP		10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	171.00		09/30/21	
		Archer 7038175862								
511		04/22 AP		10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	137.00		09/30/21	
		Archer 9095290344								
511		04/22 AP		10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	146.00		09/30/21	
		Atkins 1050264405								
511		04/22 AP		10/01/21	0037896	CEDAR FALLS UTILITIES-SEC.8	161.00		09/30/21	
		Thrower 3864735810								
511		04/22 AP		10/01/21	0037936	MALBEC PROPERTIES, LLC	453.00		09/30/21	
		HAP_Bakel P 102021								
511		04/22 AP		10/01/21	0037936	MALBEC PROPERTIES, LLC	379.00		09/30/21	
		HAP_Himes G 102021								
511		04/22 AP		10/01/21	0037936	MALBEC PROPERTIES, LLC	416.00		09/30/21	
		HAP_Halterman A 102021								
511		04/22 AP		10/01/21	0037936	MALBEC PROPERTIES, LLC	441.00		09/30/21	
		HAP_Hepker D 102021								
511		04/22 AP		10/01/21	0037936	MALBEC PROPERTIES, LLC	224.00		09/30/21	
		HAP_Stevens B 102021								
511		04/22 AP		10/01/21	0037898	CHRISTOPHERSON RENTALS	985.00		09/30/21	
		HAP_BRINER K 102021								
511		04/22 AP		10/01/21	0037898	CHRISTOPHERSON RENTALS	481.00		09/30/21	
		HAP_Hunt M 102021								
511		04/22 AP		10/01/21	0037898	CHRISTOPHERSON RENTALS	646.00		09/30/21	
		HAP_Dyer A 102021								
511		04/22 AP		10/01/21	0037898	CHRISTOPHERSON RENTALS	470.00		09/30/21	
		HAP_Gregory L 102021								
511		04/22 AP		10/01/21	0037898	CHRISTOPHERSON RENTALS	596.00		09/30/21	
		HAP_Ricks F 102021								
511		04/22 AP		10/01/21	0037898	CHRISTOPHERSON RENTALS	837.00		09/30/21	
		HAP_Carlyle T 102021								
511		04/22 AP		10/01/21	0037898	CHRISTOPHERSON RENTALS	410.00		09/30/21	
		HAP_Hall T 102021								
511		04/22 AP		10/01/21	0037898	CHRISTOPHERSON RENTALS	477.00		09/30/21	
		HAP_Sumerall T 102021								
511		04/22 AP		10/01/21	0037898	CHRISTOPHERSON RENTALS	215.00		09/30/21	
		HAP_Ross Z 102021								
511		04/22 AP		10/01/21	0037898	CHRISTOPHERSON RENTALS	253.00		09/30/21	
		HAP_Schwaab A 102021								
511		04/22 AP		10/01/21	0037898	CHRISTOPHERSON RENTALS	462.00		09/30/21	
		HAP_Hoffert J 102021								
511		04/22 AP		10/01/21	0037938	MELICK, KENT L.	579.00		09/30/21	
		HAP_Drewelow D 102021								
511		04/22 AP		10/01/21	0037943	PETERSEN, RANDEL	753.00		09/30/21	
		HAP_Brown S 102021								
511		04/22 AP		10/01/21	0037940	MHP 2216 LINCOLN STREET, LLC	434.00		09/30/21	
		HAP_Cochran S 102021								
511		04/22 AP		10/01/21	0037940	MHP 2216 LINCOLN STREET, LLC	445.00		09/30/21	
		HAP_Malone S 102021								
511		04/22 AP		10/01/21	0037940	MHP 2216 LINCOLN STREET, LLC	323.00		09/30/21	

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FUND 217 SECTION 8 HOUSING FUND										
217-2214-432.89-61 MISCELLANEOUS SERVICES / HOUS.ASSIST PMTS-OCCUPIED										
						continued				
511						HAP_Jones T 102021 04/22 AP 10/01/21 0037940	MHP 2216 LINCOLN STREET, LLC	550.00		09/30/21
511						HAP_Rule S 102021 04/22 AP 10/01/21 0037940	MHP 2216 LINCOLN STREET, LLC	435.00		09/30/21
511						HAP_Wilder S 102021 04/22 AP 10/01/21 0037909	EPM IOWA	548.00		09/30/21
511						HAP_Thompson T 102021 04/22 AP 10/01/21 0037909	EPM IOWA	1,217.00		09/30/21
511						HAP_Santiago-Lebro 102021 04/22 AP 10/01/21 0037909	EPM IOWA	394.00		09/30/21
511						HAP_Frisch K 102021 04/22 AP 10/01/21 0037906	DC MANAGEMENT, LLC	480.00		09/30/21
511						HAP_White M 102021 04/22 AP 10/01/21 0037932	KROEMER, KRAIG	366.00		09/30/21
511						HAP_Currie L 102021 04/22 AP 10/01/21 0037935	LEGACY RESIDENTIAL	291.00		09/30/21
511						HAP_Jordan L 102021 04/22 AP 10/01/21 0037889	ARENDS INVESTMENTS	749.00		09/30/21
511						HAP_Wortham W 102021 04/22 AP 10/01/21 0037941	OWL INVESTMENTS, LLC	503.00		09/30/21
511						HAP_Schroeder S 102021 04/22 AP 10/01/21 0037903	CRESCENT CONDOMINIUMS, LLC	430.00		09/30/21
511						HAP_Lohr K 102021 04/22 AP 10/01/21 0037920	HARRINGTON'S RENTAL LLC	830.00		09/30/21
511						HAP_Larronda E 102021 04/22 AP 10/01/21 0037911	FERNHOLZ, KARI L.	1,041.00		09/30/21
511						HAP_Carlton D 102021 04/22 AP 10/01/21 0037947	ROGERS, DERICK	887.00		09/30/21
511						HAP_Sherwood J 102021 04/22 AP 10/01/21 0037927	KAI, BRENT	278.00		09/30/21
511						HAP_Hamilton T 102021 04/22 AP 10/01/21 0037949	STAND FIRM PROPERTIES LLC	399.00		09/30/21
511						HAP_Hodge G 102021 04/22 AP 10/01/21 0037949	STAND FIRM PROPERTIES LLC	485.00		09/30/21
511						HAP_Washington V 102021 04/22 AP 10/01/21 0037960	WYMORE, LARRY R.	522.00		09/30/21
511						HAP_MOFFETT J 102021 04/22 AP 10/01/21 0037959	WINGSB, LLC	737.00		09/30/21
511						HAP_Johnson A 102021 04/22 AP 10/01/21 0037926	JLL EXTENDED STAY INN	298.00		09/30/21
511						HAP_Moore E 102021 04/22 AP 10/01/21 0037926	JLL EXTENDED STAY INN	166.00		09/30/21
511						HAP_Zanders D 102021 04/22 AP 10/01/21 0037934	LARSEN RENTALS LLC	507.00		09/30/21
511						HAP_Boyd J 102021 04/22 AP 10/01/21 0037934	LARSEN RENTALS LLC	507.00		09/30/21
511						HAP_Grisby C 102021 04/22 AP 10/01/21 0037956	VILLAGE II AT NINE23 APARTMEN	319.00		09/30/21
						HAP_Saccento J 102021				

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FUND 217 SECTION 8 HOUSING FUND										
217-2214-432.89-61 MISCELLANEOUS SERVICES / HOUS.ASSIST PMTS-OCCUPIED						continued				
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	333.00			09/30/21
		HAP_Harmon A 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	430.00			09/30/21
		HAP_Harken G 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	329.00			09/30/21
		HAP_Dzapo S 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	430.00			09/30/21
		HAP_Loffredo C 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	664.00			09/30/21
		HAP_Miller K 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	424.00			09/30/21
		HAP_Haug K 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	479.00			09/30/21
		HAP_Forney A 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	245.00			09/30/21
		HAP_Lane S 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	365.00			09/30/21
		HAP_Wilson J 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	223.00			09/30/21
		HAP_King D 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	215.00			09/30/21
		HAP_Rogers E 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	544.00			09/30/21
		HAP_Nielsen J 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	705.00			09/30/21
		HAP_Mullins J 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	423.00			09/30/21
		HAP_Cruise B 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	461.00			09/30/21
		HAP_Garrigus S 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	424.00			09/30/21
		HAP_Billman D 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	575.00			09/30/21
		HAP_BALM D 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	610.00			09/30/21
		HAP_Wilson S 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	379.00			09/30/21
		HAP_OBrien N 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	500.00			09/30/21
		HAP_Reams L 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	189.00			09/30/21
		HAP_Hoodjer S 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	332.00			09/30/21
		HAP_Frazier T 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	424.00			09/30/21
		HAP_Lam K 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	439.00			09/30/21
		HAP_Wiedow C 102021								
511		04/22 AP		10/01/21	0037956	VILLAGE II AT NINE23 APARTMEN	109.00			09/30/21

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FUND 217 SECTION 8 HOUSING FUND										
217-2214-432.89-61 MISCELLANEOUS SERVICES / HOUS.ASSIST PMTS-OCCUPIED continued										
						HAP Kline J 102021				
511				04/22	AP 10/01/21 0037956	VILLAGE II AT NINE23 APARTMEN	285.00			09/30/21
						HAP O'dell J 102021				
511				04/22	AP 10/01/21 0037956	VILLAGE II AT NINE23 APARTMEN	436.00			09/30/21
						HAP Humphrey E 102021				
511				04/22	AP 10/01/21 0037956	VILLAGE II AT NINE23 APARTMEN	158.00			09/30/21
						HAP Humphrey J 102021				
511				04/22	AP 10/01/21 0037928	KLEIN, JULIE	219.00			09/30/21
						HAP Stover A 102021				
511				04/22	AP 10/01/21 0037922	HOUSING AUTHORITY OF JOLIET	1,960.00			09/30/21
						HAP Payne I 102021				
511				04/22	AP 10/01/21 0037922	HOUSING AUTHORITY OF JOLIET	1,066.00			09/30/21
						HAP Wilson Q 102021				
511				04/22	AP 10/01/21 0037923	HOWARD, BRAD	1,000.00			09/30/21
						HAP Thrower M 102021				
511				04/22	AP 10/01/21 0037931	KREMER PROPERTIES LLC	422.00			09/30/21
						HAP Mulanax W 102021				
511				04/22	AP 10/01/21 0037915	GEMINI PROPERTIES, LLC	1,085.00			09/30/21
						HAP Gilmore A 102021				
511				04/22	AP 10/01/21 0037930	KRAAYENBRINK, RANDY L.	715.00			09/30/21
						HAP Maltas M 102021				
511				04/22	AP 10/01/21 0037930	KRAAYENBRINK, RANDY L.	654.00			09/30/21
						HAP Cafferty M 102021				
511				04/22	AP 10/01/21 0037930	KRAAYENBRINK, RANDY L.	684.00			09/30/21
						HAP Ewing J 102021				
511				04/22	AP 10/01/21 0037900	CMY PROPERTIES, LLC	1,222.00			09/30/21
						HAP Garcia K 102021				
511				04/22	AP 10/01/21 0037901	CNC INVESTMENTS, LLC	985.00			09/30/21
						HAP Carrillo D 102021				
511				04/22	AP 10/01/21 0037945	R & R RENTAL PROPERTIES, LLC	243.00			09/30/21
						HAP Gordon A 102021				
511				04/22	AP 10/01/21 0037893	BUTLER, MICHAEL	509.00			09/30/21
						HAP Cochran C 102021				
511				04/22	AP 10/01/21 0037924	HUNTER PROPERTY LLC	768.00			09/30/21
						HAP Thompson L 102021				
511				04/22	AP 10/01/21 0037919	HAGEDORN, JEREMIAH	778.00			09/30/21
						HAP Gottfried L 102021				
511				04/22	AP 10/01/21 0037951	SUNRISE PROPERTIES LLC	609.00			09/30/21
						HAP Lake L 102021				
511				04/22	AP 10/01/21 0037929	KOG PROPERTIES LLC	1,300.00			09/30/21
						HAP Archer A 102021				
511				04/22	AP 10/01/21 0037929	KOG PROPERTIES LLC	1,225.00			09/30/21
						HAP Atkins T 102021				
511				04/22	AP 10/01/21 0037942	PAULSON, JAMES	153.00			09/30/21
						HAP Gordon L 102021				
511				04/22	AP 10/01/21 0037942	PAULSON, JAMES	347.00			09/30/21
						HAP Topping R 102021				
511				04/22	AP 10/01/21 0037908	ELMCREST ESTATES, L.C.	436.00			09/30/21
						HAP Davis D 102021				

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FUND 217 SECTION 8 HOUSING FUND								
217-2214-432.89-61 MISCELLANEOUS SERVICES / HOUS.ASSIST PMTS-OCCUPIED						continued		
511		04/22	AP	10/01/21	0037937 MCKERNAN, JAMES M.	587.00		09/30/21
					HAP_Buchanan J 102021			
511		04/22	AP	10/01/21	0037937 MCKERNAN, JAMES M.	767.00		09/30/21
					HAP_Porter R 102021			
511		04/22	AP	10/01/21	0037913 G P MANAGEMENT LLC	403.00		09/30/21
					HAP_Wenzel J 102021			
511		04/22	AP	10/01/21	0037953 T.J.J.C. L.L.C.	282.00		09/30/21
					HAP_Dornbrock M 102021			
511		04/22	AP	10/01/21	0037953 T.J.J.C. L.L.C.	222.00		09/30/21
					HAP_Hornback K 102021			
511		04/22	AP	10/01/21	0037953 T.J.J.C. L.L.C.	675.00		09/30/21
					HAP_Bracelly J 102021			
511		04/22	AP	10/01/21	0037916 GERDES III, BENJAMIN P.	279.00		09/30/21
					HAP_Allessi S 102021			
511		04/22	AP	10/01/21	0037916 GERDES III, BENJAMIN P.	596.00		09/30/21
					HAP_Sherwood D 102021			
511		04/22	AP	10/01/21	0037916 GERDES III, BENJAMIN P.	638.00		09/30/21
					HAP_Beaman D 102021			
511		04/22	AP	10/01/21	0037916 GERDES III, BENJAMIN P.	756.00		09/30/21
					HAP_Apfel A 102021			
511		04/22	AP	10/01/21	0037925 J & A PROPERTIES	788.00		09/30/21
					HAP_Lowe L 102021			
511		04/22	AP	10/01/21	0037891 BARTELT RENTALS L.C.	475.00		09/30/21
					HAP_Luck J 102021			
511		04/22	AP	10/01/21	0037891 BARTELT RENTALS L.C.	850.00		09/30/21
					HAP_Woods N 102021			
511		04/22	AP	10/01/21	0037894 C & H HOLDINGS LLC	798.00		09/30/21
					HAP_Ross S 102021			
ACCOUNT TOTAL						103,044.00	.00	103,044.00
217-2214-432.89-65 MISCELLANEOUS SERVICES / ADMIN FEE DUE OTHERS								
511		04/22	AP	10/01/21	0037902 COOK CO.HOUSING AUTHORITY	34.16		09/30/21
					AF_Goldstein K 102021			
511		04/22	AP	10/01/21	0037922 HOUSING AUTHORITY OF JOLIET	37.70		09/30/21
					AF_Payne I 102021			
511		04/22	AP	10/01/21	0037922 HOUSING AUTHORITY OF JOLIET	48.79		09/30/21
					AF_Wilson Q 102021			
ACCOUNT TOTAL						120.65	.00	120.65
FUND TOTAL						103,164.65	.00	103,164.65

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FUND 223 COMMUNITY BLOCK GRANT										
223-2224-432	89-66	MISCELLANEOUS SERVICES / STATE CARES - CV2								
568		04/22 AP		10/07/21	0004676	VALLEY LUTHERAN SCHOOL	2,918.79			10/08/21
		CV-2 IEDA GRANT				3 MEETING OWL PRO CAMERAS				
PROJECT#:		022353								
534		04/22 AP		10/04/21	0004672	VALLEY LUTHERAN SCHOOL	8,599.86			10/04/21
		CV-2 IEDA GRANT				9 MEETING OWL PRO CAMERAS				
PROJECT#:		022353								
ACCOUNT TOTAL							11,518.65	.00		11,518.65
223-2234-432.81-01 PROFESSIONAL SERVICES / PROFESSIONAL SERVICES										
512		03/22 AP		09/28/21	0004670	BLACK HAWK CO.RECORDER	7.00			09/30/21
		RCD:SUBORDINATION AGREEMT				JOSH NELSON				
ACCOUNT TOTAL							7.00	.00		7.00
223-2244-432.89-84 MISCELLANEOUS SERVICES / HOME PROGRAM										
512		03/22 AP		09/20/21	0004671	TOJO CONSTRUCTION	7,272.00			09/30/21
		HOME:2512 CEDAR HEIGHT DR				K. BLAKESLEY				
ACCOUNT TOTAL							7,272.00	.00		7,272.00
FUND TOTAL							18,797.65	.00		18,797.65
FUND 224 TRUST & AGENCY										
FUND 242 STREET REPAIR FUND										
FUND 254 CABLE TV FUND										
254-1088-431	64-02	INSURANCE / HEALTH INS. REIMBURSEMENT								
403		03/22 AP		09/23/21	0005813	ISOLVED BENEFIT SERVICES, INC	.53			10/04/21
		HEALTH INS. REIMBURSEMENT								
ACCOUNT TOTAL							.53	.00		.53
254-1088-431.83-05 TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)										
543		04/22 AP		10/01/21	0396233	MENNEN, MIKE	70.56			10/06/21
		RMB:MILEAGE-CF FB-KENNEDY				CEDAR RAPIDS-NO CITY CAR				
ACCOUNT TOTAL							70.56	.00		70.56
254-1088-431.89-18 MISCELLANEOUS SERVICES / COMMUNITY PROGRAMMING										
584		04/22 AP		10/08/21	0396284	SIMPSON, MARK	150.00			10/12/21
		CF FOOTBALL-DBQ HEMPSTEAD				ANNOUNCER				
PROJECT#:		759								
584		04/22 AP		10/08/21	0396282	JOACHIM, JOHN D	150.00			10/12/21

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FUND 254 CABLE TV FUND										
254-1088-431.89-18 MISCELLANEOUS SERVICES / COMMUNITY PROGRAMMING continued										
						CF FOOTBALL-DBQ HEMPSTEAD ANNOUNCER				
PROJECT#:		759								
584		04/22 AP 10/08/21			0396280	BRALEY, ERIC	120.00			10/12/21
						CF FOOTBALL-DBQ HEMPSTEAD CAMERA OPERATOR				
PROJECT#:		759								
584		04/22 AP 10/08/21			0396281	DEWITT, JASON	120.00			10/12/21
						CF FOOTBALL-DBQ HEMPSTEAD CAMERA OPERATOR				
PROJECT#:		759								
584		04/22 AP 10/08/21			0396285	STOW, CHRISTIAN	120.00			10/12/21
						CF FOOTBALL-DBQ HEMPSTEAD CAMERA OPERATOR				
PROJECT#:		759								
584		04/22 AP 10/08/21			0396286	SURMA, JOSEPH EDWARD	120.00			10/12/21
						CF FOOTBALL-DBQ HEMPSTEAD CAMERA OPERATOR				
PROJECT#:		759								
568		04/22 AP 10/05/21			0396270	SIMPSON, MARK	120.00			10/08/21
						CF VOLLEYBALL-LINN-MAR ANNOUNCER				
PROJECT#:		759								
568		04/22 AP 10/05/21			0396272	SURMA, JOSEPH EDWARD	85.00			10/08/21
						CF VOLLEYBALL-LINN-MAR CAMERA OPERATOR				
PROJECT#:		759								
568		04/22 AP 10/05/21			0396264	BENSON, ERIC	85.00			10/08/21
						CF VOLLEYBALL-LINN-MAR CAMERA OPERATOR				
PROJECT#:		759								
568		04/22 AP 10/05/21			0396275	WINGERT, LUKE	65.00			10/08/21
						CF VOLLEYBALL-LINN-MAR CAMERA OPERATOR				
PROJECT#:		759								
568		04/22 AP 10/05/21			0396267	DEWITT, JASON	85.00			10/08/21
						CF VOLLEYBALL-LINN-MAR CAMERA OPERATOR				
PROJECT#:		759								
568		04/22 AP 10/05/21			0396271	STOW, CHRISTIAN	85.00			10/08/21
						CF VOLLEYBALL-LINN-MAR CAMERA OPERATOR				
PROJECT#:		759								
534		04/22 AP 10/02/21			0396230	WINGERT, LUKE	100.00			10/04/21
						UNI FOOTBALL-YOUNGSTOWN CAMERA OPERATOR				
PROJECT#:		756								
534		04/22 AP 10/02/21			0396226	SIRES, DYLAN	200.00			10/04/21
						UNI FOOTBALL-YOUNGSTOWN CAMERA OPERATOR				
PROJECT#:		756								
534		04/22 AP 10/02/21			0396219	HUNT, PHILLIP	200.00			10/04/21
						UNI FOOTBALL-YOUNGSTOWN CAMERA OPERATOR				
PROJECT#:		756								
534		04/22 AP 10/02/21			0396218	DEWITT, JASON	200.00			10/04/21
						UNI FOOTBALL-YOUNGSTOWN CAMERA OPERATOR				
PROJECT#:		756								
534		04/22 AP 10/02/21			0396228	STOW, CHRISTIAN	200.00			10/04/21
						UNI FOOTBALL-YOUNGSTOWN CAMERA OPERATOR				
PROJECT#:		756								
534		04/22 AP 09/28/21			0396228	STOW, CHRISTIAN	85.00			10/04/21
						CF VOLLEYBALL-IC HIGH CAMERA OPERATOR				

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GROUP NBR	PO NBR	ACCTG PER.	CD	-----TRANSACTION----- DATE	NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE POST DT
FUND 254 CABLE TV FUND									
254-1088-431.89-18 MISCELLANEOUS SERVICES / COMMUNITY PROGRAMMING							continued		
PROJECT#:					759				
534		04/22 AP		09/28/21	0396230	WINGERT, LUKE CAMERA OPERATOR	65.00		10/04/21
PROJECT#:					759				
534		04/22 AP		09/28/21	0396229	THORN, KEVIN CAMERA OPERATOR	85.00		10/04/21
PROJECT#:					759				
534		04/22 AP		09/28/21	0396218	DEWITT, JASON CAMERA OPERATOR	85.00		10/04/21
PROJECT#:					759				
534		04/22 AP		09/28/21	0396225	SIMPSON, MARK ANNOUNCER	120.00		10/04/21
PROJECT#:					759				
534		04/22 AP		09/28/21	0396221	LONGNECKER, JEREMIAH ANNOUNCER	100.00		10/04/21
PROJECT#:					759				
						ACCOUNT TOTAL	2,745.00	.00	2,745.00
						FUND TOTAL	2,816.09	.00	2,816.09
FUND 258 PARKING FUND									
258-5531-435.72-01 OPERATING SUPPLIES / OPERATING SUPPLIES									
403		03/22 AP		09/02/21	0005831	PROFESSIONAL SOLUTIONS	327.89		10/04/21
						AUGUST CREDIT CARD FEES			
403		03/22 AP		09/02/21	0005817	PROFESSIONAL SOLUTIONS	171.44		10/04/21
						AUGUST CREDIT CARD FEES			
403		03/22 AP		09/02/21	0005818	PROFESSIONAL SOLUTIONS	6.95		10/04/21
						AUGUST CREDIT CARD FEES			
403		03/22 AP		09/02/21	0005820	PROFESSIONAL SOLUTIONS	33.44		10/04/21
						AUGUST CREDIT CARD FEES			
						ACCOUNT TOTAL	539.72	.00	539.72
						FUND TOTAL	539.72	.00	539.72
FUND 261 TOURISM & VISITORS									
261-2291-423.73-57 OTHER SUPPLIES / GIFT SHOP									
403		03/22 AP		09/02/21	0005825	PROFESSIONAL SOLUTIONS	16.23		10/04/21
						AUGUST CREDIT CARD FEES			
						ACCOUNT TOTAL	16.23	.00	16.23
261-2291-423.85-01 UTILITIES / UTILITIES									

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GROUP	PO	ACCTG	----	TRANSACTION	----		DEBITS	CREDITS	CURRENT
NBR	NBR	PER.	CD	DATE	NUMBER	DESCRIPTION			BALANCE

									POST DT

FUND 261 TOURISM & VISITORS									
261-2291-423.85-01 UTILITIES / UTILITIES									
568		04/22	AP	09/15/21	0396266	CEDAR FALLS UTILITIES	696.93		10/08/21
						UTILITIES THRU 09/15/21			
						ACCOUNT TOTAL	696.93	.00	696.93
261-2291-423.89-04 MISCELLANEOUS SERVICES / SALES TAX									
403		03/22	AP	09/09/21	0005807	IOWA DEPT.OF REVENUE	19.27		10/04/21
						SEMI MONTHLY SALES TAX			
						VISITOR & TOURISM			
						ACCOUNT TOTAL	19.27	.00	19.27
						FUND TOTAL	732.43	.00	732.43
FUND 262 SENIOR SERVICES & COMM CT									
262-1092-423.85-01 UTILITIES / UTILITIES									
358		04/22	AP	09/05/21	0396240	CEDAR FALLS UTILITIES	1,799.36		09/30/21
						COMM. CENTER UTILITIES			
						ACCOUNT TOTAL	1,799.36	.00	1,799.36
262-1092-423.86-01 REPAIR & MAINTENANCE / REPAIR & MAINTENANCE									
448		04/22	AP	09/17/21	0396236	ARAMARK	5.20		09/30/21
						COMM. CENTER MAT SERVICE			
358		04/22	AP	09/10/21	0396236	ARAMARK	5.20		09/30/21
						COMM. CENTER MAT SERVICE			
358		04/22	AP	09/03/21	0396236	ARAMARK	5.20		09/30/21
						COMM. CENTER MAT SERVICE			
						ACCOUNT TOTAL	15.60	.00	15.60
262-1092-423.89-08 MISCELLANEOUS SERVICES / BUS TRIPS/PROGRAMMING									
358		04/22	AP	08/30/21	0396250	MASMAR, MANDY SUE	40.00		09/30/21
						SENIOR LINE DANCING FOR			
						AUGUST '21			
						ACCOUNT TOTAL	40.00	.00	40.00
						FUND TOTAL	1,854.96	.00	1,854.96

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FUND 291						POLICE FORFEITURE FUND				
FUND 292						POLICE RETIREMENT FUND				
FUND 293						FIRE RETIREMENT FUND				
FUND 294						LIBRARY RESERVE				
FUND 295						SOFTBALL PLAYER CAPITAL				
FUND 296						GOLF CAPITAL				
FUND 297						REC FACILITIES CAPITAL				
FUND 298						HEARST CAPITAL				
FUND 311						DEBT SERVICE FUND				
FUND 402						WASHINGTON PARK FUND				
FUND 404						FEMA				
FUND 405						FLOOD RESERVE FUND				
FUND 407						VISION IOWA PROJECT				
FUND 408						STREET IMPROVEMENT FUND				
FUND 410						CORONAVIRUS LOCAL RELIEF				
FUND 430						2004 TIF BOND				
FUND 431						2014 BOND				
FUND 432						2003 BOND				
FUND 433						2001 TIF				
FUND 434						2000 BOND				
FUND 435						1999 TIF				
FUND 436						2012 BOND				
436-1220-431.94-83						CAPITAL PROJECTS / WEST 1ST STREET				
543				04/22	AP 02/18/19 0396235	THE MUSIC STATION	100.00			10/06/21
					3118-W.1ST ST. RECONST.	PARCEL#74-RE-ISSUE#392493				
PROJECT#:					023118					
						ACCOUNT TOTAL	100.00	0.00	100.00	
						FUND TOTAL	100.00	0.00	100.00	
FUND 437						2018 BOND				
FUND 438						2020 BOND FUND				
438-1220-431.98-23						CAPITAL PROJECTS / GREENHILL RD & S MAIN INT				
584				04/22	AP 10/04/21 0396279	BLACK HAWK CO.RECORDER	265.20			10/12/21
					3228-GREENHILL/S.MAIN INT	CONDEMNATION#538-MCELHOSE				
PROJECT#:					023228					
						ACCOUNT TOTAL	265.20	0.00	265.20	
						FUND TOTAL	265.20	0.00	265.20	

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FUND 439	2008	BOND FUND								
FUND 443	CAPITAL	PROJECTS								
FUND 472	PARKADE	RENOVATION								
FUND 473	SIDEWALK	ASSESSMENT								
FUND 483	ECONOMIC	DEVELOPMENT								
FUND 484	ECONOMIC	DEVELOPMENT LAND								
FUND 541	2018	STORM WATER BONDS								
FUND 544	2008	SEWER BONDS								
FUND 545	2006	SEWER BONDS								
FUND 546	SEWER	IMPROVEMENT FUND								
FUND 547	SEWER	RESERVE FUND								
FUND 548	1997	SEWER BOND FUND								
FUND 549	1992	SEWER BOND FUND								
FUND 550	2000	SEWER BOND FUND								
FUND 551	REFUSE	FUND								
551-0000-213.00-00	CURRENT LIABILITY /	SALES TAX PAYABLE								
403	03/22 AP	09/09/21 0005807				IOWA DEPT.OF REVENUE	204.76			10/04/21
		SEMI MONTHLY SALES TAX				COMMERCIAL GARBAGE A/R				
	ACCOUNT TOTAL						204.76	.00	204.76	
551-6685-436.72-01	OPERATING SUPPLIES /	OPERATING SUPPLIES								
512	03/22 AP	09/28/21 0396216				BEN RUSSELL	53.00			09/30/21
		REFUND CONTAINER DUMP FEE								
403	03/22 AP	09/02/21 0005828				PROFESSIONAL SOLUTIONS	598.82			10/04/21
		AUGUST CREDIT CARD FEES								
403	03/22 AP	09/02/21 0005820				PROFESSIONAL SOLUTIONS	29.14			10/04/21
		AUGUST CREDIT CARD FEES								
	ACCOUNT TOTAL						680.96	.00	680.96	
551-6685-436.85-01	UTILITIES /	UTILITIES								
568	04/22 AP	09/15/21 0396266				CEDAR FALLS UTILITIES	2,627.83			10/08/21
		UTILITIES THRU 09/15/21								
	ACCOUNT TOTAL						2,627.83	.00	2,627.83	
551-6685-436.86-34	REPAIR & MAINTENANCE /	BILLING & COLLECTING								
568	04/22 AP	09/15/21 0396266				CEDAR FALLS UTILITIES	6,093.34			10/08/21
		UTILITIES THRU 09/15/21								
	ACCOUNT TOTAL						6,093.34	.00	6,093.34	
551-6685-436.87-02	RENTALS /	MATERIAL DISPOSAL/HANDLIN								
568	04/22 AP	09/30/21 0396265				BLACK HAWK CO.LANDFILL	23,661.33			10/08/21
		LANDFILL SRV:9/16-9/30/21								
	ACCOUNT TOTAL						23,661.33	.00	23,661.33	

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FUND 551 REFUSE FUND										
551-6685-436.89-04 MISCELLANEOUS SERVICES / SALES TAX										
403		03/22	AP	09/23/21	0005808	IOWA DEPT.OF REVENUE	77.28			10/04/21
						SEMI MONTHLY SALES TAX				
403		03/22	AP	09/09/21	0005807	IOWA DEPT.OF REVENUE	76.12			10/04/21
						SEMI MONTHLY SALES TAX				
						ACCOUNT TOTAL	153.40	.00		153.40
						FUND TOTAL	33,421.62	.00		33,421.62
FUND 552 SEWER RENTAL FUND										
552-6655-436.85-01 UTILITIES / UTILITIES										
568		04/22	AP	09/15/21	0396266	CEDAR FALLS UTILITIES	2,786.76			10/08/21
						UTILITIES THRU 09/15/21				
						ACCOUNT TOTAL	2,786.76	.00		2,786.76
552-6665-436.64-02 INSURANCE / HEALTH INS. REIMBURSEMENT										
403		03/22	AP	09/23/21	0005813	ISOLVED BENEFIT SERVICES, INC	135.94			10/04/21
						HEALTH INS. REIMBURSEMENT				
403		03/22	AP	09/23/21	0005813	ISOLVED BENEFIT SERVICES, INC	100.00			10/04/21
						HEALTH INS. REIMBURSEMENT				
403		03/22	AP	09/23/21	0005813	ISOLVED BENEFIT SERVICES, INC	400.00			10/04/21
						HEALTH INS. REIMBURSEMENT				
						ACCOUNT TOTAL	635.94	.00		635.94
552-6665-436.86-33 REPAIR & MAINTENANCE / SLUDGE REMOVAL										
568		04/22	AP	09/30/21	0396265	BLACK HAWK CO.LANDFILL	42.25			10/08/21
						LANDFILL SRV:9/16-9/30/21				
						ACCOUNT TOTAL	42.25	.00		42.25
552-6665-436.86-34 REPAIR & MAINTENANCE / BILLING & COLLECTING										
568		04/22	AP	09/15/21	0396266	CEDAR FALLS UTILITIES	6,093.33			10/08/21
						UTILITIES THRU 09/15/21				
						ACCOUNT TOTAL	6,093.33	.00		6,093.33
552-6665-436.89-04 MISCELLANEOUS SERVICES / SALES TAX										
403		03/22	AP	09/23/21	0005808	IOWA DEPT.OF REVENUE	2,070.14			10/04/21
						SEMI MONTHLY SALES TAX				
403		03/22	AP	09/09/21	0005807	IOWA DEPT.OF REVENUE	9,701.03			10/04/21
						SEMI MONTHLY SALES TAX				
						COMMERCIAL SEWER				

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FUND 552 SEWER RENTAL FUND										
552-6665-436.89-04 MISCELLANEOUS SERVICES / SALES TAX							continued			
ACCOUNT TOTAL							11,771.17	.00	11,771.17	
FUND TOTAL							21,329.45	.00	21,329.45	
FUND 553 2004 SEWER BOND										
FUND 555 STORM WATER UTILITY										
555-6630-432.86-34 REPAIR & MAINTENANCE / BILLING & COLLECTING										
568		04/22 AP		09/15/21	0396266	CEDAR FALLS UTILITIES UTILITIES THRU 09/15/21	6,093.33			10/08/21
ACCOUNT TOTAL							6,093.33	.00	6,093.33	
FUND TOTAL							6,093.33	.00	6,093.33	
FUND 570 SEWER ASSESSMENT										
FUND 606 DATA PROCESSING FUND										
606-1078-441.82-10 COMMUNICATION / TELEPHONE HOLDING ACCOUNT										
568		04/22 AP		09/19/21	0396274	VERIZON WIRELESS	1,441.26			10/08/21
						WIRELESS SRV:9/20-10/19 9/20-10/19/21				
568		04/22 AP		09/06/21	0396273	U.S. CELLULAR	2,476.08			10/08/21
						WIRELESS SRV:9/6-10/5/21				
ACCOUNT TOTAL							3,917.34	.00	3,917.34	
FUND TOTAL							3,917.34	.00	3,917.34	
FUND 680 HEALTH INSURANCE FUND										
680-1902-457.51-01 INSURANCE / HEALTH INSURANCE										
403		03/22 AP		09/27/21	0005800	EXPRESS SCRIPTS, INC.	31,063.75			10/04/21
						RX CLAIMS PROCESSING				
403		03/22 AP		09/24/21	0005810	IOWA INSURANCE DIVISION	115.00			10/04/21
						STATUTORY FILING FEE-FY21				
403		03/22 AP		09/24/21	0005841	WELLMARK IOWA	47,238.66			10/04/21
						HEALTH CLAIMS PROCESSING				
403		03/22 AP		09/24/21	0005842	WEX HEALTH, INC.	122.40			10/04/21
						COBRA MONTHLY ADMIN FEE				
403		03/22 AP		09/20/21	0005799	EXPRESS SCRIPTS, INC.	30,543.46			10/04/21
						RX CLAIMS PROCESSING				
403		03/22 AP		09/17/21	0005840	WELLMARK IOWA	67,131.30			10/04/21
						HEALTH CLAIMS PROCESSING				
403		03/22 AP		09/13/21	0005798	EXPRESS SCRIPTS, INC.	10,633.98			10/04/21
						RX CLAIMS PROCESSING				

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FUND 680 HEALTH INSURANCE FUND										
680-1902-457.51-01						INSURANCE / HEALTH INSURANCE				continued
403		03/22	AP	09/10/21	0005838	WELLMARK IOWA	112,591.85			10/04/21
						HEALTH CLAIMS PROCESSING				
403		03/22	AP	09/07/21	0005797	EXPRESS SCRIPTS, INC.	7,493.96			10/04/21
						RX CLAIMS PROCESSING				
403		03/22	AP	09/03/21	0005837	WELLMARK IOWA	40,862.51			10/04/21
						HEALTH CLAIMS PROCESSING				
403		03/22	AP	09/01/21	0005839	WELLMARK IOWA	26,825.52			10/04/21
						HEALTH CLAIMS PROCESSING				
						ACCOUNT TOTAL	374,622.39	.00		374,622.39
680-1902-457.51-06 INSURANCE / DENTAL INSURANCE										
403		03/22	AP	09/01/21	0005795	DELTA DENTAL OF IOWA	7,739.52			10/04/21
						SEPTEMBER 2021 DENTAL				
						ACCOUNT TOTAL	7,739.52	.00		7,739.52
						FUND TOTAL	382,361.91	.00		382,361.91
FUND 681 HEALTH SEVERANCE										
681-1902-457.51-10						INSURANCE / HEALTH SEVERANCE PAYMENTS				
584		04/22	AP	10/08/21	0396277	ANDERSON, ALETA L.	148.50			10/12/21
						RMB:SEP.2021 HEALTH SEV.				
584		04/22	AP	10/08/21	0396277	ANDERSON, ALETA L.	148.50			10/12/21
						RMB:SEP.2021 HEALTH SEV.				
568		04/22	AP	10/07/21	0396276	WINTERBERG, PATSY	486.00			10/08/21
						RMB:OCT-DEC'21 HEALTH SEV				
568		04/22	AP	10/07/21	0396276	WINTERBERG, PATSY	564.90			10/08/21
						RMB:OCT-DEC'21 HEALTH SEV				
584		04/22	AP	10/07/21	0396283	REGENOLD, SHARON K.	261.17			10/12/21
						RMB:AUG.2021 HEALTH SEV.				
						ACCOUNT TOTAL	1,609.07	.00		1,609.07
						FUND TOTAL	1,609.07	.00		1,609.07
FUND 682 HEALTH INSURANCE - FIRE										
FUND 685 VEHICLE MAINTENANCE FUND										
FUND 686 PAYROLL FUND										
686-0000-222.01-00						PAYROLL LIABILITY / FEDERAL TAXES				
403		03/22	AP	09/27/21	0005833	UNITED STATES TREASURY	65,374.39			10/04/21
						FEDERAL WITHHOLDING TAX				
403		03/22	AP	09/13/21	0005832	UNITED STATES TREASURY	64,309.64			10/04/21
						FEDERAL WITHHOLDING				

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FUND 686 PAYROLL FUND										
686-0000-222.01-00 PAYROLL LIABILITY / FEDERAL TAXES							continued			
ACCOUNT TOTAL							129,684.03	.00	129,684.03	
686-0000-222.02-00 PAYROLL LIABILITY / STATE WITHHOLDING										
403		03/22 AP		09/27/21	0005809	IOWA DEPT.OF REVENUE	27,950.01			10/04/21
						STATE WITHHOLDING TAX				09/24/21 PAYROLL
403		03/22 AP		09/10/21	0005806	IOWA DEPT.OF REVENUE	27,618.51			10/04/21
						STATE WITHHOLDING TAX				09/10/21 PAYROLL
ACCOUNT TOTAL							55,568.52	.00	55,568.52	
686-0000-222.03-00 PAYROLL LIABILITY / FICA										
403		03/22 AP		09/27/21	0005833	UNITED STATES TREASURY	74,965.74			10/04/21
						SS & MQGE/MEDICARE TAX				09/24/21 PAYROLL
403		03/22 AP		09/13/21	0005832	UNITED STATES TREASURY	76,048.40			10/04/21
						SS & MQGE/MEDICARE TAX				09/10/21 PAYROLL
ACCOUNT TOTAL							151,014.14	.00	151,014.14	
686-0000-222.04-00 PAYROLL LIABILITY / IPERS										
403		03/22 AP		09/29/21	0005805	I.P.E.R.S.	138,212.29			10/04/21
						IPERS SEPTEMBER 2021				
403		03/22 AP		09/08/21	0005804	I.P.E.R.S.	137,041.45			10/04/21
						IPERS AUGUST 2021				
ACCOUNT TOTAL							275,253.74	.00	275,253.74	
686-0000-222.05-00 PAYROLL LIABILITY / OTHER DEDUCTIONS PAYABLE										
403		03/22 AP		09/27/21	0005793	COLLECTION SERVICES CENTER	653.39			10/04/21
						CHILD SUPPORT PAYMENTS				09/24/21 PAYROLL
403		03/22 AP		09/24/21	0005814	ISOLVED BENEFIT SERVICES, INC	7,336.77			10/04/21
						CAFETERIA PLAN				09/24/21 PAYROLL
403		03/22 AP		09/23/21	0005836	VOYA FINANCIAL	9,865.00			10/04/21
						EMPLOYEE 457 CONTRIBUTION				09/24/21 PAYROLL
403		03/22 AP		09/13/21	0005792	COLLECTION SERVICES CENTER	653.39			10/04/21
						CHILD SUPPORT PAYMENTS				09/10/21 PAYROLL
403		03/22 AP		09/10/21	0005811	ISOLVED BENEFIT SERVICES, INC	7,336.77			10/04/21
						CAFETERIA PLAN				09/10/21 PAYROLL
403		03/22 AP		09/08/21	0005835	VOYA FINANCIAL	10,465.00			10/04/21
						EMPLOYEE 457 CONTRIBUTION				09/10/21 PAYROLL
ACCOUNT TOTAL							36,310.32	.00	36,310.32	
686-0000-222.14-00 PAYROLL LIABILITY / POLICE & FIRE RETIREMENT										

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FUND 686 PAYROLL FUND										
686-0000-222.14-00 PAYROLL LIABILITY / POLICE & FIRE RETIREMENT						continued				
403		03/22 AP		09/29/21	0005816	MUNICIPAL FIRE & POLICE RETIR	161,905.90			10/04/21
						MPPRSI RETIREMENT				
403		03/22 AP		09/07/21	0005815	MUNICIPAL FIRE & POLICE RETIR	162,189.95			10/04/21
						MPPRSI RETIREMENT				
						ACCOUNT TOTAL	324,095.85	.00	324,095.85	
						FUND TOTAL	971,926.60	.00	971,926.60	
FUND 687 WORKERS COMPENSATION FUND										
687-1902-457.51-02 INSURANCE / WORKERS COMP INSURANCE										
403		03/22 AP		09/14/21	0005796	EMC RISK SERVICES, LLC	225.00			10/04/21
						WORKER COMP ADMIN FEES				
						ACCOUNT TOTAL	225.00	.00	225.00	
						FUND TOTAL	225.00	.00	225.00	
FUND 688 LTD INSURANCE FUND										
688-1902-457.51-03 INSURANCE / LTD INSURANCE										
534		04/22 AP		10/01/21	0396222	MADISON NATIONAL LIFE INS.CO	4,038.15			10/04/21
						LTD - OCTOBER 2021				
						ACCOUNT TOTAL	4,038.15	.00	4,038.15	
688-1902-457.51-04 INSURANCE / LIFE INSURANCE										
534		04/22 AP		10/01/21	0396227	STANDARD INSURANCE COMPANY	3,602.67			10/04/21
						GROUP LIFE AD/D-OCT'21				
						ACCOUNT TOTAL	3,602.67	.00	3,602.67	
						FUND TOTAL	7,640.82	.00	7,640.82	
FUND 689 LIABILITY INSURANCE FUND										
FUND 724 TRUST & AGENCY										
FUND 727 GREENWOOD CEMETERY P-CARE										
FUND 728 FAIRVIEW CEMETERY P-CARE										

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GROUP	PO	ACCTG	----TRANSACTION----						CURRENT
NBR	NBR	PER.	CD	DATE	NUMBER	DESCRIPTION	DEBITS	CREDITS	BALANCE
									POST DT ----
FUND 729	HILLSIDE	CEMETERY	P-CARE						
FUND 790	FLOOD	LEVY							
			GRAND TOTAL				1,646,062.65	1,000.00	1,645,062.65

Council Invoices for Council Meeting 10/18/21

Item 26.

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GROUP	PO	ACCTG	----TRANSACTION----	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE
NBR	NBR	PER.	CD	DATE	NUMBER		POST DT
FUND 101 GENERAL FUND							
101-1008-441.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES							
547		04/22 AP		09/29/21	0000000	13.04	10/12/21
		COPY PAPER		OFFICE EXPRESS OFFICE PRODUCT			
547		04/22 AP		09/28/21	0000000	1.58	10/12/21
		STAPLES, CALC PAPER, POSTIT		OFFICE EXPRESS OFFICE PRODUCT			
		ACCOUNT TOTAL				14.62	14.62
101-1008-441.83-06 TRANSPORTATION&EDUCATION / EDUCATION							
544		04/22 AP		09/17/21	0138364	125.00	10/07/21
		IOWA LEAGUE OF CITIES		US BANK REG:IMFOA FALL CONF-KERR			
		ACCOUNT TOTAL				125.00	125.00
101-1026-441.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES							
547		04/22 AP		09/29/21	0000000	4.35	10/12/21
		COPY PAPER		OFFICE EXPRESS OFFICE PRODUCT			
547		04/22 AP		09/28/21	0000000	.47	10/12/21
		STAPLES, CALC PAPER, POSTIT		OFFICE EXPRESS OFFICE PRODUCT			
		ACCOUNT TOTAL				4.82	4.82
101-1026-441.83-04 TRANSPORTATION&EDUCATION / DUES & MEMBERSHIPS							
544		04/22 AP		08/24/21	0138364	285.00	10/07/21
		AICPA *ORDER		US BANK MEMBERSHIP:RODENBECK			
		ACCOUNT TOTAL				285.00	285.00
101-1028-441.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES							
547		04/22 AP		09/29/21	0000000	17.39	10/12/21
		COPY PAPER		OFFICE EXPRESS OFFICE PRODUCT			
547		04/22 AP		09/28/21	0000000	1.58	10/12/21
		STAPLES, CALC PAPER, POSTIT		OFFICE EXPRESS OFFICE PRODUCT			
547		04/22 AP		09/16/21	0000000	76.51	10/12/21
		S42 LASER PERF PAPER		STOREY KENWORTHY BLANK CP-20			
		ACCOUNT TOTAL				95.48	95.48
101-1028-441.83-06 TRANSPORTATION&EDUCATION / EDUCATION							
544		04/22 AP		09/13/21	0138364	175.00	10/07/21
		IOWA LEAGUE OF CITIES		US BANK REG:IMFOA-ROEDING 10/21			
544		04/22 AP		09/13/21	0138364	175.00	10/07/21
		IOWA LEAGUE OF CITIES		US BANK REG:IMFOA-KOCKLER 10/21			
		ACCOUNT TOTAL				350.00	350.00

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GROUP NBR	PO NBR	ACCTG PER.	CD	DATE	TRANSACTION NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE	POST DT	
FUND 101 GENERAL FUND											
101-1038-441.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES											
547		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	17.39			10/12/21	
		COPY PAPER									
547		04/22 AP		09/28/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	.47			10/12/21	
		STAPLES,CALC PAPER,POSTIT									
		ACCOUNT TOTAL						17.86	.00	17.86	
101-1038-441.81-49 ADMINISTRATIVE SERVICES / PROFESSIONAL SERVICES											
547		04/22 AP		09/30/21	0000000	ONE SOURCE THE BACKGROUND CHE	99.00			10/12/21	
		ACCOUNT SET UP FEE									
		ACCOUNT TOTAL						99.00	.00	99.00	
101-1038-441.81-53 PROFESSIONAL SERVICES / JOB NOTICES											
547		04/22 AP		09/30/21	0000000	CEDAR VALLEY SAVER, INC.	75.00			10/12/21	
		JOB AD:REC CTR PROGRAMS 9/30/21 DISPLAY AD/WEB AD									
547		04/22 AP		09/26/21	0000000	COURIER COMMUNICATIONS-ADVERT	840.00			10/12/21	
		CV AT WORK POSTINGS EMPLOYMENT PACKAGES									
547		04/22 AP		09/26/21	0000000	COURIER COMMUNICATIONS-ADVERT	840.00			10/12/21	
		MONSTER POSTINGS EMPLOYMENT PACKAGES									
547		04/22 AP		09/26/21	0000000	COURIER COMMUNICATIONS-ADVERT	1,000.00			10/12/21	
		SOCIAL POSTINGS EMPLOYMENT PACKAGES									
547		04/22 AP		09/26/21	0000000	COURIER COMMUNICATIONS-ADVERT	250.00			10/12/21	
		JOB AD:SEASONAL LABORERS ONLINE DIGITAL IMPRESSION									
547		04/22 AP		09/26/21	0000000	COURIER COMMUNICATIONS-ADVERT	41.34			10/12/21	
		JOB AD:SEASONAL LABORERS COURIER									
547		04/22 AP		09/26/21	0000000	COURIER COMMUNICATIONS-ADVERT	267.00			10/12/21	
		JOB AD:PT LABORERS ONLINE DIGITAL IMPRESSION									
547		04/22 AP		09/26/21	0000000	COURIER COMMUNICATIONS-ADVERT	45.50			10/12/21	
		JOB AD:PT LABORERS COURIER									
547		04/22 AP		09/26/21	0000000	COURIER COMMUNICATIONS-ADVERT	166.66			10/12/21	
		JOB AD:REC CENTER ONLINE DIGITAL IMPRESSION									
547		04/22 AP		09/26/21	0000000	COURIER COMMUNICATIONS-ADVERT	31.25			10/12/21	
		JOB AD:REC CENTER COURIER									
547		04/22 AP		09/26/21	0000000	COURIER COMMUNICATIONS-ADVERT	85.50			10/12/21	
		JOB AD:RESERVE POLICE COURIER									
547		04/22 AP		09/26/21	0000000	COURIER COMMUNICATIONS-ADVERT	54.00			10/12/21	
		JOB AD:PUB.SAFETY OFFICER COURIER									
547		04/22 AP		09/22/21	0000000	COURIER COMMUNICATIONS-ADVERT	33.00			10/12/21	
		JOB AD:SEASONAL LABORERS PULSE									
547		04/22 AP		09/22/21	0000000	COURIER COMMUNICATIONS-ADVERT	33.00			10/12/21	
		JOB AD:PT LABORERS PULSE									
547		04/22 AP		09/22/21	0000000	COURIER COMMUNICATIONS-ADVERT	25.00			10/12/21	
		JOB AD:REC CENTER PULSE									
547		04/22 AP		09/21/21	0000000	COURIER COMMUNICATIONS-ADVERT	39.00			10/12/21	
		SEARCH BOOST ONLINE									
547		04/22 AP		09/19/21	0000000	COURIER COMMUNICATIONS-ADVERT	33.00			10/12/21	

GROUP NBR	PO NBR	ACCTG PER.	CD	DATE	TRANSACTION NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE	POST DT
FUND 101 GENERAL FUND										
101-1038-441.81-53						PROFESSIONAL SERVICES / JOB NOTICES				continued
						JOB AD:VISITOR & TOURISM				
547		04/22 AP		09/19/21	0000000	COURIER COMMUNICATIONS-ADVERT	41.33			10/12/21
						COURIER				
547		04/22 AP		09/19/21	0000000	COURIER COMMUNICATIONS-ADVERT	74.50			10/12/21
						COURIER				
547		04/22 AP		09/19/21	0000000	COURIER COMMUNICATIONS-ADVERT	60.25			10/12/21
						COURIER				
547		04/22 AP		09/18/21	0000000	COURIER COMMUNICATIONS-ADVERT	250.00			10/12/21
						ONLINE DIGITAL IMPRESSION				
547		04/22 AP		09/15/21	0000000	COURIER COMMUNICATIONS-ADVERT	33.00			10/12/21
						PULSE				
547		04/22 AP		09/15/21	0000000	COURIER COMMUNICATIONS-ADVERT	33.00			10/12/21
						PULSE				
544		04/22 AP		09/13/21	0138364	US BANK	527.08			10/07/21
						LINKEDIN-701*9577654				
547		04/22 AP		09/12/21	0000000	COURIER COMMUNICATIONS-ADVERT	33.00			10/12/21
						COURIER				
547		04/22 AP		09/12/21	0000000	COURIER COMMUNICATIONS-ADVERT	41.33			10/12/21
						COURIER				
547		04/22 AP		09/08/21	0000000	COURIER COMMUNICATIONS-ADVERT	33.00			10/12/21
						PULSE				
544		04/22 AP		09/06/21	0138364	US BANK	119.95			10/07/21
						LINKEDIN 7000449894				
547		04/22 AP		09/05/21	0000000	COURIER COMMUNICATIONS-ADVERT	62.00			10/12/21
						COURIER				
547		04/22 AP		09/05/21	0000000	COURIER COMMUNICATIONS-ADVERT	450.00			10/12/21
						30K IMPRESSIONS				
544		04/22 AP		08/25/21	0138364	US BANK	229.00			10/07/21
						YOURMEMBER-CAREERS				
544		04/22 AP		08/25/21	0138364	US BANK	90.19			10/07/21
						LINKEDIN-696*0179764				
544		04/22 AP		08/25/21	0138364	US BANK	315.69			10/07/21
						LINKEDIN-696*0179764				
544		04/22 AP		08/25/21	0138364	US BANK	104.87			10/07/21
						LINKEDIN-696*0179764				
						JOB AD:CODE ENFORCEMENT				
						JOB AD:LAND SURVEYOR				
						JOB AD:CODE ENFORCEMENT				
						JOB AD:HR MANAGER				
						ACCOUNT TOTAL	6,357.44	.00	6,357.44	
101-1038-441.81-56 PROFESSIONAL SERVICES / EMPLOYEE WELLNESS PROG										
547		04/22 AP		09/30/21	0000000	SQL INVESTMENTS LLC	463.76			10/12/21
						WELLNESS CHALLENGE PRIZES				
						62 SMOOTHIES				
						ACCOUNT TOTAL	463.76	.00	463.76	
101-1048-441.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES										
547		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	1.74			10/12/21
						COPY PAPER				

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GROUP NBR	PO NBR	ACCTG PER.	CD	DATE	TRANSACTION NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE	POST DT
FUND 101 GENERAL FUND										
101-1048-441.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES						continued				
547		04/22 AP		09/28/21	0000000	OFFICE EXPRESS OFFICE PRODUCT STAPLES,CALC PAPER,POSTIT	.29			10/12/21
ACCOUNT TOTAL							2.03	.00	2.03	
101-1048-441.72-11 OPERATING SUPPLIES / DUES, BOOKS, MAGAZINES										
547		04/22 AP		10/01/21	0000000	THOMSON REUTERS - WEST WESTLAW INFORMATION	644.21			10/12/21
ACCOUNT TOTAL							644.21	.00	644.21	
101-1048-441.81-29 PROFESSIONAL SERVICES / LEGAL CONSULTANTS										
547		04/22 AP		09/23/21	0000000	AHLERS AND COONEY, P.C. LGL:GENERAL MATTERS	73.50			10/12/21
ACCOUNT TOTAL							73.50	.00	73.50	
101-1060-423.81-91 PROFESSIONAL SERVICES / LICENSES & SERVICE CONTRT										
545		04/22 AP		09/13/21	0138364	US BANK INTUIT *QUICKBOOKS ONLINE	70.00			10/07/21
ACCOUNT TOTAL							70.00	.00	70.00	
101-1060-423.89-20 MISCELLANEOUS SERVICES / ADULT BOOKS										
545		04/22 AP		08/30/21	0138364	US BANK AMAZON.COM*251F07XW1	25.99			10/07/21
ACCOUNT TOTAL							25.99	.00	25.99	
101-1060-423.89-33 MISCELLANEOUS SERVICES / FRIENDS SUPPORTED PROGRAM										
545		04/22 AP		09/20/21	0138364	US BANK	20.50			10/07/21
545		04/22 AP		09/17/21	0138364	US BANK AMZN MKTP US*2G1FN5KM1	80.44			10/07/21
545		04/22 AP		09/15/21	0138364	US BANK AMZN MKTP US*2G99M7DF1	21.98			10/07/21
545		04/22 AP		09/14/21	0138364	US BANK AMZN MKTP US*2G60I9MCO	21.90			10/07/21
545		04/22 AP		09/09/21	0138364	US BANK AMZN MKTP US*255JI3RI2	10.79			10/07/21
545		04/22 AP		09/09/21	0138364	US BANK AMZN MKTP US*2G9FB5ZD1 AM	10.79			10/07/21
545		04/22 AP		09/09/21	0138364	US BANK AMZN MKTP US*2G86T5LY0 AM	14.80			10/07/21
545		04/22 AP		09/09/21	0138364	US BANK AMZN MKTP US*250ID8HY2				10/07/21

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GROUP NBR	PO NBR	ACCTG PER.	CD	DATE	TRANSACTION NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE	POST DT
FUND 101 GENERAL FUND										
101-1060-423.89-33 MISCELLANEOUS SERVICES / FRIENDS SUPPORTED PROGRAM						continued				
545		04/22 AP		09/09/21	0138364	US BANK	19.80			10/07/21
						FOTL:YOUTH-GLOVES				
545		04/22 AP		09/06/21	0138364	US BANK	5.85			10/07/21
						FOTL:YOUTH-LETTER BEADS				
545		04/22 AP		09/03/21	0138364	US BANK	14.16			10/07/21
						FOTL:COLAB-SPICES				
545		04/22 AP		09/02/21	0138364	US BANK	152.99			10/07/21
						FOTL:ADULT-INFLATABLE				
545		04/22 AP		09/01/21	0138364	US BANK	71.04			10/07/21
						FOTL:YOUTH-PAINT				
545		04/22 AP		08/31/21	0138364	US BANK	119.84			10/07/21
						FOTL:YA-PSN &XBOX NETWORK				
545		04/22 AP		08/31/21	0138364	US BANK	21.99			10/07/21
						FOTL:YOUTH-DESKTOP				
						ACCOUNT TOTAL	586.87	.00	586.87	
101-1060-423.89-34 MISCELLANEOUS SERVICES / ENDOWMENT SUPPORTED PROG.										
545		04/22 AP		09/10/21	0138364	US BANK	10.00			10/07/21
						BERG 2 RMB SLP '21-TROPHY				
						ACCOUNT TOTAL	10.00	.00	10.00	
101-1061-423.71-11 OFFICE SUPPLIES / TECHNICAL PROCESSING SUPP										
545		04/22 AP		08/27/21	0138364	US BANK	5.81			10/07/21
						LR1130 BATTERIES 4 YOUTH				
545		04/22 AP		08/25/21	0138364	US BANK	226.90			10/07/21
						CD/DVD/BLURAY REPAIR				
						ACCOUNT TOTAL	232.71	.00	232.71	
101-1061-423.89-20 MISCELLANEOUS SERVICES / ADULT BOOKS										
545		04/22 AP		09/20/21	0138364	US BANK	14.29			10/07/21
						ADULT BOOKS				
545		04/22 AP		09/20/21	0138364	US BANK	21.95			10/07/21
						ADULT BOOKS				
545		04/22 AP		09/15/21	0138364	US BANK	17.47			10/07/21
						ADULT BOOKS				
545		04/22 AP		09/14/21	0138364	US BANK	28.01			10/07/21
						ADULT BOOKS				
545		04/22 AP		09/03/21	0138364	US BANK	16.99			10/07/21
						ADULT BOOKS				
545		04/22 AP		08/30/21	0138364	US BANK	23.83			10/07/21
						ADULT BOOKS				
545		04/22 AP		08/23/21	0138364	US BANK	12.99			10/07/21
						ADULT BOOKS				

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GROUP NBR	PO NBR	ACCTG PER.	CD	DATE	TRANSACTION NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE	POST DT
FUND 101 GENERAL FUND										
101-1061-423.89-20 MISCELLANEOUS SERVICES / ADULT BOOKS continued										
ACCOUNT TOTAL							135.53	.00	135.53	
101-1061-423.89-21 MISCELLANEOUS SERVICES / YOUNG ADULT BOOKS										
545		04/22 AP		09/08/21	0138364	US BANK	23.95			10/07/21
						AMAZON.COM*2G4PF1481				
ACCOUNT TOTAL							23.95	.00	23.95	
101-1061-423.89-22 MISCELLANEOUS SERVICES / YOUTH BOOKS										
545		04/22 AP		09/20/21	0138364	US BANK	30.38			10/07/21
						AMAZON.COM*2G9DH7RB1 AMZN				
545		04/22 AP		09/16/21	0138364	US BANK	14.40			10/07/21
						AMAZON.COM*2G6JP0QB1 AMZN				
545		04/22 AP		09/15/21	0138364	US BANK	39.94			10/07/21
						AMZN MKTP US*2G9JI4HV1				
545		04/22 AP		09/13/21	0138364	US BANK	15.49			10/07/21
						AMAZON.COM*2G8JF10Z1				
545		04/22 AP		09/10/21	0138364	US BANK	19.71			10/07/21
						AMZN MKTP US*2G50W2NDO				
545		04/22 AP		09/07/21	0138364	US BANK	26.25			10/07/21
						AMAZON.COM*255P59YR0 AMZN				
545		04/22 AP		09/07/21	0138364	US BANK	132.93			10/07/21
						AMZN MKTP US*258Y87GA2				
545		04/22 AP		09/03/21	0138364	US BANK	47.52			10/07/21
						AMZN MKTP US*259Y70SB1				
545		04/22 AP		08/31/21	0138364	US BANK	14.99			10/07/21
						AMAZON.COM*2527V7VX0				
545		04/22 AP		08/23/21	0138364	US BANK	7.99			10/07/21
						AMAZON.COM*2D27H1GN2 AMZN				
545		04/22 AP		08/23/21	0138364	US BANK	49.56			10/07/21
						AMZN MKTP US*2D19G0KB0				
545		04/22 AP		08/23/21	0138364	US BANK	13.30			10/07/21
						AMAZON.COM*2D7147YA1				
ACCOUNT TOTAL							412.46	.00	412.46	
101-1061-423.89-24 MISCELLANEOUS SERVICES / ADULT AUDIO										
545		04/22 AP		08/30/21	0138364	US BANK	13.98			10/07/21
						AMAZON.COM*256AG81A0 AMZN				
545		04/22 AP		08/24/21	0138364	US BANK	20.96			10/07/21
						AMZN MKTP US*2D3BX2RJ0				
ACCOUNT TOTAL							34.94	.00	34.94	

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GROUP NBR	PO NBR	ACCTG PER.	CD	DATE	-----TRANSACTION----- NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE	POST DT
FUND 101 GENERAL FUND										
101-1061-423.89-25						MISCELLANEOUS SERVICES / ADULT VIDEO				
545		04/22 AP		09/03/21	0138364	US BANK	53.38			10/07/21
						AMZN MKTP US*252004JR2				
545		04/22 AP		09/02/21	0138364	US BANK	24.99			10/07/21
						AMZN MKTP US*2553N5Q40				
545		04/22 AP		09/01/21	0138364	US BANK	22.88			10/07/21
						AMZN MKTP US*258HI7H91				
545		04/22 AP		09/01/21	0138364	US BANK	17.60			10/07/21
						AMZN MKTP US*2543T2B71				
545		04/22 AP		08/23/21	0138364	US BANK	9.99			10/07/21
						AMAZON.COM*2D0100Y11 AMZN				
						ADULT VIDEOS				
						ACCOUNT TOTAL	128.84	.00		128.84
101-1061-423.89-47						MISCELLANEOUS SERVICES / LIBRARY OF THINGS				
545		04/22 AP		09/16/21	0138364	US BANK	35.96			10/07/21
						AMZN MKTP US*2G9S60FP2				
						6 & 9" SILICONE BANDS				
545		04/22 AP		08/31/21	0138364	US BANK	7.99			10/07/21
						AMZN MKTP US*258I05MF0				
						METAL BINDER RINGS				
						ACCOUNT TOTAL	43.95	.00		43.95
101-1118-441.71-01						OFFICE SUPPLIES / OFFICE SUPPLIES				
547		04/22 AP		10/01/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	6.33			10/12/21
						PERM. MARKERS BLACK				
547		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	.87			10/12/21
						COPY PAPER				
547		04/22 AP		09/28/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	16.46			10/12/21
						STAPLES,CALC PAPER,POSTIT				
						PENS				
						ACCOUNT TOTAL	23.66	.00		23.66
101-1118-441.83-05						TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)				
544		04/22 AP		09/03/21	0138364	US BANK	20.49			10/07/21
						KUM&GO 0201 CORALVIL				
544		04/22 AP		09/03/21	0138364	US BANK	946.36			10/07/21
						HYATT REGENCY ST.LOUIS				
544		04/22 AP		09/03/21	0138364	US BANK	7.29			10/07/21
						HYATT REGENCY ST.LOUIS F				
544		04/22 AP		09/01/21	0138364	US BANK	7.01			10/07/21
						MARRIOTT ST LOUIS GRND				
544		04/22 AP		08/30/21	0138364	US BANK	31.54			10/07/21
						SHELL OIL 52408520048				
544		04/22 AP		08/30/21	0138364	US BANK	16.52			10/07/21
						HYATT REGENCY ST.LOUIS F				
						MEAL:GAINES APWA PWX				
						ACCOUNT TOTAL	1,029.21	.00		1,029.21

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FUND 101 GENERAL FUND										
101-1158-441.71-01						OFFICE SUPPLIES / OFFICE SUPPLIES				
547		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	.87			10/12/21
						COPY PAPER				
547		04/22 AP		09/28/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	.23			10/12/21
						STAPLES,CALC PAPER,POSTIT				
						ACCOUNT TOTAL	1.10	.00	1.10	
101-1158-441.83-04 TRANSPORTATION&EDUCATION / DUES & MEMBERSHIPS										
547		04/22 AP		10/06/21	0000000	UNIVERSITY OF NORTHERN IOWA	500.00			10/12/21
						IDM PARTNERSHIP FEE				
						ACCOUNT TOTAL	500.00	.00	500.00	
101-1158-441.83-05 TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)										
544		04/22 AP		08/30/21	0138364	US BANK		13.00		10/07/21
						UNITED 0169933760565				
						REFUND OF SEAT ASSIGNMENT				
544		04/22 AP		08/30/21	0138364	US BANK		8.00		10/07/21
						UNITED 0169933760566				
						REFUND OF SEAT ASSIGNMENT				
						ACCOUNT TOTAL	.00	21.00	21.00	
101-1158-441.83-06 TRANSPORTATION&EDUCATION / EDUCATION										
544		04/22 AP		09/06/21	0138364	US BANK	215.00			10/07/21
						IOWA LEAGUE OF CITIES				
						REG:ANNUAL CONF-GREEN				
						ACCOUNT TOTAL	215.00	.00	215.00	
101-1199-411.32-91 COMM PROTECTION GRANTS / POL-TARGET CHILD SAFETY										
544		04/22 AP		09/14/21	0138364	US BANK	462.00			10/07/21
						COPYWORKS CEDAR FALLS				
						FINGERPRINT KITS-SAFETY				
544		04/22 AP		08/30/21	0138364	US BANK	1,402.69			10/07/21
						PROMOTIONS NOW				
						SAFETY CITY PROMO SUPPL.				
						ACCOUNT TOTAL	1,864.69	.00	1,864.69	
101-1199-421.31-10 HUMAN DEVELOPMENT GRANTS / GRANTS - CULTURAL SERVICE										
556		04/22 AP		10/07/21	0000000	BEHM, KIM	200.00			10/12/21
						TEACHING IOWA ARTIST				
						WORKSHOP 10/3/21				
544		04/22 AP		09/06/21	0138364	US BANK	1,107.82			10/07/21
						IN *BOOKMOBILE				
						NUHN BOOKS - GRANT FUNDED				
544		04/22 AP		08/31/21	0138364	US BANK	590.82			10/07/21
						BOOK MOBILE				
						DOWNPAYMENT ON NUHN BOOKS				
						ACCOUNT TOTAL	1,898.64	.00	1,898.64	

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FUND 101 GENERAL FUND										
101-1199-431.88-01						OUTSIDE AGENCIES / MET - CF DISABLED				
547		04/22 AP		10/01/21	0000000	METROPOLITAN TRANSIT AUTHORIT	8,792.50			10/12/21
						PAYMENT FOR FY22-2ND QTR				
						ACCOUNT TOTAL	8,792.50	.00	8,792.50	
101-1199-431.88-02						OUTSIDE AGENCIES / MET-RTC				
547		04/22 AP		10/01/21	0000000	METROPOLITAN TRANSIT AUTHORIT	5,860.00			10/12/21
						PAYMENT FOR FY22-2ND QTR				
						ACCOUNT TOTAL	5,860.00	.00	5,860.00	
101-1199-431.88-11						OUTSIDE AGENCIES / MET TRANSIT AUTHORITY				
547		04/22 AP		10/01/21	0000000	METROPOLITAN TRANSIT AUTHORIT	83,267.50			10/12/21
						PAYMENT FOR FY22-2ND QTR				
						ACCOUNT TOTAL	83,267.50	.00	83,267.50	
101-1199-431.88-12						OUTSIDE AGENCIES / MET CAPITAL REPLACEMENT				
547		04/22 AP		10/01/21	0000000	VEHICLE MAINTENANCE FUND	4,107.50			10/12/21
						PAYMENT FOR FY22-2ND QTR				
						ACCOUNT TOTAL	4,107.50	.00	4,107.50	
101-1199-431.88-19						OUTSIDE AGENCIES / MET-ROUTE 9				
547		04/22 AP		10/01/21	0000000	METROPOLITAN TRANSIT AUTHORIT	8,677.50			10/12/21
						PAYMENT FOR FY22-2ND QTR				
						ACCOUNT TOTAL	8,677.50	.00	8,677.50	
101-1199-441.72-19						OPERATING SUPPLIES / PRINTING				
547		04/22 AP		09/28/21	0000000	COURIER LEGAL COMMUNICATIONS	468.80			10/12/21
						9/20/21 CC MTG MINS/BILLS				
547		04/22 AP		09/28/21	0000000	COURIER COMMUNICATIONS	116.25			10/12/21
						NEWSPAPER SUBSCRIPTION				
						UP TO 52 WEEKS-GOLD				
547		04/22 AP		09/24/21	0000000	COURIER LEGAL COMMUNICATIONS	37.28			10/12/21
						PH NTC-REZONE/LUMA				
						CREEKSIDE CONDOS				
547		04/22 AP		09/17/21	0000000	COURIER LEGAL COMMUNICATIONS	433.41			10/12/21
						9/7/21 CC MTG MINS/BILLS				
						ACCOUNT TOTAL	1,055.74	.00	1,055.74	
101-1199-441.81-02						PROFESSIONAL SERVICES / AUDIT				
547		04/22 AP		09/30/21	0000000	EIDE BAILLY, LLP	19,000.00			10/12/21

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FUND 101 GENERAL FUND										
101-1199-441.81-02 PROFESSIONAL SERVICES / AUDIT						continued				
INTERIM AUDIT WORK-FY2021						THROUGH SEPTEMBER 30 2021				
ACCOUNT TOTAL							19,000.00	.00	19,000.00	
101-1199-441.81-09 PROFESSIONAL SERVICES / HUMAN RIGHTS COMMISSION										
547		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT COPY PAPER	1.74			10/12/21
ACCOUNT TOTAL							1.74	.00	1.74	
101-2205-432.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES										
547		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT COPY PAPER	1.74			10/12/21
ACCOUNT TOTAL							1.74	.00	1.74	
101-2205-432.72-11 OPERATING SUPPLIES / DUES, BOOKS, MAGAZINES										
547		04/22 AP		09/28/21	0000000	COURIER COMMUNICATIONS NEWSPAPER SUBSCRIPTION UP TO 52 WEEKS-GOLD	116.25			10/12/21
ACCOUNT TOTAL							116.25	.00	116.25	
101-2205-432.83-06 TRANSPORTATION&EDUCATION / EDUCATION										
544		04/22 AP		08/31/21	0138364	US BANK AMERICAN PLANNING A TRAINING-STEPHANIE SHEETZ	150.00			10/07/21
ACCOUNT TOTAL							150.00	.00	150.00	
101-2205-432.88-10 OUTSIDE AGENCIES / BLACK HAWK COUNTY HEALTH										
547		04/22 AP		10/01/21	0000000	BLACK HAWK CO.HEALTH DEPT. PAYMENT FOR FY22-2ND QTR	3,250.00			10/12/21
ACCOUNT TOTAL							3,250.00	.00	3,250.00	
101-2205-432.88-38 OUTSIDE AGENCIES / CEDAR VALLEY SOCCER										
547		04/22 AP		10/01/21	0000000	CEDAR VALLEY YOUTH SOCCER ASS PAYMENT FOR FY22-2ND QTR	1,250.00			10/12/21
ACCOUNT TOTAL							1,250.00	.00	1,250.00	
101-2235-412.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES										
503		04/22 AP		09/22/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	26.10			10/12/21

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FUND 101 GENERAL FUND										
101-2235-412.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES						continued				
						11X17 PAPER				
503		04/22 AP		09/21/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	5.36			10/12/21
						LEGAL PADS, 1" BINDERS				
503		04/22 AP		09/21/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	13.77			10/12/21
						COPY PAPER				
ACCOUNT TOTAL							45.23	.00	45.23	
101-2235-412.71-07 OFFICE SUPPLIES / CODE ENFORCEMENT SUPPLIES										
501		04/22 AP		09/29/21	0000000	PROFESSIONAL LAWN CARE, LLC	261.25			10/12/21
						CODE E.MOW-2303 WASHINGTON				
501		04/22 AP		09/29/21	0000000	PROFESSIONAL LAWN CARE, LLC	85.00			10/12/21
						CODE ENF-2303 WASHINGTON				
501		04/22 AP		09/27/21	0000000	PROFESSIONAL LAWN CARE, LLC	142.50			10/12/21
						CODE ENF.MOW-234 CLARK				
501		04/22 AP		09/27/21	0000000	COOLEY SANITATION LLC	100.00			10/12/21
						519 SPRUCE HILL DR.				
501		04/22 AP		09/22/21	0000000	PROFESSIONAL LAWN CARE, LLC	142.50			10/12/21
						CODE EN.MOW-130 N.COLLEGE				
501		04/22 AP		09/17/21	0000000	COOLEY SANITATION LLC	200.00			10/12/21
						2321 IOWA PICKUP				
ACCOUNT TOTAL							931.25	.00	931.25	
101-2235-412.83-06 TRANSPORTATION&EDUCATION / EDUCATION										
544		04/22 AP		08/25/21	0138364	US BANK	387.00			10/07/21
						AIA IOWA				
						AIA CONFERENCE-J CASTLE				
ACCOUNT TOTAL							387.00	.00	387.00	
101-2245-442.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES										
547		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	13.05			10/12/21
						COPY PAPER				
ACCOUNT TOTAL							13.05	.00	13.05	
101-2245-442.72-11 OPERATING SUPPLIES / DUES, BOOKS, MAGAZINES										
547		04/22 AP		09/28/21	0000000	COURIER COMMUNICATIONS	116.25			10/12/21
						NEWSPAPER SUBSCRIPTION				
						UP TO 52 WEEKS-GOLD				
ACCOUNT TOTAL							116.25	.00	116.25	
101-2245-442.72-19 OPERATING SUPPLIES / PRINTING										
547		04/22 AP		09/16/21	0000000	COURIER LEGAL COMMUNICATIONS	24.15			10/12/21

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FUND 101 GENERAL FUND										
101-2245-442.72-19						OPERATING SUPPLIES / PRINTING PH NTC-REZONE 5424 UNIV AVENUE				continued
						ACCOUNT TOTAL	24.15	.00	24.15	
101-2245-442.81-01						PROFESSIONAL SERVICES / PROFESSIONAL SERVICES				
547		04/22 AP		09/24/21	0000000	DENTONS DAVIS BROWN PC	77.74			10/12/21
						LGL:RE:IMMIGRATION 8/5/21-8/9/21				
						ACCOUNT TOTAL	77.74	.00	77.74	
101-2245-442.83-06						TRANSPORTATION&EDUCATION / EDUCATION				
544		04/22 AP		09/10/21	0138364	US BANK		155.00		10/07/21
						GROWING SUSTAINABLE CC CONFERENCE-THOM WEINTRAUT				
544		04/22 AP		08/31/21	0138364	US BANK	155.00			10/07/21
						GROWING SUSTAINABLE CC CONFERENCE-THOM WEINTRAUT				
						ACCOUNT TOTAL	155.00	155.00	.00	
101-2253-423.71-01						OFFICE SUPPLIES / OFFICE SUPPLIES				
535		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	48.74			10/12/21
						11x17 COPY PAPER				
						ACCOUNT TOTAL	48.74	.00	48.74	
101-2253-423.72-31						OPERATING SUPPLIES / YOUTH SPORTS EQUIPMENT				
544		04/22 AP		09/09/21	0138364	US BANK	21.07			10/07/21
						O DONNELL ACE HARDWARE BATTERIES FOR YOUTH SPORT				
544		04/22 AP		09/06/21	0138364	US BANK	700.00			10/07/21
						NFLFLAGJERSEY ORDER FLAG FOOTBALL EQUIPMENT				
						ACCOUNT TOTAL	721.07	.00	721.07	
101-2253-423.72-32						OPERATING SUPPLIES / ADULT SPORTS EQUIPMENT				
535		04/22 AP		09/30/21	0000000	IOWA SPORTS SUPPLY	38.50			10/12/21
						HOME PLATE PLAQUES				
502		04/22 AP		09/14/21	0000000	XPRESSIONS	239.24			10/12/21
						KICKBALL SHIRTS				
544		04/22 AP		09/02/21	0138364	US BANK	55.95			10/07/21
						MENARDS CEDAR FALLS IA FACILITY SUPPLIES, REACH				
						ACCOUNT TOTAL	333.69	.00	333.69	
101-2253-423.72-50						OPERATING SUPPLIES / SPECIAL PROGRAM SUPPLIES				

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FUND 101 GENERAL FUND										
101-2253-423.72-50 OPERATING SUPPLIES / SPECIAL PROGRAM SUPPLIES						continued				
502		04/22 AP		05/18/21	0000000	XPRESSIONS PROMO BAGS	262.50			10/12/21
ACCOUNT TOTAL							262.50	.00	262.50	
101-2253-423.81-01 PROFESSIONAL SERVICES / PROFESSIONAL SERVICES										
502		04/22 AP		09/27/21	0000000	WATERLOO-C.F. UMPIRES ASSOC. UMPIRE BIRDSALL LEAGUE JULY-END SUMMER 2021	1,562.00			10/12/21
ACCOUNT TOTAL							1,562.00	.00	1,562.00	
101-2253-423.86-30 REPAIR & MAINTENANCE / MAINTENANCE & UPKEEP										
535		04/22 AP		09/30/21	0000000	CULLIGAN WATER CONDITIONING WORK ORDER WATER COND	68.75			10/12/21
544		04/22 AP		09/16/21	0138364	US BANK SQ *POLK'S LOCK SERVICE DOORS KEYS FOR REC CENTER	6.00			10/07/21
ACCOUNT TOTAL							74.75	.00	74.75	
101-2253-423.86-31 REPAIR & MAINTENANCE / THE FALLS REPAIR & MAINT.										
544		04/22 AP		09/17/21	0138364	US BANK O DONNELL ACE HARDWARE WEED TRIMMER STRING	33.38			10/07/21
502		04/22 AP		09/14/21	0000000	PLUMB TECH INC.	1,757.06			10/12/21
535		04/22 AP		06/30/21	0000000	PLUMB TECH INC. WATER HEATER DRAFT INDUCR FALLS	336.74			10/12/21
ACCOUNT TOTAL							2,127.18	.00	2,127.18	
101-2280-423.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES										
544		04/22 AP		09/16/21	0138364	US BANK AMZN MKTP US*2G4526890 KEYBOARD,MOUSE AND PART	94.97			10/07/21
ACCOUNT TOTAL							94.97	.00	94.97	
101-2280-423.72-70 OPERATING SUPPLIES / CLASSROOM SUPPLIES										
544		04/22 AP		09/16/21	0138364	US BANK WM SUPERCENTER #753 WATERCOLORS,DUCK TAPE,	70.70			10/07/21
544		04/22 AP		09/15/21	0138364	US BANK AMZN MKTP US*2G5NQ2CC2 RAKU KILN APRON AND LEG	193.76			10/07/21
544		04/22 AP		09/09/21	0138364	US BANK AMZN MKTP US*2G5CR3NY1 RAKU KILN THERMOMETER	74.88			10/07/21
544		04/22 AP		09/06/21	0138364	US BANK AMZN MKTP US*256KL3UT0 SUN PRINTS	43.96			10/07/21

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FUND 101 GENERAL FUND										
101-2280-423.72-70						OPERATING SUPPLIES / CLASSROOM SUPPLIES				continued
544		04/22 AP		08/23/21	0138364	US BANK	8.95			10/07/21
		HY-VEE				CEDAR FALLS 1052				
544		04/22 AP		08/23/21	0138364	US BANK	15.00			10/07/21
		DOLLAR TREE				PIPE CLEANERS, CAKE PANS				
ACCOUNT TOTAL							407.25	.00		407.25
101-2280-423.72-71 OPERATING SUPPLIES / GALLERY SUPPLIES										
556		04/22 AP		10/06/21	0000000	SIGNS BY TOMORROW	139.50			10/12/21
		SLICK, DRISCOLL, YOUNG BEAR				AND KAPAYOU LABELS				
556		04/22 AP		10/05/21	0000000	O'DONNELL ACE HARDWARE	8.38			10/12/21
		SAWTOOTH HANGER FOR ART								
556		04/22 AP		09/24/21	0000000	SIGNS & DESIGNS, INC.	70.00			10/12/21
		VINYL-SLICK & DIASPORA								
544		04/22 AP		09/20/21	0138364	US BANK	11.59			10/07/21
		AMZN MKTP US*2G1TA62L1				DOLL STAND				
544		04/22 AP		09/17/21	0138364	US BANK	51.51			10/07/21
		ETSY.COM - HANGERBEE				PADDED HANGERS				
544		04/22 AP		09/08/21	0138364	US BANK	149.86			10/07/21
		APPLIED MAGNETS				MAGNETS FOR EXHIBITIONS				
ACCOUNT TOTAL							430.84	.00		430.84
101-2280-423.72-72 OPERATING SUPPLIES / PRODUCTS FOR RESALE										
544		04/22 AP		08/26/21	0138364	US BANK	102.40			10/07/21
		AMZN MKTP US*2580I9NX1				MANS SEARCH FOR MEANING				
ACCOUNT TOTAL							102.40	.00		102.40
101-2280-423.72-73 OPERATING SUPPLIES / GROUNDS SUPPLIES										
544		04/22 AP		08/23/21	0138364	US BANK	26.98			10/07/21
		AMZN MKTP US*2D1TD4IY1				PLANT STAND FOR GALLERY				
ACCOUNT TOTAL							26.98	.00		26.98
101-2280-423.72-74 OPERATING SUPPLIES / SERVICE/VOLUNTEER SUPP.										
544		04/22 AP		09/03/21	0138364	US BANK	14.73			10/07/21
		UNI BOOKSTORE				PENS FOR BOOK SIGNING				
544		04/22 AP		08/30/21	0138364	US BANK	9.87			10/07/21
		KWIK STAR 72600007260				WATER AND ICE FOR FINAL				
544		04/22 AP		08/25/21	0138364	US BANK	399.80			10/07/21
		SPECIAL OCCASIONS				TENT RENTAL FOR GK BOOK				
ACCOUNT TOTAL							424.40	.00		424.40

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FUND 101 GENERAL FUND										
101-2280-423.72-99 OPERATING SUPPLIES / POSTAGE										
556		04/22	AP	09/29/21	0000000	FEDERAL EXPRESS	28.41			10/12/21
		DISCOLL ART-SHIPPING								
556		04/22	AP	09/22/21	0000000	FEDERAL EXPRESS	285.62			10/12/21
		SLICK ART-SHIPPING								
ACCOUNT TOTAL							314.03	.00		314.03
101-2280-423.81-01 PROFESSIONAL SERVICES / PROFESSIONAL SERVICES										
556		04/22	AP	10/07/21	0000000	KAPAYOU, DAZEGON	49.28			10/12/21
		DELIVERY OF ART PIECES- EXHIBITION.								
556		04/22	AP	10/03/21	0000000	HAWKEYE ALARM & SIGNAL CO.	142.50			10/12/21
		TESTED FIRE ALARM SYSTEM								
556		04/22	AP	10/01/21	0000000	ARAMARK	6.56			10/12/21
		RUG SERVICE								
556		04/22	AP	09/22/21	0000000	JOHNSON, DENNIS	50.00			10/12/21
		LUNCHTIME CONCERT 10/8/21								
ACCOUNT TOTAL							248.34	.00		248.34
101-2280-423.81-06 PROFESSIONAL SERVICES / PRINTING & PUBLICATION										
556		04/22	AP	09/22/21	0000000	KAREN'S PRINT-RITE	744.00			10/12/21
		SLICK &MESKWAKI POSTCARDS								
ACCOUNT TOTAL							744.00	.00		744.00
101-2280-423.81-61 PROFESSIONAL SERVICES / PROMOTIONS										
556		04/22	AP	09/30/21	0000000	IOWA PUBLIC RADIO, INC.	128.00			10/12/21
		FALL IPR ADS								
544		04/22	AP	09/15/21	0138364	US BANK	80.00			10/07/21
		BUSY BEAVER BUTTON CO. DUANE SLICK BUTTONS								
544		04/22	AP	09/13/21	0138364	US BANK	12.95			10/07/21
		CANVA* I03173-21827665 MONTHLY FEE								
544		04/22	AP	09/03/21	0138364	US BANK	76.18			10/07/21
		FACEBK FCHSL73ZN2 FALL CLASS ADS ON FACEBK								
544		04/22	AP	08/25/21	0138364	US BANK	45.00			10/07/21
		BUSY BEAVER BUTTON CO. BUTTONS FOR GK EXHIBITION								
ACCOUNT TOTAL							342.13	.00		342.13
101-2280-423.83-05 TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)										
544		04/22	AP	08/30/21	0138364	US BANK		8.00		10/07/21
		UNITED 0169933760563 REFUND OF SEAT ASSIGNMENT								
544		04/22	AP	08/30/21	0138364	US BANK		13.00		10/07/21
		UNITED 0169933760564 REFUND OF SEAT ASSIGNMENT								
ACCOUNT TOTAL							.00	21.00		21.00-

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FUND 101 GENERAL FUND										
101-2280-423.93-01						EQUIPMENT / EQUIPMENT				
544		04/22 AP		09/01/21	0138364	US BANK	12.98			10/07/21
						AMZN MKTP US*255HA4541				
						IPAD CABLE				
						ACCOUNT TOTAL	12.98	.00	12.98	
101-4511-414.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES										
547		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	1.74			10/12/21
						COPY PAPER				
						ACCOUNT TOTAL	1.74	.00	1.74	
101-4511-414.72-02 OPERATING SUPPLIES / LAUNDRY										
557		04/22 AP		10/01/21	0000000	ARAMARK	13.20			10/12/21
						TOWELS;MATS-PSS BUILDING				
557		04/22 AP		09/24/21	0000000	ARAMARK	7.25			10/12/21
						TOWELS-STATION #1				
557		04/22 AP		09/24/21	0000000	ARAMARK	13.20			10/12/21
						TOWELS;MATS-PSS BUILDING				
557		04/22 AP		09/17/21	0000000	ARAMARK	13.20			10/12/21
						TOWELS;MATS-PSS BUILDING				
						ACCOUNT TOTAL	46.85	.00	46.85	
101-4511-414.72-07 OPERATING SUPPLIES / EMS/RESCUE SUPPLIES										
544		04/22 AP		08/30/21	0138364	US BANK		14.84		10/07/21
						AED SUPERSTORE				
						CREDIT TAX-EMS SUPPLIES				
						ACCOUNT TOTAL	.00	14.84	14.84	
101-4511-414.72-10 OPERATING SUPPLIES / FIRE PREVENTION										
557		04/22 AP		10/06/21	0000000	MENARDS-CEDAR FALLS	237.44			10/12/21
						SMOKE ALARMS-FIRE PREVENT				
						FIRE PREVENTION WEEK				
544		04/22 AP		09/10/21	0138364	US BANK	1,095.48			10/07/21
						NFPA NATL FIRE PROTECT				
						FIRE PREVENTION MATERIALS				
						ACCOUNT TOTAL	1,332.92	.00	1,332.92	
101-4511-414.72-99 OPERATING SUPPLIES / POSTAGE										
557		04/22 AP		10/05/21	0000000	SANDRY FIRE SUPPLY, L.L.C.	9.51			10/12/21
						SHIPPING-SCBA WARRANTY				
						ACCOUNT TOTAL	9.51	.00	9.51	

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NBR	NBR	PER.	CD	DATE	NUMBER	DESCRIPTION		BALANCE
								POST DT
FUND 101 GENERAL FUND								
101-4511-414.73-10						OTHER SUPPLIES / HEADQUARTER SUPPLIES		
510		04/22 AP		08/31/21	0000000	NAPA AUTO PARTS	290.28	10/12/21
						PARTS & EXPENSES AUG'21		
557		04/22 AP		08/20/21	0000000	VARISITY CLEAN-CF	4.90	10/12/21
						CLEAN BLOOD OFF SHORTS		
						CASE#21-067445-JOSH GETZ		
ACCOUNT TOTAL						295.18	.00	295.18
101-4511-414.83-06 TRANSPORTATION&EDUCATION / EDUCATION								
557		04/22 AP		10/05/21	0000000	FIRE SERVICE TRNG. BUREAU	50.00	10/12/21
						1 CERT.FEE-FIRE FIGHTER 2		
						KYLE MANTERNACH		
557		04/22 AP		10/01/21	0000000	FIRE SERVICE TRNG. BUREAU	50.00	10/12/21
						1 CERT.FEE-FIRE FIGHTER 2		
						RETEST#3-BROOKE HELGESON		
544		04/22 AP		09/17/21	0138364	US BANK		10/07/21
						AEDS TODAY	184.50	
						CREDIT-AED TRAINER		
544		04/22 AP		08/30/21	0138364	US BANK	50.00	10/07/21
						FIRE SERVICE TRAINING BUR		
						1 CERT.FEE-FIRE OFFICER 2		
ACCOUNT TOTAL						150.00	184.50	34.50-
101-4511-414.86-01 REPAIR & MAINTENANCE / REPAIR & MAINTENANCE								
557		04/22 AP		09/17/21	0000000	OUTDOOR & MORE	74.85	10/12/21
						SMALL ENGINE FUEL		
ACCOUNT TOTAL						74.85	.00	74.85
101-4511-414.86-50 REPAIR & MAINTENANCE / SERVICE CONTRACTS								
557		04/22 AP		10/05/21	0000000	MIDWEST BREATHING AIR L.L.C.	802.16	10/12/21
						QTRLY.AIR TEST;REPAIRS		
						ANNUAL SERVICE		
ACCOUNT TOTAL						802.16	.00	802.16
101-4511-414.89-40 MISCELLANEOUS SERVICES / UNIFORM ALLOWANCE								
544		04/22 AP		09/02/21	0138364	US BANK	424.00	10/07/21
						EMBLEM ENTERPRISES INC		
						200 FIRE RESCUE PATCHES		
ACCOUNT TOTAL						424.00	.00	424.00
101-4511-414.93-01 EQUIPMENT / EQUIPMENT								
557		04/22 AP		09/23/21	0000000	CAMPBELL SUPPLY WATERLOO	171.72	10/12/21
						LONG BARREL AIR HAMMER		
						RESCUE EQUIPMENT FOR 540		
ACCOUNT TOTAL						171.72	.00	171.72

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FUND 101 GENERAL FUND											
101-5521-415.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES											
547		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	1.74			10/12/21	
		COPY PAPER									
561		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	24.50			10/12/21	
		REPORT COVER;RECEIPT BOOK									
561		04/22 AP		09/23/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	40.68			10/12/21	
		PLANNERS;BINDER CLIPS; LEGAL PADS;INDEX TABS									
561		04/22 AP		09/22/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	162.04			10/12/21	
		PAPER;PENS;CORRECT.TAPE									
561		04/22 AP		09/14/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	43.33			10/12/21	
		ORGANIZERS;POST-ITS									
544		04/22 AP		09/09/21	0138364	US BANK	24.98			10/07/21	
		AMZN MKTP US*251GD6882 WATERPROOF NOTEBOOKS-SWAT									
		ACCOUNT TOTAL						297.27	.00		297.27
101-5521-415.72-01 OPERATING SUPPLIES / OPERATING SUPPLIES											
557		04/22 AP		10/01/21	0000000	ARAMARK	13.20			10/12/21	
		TOWELS;MATS-PSS BUILDING									
561		04/22 AP		10/01/21	0000000	L & M TRANSMISSION	142.00			10/12/21	
		TOW & STORE-FORD ESCAPE CASE# 21-055304-ROLLOVER									
561		04/22 AP		10/01/21	0000000	L & M TRANSMISSION	98.00			10/12/21	
		TOW & STORE-FORD RANGER JBU 856									
561		04/22 AP		10/01/21	0000000	L & M TRANSMISSION	75.00			10/12/21	
		TOW & STORE-BUICK LESABRE SUE 876									
561		04/22 AP		10/01/21	0000000	L & M TRANSMISSION	88.00			10/12/21	
		TOW & STORE-SATURN AURA SQU 604									
561		04/22 AP		10/01/21	0000000	THOMSON REUTERS - WEST	285.65			10/12/21	
		INVESTIGATIVE SOFTWARE 09/01/21-09/30/21									
561		04/22 AP		09/29/21	0000000	BENTON BUILDING CENTER	22.50			10/12/21	
		WOOD LATHE-NO PRKG.SIGNS HOMECOMING									
557		04/22 AP		09/24/21	0000000	ARAMARK	13.20			10/12/21	
		TOWELS;MATS-PSS BUILDING									
557		04/22 AP		09/17/21	0000000	ARAMARK	13.20			10/12/21	
		TOWELS;MATS-PSS BUILDING									
544		04/22 AP		08/30/21	0138364	US BANK	17.00			10/07/21	
		WM SUPERCENTER #753 MOUTHGUARDS;GLASSES-RANGE									
		ACCOUNT TOTAL						767.75	.00		767.75
101-5521-415.72-19 OPERATING SUPPLIES / PRINTING											
561		04/22 AP		09/30/21	0000000	PARKADE PRINTER, INC.	229.42			10/12/21	
		CFPD CONTACT DOOR HANGERS									
		ACCOUNT TOTAL						229.42	.00		229.42
101-5521-415.72-20 OPERATING SUPPLIES / OFFICERS EQUIPMENT											

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FUND 101 GENERAL FUND										
101-5521-415.72-20 OPERATING SUPPLIES / OFFICERS EQUIPMENT						continued				
544		04/22	AP	09/13/21	0138364	US BANK	266.40			10/07/21
						WWW.SCHEELS.COM				
						BIKE PATROL GEAR				
						ACCOUNT TOTAL	266.40	.00	266.40	
101-5521-415.72-29 OPERATING SUPPLIES / MIRT EQUIPMENT										
544		04/22	AP	09/03/21	0138364	US BANK	23.96			10/07/21
						SQ *COVER ALL EMBROIDERY				
						SWAT HATS				
544		04/22	AP	08/30/21	0138364	US BANK	411.19			10/07/21
						BROWNELLS INC				
						MIRT-RIFLE MAGAZINES;BATT				
						ACCOUNT TOTAL	435.15	.00	435.15	
101-5521-415.83-05 TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)										
544		04/22	AP	09/20/21	0138364	US BANK	596.90			10/07/21
						BEST WESTERN ST CLOUD				
						HTL.-BASIC SNIPER SCHOOL				
						ACCOUNT TOTAL	596.90	.00	596.90	
101-5521-415.83-06 TRANSPORTATION&EDUCATION / EDUCATION										
544		04/22	AP	09/17/21	0138364	US BANK		184.50		10/07/21
						AEDS TODAY				
						CREDIT-AED TRAINER				
						ACCOUNT TOTAL	.00	184.50	184.50	
101-5521-415.83-08 TRANSPORTATION&EDUCATION / ACADEMY										
544		04/22	AP	09/03/21	0138364	US BANK	230.00			10/07/21
						IOWA PRISON INDUSTRIES				
						ILEA UNIFORM-HANNA ZIKUDA				
						ACCOUNT TOTAL	230.00	.00	230.00	
101-5521-415.89-40 MISCELLANEOUS SERVICES / UNIFORM ALLOWANCE										
561		04/22	AP	09/27/21	0000000	GALLS, LLC	56.44			10/12/21
						BIKE PATROL PANTS				
						MARISSA ABBOTT				
						ACCOUNT TOTAL	56.44	.00	56.44	
101-5521-415.93-01 EQUIPMENT / EQUIPMENT										
544		04/22	AP	09/17/21	0138364	US BANK	1,118.72			10/07/21
						SP * THECONEZONE				
						100 TRAFFIC CONES				
544		04/22	AP	09/01/21	0138364	US BANK	564.98			10/07/21
						MAGPUL INDUSTRIES CORP				
						REAR RIFLE SIGHTS				
						ACCOUNT TOTAL	1,683.70	.00	1,683.70	

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FUND 101 GENERAL FUND										
101-5521	425.81	20				PROFESSIONAL SERVICES / HUMANE SOCIETY				
561		04/22 AP		09/05/21	0000000	WATERLOO, CITY OF ANIMAL CALLS;8/1-8/31/21	7,867.65			10/12/21
ACCOUNT TOTAL							7,867.65	0.00	7,867.65	
101-6613-433.72-01 OPERATING SUPPLIES / OPERATING SUPPLIES										
562		04/22 AP		09/30/21	0000000	CULLIGAN WATER CONDITIONING WATER AT GREENWOOD CEMETERY	6.75			10/12/21
510		04/22 AP		08/31/21	0000000	NAPA AUTO PARTS PARTS & EXPENSES AUG'21	205.96			10/12/21
ACCOUNT TOTAL							212.71	0.00	212.71	
101-6616-446.72-01 OPERATING SUPPLIES / OPERATING SUPPLIES										
541		04/22 AP		09/28/21	0000000	OFFICE EXPRESS OFFICE PRODUCT TOWELS, TISSUES, LINERS, SOAP, URNL SCRNS	84.42			10/12/21
PROJECT#:					062501					
541		04/22 AP		09/28/21	0000000	OFFICE EXPRESS OFFICE PRODUCT TOWELS, TISSUES, LINERS, SOAP, URNL SCRNS	116.33			10/12/21
PROJECT#:					062503					
541		04/22 AP		09/28/21	0000000	OFFICE EXPRESS OFFICE PRODUCT TOWELS, TISSUES, LINERS, SOAP, URNL SCRNS	61.50			10/12/21
PROJECT#:					062506					
541		04/22 AP		09/28/21	0000000	OFFICE EXPRESS OFFICE PRODUCT TOWELS, TISSUES, LINERS, SOAP, URNL SCRNS	224.53			10/12/21
PROJECT#:					062511					
562		04/22 AP		09/24/21	0000000	ECHO GROUP, INC. LIGHT BULBS	203.80			10/12/21
PROJECT#:					062503					
510		04/22 AP		09/15/21	0000000	OFFICE EXPRESS OFFICE PRODUCT URINAL SCREENS	80.85			10/12/21
PROJECT#:					062507					
544		04/22 AP		09/14/21	0138364	US BANK ANTIBACTERIAL WIPES	41.98			10/07/21
PROJECT#:					062506					
544		04/22 AP		09/14/21	0138364	US BANK SWITCH LOCKS FOR RED	13.98			10/07/21
PROJECT#:					062505					
541		04/22 AP		09/07/21	0000000	ECHO GROUP, INC. LED LIGHT BULBS	657.90			10/12/21
PROJECT#:					062506					
510		04/22 AP		08/31/21	0000000	NAPA AUTO PARTS PARTS & EXPENSES AUG'21	640.88			10/12/21
544		04/22 AP		08/30/21	0138364	US BANK SPRAYER NOZZLE FOR	45.36			10/07/21
PROJECT#:					062507					
544		04/22 AP		08/30/21	0138364	US BANK	121.11			10/07/21

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FUND 101 GENERAL FUND										
101-6616-446.72-01 OPERATING SUPPLIES / OPERATING SUPPLIES						continued				
AMZN MKTP US*253QT7PO0						SANITIZER DISPENSER				
PROJECT#:		062511								
544		04/22 AP		08/24/21	0138364	US BANK	84.99			10/07/21
AMAZON.COM*250Y31OW1 AMZN						AIR PURIFIER FOR CHILD				
PROJECT#:		062507								
ACCOUNT TOTAL							2,377.63	.00	2,377.63	
101-6616-446.72-17 OPERATING SUPPLIES / UNIFORMS										
541		04/22 AP		09/08/21	0000000	SERVICEWEAR APPAREL, INC.	51.74			10/12/21
UNIFORMS MATT BUCK										
ACCOUNT TOTAL							51.74	.00	51.74	
101-6616-446.73-05 OTHER SUPPLIES / OPERATING EQUIPMENT										
541		04/22 AP		09/21/21	0000000	MENARDS-CEDAR FALLS	189.99			10/12/21
POWER WASHER										
PROJECT#:		062507								
544		04/22 AP		09/15/21	0138364	US BANK	199.99			10/07/21
AMZN MKTP US*2G6FY3C52						HEATER BED BUG KILLER FOR				
PROJECT#:		062503								
ACCOUNT TOTAL							389.98	.00	389.98	
101-6616-446.73-06 OTHER SUPPLIES / BUILDING REPAIR										
562		04/22 AP		09/28/21	0000000	MENARDS-CEDAR FALLS	44.97			10/12/21
HOLE SAW AND MARKERS										
PROJECT#:		062514								
541		04/22 AP		09/27/21	0000000	CHRISTIE DOOR COMPANY	435.82			10/12/21
OVERHEAD DOOR REPAIR										
PROJECT#:		062506								
562		04/22 AP		09/27/21	0000000	ECHO GROUP, INC.	210.10			10/12/21
LIGHTING BALLAST AND BULBS										
PROJECT#:		062501								
541		04/22 AP		09/24/21	0000000	BUILDERS SELECT LLC	4.96			10/12/21
LUMBER FOR FORMS AT FALLS						AQUATIC CENTER				
PROJECT#:		062514								
510		04/22 AP		09/22/21	0000000	O'DONNELL ACE HARDWARE	.80			10/12/21
SCREWS										
PROJECT#:		062507								
541		04/22 AP		09/22/21	0000000	BUILDERS SELECT LLC	43.98			10/12/21
LUMBER FOR FORMS AT FALLS						AQUATIC CENTER				
PROJECT#:		062514								
510		04/22 AP		09/15/21	0000000	MENARDS-CEDAR FALLS	15.99			10/12/21
SHUT OFF VALVE FOR HOTSY										
PROJECT#:		062506								

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FUND 101 GENERAL FUND										
101-6616-446.73-06						OTHER SUPPLIES / BUILDING REPAIR				
510		04/22 AP		09/14/21	0000000	ECHO GROUP, INC.	146.20			10/12/21
						LIGHT BALLASTS				
PROJECT#:					062503					
544		04/22 AP		09/10/21	0138364	US BANK	25.00			10/07/21
						AMZN MKTP US*2530716E2				
PROJECT#:					062507					
544		04/22 AP		09/02/21	0138364	US BANK	37.45			10/07/21
						BALLASTSHOP				
PROJECT#:					062506					
						ACCOUNT TOTAL	965.27	.00	965.27	
101-6616-446.83-06 TRANSPORTATION&EDUCATION / EDUCATION										
541		04/22 AP		09/08/21	0000000	HAWKEYE COMMUNITY COLLEGE-CF	950.00			10/12/21
						BRETT RILEY HVAC APPRENTI				
						CE CLASS				
						ACCOUNT TOTAL	950.00	.00	950.00	
101-6616-446.86-02 REPAIR & MAINTENANCE / BUILDINGS & GROUNDS										
562		04/22 AP		10/03/21	0000000	HAWKEYE ALARM & SIGNAL CO.	142.50			10/12/21
						FIRE ALARM INSPECTION				
PROJECT#:					062501					
562		04/22 AP		10/03/21	0000000	HAWKEYE ALARM & SIGNAL CO.	237.50			10/12/21
						FIRE ALARM INSPECTION				
PROJECT#:					062507					
541		04/22 AP		10/01/21	0000000	FRESH START CLEANING SOLUTION	3,700.00			10/12/21
						JANITORIAL SERVICES				
PROJECT#:					062501					
541		04/22 AP		10/01/21	0000000	FRESH START CLEANING SOLUTION	700.00			10/12/21
						JANITORIAL SERVICES				
PROJECT#:					062509					
541		04/22 AP		10/01/21	0000000	FRESH START CLEANING SOLUTION	7,000.00			10/12/21
						JANITORIAL SERVICES				
PROJECT#:					062507					
541		04/22 AP		10/01/21	0000000	FRESH START CLEANING SOLUTION	3,165.00			10/12/21
						JANITORIAL SERVICES				
PROJECT#:					062511					
541		04/22 AP		10/01/21	0000000	FRESH START CLEANING SOLUTION	770.00			10/12/21
						JANITORIAL SERVICES				
PROJECT#:					062508					
541		04/22 AP		10/01/21	0000000	FRESH START CLEANING SOLUTION	3,300.00			10/12/21
						JANITORIAL SERVICES				
PROJECT#:					062503					
541		04/22 AP		10/01/21	0000000	FRESH START CLEANING SOLUTION	1,865.00			10/12/21
						JANITORIAL SERVICES				
PROJECT#:					062506					
541		04/22 AP		10/01/21	0000000	FRESH START CLEANING SOLUTION	1,500.00			10/12/21

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GROUP NBR	PO NBR	ACCTG PER.	CD	-----TRANSACTION----- DATE	NUMBER	DESCRIPTION	DEBITS	CREDITS	CURRENT BALANCE	POST DT
FUND 101 GENERAL FUND										
101-6616-446.86-02 REPAIR & MAINTENANCE / BUILDINGS & GROUNDS continued										
JANITORIAL SERVICES										
PROJECT#:		062505								
541		04/22 AP		10/01/21	0000000	FRESH START CLEANING SOLUTION	250.00			10/12/21
JANITORIAL SERVICES										
PROJECT#:		062515								
548		04/22 AP		10/01/21	0000000	ARAMARK	22.70			10/12/21
MAT SERVICE										
PROJECT#:		062506								
562		04/22 AP		10/01/21	0000000	ARAMARK	13.00			10/12/21
MAT SERVICE										
PROJECT#:		062501								
562		04/22 AP		10/01/21	0000000	PLUNKETT'S PEST CONTROL, INC	49.18			10/12/21
PEST CONTROL SERVICES										
PROJECT#:		062511								
562		04/22 AP		10/01/21	0000000	PLUNKETT'S PEST CONTROL, INC	24.96			10/12/21
PEST CONTROL SERVICES										
PROJECT#:		062508								
562		04/22 AP		10/01/21	0000000	PLUNKETT'S PEST CONTROL, INC	204.50			10/12/21
PEST CONTROL SERVICES										
PROJECT#:		062507								
562		04/22 AP		10/01/21	0000000	PLUNKETT'S PEST CONTROL, INC	25.00			10/12/21
PEST CONTROL SERVICES										
PROJECT#:		062505								
562		04/22 AP		10/01/21	0000000	PLUNKETT'S PEST CONTROL, INC	80.00			10/12/21
PEST CONTROL SERVICES										
PROJECT#:		062515								
562		04/22 AP		10/01/21	0000000	PLUNKETT'S PEST CONTROL, INC	53.50			10/12/21
PEST CONTROL SERVICES										
PROJECT#:		062506								
562		04/22 AP		10/01/21	0000000	PLUNKETT'S PEST CONTROL, INC	30.00			10/12/21
PEST CONTROL SERVICES										
PROJECT#:		062510								
510		04/22 AP		09/30/21	0000000	ENGINEERED CONTROLS, INC.	10,875.00			10/12/21
JACE UPGRADE TO REPLACE OUTDATED BUILDING CONT										
PROJECT#:		062506								
510		04/22 AP		09/24/21	0000000	ARAMARK	13.00			10/12/21
MAT SERVICE										
PROJECT#:		062501								
541		04/22 AP		09/24/21	0000000	ARAMARK	22.70			10/12/21
MAT SERVICE										
PROJECT#:		062506								
510		04/22 AP		09/23/21	0000000	PROSHIELD FIRE & SECURITY	87.00			10/12/21
FIRE EXTINGUISHER INSPECT										
PROJECT#:		062501								
541		04/22 AP		09/17/21	0000000	ARAMARK	22.70			10/12/21
MAT SERVICE										
PROJECT#:		062506								
510		04/22 AP		08/16/21	0000000	HAWKEYE COMMUNICATION/FANDEL	150.00			10/12/21
FIRE ALARM INSPECTING AND TESTING										

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FUND 101 GENERAL FUND										
101-6616-446.86-02 REPAIR & MAINTENANCE / BUILDINGS & GROUNDS						continued				
PROJECT#: 062506										
ACCOUNT TOTAL							34,303.24	.00	34,303.24	
101-6616-446.86-14 REPAIR & MAINTENANCE / MECH EQUIPMENT SERVICING										
541		04/22 AP		09/23/21	0000000	ENGINEERED CONTROLS, INC.	609.22			10/12/21
PROJECT#: 062506										
510		04/22 AP		09/20/21	0000000	PLUMB TECH INC.	4,146.47			10/12/21
PROJECT#: 062506										
510		04/22 AP		09/19/21	0000000	PLUMB TECH INC.	525.42			10/12/21
PROJECT#: 062511										
510		04/22 AP		09/14/21	0000000	AIRE SERV.OF THE CEDAR VALLEY	185.36			10/12/21
PROJECT#: 062501										
510		04/22 AP		09/14/21	0000000	AIRE SERV.OF THE CEDAR VALLEY	614.61			10/12/21
PROJECT#: 062506										
ACCOUNT TOTAL							6,081.08	.00	6,081.08	
101-6625-432.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES										
503		04/22 AP		09/22/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	26.10			10/12/21
PROJECT#: 062506										
503		04/22 AP		09/21/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	2.42			10/12/21
PROJECT#: 062506										
503		04/22 AP		09/21/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	13.77			10/12/21
PROJECT#: 062506										
ACCOUNT TOTAL							42.29	.00	42.29	
101-6625-432.71-08 OFFICE SUPPLIES / PUBLIC ADVERTISING										
503		04/22 AP		10/01/21	0000000	QUESTCDN	135.00			10/12/21
PROJECT#: 062506										
ACCOUNT TOTAL							135.00	.00	135.00	
101-6625-432.72-11 OPERATING SUPPLIES / DUES, BOOKS, MAGAZINES										
547		04/22 AP		09/28/21	0000000	COURIER COMMUNICATIONS	116.25			10/12/21
PROJECT#: 062506										
ACCOUNT TOTAL							116.25	.00	116.25	

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FUND 101 GENERAL FUND										
101-6625-432.73-05						OTHER SUPPLIES / OPERATING EQUIPMENT				
503		04/22 AP		08/13/21	0000000	IOWA DEPT-TRANSPORTATION AIR METER GAUGES	158.56			10/12/21
						ACCOUNT TOTAL	158.56	.00	158.56	
101-6625-432.81-44						PROFESSIONAL SERVICES / USGS RIVER GAUGE				
503		04/22 AP		09/22/21	0000000	MIDAMERICAN ENERGY FINCHFORD RIVER GAUGE	10.33			10/12/21
						ACCOUNT TOTAL	10.33	.00	10.33	
101-6625-432.83-05						TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)				
544		04/22 AP		08/23/21	0138364	US BANK MARRIOTT WEST DES MOIN	122.08			10/07/21
						ACCOUNT TOTAL	122.08	.00	122.08	
101-6625-432.86-25						REPAIR & MAINTENANCE / ENGINEERING & ARCHITECT.				
503		04/22 AP		09/30/21	0000000	SNYDER & ASSOCIATES, INC. 3282-2021 SURVEY SERVICES	9,968.92			10/12/21
						PROJECT#: 023282				
						ACCOUNT TOTAL	9,968.92	.00	9,968.92	
101-6633-423.72-01						OPERATING SUPPLIES / OPERATING SUPPLIES				
562		04/22 AP		10/05/21	0000000	STOKES WELDING BRUSH ATTACHMENTS	325.98			10/12/21
548		04/22 AP		10/01/21	0000000	MENARDS-CEDAR FALLS POWER WASHER TIPS	15.98			10/12/21
541		04/22 AP		09/30/21	0000000	JOHNSTONE SUPPLY OF WATERLOO CAPACITORS-ISLAND LIFT	13.96			10/12/21
562		04/22 AP		09/29/21	0000000	OUTDOOR & MORE SHOVEL HANDLES AND RAKES	79.80			10/12/21
562		04/22 AP		09/27/21	0000000	ZIMCO SUPPLY CO. GRASS SEED	275.00			10/12/21
510		04/22 AP		09/24/21	0000000	MARTIN BROS.DISTRIBUTING PARKS TOLIET PAPER	340.67			10/12/21
562		04/22 AP		09/23/21	0000000	B & F FASTENER SUPPLY CO SCREWS FOR BRIDGE DECKING	837.72			10/12/21
510		04/22 AP		09/16/21	0000000	BENTON'S READY MIX CONCRETE, CONCRETE-SIDEWLK VETS PRK	833.00			10/12/21
510		04/22 AP		09/14/21	0000000	BLUFF STREET ECHO GROUP, INC.	39.79			10/12/21
510		04/22 AP		09/10/21	0000000	EXM HOLE PLUGS KEY REPLACEMENT	18.00			10/12/21

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FUND 101 GENERAL FUND									
101-6633-423.72-01 OPERATING SUPPLIES / OPERATING SUPPLIES					continued				
541		04/22 AP		09/08/21 0000000	SERVICEWEAR APPAREL, INC.	21.17			10/12/21
					UNIFORMS KIM ARMSTRONG				
541		04/22 AP		09/08/21 0000000	SERVICEWEAR APPAREL, INC.	90.98			10/12/21
					UNIFORMS CRAWFORD, ARMSTRONG				
510		04/22 AP		08/31/21 0000000	NAPA AUTO PARTS	221.95			10/12/21
					PARTS & EXPENSES AUG'21				
544		04/22 AP		08/30/21 0138364	US BANK	1,231.75			10/07/21
					SHERRILLTREE				
544		04/22 AP		08/30/21 0138364	US BANK	263.34			10/07/21
					FORESTRY SUPPLIERS INC				
					ARBORIST HARD HATS				
					ACCOUNT TOTAL	4,609.09	.00	4,609.09	
101-6633-423.83-05 TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)									
544		04/22 AP		09/17/21 0138364	US BANK	148.99			10/07/21
					GLACIER CANYON LLC				
544		04/22 AP		09/16/21 0138364	US BANK	109.00			10/07/21
					GLACIER CANYON LLC				
544		04/22 AP		09/15/21 0138364	US BANK	50.17			10/07/21
					AMOCO#2005130BALTUS GPM				
					DAY TRIP FOR TRAINING				
					ACCOUNT TOTAL	308.16	.00	308.16	
101-6633-423.83-06 TRANSPORTATION&EDUCATION / EDUCATION									
544		04/22 AP		09/06/21 0138364	US BANK	60.00			10/07/21
					RAMAKER & ASSOCIATES				
544		04/22 AP		08/27/21 0138364	US BANK	60.00			10/07/21
					RAMAKER & ASSOCIATES				
					REG:CIMS TRNG-J DONAHUE				
					REG:CIMS CONF-K CROSS				
					ACCOUNT TOTAL	120.00	.00	120.00	
					FUND TOTAL	237,990.59	580.84	237,409.75	
FUND 203 TAX INCREMENT FINANCING									
FUND 206 STREET CONSTRUCTION FUND									
206-6637-436.72-17 OPERATING SUPPLIES / UNIFORMS									
541		04/22 AP		09/08/21 0000000	SERVICEWEAR APPAREL, INC.	218.98			10/12/21
					UNIFORMS HEATH, SOPPE,				
					YOKEM, EHMEN				
541		04/22 AP		09/08/21 0000000	SERVICEWEAR APPAREL, INC.	444.40			10/12/21
					UNIFORMS DIETZ, DOYLE,EIK				
					LENBERG, HENRY, TIMMERMAN				
					ACCOUNT TOTAL	663.38	.00	663.38	
206-6637-436.72-54 OPERATING SUPPLIES / BUILDING SUPPLIES									

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FUND 206 STREET CONSTRUCTION FUND										
206-6637-436.72-54 OPERATING SUPPLIES / BUILDING SUPPLIES						continued				
548		04/22 AP		09/30/21	0000000	GIERKE-ROBINSON COMPANY, INC. SUPPLIES FOR UTILITY TRUC K #296	89.61			10/12/21
ACCOUNT TOTAL							89.61	.00	89.61	
206-6637-436.73-05 OTHER SUPPLIES / OPERATING EQUIPMENT										
544		04/22 AP		09/09/21	0138364	US BANK FLEET FARM 5600 VINEGAR, SOAP	30.91			10/07/21
ACCOUNT TOTAL							30.91	.00	30.91	
206-6637-436.73-06 OTHER SUPPLIES / BUILDING REPAIR										
548		04/22 AP		09/30/21	0000000	O'DONNELL ACE HARDWARE	22.68			10/12/21
548		04/22 AP		09/30/21	0000000	HOSE COUPLER, SPRAYER TIP O'DONNELL ACE HARDWARE	28.05			10/12/21
ACCOUNT TOTAL							50.73	.00	50.73	
206-6637-436.73-32 OTHER SUPPLIES / STREETS										
548		04/22 AP		09/30/21	0000000	BITUMINOUS MATERIALS & SUPPLY	351.23			10/12/21
548		04/22 AP		09/29/21	0000000	CRS-2 SPRAY PATCH EMULSIO BENTON'S READY MIX CONCRETE, LAVERNE LANE	426.00			10/12/21
548		04/22 AP		09/29/21	0000000	CONCRETE-STREET REPAIR BENTON'S READY MIX CONCRETE, REPAIRS LOVEJOY DRIVE	1,190.00			10/12/21
PROJECT#:		062436								
541		04/22 AP		09/28/21	0000000	BUILDERS SELECT LLC LUMBER FOR FORMS	53.76			10/12/21
PROJECT#:		062436								
548		04/22 AP		09/28/21	0000000	BENTON'S READY MIX CONCRETE, REPAIRS CEDAR HEIGHTS	862.75			10/12/21
PROJECT#:		062436								
548		04/22 AP		09/27/21	0000000	BENTON'S READY MIX CONCRETE, REPAIR	355.00			10/12/21
548		04/22 AP		09/25/21	0000000	CONCRETE FOR STERLING ST ASPRO, INC.	527.89			10/12/21
548		04/22 AP		09/25/21	0000000	HOTMIX ASPHALT TACK BMC AGGREGATES L.C.	168.90			10/12/21
548		04/22 AP		09/25/21	0000000	ROCK FOR SHOULDERS BMC AGGREGATES L.C.	747.61			10/12/21
548		04/22 AP		09/24/21	0000000	ROCK FOR SHOULDERS BITUMINOUS MATERIALS & SUPPLY	372.56			10/12/21
548		04/22 AP		09/23/21	0000000	CRS-2 SPRAY PATCH EMULSIO BENTON'S READY MIX CONCRETE, STERLING LN	250.50			10/12/21
541		04/22 AP		09/21/21	0000000	CONCRETE-CURE/STREET BITUMINOUS MATERIALS & SUPPLY	385.72			10/12/21

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FUND 206 STREET CONSTRUCTION FUND									
206-6637-436.73-32 OTHER SUPPLIES / STREETS						continued			
541				04/22 AP 09/18/21	0000000	ASPRO, INC.	443.52		10/12/21
541				04/22 AP 09/18/21	0000000	BITUMINOUS MATERIALS & SUPPLY	360.29		10/12/21
510				04/22 AP 09/13/21	0000000	BENTON'S READY MIX CONCRETE, REPAIR FOREST ROAD	544.50		10/12/21
510				04/22 AP 08/31/21	0000000	NAPA AUTO PARTS	162.86		10/12/21
						PARTS & EXPENSES AUG'21			
ACCOUNT TOTAL							7,203.09	.00	7,203.09
206-6637-436.83-06 TRANSPORTATION&EDUCATION / EDUCATION									
544				04/22 AP 09/08/21	0138364	US BANK	75.00		10/07/21
						ISU EVENT REGISTRATION REG: SUPERVISORY TECHINQUE			
ACCOUNT TOTAL							75.00	.00	75.00
206-6647-436.72-01 OPERATING SUPPLIES / OPERATING SUPPLIES									
510				04/22 AP 09/17/21	0000000	FARNSWORTH ELECTRONICS, INC.	184.50		10/12/21
						CAPACITOR			
510				04/22 AP 09/14/21	0000000	ECHO GROUP, INC.	73.00		10/12/21
						ELECTRICAL SUPPLIES			
544				04/22 AP 09/14/21	0138364	US BANK	133.30		10/07/21
						IN *THE OHIO CONTACT COMP ELECTRICAL COMPONET			
510				04/22 AP 08/31/21	0000000	NAPA AUTO PARTS	127.55		10/12/21
						PARTS & EXPENSES AUG'21			
ACCOUNT TOTAL							518.35	.00	518.35
206-6647-436.72-17 OPERATING SUPPLIES / UNIFORMS									
541				04/22 AP 09/08/21	0000000	SERVICEWEAR APPAREL, INC.	25.25		10/12/21
						UNIFORMS LUKEHART			
541				04/22 AP 09/08/21	0000000	SERVICEWEAR APPAREL, INC.	46.54		10/12/21
						UNIFORMS GRAHAM			
ACCOUNT TOTAL							71.79	.00	71.79
206-6647-436.73-12 OTHER SUPPLIES / TRAFFIC SIGNALS									
510				04/22 AP 09/22/21	0000000	MOBOTREX, INC	400.00		10/12/21
						CABLES FOR TRAFFIC SIGNALS			
ACCOUNT TOTAL							400.00	.00	400.00

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FUND 206 STREET CONSTRUCTION FUND										
206-6647-436.73-20 OTHER SUPPLIES / POSTS										
541		04/22 AP		09/27/21	0000000	XCESSORIES SQUARED DEV.& MFG. SIGN POSTS	8,708.50			10/12/21
ACCOUNT TOTAL							8,708.50	.00	8,708.50	
206-6647-436.73-25 OTHER SUPPLIES / TRAFFIC SIGNS										
562		04/22 AP		09/27/21	0000000	TAPCO SIGNS AND MATERIALS	3,830.50			10/12/21
541		04/22 AP		09/17/21	0000000	MENARDS-CEDAR FALLS LABELS FOR SIGNS	14.85			10/12/21
ACCOUNT TOTAL							3,845.35	.00	3,845.35	
FUND TOTAL							21,656.71	.00	21,656.71	
FUND 215 HOSPITAL FUND										
FUND 216 POLICE BLOCK GRANT FUND										
FUND 217 SECTION 8 HOUSING FUND										
FUND 223 COMMUNITY BLOCK GRANT										
223-2224-432.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES										
547		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT COPY PAPER	.87			10/12/21
ACCOUNT TOTAL							.87	.00	.87	
223-2224-432.72-19 OPERATING SUPPLIES / PRINTING										
501		04/22 AP		09/20/21	0000000	COURIER LEGAL COMMUNICATIONS CDBG RELEASE OF FUNDS NTC	166.42			10/12/21
ACCOUNT TOTAL							166.42	.00	166.42	
223-2224-432.89-66 MISCELLANEOUS SERVICES / STATE CARES - CV2										
544		04/22 AP		09/02/21	0004675	US BANK PROJECT#: 022353	17.98			10/07/21
ACCOUNT TOTAL							17.98	.00	17.98	
FUND TOTAL							185.27	.00	185.27	

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FUND 224 TRUST & AGENCY										
FUND 242 STREET REPAIR FUND										
242-1240-431.92-44 STRUCTURE IMPROV & BLDGS / STREET RECONSTRUCTION										
503		04/22 AP		10/01/21	0000000	PETERSON CONTRACTORS	261,975.99			10/12/21
PROJECT#: 3227-2021 STREET CONST.										
PROJECT#: 023227										
ACCOUNT TOTAL							261,975.99	.00	261,975.99	
FUND TOTAL							261,975.99	.00	261,975.99	
FUND 254 CABLE TV FUND										
254-1088-431.72-01 OPERATING SUPPLIES / OPERATING SUPPLIES										
547		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	4.35			10/12/21
COPY PAPER										
547		04/22 AP		09/28/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	.47			10/12/21
STAPLES,CALC PAPER,POSTIT										
544		04/22 AP		09/13/21	0138364	US BANK	25.28			10/07/21
AMZN MKTP US*2G9JK2AF0 MEMORY CARD,ADAPTERS										
ACCOUNT TOTAL							30.10	.00	30.10	
254-1088-431.72-11 OPERATING SUPPLIES / DUES, BOOKS, MAGAZINES										
547		04/22 AP		10/01/21	0000000	DE WOLFE MUSIC USA, INC.	700.00			10/12/21
ANNUAL MUSIC LIC-CABLE TV										
544		04/22 AP		08/24/21	0138364	US BANK		128.27		10/07/21
DROPBOX 1QCKZGJ99R4L REFUND DROPBOX FEE										
ACCOUNT TOTAL							700.00	128.27	571.73	
254-1088-431.83-05 TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)										
544		04/22 AP		09/13/21	0138364	US BANK	22.46			10/07/21
HAPPY JOES PIZZA - CEDAR MEAL:CF FB-CEDAR RAPIDS										
544		04/22 AP		09/10/21	0138364	US BANK	70.00			10/07/21
TST* URBAN PIE- MEAL FOR CREW										
544		04/22 AP		09/06/21	0138364	US BANK	82.58			10/07/21
CASEYS GEN STORE 2630 MEALS:CF FOOTBALL										
544		04/22 AP		08/30/21	0138364	US BANK	15.15			10/07/21
TST* SMOKEY D S BBQ - 2ND MEAL:CF FOOTBALL										
ACCOUNT TOTAL							190.19	.00	190.19	
254-1088-431.86-01 REPAIR & MAINTENANCE / REPAIR & MAINTENANCE										
547		04/22 AP		09/22/21	0000000	MENARDS-CEDAR FALLS	57.98			10/12/21
10IN LOW PROFILE NO FLAT										
544		04/22 AP		08/25/21	0138364	US BANK	99.00			10/07/21

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FUND 254 CABLE TV FUND										
254-1088-431.86-01 REPAIR & MAINTENANCE / REPAIR & MAINTENANCE						continued				
AMZN MKTP US*254OU9L01						DEWALT 12V BATTERIES				
ACCOUNT TOTAL							156.98	.00	156.98	
254-1088-431.92-01 STRUCTURE IMPROV & BLDGS / STRUCTURE IMPROV & BLDGS										
547		04/22 AP		08/06/21	0000000	NEMAL ELECTRONICS INTERNATION SMPTE STADIUM4 PLENUM,	5,219.16			10/12/21
ACCOUNT TOTAL						5,219.16	.00	5,219.16		
254-1088-431.93-01 EQUIPMENT / EQUIPMENT										
547		04/22 AP		09/27/21	0000000	MARKERTEK VIDEO SUPPLY FIBER CAMERA CABLE	3,320.90			10/12/21
544		04/22 AP		09/15/21	0138364	US BANK B&H PHOTO 800-606-6969	890.53			10/07/21
544		04/22 AP		09/08/21	0138364	US BANK FULL COMPASS SYS VT	105.95			10/07/21
544		04/22 AP		08/27/21	0138364	US BANK B&H PHOTO 800-606-6969	405.00			10/07/21
ACCOUNT TOTAL						4,722.38	.00	4,722.38		
FUND TOTAL							11,018.81	128.27	10,890.54	
FUND 258 PARKING FUND										
258-5531-435.71-01 OFFICE SUPPLIES / OFFICE SUPPLIES										
547		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	4.35			10/12/21
547		04/22 AP		09/28/21	0000000	OFFICE EXPRESS OFFICE PRODUCT COPY PAPER STAPLES,CALC PAPER,POSTIT	.29			10/12/21
ACCOUNT TOTAL							4.64	.00	4.64	
258-5531-435.81-48 PROFESSIONAL SERVICES / CONTRACT SERVICES										
547		04/22 AP		09/30/21	0000000	IPS GROUP, INC GATEWAY FEES-SEPTEMBER'21	83.54			10/12/21
547		04/22 AP		01/31/21	0000000	IPS GROUP, INC CITATION PRKNG FEES JAN21	1,875.25			10/12/21
ACCOUNT TOTAL							1,958.79	.00	1,958.79	
FUND TOTAL							1,963.43	.00	1,963.43	

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FUND 261 TOURISM & VISITORS										
261-2291-423.72-01 OPERATING SUPPLIES / OPERATING SUPPLIES										
544		04/22 AP		09/09/21	0138364	US BANK WAL-MART #0753	10.75		10/07/21	
ACCOUNT TOTAL							10.75	.00	10.75	
261-2291-423.72-99 OPERATING SUPPLIES / POSTAGE										
544		04/22 AP		09/13/21	0138364	US BANK THE UPS STORE 5189	24.62		10/07/21	
544		04/22 AP		08/23/21	0138364	US BANK THE UPS STORE 5189	79.77		10/07/21	
ACCOUNT TOTAL							104.39	.00	104.39	
261-2291-423.73-54 OTHER SUPPLIES / PROMOTIONAL ITEMS										
544		04/22 AP		09/09/21	0138364	US BANK WAL-MART #0753	12.20		10/07/21	
ACCOUNT TOTAL							12.20	.00	12.20	
261-2291-423.73-55 OTHER SUPPLIES / MEDIA										
554		04/22 AP		10/06/21	0000000	AMPERAGE NOV GOOGLE/FACEBOOK	1,800.00		10/12/21	
554		04/22 AP		09/29/21	0000000	BUSINESS PUBLICATIONS CORP., TRAVEL IA FALL/WINTER AD	1,109.25		10/12/21	
ACCOUNT TOTAL							2,909.25	.00	2,909.25	
261-2291-423.73-57 OTHER SUPPLIES / GIFT SHOP										
554		04/22 AP		09/15/21	0000000	KATE BRENNAN HALL ILLUSTR. & PR TOWELS/CARDS/STICKERS	115.00		10/12/21	
544		04/22 AP		09/09/21	0138364	US BANK WAL-MART #0753	6.56		10/07/21	
ACCOUNT TOTAL							121.56	.00	121.56	
261-2291-423.83-04 TRANSPORTATION&EDUCATION / DUES & MEMBERSHIPS										
544		04/22 AP		09/20/21	0138364	US BANK MEETINGPROF	272.50		10/07/21	
PROJECT#: 032423										
ACCOUNT TOTAL							272.50	.00	272.50	
261-2291-423.83-05 TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)										

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FUND 261 TOURISM & VISITORS										
261-2291-423.83-05 TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)						continued				
544		04/22	AP	09/20/21	0138364	US BANK		19.26		10/07/21
						HILTON HOTELS				
						REFUND FOR PARKING				
PROJECT#:					032424					
544		04/22	AP	09/16/21	0138364	US BANK	148.62			10/07/21
						HILTON HOTELS				
						UPPER MIDWEST CVB CONFERE				
PROJECT#:					032424					
544		04/22	AP	09/16/21	0138364	US BANK	30.00			10/07/21
						HILTON DES MOINES DWTN PA				
						UPPER MIDWEST CVB CONFERN				
PROJECT#:					032424					
544		04/22	AP	09/16/21	0138364	US BANK	228.99			10/07/21
						HILTON HOTELS				
						LODGING-UPPER MIDWEST CVB				
PROJECT#:					032424					
						ACCOUNT TOTAL	407.61	19.26	388.35	
261-2291-423.83-06 TRANSPORTATION&EDUCATION / EDUCATION										
544		04/22	AP	08/26/21	0138364	US BANK	402.50			10/07/21
						TEMPEST IN* REG5Q3FHR4				
						UPPER MIDWEST CVB CONFERN				
PROJECT#:					032424					
						ACCOUNT TOTAL	402.50	.00	402.50	
261-2291-423.85-20 UTILITIES / INTERNET SERVICE										
554		04/22	AP	10/01/21	0000000	SPINUTECH WEB DESIGN, INC.	570.00			10/12/21
						QUARTERLY HOST/CMS LICNS/				
						SUPPORT FEE - OCT NOV DEC				
						ACCOUNT TOTAL	570.00	.00	570.00	
261-2291-423.85-23 UTILITIES / BUILDING MAINTENANCE										
554		04/22	AP	10/01/21	0000000	ARAMARK	5.20			10/12/21
						MAT SERVICE				
554		04/22	AP	09/24/21	0000000	ARAMARK	5.20			10/12/21
						MAT SERVICE				
						ACCOUNT TOTAL	10.40	.00	10.40	
						FUND TOTAL	4,821.16	19.26	4,801.90	
FUND 262 SENIOR SERVICES & COMM CT										
262-1092-423.89-08 MISCELLANEOUS SERVICES / BUS TRIPS/PROGRAMMING										
545		04/22	AP	09/06/21	0138364	US BANK	100.00			10/07/21
						MARCUS COLLEGE SQ BOX				
						MOVIE TICKETS (20)				
545		04/22	AP	09/06/21	0138364	US BANK	100.00			10/07/21
						MARCUS COLLEGE SQ BOX				
						MOVIE TICKETS (20)				

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FUND 262 SENIOR SERVICES & COMM CT									
262-1092-423.89-08 MISCELLANEOUS SERVICES / BUS TRIPS/PROGRAMMING						continued			
ACCOUNT TOTAL						200.00	.00	200.00	
FUND TOTAL						200.00	.00	200.00	
FUND 291 POLICE FORFEITURE FUND									
FUND 292 POLICE RETIREMENT FUND									
FUND 293 FIRE RETIREMENT FUND									
FUND 294 LIBRARY RESERVE									
FUND 295 SOFTBALL PLAYER CAPITAL									
FUND 296 GOLF CAPITAL									
FUND 297 REC FACILITIES CAPITAL									
FUND 298 HEARST CAPITAL									
FUND 311 DEBT SERVICE FUND									
FUND 402 WASHINGTON PARK FUND									
FUND 404 FEMA									
404-1220-431.89-80 MISCELLANEOUS SERVICES / COVID-19 PUB HEALTH EMERG									
545		04/22	AP	08/25/21	0138364 US BANK	79.18			10/07/21
PROJECT#: 012020									
AMZN MKTP US*259RT8C90									
N95 MASKS FOR IN-SERVICE									
ACCOUNT TOTAL						79.18	.00	79.18	
FUND TOTAL						79.18	.00	79.18	
FUND 405 FLOOD RESERVE FUND									
FUND 407 VISION IOWA PROJECT									
FUND 408 STREET IMPROVEMENT FUND									
FUND 410 CORONAVIRUS LOCAL RELIEF									
FUND 430 2004 TIF BOND									
430-1220-431.97-82 TIF BOND PROJECTS / STREETScape MAINTENANCE									
503		04/22	AP	10/01/21	0000000 OWEN CONTRACTING INC.	205,087.64			10/12/21
PROJECT#: 023242									
503		04/22	AP	09/30/21	0000000 SNYDER & ASSOCIATES, INC.	3,305.68			10/12/21
PROJECT#: 023242									
3242-DWNTWN STREETS CP II									
SERVICES THRU 08/31/21									
ACCOUNT TOTAL						208,393.32	.00	208,393.32	
FUND TOTAL						208,393.32	.00	208,393.32	

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FUND 431	2014	BOND								
FUND 432	2003	BOND								
FUND 433	2001	TIF								
FUND 434	2000	BOND								
FUND 435	1999	TIF								
FUND 436	2012	BOND								
FUND 437	2018	BOND								
FUND 438	2020	BOND FUND								
438-1220-431.95-27		BOND FUND PROJECTS / UNION ROAD TRAIL								
503	04/22 AP	10/04/21 0000000				LODGE CONSTRUCTION, INC	41,116.76			10/12/21
						3217-UNION ROAD TRAIL				
PROJECT#:		023217								
503	04/22 AP	10/04/21 0000000				TERRACON CONSULTANTS, INC.	860.37			10/12/21
						3217-UNION ROAD TRAIL				
						SERVICES THRU 9/25/21				
PROJECT#:		023217								
503	04/22 AP	09/20/21 0000000				SNYDER & ASSOCIATES, INC.	4,322.80			10/12/21
						3217-UNION ROAD TRAIL				
						SERVICES THRU 08/31/21				
PROJECT#:		023217								
						ACCOUNT TOTAL	46,299.93	.00	46,299.93	
438-1220-431.98-23		CAPITAL PROJECTS / GREENHILL RD & S MAIN INT								
503	04/22 AP	09/27/21 0000000				AHLERS AND COONEY, P.C.	122.50			10/12/21
						3228-GREENHILL/S MAIN INT				
						CONDEMNATION; 9/1,9/16/21				
PROJECT#:		023228								
						ACCOUNT TOTAL	122.50	.00	122.50	
438-1220-431.98-83		CAPITAL PROJECTS / CEDAR HGTS DRIVE RECON								
503	04/22 AP	10/04/21 0000000				PETERSON CONTRACTORS	121,881.48			10/12/21
						3171-CEDAR HEIGHTS RECON.				
PROJECT#:		023171								
503	04/22 AP	10/04/21 0000000				TERRACON CONSULTANTS, INC.	1,090.71			10/12/21
						3171-CEDAR HEIGHTS RECON.				
						SERVICES THRU 9/25/21				
PROJECT#:		023171								
503	04/22 AP	09/30/21 0000000				SNYDER & ASSOCIATES, INC.	27,886.46			10/12/21
						3171-CEDAR HEIGHTS RECON.				
						SERVICES THRU 8/31/21				
PROJECT#:		023171								
						ACCOUNT TOTAL	150,858.65	.00	150,858.65	
						FUND TOTAL	197,281.08	.00	197,281.08	

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FUND 439 2008 BOND FUND									
FUND 443 CAPITAL PROJECTS									
443-1220-431	94-90	CAPITAL PROJECTS / DOWNTOWN TIF-SSMID REIMB							
547	04/22	AP		10/01/21	0000000	COMMUNITY MAIN STREET	132,000.00		10/12/21
						1ST 1/2 PAYMENT FOR FY22			
ACCOUNT TOTAL							132,000.00	.00	132,000.00
443-1220-431.98-88 CAPITAL PROJECTS / ASHWORTH DR TO HUDSON RD									
503	04/22	AP		09/28/21	0000000	RALLY APPRAISAL, LLC	1,200.00		10/12/21
						3244-ASHWORTH DR EXT. 4923 HUDSON RD APPRAISAL			
PROJECT#:					023244				
503	04/22	AP		09/27/21	0000000	AHLERS AND COONEY, P.C.	931.00		10/12/21
						3244-ASHWORTH DR EXT. EASEMENT; 09/10-09/15/21			
PROJECT#:					023244				
503	04/22	AP		09/27/21	0000000	AHLERS AND COONEY, P.C.	186.00		10/12/21
						3244-ASHWORTH DR EXT. URBAN RENEWAL; 09/13/21			
PROJECT#:					023244				
ACCOUNT TOTAL							2,317.00	.00	2,317.00
443-1220-431.98-90 CAPITAL PROJECTS / COLL HILL TIF-SSMID REIMB									
547	04/22	AP		10/01/21	0000000	COLLEGE HILL PARTNERSHIP	3,510.00		10/12/21
						1ST 1/2 PAYMENT FOR FY22			
ACCOUNT TOTAL							3,510.00	.00	3,510.00
FUND TOTAL							137,827.00	.00	137,827.00
FUND 472 PARKADE RENOVATION									
FUND 473 SIDEWALK ASSESSMENT									
FUND 483 ECONOMIC DEVELOPMENT									
483-2245-432	89-16	MISCELLANEOUS SERVICES / ECON DEVEL MARKETING							
547	04/22	AP		10/11/21	0000000	CEDAR FALLS ECONOMIC DEVELOPM	75,000.00		10/12/21
						ENHANCE ECON.DEV. PROJECT TO SUPPORT IMPELEMNTATION			
ACCOUNT TOTAL							75,000.00	.00	75,000.00
FUND TOTAL							75,000.00	.00	75,000.00

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FUND 484 ECONOMIC DEVELOPMENT LAND										
FUND 541 2018 STORM WATER BONDS										
FUND 544 2008 SEWER BONDS										
FUND 545 2006 SEWER BONDS										
FUND 546 SEWER IMPROVEMENT FUND										
FUND 547 SEWER RESERVE FUND										
FUND 548 1997 SEWER BOND FUND										
FUND 549 1992 SEWER BOND FUND										
FUND 550 2000 SEWER BOND FUND										
FUND 551 REFUSE FUND										
551-6675-436.83-05 TRANSPORTATION&EDUCATION / TRAVEL (FOOD/MILEAGE/LOD)										
544		04/22 AP		09/03/21	0138364	US BANK	583.77			10/07/21
						HYATT REGENCY ST.LOUIS				
						HOTEL:APWA CONF-B MORRIS				
544		04/22 AP		09/03/21	0138364	US BANK	583.77			10/07/21
						HYATT REGENCY ST.LOUIS				
						HOTEL:APWA CONF-B HEATH				
544		04/22 AP		09/03/21	0138364	US BANK	94.50			10/07/21
						HYATT REGENCY ST.LOUIS				
						PARKING:APWA CONF-B HEATH				
544		04/22 AP		09/02/21	0138364	US BANK	22.93			10/07/21
						HARDEES 1503148				
						BREAKFAST AT APWA CONF				
544		04/22 AP		09/01/21	0138364	US BANK	35.17			10/07/21
						HYATT REGENCY ST.LOUIS F				
						DINNER AT APWA CONF				
544		04/22 AP		08/31/21	0138364	US BANK	40.29			10/07/21
						CALECOS BAR GRILL				
						DINNER AT 2021 APWA				
544		04/22 AP		08/30/21	0138364	US BANK	39.46			10/07/21
						PHILLIPS 66 - 26 FASTLANE				
						2021 APWA CONFERENCE GAS				
						ACCOUNT TOTAL	1,399.89	.00		1,399.89
551-6675-436.83-06 TRANSPORTATION&EDUCATION / EDUCATION										
544		04/22 AP		09/13/21	0138364	US BANK		829.00		10/07/21
						AMERICAN PUBLIC WORKS				
						REFUND FOR 2021 APWA				
						ACCOUNT TOTAL	.00	829.00		829.00-
551-6685-426.81-20 PROFESSIONAL SERVICES / HUMANE SOCIETY										
561		04/22 AP		09/05/21	0000000	WATERLOO, CITY OF	203.70			10/12/21
						DEER DISPOSAL;8/1-8/31/21				
						ACCOUNT TOTAL	203.70	.00		203.70
551-6685-436.72-01 OPERATING SUPPLIES / OPERATING SUPPLIES										
541		04/22 AP		09/30/21	0000000	CULLIGAN WATER CONDITIONING	6.75			10/12/21
						TRANSFER STATION WATER				
						ACCOUNT TOTAL	6.75	.00		6.75
551-6685-436.72-17 OPERATING SUPPLIES / UNIFORMS										

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FUND 551 REFUSE FUND								
551-6685-436.72-17 OPERATING SUPPLIES / UNIFORMS						continued		
541		04/22 AP		09/08/21	0000000 SERVICEWEAR APPAREL, INC.	25.25		10/12/21
					UNIFORMS DOYLE SMITH			
541		04/22 AP		09/08/21	0000000 SERVICEWEAR APPAREL, INC.	387.36		10/12/21
					UNIFORMS BASS, SMITH, JUH			
					L, BLOHN, RAVN, GAEDE			
					ACCOUNT TOTAL	412.61	.00	412.61
551-6685-436.73-05 OTHER SUPPLIES / OPERATING EQUIPMENT								
510		04/22 AP		08/31/21	0000000 NAPA AUTO PARTS	450.02		10/12/21
					PARTS & EXPENSES AUG'21			
					ACCOUNT TOTAL	450.02	.00	450.02
551-6685-436.86-35 REPAIR & MAINTENANCE / SCALES								
544		04/22 AP		09/01/21	0138364 US BANK	89.04		10/07/21
					KELLY REGISTRATION SYSTE			
					2022 SCALE RENEWAL FEE			
					ACCOUNT TOTAL	89.04	.00	89.04
551-6685-436.87-02 RENTALS / MATERIAL DISPOSAL/HANDLIN								
541		04/22 AP		10/01/21	0000000 WEIKERT IRON AND METAL	2,674.00		10/12/21
					APPLIANCE RECYCLING			
510		04/22 AP		09/21/21	0000000 MIDWEST ELECTRONIC RECOVERY	425.00		10/12/21
					ELECTRONIC RECYCLING			
510		04/22 AP		09/11/21	0000000 LIBERTY TIRE RECYCLING, LLC	1,047.12		10/12/21
					SCRAP TIRE RECYCLING			
					ACCOUNT TOTAL	4,146.12	.00	4,146.12
551-6685-436.93-01 EQUIPMENT / EQUIPMENT								
510		04/22 AP		09/21/21	0000000 ATLAS RFID SOLUTIONS STORE LL	514.00		10/12/21
					RFID READER			
544		04/22 AP		09/10/21	0138364 US BANK	388.22		10/07/21
					POSGUYSCOM			
					RFID READER FOR YARD			
					ACCOUNT TOTAL	902.22	.00	902.22
					FUND TOTAL	7,610.35	829.00	6,781.35

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FUND 552 SEWER RENTAL FUND										
552-6665-436.73-05 OTHER SUPPLIES / OPERATING EQUIPMENT						continued				
565		04/22	AP	09/30/21	0000000	O'DONNELL ACE HARDWARE	5.52			10/12/21
						TUBING				
565		04/22	AP	09/27/21	0000000	NORTHLAND PRODUCTS CO.	84.97			10/12/21
						LUBRICANT				
565		04/22	AP	09/24/21	0000000	BRECKE MECHANICAL CONTRACTORS	316.64			10/12/21
						BOILER GASKET ROPE				
565		04/22	AP	09/17/21	0000000	WBC MECHANICAL, INC.	37.00			10/12/21
						BOILER GASKET				
510		04/22	AP	08/31/21	0000000	NAPA AUTO PARTS	9.56			10/12/21
						PARTS & EXPENSES AUG'21				
						ACCOUNT TOTAL	503.37	.00		503.37
552-6665-436.73-06 OTHER SUPPLIES / BUILDING REPAIR										
565		04/22	AP	09/30/21	0000000	MENARDS-CEDAR FALLS	67.89			10/12/21
						FOAM INSULATION				
565		04/22	AP	09/29/21	0000000	SHERWIN-WILLIAMS COMPANY	127.66			10/12/21
						PAINT AND SUPPLIES				
565		04/22	AP	09/28/21	0000000	GROSSE STEEL CO., INC.	1,317.00			10/12/21
						ENTRY DOOR				
						ACCOUNT TOTAL	1,512.55	.00		1,512.55
552-6665-436.83-04 TRANSPORTATION&EDUCATION / DUES & MEMBERSHIPS										
544		04/22	AP	08/26/21	0138364	US BANK	1,275.00			10/07/21
						IOWA DNR SALES				
						PERMIT RENEWAL FEE				
						ACCOUNT TOTAL	1,275.00	.00		1,275.00
552-6665-436.86-12 REPAIR & MAINTENANCE / TOWELS										
565		04/22	AP	10/01/21	0000000	ARAMARK	22.11			10/12/21
						RUGS				
565		04/22	AP	09/24/21	0000000	ARAMARK	22.11			10/12/21
						RUGS				
						ACCOUNT TOTAL	44.22	.00		44.22
552-6665-436.86-29 REPAIR & MAINTENANCE / LAB & TESTING										
565		04/22	AP	09/29/21	0000000	TESTAMERICA LABORATORIES, INC	75.00			10/12/21
						QC TESTING				
565		04/22	AP	09/28/21	0000000	TESTAMERICA LABORATORIES, INC	1,625.00			10/12/21
						LAB TESTS				
						ACCOUNT TOTAL	1,700.00	.00		1,700.00

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FUND 552 SEWER RENTAL FUND										
552-6665-436.86-33		REPAIR & MAINTENANCE				SLUDGE REMOVAL				
565		04/22 AP		10/01/21	0000000	LONG CROP CONSULTING	1,920.00			10/12/21
						BIOSOLIDS LAND TEST				
ACCOUNT TOTAL							1,920.00	.00	1,920.00	
FUND TOTAL							9,567.28	.00	9,567.28	
FUND 553 2004 SEWER BOND										
FUND 555 STORM WATER UTILITY										
555-6630-432.72-01		OPERATING SUPPLIES				OPERATING SUPPLIES				
503		04/22 AP		09/22/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	2.75			10/12/21
						11X17 PAPER				
503		04/22 AP		09/21/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	.21			10/12/21
						LEGAL PADS				
503		04/22 AP		09/21/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	1.45			10/12/21
						COPY PAPER				
ACCOUNT TOTAL							4.41	.00	4.41	
555-6630-432.73-34 OTHER SUPPLIES / STORM SEWERS										
548		04/22 AP		09/30/21	0000000	BENTON'S READY MIX CONCRETE, CATCH BASIN CONCRETE	292.25			10/12/21
						LAVERNE LANE				
548		04/22 AP		09/29/21	0000000	MENARDS-CEDAR FALLS CATCH BASIN BOX LUMBER AN	205.10			10/12/21
						D MATERIALS				
548		04/22 AP		09/24/21	0000000	BENTON'S READY MIX CONCRETE, CATCH BASIN CONCRETE	250.50			10/12/21
						STERLING LANE				
548		04/22 AP		09/21/21	0000000	LEYMASTER TILE, RUSTY	8.31			10/12/21
						TILE SUBDRAIN CLEANOUT				
541		04/22 AP		09/15/21	0000000	BMC AGGREGATES L.C.	93.42			10/12/21
						ROCK FOR EROSION CONTROL				
548		04/22 AP		09/15/21	0000000	STETSON BUILDING PRODUCTS LLC EROSION CONTROL FOR 1ST	278.90			10/12/21
						ST AND EAGLE RIDGE				
ACCOUNT TOTAL							1,128.48	.00	1,128.48	
FUND TOTAL							1,132.89	.00	1,132.89	
FUND 570 SEWER ASSESSMENT										
FUND 606 DATA PROCESSING FUND										
606-1078-441.71-01		OFFICE SUPPLIES				OFFICE SUPPLIES				
547		04/22 AP		09/29/21	0000000	OFFICE EXPRESS OFFICE PRODUCT	1.74			10/12/21
						COPY PAPER				
ACCOUNT TOTAL							1.74	.00	1.74	

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FUND 606 DATA PROCESSING FUND										
606-1078-441.72-01						OPERATING SUPPLIES / OPERATING SUPPLIES				
544		04/22 AP		09/06/21	0138364	US BANK	99.00			10/07/21
						STK*BIGSTOCKPHOTO.COM				
						ONLINE IMAGE SUBSCRIPTION				
						ACCOUNT TOTAL	99.00	0.00	99.00	
606-1078-441.86-10 REPAIR & MAINTENANCE / SOFTWARE SUPPORT AGREEMTS										
547		04/22 AP		09/27/21	0000000	INFOUSA MARKETING INC	1,595.00			10/12/21
						CITY DIRECTORIES-IOWA REF				
						ACCOUNT TOTAL	1,595.00	0.00	1,595.00	
						FUND TOTAL	1,695.74	0.00	1,695.74	
FUND 680 HEALTH INSURANCE FUND										
680-1902-457.51-01						INSURANCE / HEALTH INSURANCE				
547		04/22 AP		10/04/21	0000000	HOLMES MURPHY & ASSOCIATES LL	2,333.33			10/12/21
						BENEFITS CONSULTING SERV				
						NOVEMBER 2021				
						ACCOUNT TOTAL	2,333.33	0.00	2,333.33	
						FUND TOTAL	2,333.33	0.00	2,333.33	
FUND 681 HEALTH SEVERANCE										
FUND 682 HEALTH INSURANCE - FIRE										
FUND 685 VEHICLE MAINTENANCE FUND										
685-6698-446.72-05						OPERATING SUPPLIES / GAS & OIL				
548		04/22 AP		09/30/21	0000000	MANSFIELD OIL COMPANY	845.21			10/12/21
						1500 BLUFF STREET GASOHOL				
548		04/22 AP		09/30/21	0000000	MANSFIELD OIL COMPANY	20,845.30			10/12/21
						2200 TECHNOLOGY GASOHOL				
548		04/22 AP		09/27/21	0000000	HTP ENERGY	17,338.37			10/12/21
						#2 DIESEL FUEL FOR TECH				
548		04/22 AP		09/21/21	0000000	AIRGAS USA, LLC	38.06			10/12/21
						WELDING GAS				
510		04/22 AP		08/31/21	0000000	NAPA AUTO PARTS	632.51			10/12/21
						PARTS & EXPENSES AUG'21				
						ACCOUNT TOTAL	39,699.45	0.00	39,699.45	
685-6698-446.72-17 OPERATING SUPPLIES / UNIFORMS										
541		04/22 AP		09/08/21	0000000	SERVICEWEAR APPAREL, INC	29.96			10/12/21
						UNIFORMS AJ LEE				
541		04/22 AP		09/08/21	0000000	SERVICEWEAR APPAREL, INC	152.39			10/12/21

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FUND 685 VEHICLE MAINTENANCE FUND										
685-6698-446.72-17 OPERATING SUPPLIES / UNIFORMS						continued				
						UNIFORMS STEINLAGE, DEREK				
						GEARHART				
ACCOUNT TOTAL							182.35	.00	182.35	
685-6698-446.73-04 OTHER SUPPLIES / VEHICLE SUPPLIES										
548		04/22 AP		09/28/21	0000000	O'DONNELL ACE HARDWARE	14.76			10/12/21
						STATION #1 AIRLINE REPAIR				
548		04/22 AP		09/25/21	0000000	LAWSON PRODUCTS, INC.	682.87			10/12/21
						MISC SHOP SUPPLIES				
548		04/22 AP		09/17/21	0000000	POLK'S LOCK SERVICE, INC.	6.00			10/12/21
						SPARE JOHN DEERE KEY				
510		04/22 AP		08/31/21	0000000	NAPA AUTO PARTS	42,968.13			10/12/21
						PARTS & EXPENSES AUG'21				
ACCOUNT TOTAL							43,671.76	.00	43,671.76	
685-6698-446.86-04 REPAIR & MAINTENANCE / RADIO & COMMUNICATIONS										
548		04/22 AP		09/27/21	0000000	PRECISE MRM LLC	1,000.00			10/12/21
						AVL CELL CHARGE AUG 2021				
ACCOUNT TOTAL							1,000.00	.00	1,000.00	
685-6698-446.86-12 REPAIR & MAINTENANCE / TOWELS										
548		04/22 AP		10/01/21	0000000	ARAMARK	82.45			10/12/21
						SHOP TOWELS				
541		04/22 AP		09/24/21	0000000	ARAMARK	82.45			10/12/21
						TOWEL SERVICE				
541		04/22 AP		09/17/21	0000000	ARAMARK	82.45			10/12/21
						TOWEL SERVICE				
ACCOUNT TOTAL							247.35	.00	247.35	
685-6698-446.87-08 RENTALS / WORK BY OUTSIDE AGENCY										
548		04/22 AP		09/27/21	0000000	MACQUEEN EQUIPMENT	644.40			10/12/21
						#491 REPAIRED DOOR CONTRO				
						L BUTTONS				
510		04/22 AP		08/12/21	0000000	RASMUSSEN CO., THE	125.00			10/12/21
						#236 TO PW TOWING				
510		04/22 AP		08/12/21	0000000	RASMUSSEN CO., THE	300.00			10/12/21
						#346 TO PW TOWING				
ACCOUNT TOTAL							1,069.40	.00	1,069.40	
685-6698-446.93-04 EQUIPMENT / REFURBISH VEHICLES										
510		04/22 AP		08/31/21	0000000	NAPA AUTO PARTS	9,656.92			10/12/21

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FUND 685 VEHICLE MAINTENANCE FUND											
685-6698-446.93-04 EQUIPMENT / REFURBISH VEHICLES							continued				
PARTS & EXPENSES AUG'21											
ACCOUNT TOTAL							9,656.92	0.00	9,656.92		
FUND TOTAL							95,527.23	0.00	95,527.23		
FUND 686 PAYROLL FUND											
FUND 687 WORKERS COMPENSATION FUND											
FUND 688 LTD INSURANCE FUND											
FUND 689 LIABILITY INSURANCE FUND											
689-1902-457.51-05 INSURANCE / LIABILITY INSURANCE											
510		04/22	AP	08/31/21	0000000	NAPA AUTO PARTS	1,461.94			10/12/21	
PARTS & EXPENSES AUG'21											
ACCOUNT TOTAL							1,461.94	0.00	1,461.94		
FUND TOTAL							1,461.94	0.00	1,461.94		
FUND 724 TRUST & AGENCY											
FUND 727 GREENWOOD CEMETERY P-CARE											
FUND 728 FAIRVIEW CEMETERY P-CARE											
FUND 729 HILLSIDE CEMETERY P-CARE											
FUND 790 FLOOD LEVY											
GRAND TOTAL							1,277,721.30	1,557.37	1,276,163.93		