

CUMBERLAND ZONING BOARD OF APPEALS STAFF REPORT

ZA23-000002: Knox Street Setback Modification – Conditional Use

August 2, 2023

OVERVIEW:

On July 17, 2023 , applicant William Rothman, of Rocon, LLC, on behalf of property owners Dominic and Marcy Dearcangellis filed a petition (ZA23-000002), which is subject to specific conditions as specified in Section 25-206 (g) In the Cumberland Zoning Ordinance, for a request for setback modification to construct a speculative Cellular Communications Tower located on Knox Street. The Zoning Ordinance authorizes the Board of Appeals to consider the variance request as a conditional use approval. A copy of the application and all associated submittals is attached to this report.

The applicant is seeking this setback relief from Section 25-206 (g) of the Cumberland Zoning Ordinance, which requires that each telecommunication tower have a minimum setback of one (1) foot from all adjacent property lines for every foot of height of the tower. As specifically applied to the applicant's 195-foot tall proposed tower structure, a 195-foot minimum setback from each property line would be required from the center-point of the tower. Per the originally submitted site plans (a copy of which is attached to this report), the applicants were seeking relief for the setback.

The applicant has already had BOZA approval on ZA20-000002. They are wanting to move the location of the tower, but on the same parcel of land. If approved they will not seek to build on the first approval's location. The new location is located at the western most point on the property and approx. 450' away from the previous location.

PROCEDURAL STATUS:

The applicant prepared a site and submitted these plans on July 17, 2023. The application was reviewed by City Staff and was determined to comply with all basic requirements on the Zoning Ordinance, except for the side yard setbacks. Based on this determination, staff scheduled the petition for a public hearing before the Zoning Board of Appeals on August 2, 2023.

STAFF RECOMMENDATION:

Staff reviewed the packet of information filed by the applicant with the Conditional Use petition and confirmed that the proposed tower does not satisfy the minimum setback required by Section 25-206 (g). The applicant is seeking approval for setback modifications per Section 25-206 (g) (5) of the Zoning Ordinance.

Staff has not determined if the proposed tower has been approved by the Federal Aviation Administration for compliance with F.A.R. Part 77 and any other formal review that may be required to ensure that the tower will not create an air navigation hazard for planes arriving and departing from the Greater Cumberland Regional Airport in Wiley Ford, WV. Such approvals may be necessary for this project to be constructed. The Zoning Board of Appeals is authorized to issue a variance from specific requirements of the City's Zoning Ordinance *only*, and no assurance can be implied or suggested that the applicant will be relieved from any subsequent requirements that may be imposed by any cognizant Federal or State Agency (either in Maryland or West Virginia) regardless of whether or not such requirements are more restrictive than any relief that may be granted by the Zoning Board of Appeals. Written approval by the FAA will be required of the applicant prior to filing an application for a building permit.

According to Section 25-174 (i) of the Zoning Ordinance, the applicant shall bear the "burden of proof" for any conditional use or variance application before the Zoning Board of Appeals. Under Maryland Law, this "burden of proof" requires that the applicant produce evidence to the Board in support of the request and to persuade the Board of the justification for the requested relief based on that evidence. Based on the materials submitted with the application and a site investigation of the area, staff can offer the following additional facts and determinations for the Board's consideration with regard to the application:

1. The subject property is located in the I-G – Industrial General Zone.
2. There are no applicable height restrictions in the I-G zone that would limit the ultimate height of the proposed tower. The only applicable height restriction within the zone is fifty (50) stories, and an antenna tower has no stories.
3. There were 15 parcels identified within two-hundred feet (200') of the proposed tower location. While the parcel in question is located in the Industrial General Zone, it borders the Business Highway and Urban Residential Zones. There were 3 residential land use parcels and 1 residential/commercial land use parcels identified within two-hundred feet (200') of the proposed tower location.

4. The applicant has asserted that the engineered fall zone for the proposed tower is twenty-five feet (25') from the center-point, according to the letter and site plan in the appendix, in which there were no residences identified. Attached is a letter from the engineer providing certification that asserts that the tower has been designed to collapse in a way that will result in a fall radius no greater than twenty-five feet (25').
5. The applicant has indicated that AT&T will use 2 of the 4 antennas, with the remaining 2 available for future leasing.
6. The applicant has provided no specific justification for the proposed one-hundred ninety-five foot (195') height of the tower.

In order to approve the requested variance, the Zoning Board of Appeals must find that the request satisfies the 7 specific criteria outlined in Section 25-175 (1) (c) of the Zoning Ordinance. The following list indicates the *minimum* questions that should be asked of any applicant for a conditional use to address the aforementioned criteria. The Zoning Board of Appeals may ask additional related or follow-up questions, but *must* make findings of fact for its decision that address the basic questions below:

1.
 - a. How is the proposed use in accordance with the Cumberland Comprehensive Plan?
 - b. How is the proposed use consistent with the spirit, purpose, and intent of the Zoning Ordinance?
2. How is the proposed use in the best interests of the City, the convenience of the community, and the public welfare?
3. How do you show that the proposed use is suitable for the property in question and will be designed, constructed, operated, and maintained so as to be in harmony with and appropriate in appearance with the existing or intended character of the general vicinity?
4. Does the proposed use comply with all applicable requirements of this Ordinance?

- 5. How is the proposed use suitable in terms of permitting the logical, efficient, and economical extension of public services and facilities, such as public water, sewers, police and fire protection, and public schools?**
- 6. How is the proposed use suitable in terms of effects on street traffic and safety with adequate sidewalks and vehicular access arrangements to protect major streets from undue congestion and hazard?**
- 7. How do you show that the proposed use is in complete conformance with the performance standards contained in Section 25-138 of this Ordinance?**

Staff recommends that the Zoning Board of Appeals apply the following conditions to any approval of the petition:

- 1. Approval of this Petition by the City does not relieve the owner and applicant from the responsibility of compliance with all applicable local, state, and federal codes, ordinances, and regulations lawfully in effect at later stages of the approval and development process.**
- 2. Documentation or written approval by the Federal Aviation Administration and non-Interference with flight approach, departure, and air hazard safety zones associated with and surrounding the Greater Cumberland Regional Airport shall be provided by the applicant prior to approval of a building permit for the proposed tower.**
- 3. While this application is to be handled as a Conditional Use, according to Section 20-206 (g) (5), the 7 legal requirements/standards attached to variance petitions should still be reviewed in regards to this project, since dimensional issues are prominent.**
- 4. In a previous Communication Tower project, the Board imposed required liability insurance as a condition of approval. The precedence of this condition is not required by any ordinance, but due to the proximity of neighboring parcels, a similar condition could be considered by the Board.**

5. The Board should consider any site-specific adverse impacts that are inherent to Cellular Communication Towers. These adverse impacts that might be considered cannot be those which would exist regardless of where the use would exist in the applicable zone.

Board of Appeals Action:

- Approve the requested Conditional Use Setback Modification petition in accordance with the findings of fact indicated on the ZA23-000002 Zoning Appeal form, and with the following additional conditions of approval, if deemed necessary, by the Zoning Board of Appeals:

- Deny the requested Conditional Use Setback Modification, based on the following findings of fact:

Motion by: _____

Seconded by: _____

Vote:

In favor of motion: _____ Opposed: _____ Abstained: _____

Number of voting members present: _____

Signed:

Chair, Zoning Board of Appeals

Date: _____

Secretary, Zoning Board of Appeals

Date: _____

APPENDIX A

Permit Application, Maps, & Documentation

City of Cumberland - Dept. of Community Development

Internal Routing Sheet

Permit or Review #: **ZA23-000002**

Permit or Review Type: Conditional Use or Special Exception

Project Location: 0 KNOX ST CUMBERLAND, MD 21502

Applicant Contact Information: Name: Rocon, LLC
 Address: 9101 Chesapeake Avenue
 City/State/Zip: Cumberland MD 21502
 Phone: (410) 499-7010
 Email: roconllc@gmail.com

Contractor Contact Information: Company Name:
 Contact:
 Address:
 City/State/Zip:
 Phone:
 Email:

Date of Application: 07/17/2023

Work Description: (narrative box)

Zoning Board Appeal for the modification of property line and dwelling setback distance requirements for the installation of communications tower.

Amount Paid: 300.00

Amount Due: 0.00



City of Cumberland

Department of Community Development • 57 N. Liberty Street • Cumberland, MD 21502 • www.cumberlandmd.gov
301-759-2000, ext. 5600 • Fax 301-759-6432 • complaints@cumberlandmd.gov

ZA # 23-00002

ZA23-000002

MUNICIPAL ZONING BOARD OF APPEALS, known as the Cumberland Board of Appeals, decide: appeals challenged due to the Zoning Administrator's enforcement, interpretation or administration of the City Code; challenges to Issue of Interpretation relative to the Zoning Ordinance or Zoning Map; applications for conditional uses, and authorize nonconforming uses. (Further powers found in City Code). Regular meetings are scheduled at 4:00 p.m. on the first and third Wednesday of each month when there are agenda items to be addressed.

ZONING BOARD APPEAL

- Variance Petition - *public hearing required*
- Conditional Use or Special Exception - *public hearing required*
- Appeal from an Administrative Decision - *public hearing required*
- Approval Extension Request (*no fee*)

A Cumberland Board of Appeals brochure is available

Requirements vary depending on the type of appeal

All appeals must be applied for in writing, accompanied by a written explanation of the rationale or justification for the extension.

Project Location: Knox Street, Cumberland, Maryland 21502 Property ID #: 05 - 002389
found on deed or view: www.dat.state.md.us, Real Property Search

Applicant Name: Rocon, LLC Phone: 443-804-8007; 410-499-7010

Applicant Address: 9101 Chesapeake Avenue, Sparrow's Point, Maryland 21219

Short Description: Application for Conditional Use to modify property line and dwelling setback distance requirements for communications tower

To learn the detailed requirements of your specific application and Zoning Board of Appeal process, please review Cumberland City Code available on the City's website www.ci.cumberland.md.us, search 'Municipal Codes'.

- o Attach a site plan drawn to scale and bearing the dimensional requirements for which the variance is being sought. All boundaries of the property must be shown and all buildings located correctly to scale within them. This may include minimum yard setbacks, maximum building coverage, height requirements and size requirements for signs
- o Provide written justification addressing the variance legal requirements from the City Code. Chapter 25. Article VII, Sec. 25-173
- o The basic submission requirements for Conditional Use or Special Exception application are specified in the City Code. Chapter 25. Article VII, Sec. 25-175.
- o Certain uses, listed in City Code. Chapter 25. Article VII, Sec. 25-176, will have additional special requirements that the applicant must satisfy in writing for approval by the Board.
- o An Appeal from an Administrative Decision should include a copy of the Denial (or reasons stated for the denial) and a statement of the applicant's rationale or reasons why the decision should be overturned.
- o All appeals require a public hearing.
- o A non-refundable \$300.00 Zoning Appeal review fee is payable at time of application.
- o No fee for an approval extension request.

To apply online go to citizenserve.com/Cumberland

PROPOSED 185' TOWER AND
35'x70' COMPOUND OWNED BY
ROCON LLC (2,450 SF)

EXISTING GRAVEL PARKING AREA TO BE USED
AS AT&T ACCESS ROAD. EXISTING GRAVEL TO
BE REFRESHED FROM KNOX RD. TO COMPOUND.

SERVICE UNLIMITED INC-
TWO-WAY RADIO SERVICE
INC.
ZONING: GATEWAY
INDUSTRIAL
PARCEL: 0105002389
0.82 ACRES

SITE PLAN

SCALE: 1" = 100'



KCI TECHNOLOGIES, INC.
11830 West Market Place, Suite F
Fulton, MD 20759
Phone: 410.792.8086



1997 ANNAPOLIS EXCHANGE
PKWY., SUITE 200
ANNAPOLIS, MD 21401
PHONE: (410)582-8043
FAX: (410)221-2862



7150 STANDARD DRIVE
HANOVER, MD 21076

SUBMITTALS

NO.	DATE	DESCRIPTION
1	11/11/03	PRELIMINARY

SHEET 1 OF 5

WINIFRED III
KNOX STREET
CUMBERLAND, MD 21502
ALLEGANY COUNTY

FA#: 14372653
SITE#: 1945

HENDERSON AVE.

PROPOSED AT&T 6'-8" x 6'-8" STEEL VERTIV WIC SHELTER (NEQ.20061) ON 12'x16' CONCRETE PAD.

PROPOSED AT&T 13'-6" x 18'-8" LEASE AREA (250 SQ. FT.)

PROPOSED 195' MONOPOLE BY ROCON, LLC.

REFER TO SHEET 3 FOR COMPOUND LAYOUT

PROPOSED GRAVEL EXTENSION FOR AT&T GRAVEL ACCESS ROAD AND TURN-AROUND.

EXISTING GRAVEL PARKING AREA TO BE USED AS AT&T ACCESS ROAD. EXISTING GRAVEL TO BE REFRESHED FROM KNOX RD. TO COMPOUND.

PROPOSED MAT FOUNDATION

25' TOWER RADIUS

PROPOSED ROCON, LLC 35'x70' GRAVEL COMPOUND (2,450 SF)

EXISTING BUILDING (TRF)

3'-12"-0"

GRAVEL ROAD

- NOTES:**
1. TREES WILL BE LOCATED AT TIME OF SURVEY AND USED TO DETERMINE IF TREE TRIMMING/REMOVAL IS NECESSARY.
 2. EXISTING UNDERGROUND UTILITIES MUST BE LOCATED IN ORDER TO ENSURE NO CONFLICT WITH PROPOSED EQUIPMENT.

SITE PLAN

SCALE: 1" = 30'



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TECHNOLOGIES

KCI TECHNOLOGIES, INC.
11830 West Market Place, Suite F
Fulton, MD 20759
Phone: 410.792.8088



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ANNAPOLIS, MD 21401
PHONE: (410)582-8043
FAX: (410)221-2982



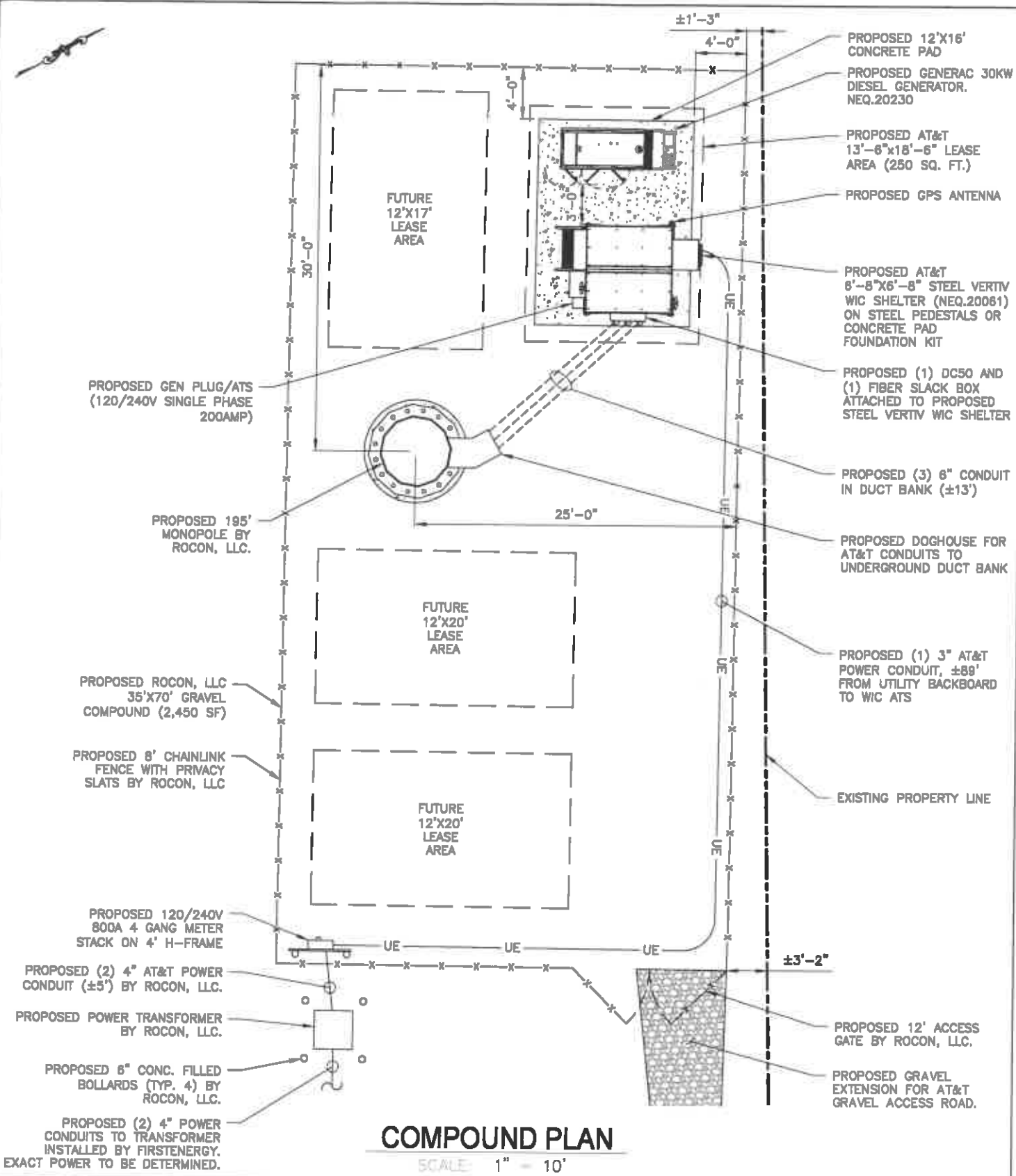
7150 STANDARD DRIVE
HANOVER, MD 21078

SUBMITTALS	
#	DATE
1	2-13-01

SHEET 2 OF 5

WINIFRED III
KNOX STREET
CUMBERLAND, MD 21502
ALLEGANY COUNTY

FA#: 14372653
SITE#: 1945



COMPOUND PLAN

SCALE: 1" = 10'

KCI TECHNOLOGIES
 KCI TECHNOLOGIES, INC.
 11830 West Market Place, Suite F
 Fulton, MD 20759
 Phone: 410.792.8086

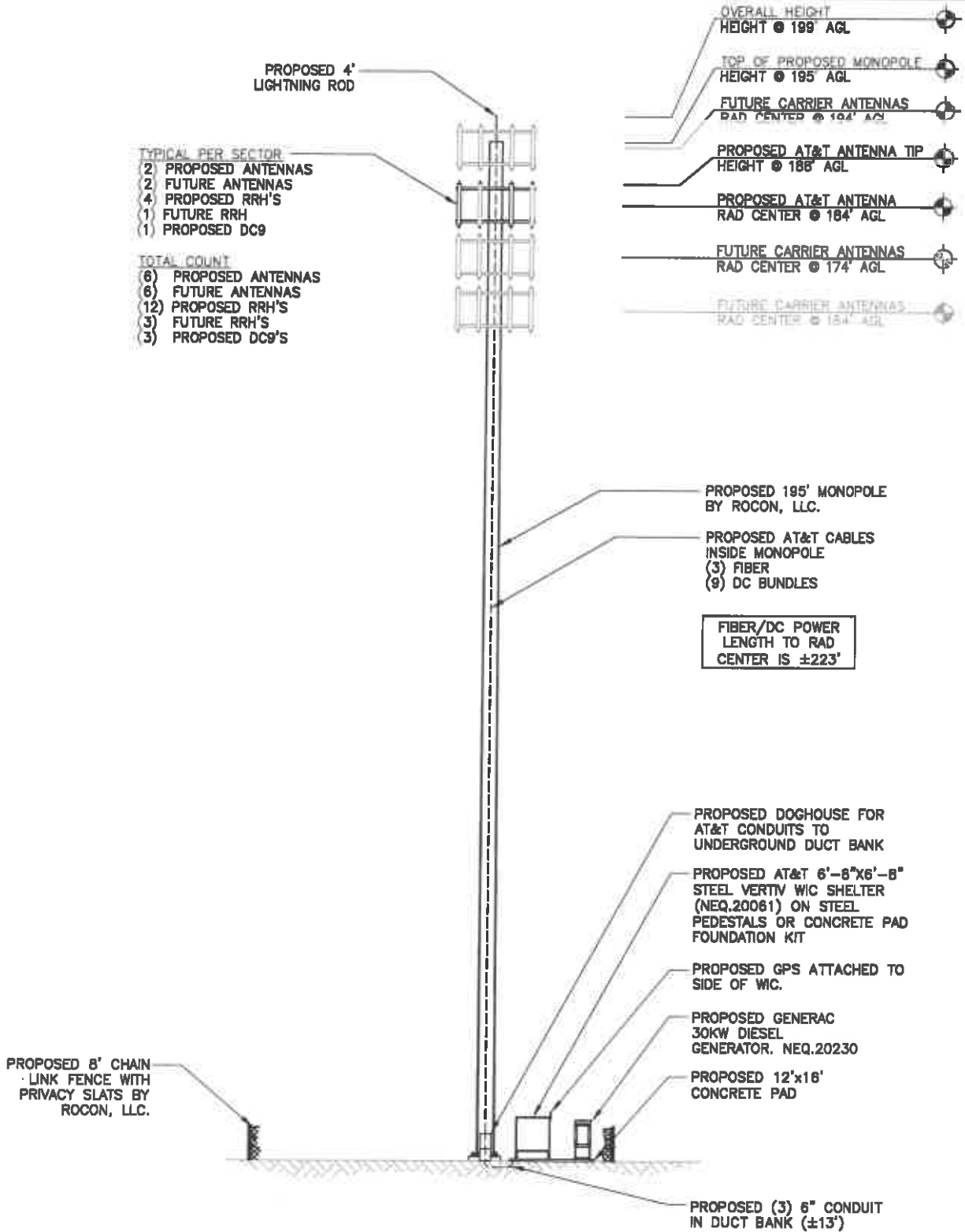
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 1987 ANNAPOLIS EXCHANGE
 PKWY., SUITE 200
 ANNAPOLIS, MD 21401
 PHONE: (410)582-8043
 FAX: (410)221-2982

at&t
 7150 STANDARD DRIVE
 HANOVER, MD 21076

SUBMITTALS	
1	PROJ/ISSUE

SHEET 3 OF 5

WINIFRED III
 KNOX STREET
 CUMBERLAND, MD 21502
 ALLEGANY COUNTY
 FA#: 14372653
 SITE#: 1945



TOWER ELEVATION
SCALE: N.T.S.

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smartlink

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HANOVER, MD 21078

SUBMITTALS	
1. PRELIMINARY	1-12-21

SHEET 4 OF 5

WINIFRED III
KNOX STREET
CUMBERLAND, MD 21502
ALLEGANY COUNTY

FA#: 14372653
SITE#: 1945

PROPOSED ANTENNAS.
TYP. (2) PER SECTOR, (6) TOTAL

(2) PROPOSED RRH'S MOUNTED
ON MAST BEHIND 2ND AND 3RD
ANTENNA POSITIONS. (4) RRH'S
PER SECTOR, (12) TOTAL

FUTURE ANTENNA TYP.
(2) PER SECTOR, (6) TOTAL

PROPOSED DCB. TYP. OF (1)
PER SECTOR, (3) TOTAL ON
PROPOSED LIGHT WEIGHT RING
MOUNT/ SITE PRO PART# UGLM
WITH PIPE MOUNT ADAPTER
(SITE PRO PART# FMA1).

GAMMA SECTOR
AZ = 300°

ALPHA SECTOR
AZ = 40°

BETA SECTOR
AZ = 160°

FIRSTNET

FIRSTNET

PROPOSED SITE PRO
ANTENNA PLATFORM PART#
F3P-14W WITH HANDRAIL
KIT PART# F3P-HRK14

3' PIM FREE AREA (TYP.)

ANTENNA LAYOUT PLAN

SCALE: 1" = 3'



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7150 STANDARD DRIVE
HANOVER, MD 21078

SUBMITTALS	
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WINIFRED III
KNOX STREET
CUMBERLAND, MD 21502
ALLEGANY COUNTY

FA#: 14372653
SITE#: 1945



1 Fairholm Avenue
Peoria, IL 61603 USA
Phone: (309)-566-3000
Fax: (309)-566-3079

DATE: OCTOBER 16, 2020

PURCHASER: ROCON LLC

PROJECT: 195 FT TAPERED STEEL POLE
WINIFRED SITE, CUMBERLAND, MARYLAND

FILE NUMBER:235008

DRAWINGS: 235008-01-D1 R4 , 235008-01-F1 , B090548

I CERTIFY THAT THE REFERENCED DRAWINGS WERE PREPARED UNDER MY SUPERVISION IN ACCORDANCE WITH THE DESIGN AND LOADING CRITERIA SPECIFIED BY THE PURCHASER AND THAT I AM A REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.

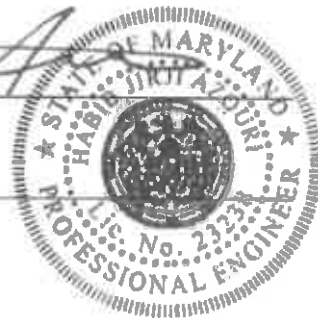
THE REFERENCED FOUNDATION DESIGN IS BASED ON PRESUMPTIVE SOIL PARAMETERS. A GEOTECHNICAL SITE INVESTIGATION SHALL BE PERFORMED PRIOR TO INSTALLATION FOR COMPETENT PROFESSIONAL EXAMINATION AND VALIDATION OF THE SUITABILITY OF THE PRESUMPTIVE SOIL PARAMETERS FOR THE SITE.

CERTIFIED BY: _____

HWA

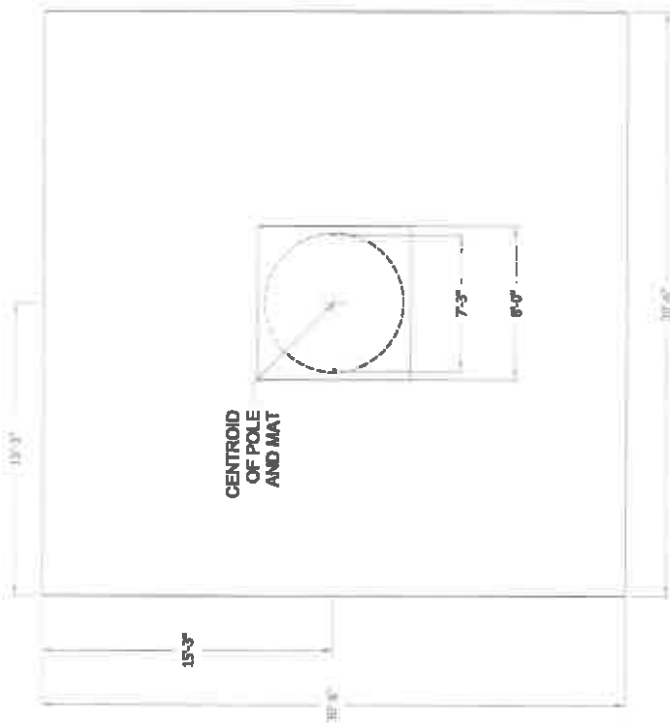
DATE: _____

10/16/20



Products for a Growing World of Technology®

NOTE: SEE DRAWING NO. B080548 FOR STANDARD FOUNDATION NOTES.



PLAN VIEW

(2) NO. 5 CIRCULAR STIRRUPS ENCLOSING VERTICAL BARS @ 2'-1/2' C-C W/ 180 DEG. STAGGERED 6" MIN LAPS TERMINATED AT EACH END WITH A STD. ACI 318 HOOK ENGAGING A VERTICAL BAR WITH 2" COVER (TYP).

NO. 5 CIRCULAR STIRRUPS ENCLOSING VERTICAL BARS WITH 30" LAPS STAGGERED 180 DEG. ON 6" CENTERS

GROUND LINE

12 BAR DIA. (MIN)

(40) NO. 10 VERTICAL BARS EQUALLY SPACED ON 8" DIA. CIRCULAR CAGE (CENTERLINE OF VERT. BARS) W/ STD ACI 318 HOOKS AT BOTTOM

(56) NO. 10 HORIZONTAL BARS EQUALLY SPACED EACH WAY, TOP & BOTTOM (224 TOTAL)

ELEVATION VIEW

CONCRETE VOLUME
 SQUARE PIER 10.7 CU.YDS
 PAD 68.9 CU.YDS
 TOTAL 79.6 CU.YDS

ADJUSTED FACTORED REACTIONS
 O.T.M. = 8,248.2 FT-K
 DOWNLOAD = 163.8 KIPS
 SHEAR = 52.4 KIPS

235008

DATE: 7/24/2020
 DRAWN: SWG
 CHECKED: HA
 PROJECT: 235008-01-41
 SHEET: 0



MAT RAISED PIER
 PRESUMPTIVE CLAY PER AWS/TIA-222-G

DRAWN:	SWG	CHECKED:	HA	DATE:	7/24/2020
PROJECT:	235008	SHEET:	01	TOTAL:	41
PRO. CLIENT:	SWG	PROJ. NAME:			
DRAWING NO.:	235008-01-41	REV:	0		

STANDARD FOUNDATION NOTES
ANSI/TIA-222-G/H

STANDARD FOUNDATION DESIGNS ARE IN ACCORDANCE WITH ANSI/TIA-222-G/H, "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES" FOR THE FOLLOWING PRESUMPTIVE CLAY SOIL PARAMETERS:

h (ft) (m)	c (psf) (kPa)	φ (deg) (rad)	Ultimate Allowable (psf) (kPa)		Ultimate Skin Friction (psf) (kPa)	s _u (psi) (MPa)
			Shallow Fndg.	Deep Fndg.		
0	110 [7.7]	1000 [68.9]	8000 [561]	14111 [1000]	3011 [214]	1100 [77.0]
10	110 [7.7]	1000 [68.9]	8000 [561]	14111 [1000]	3011 [214]	1100 [77.0]

GROUND WATER TABLE IS AT OR BELOW FOUNDATION DEPTH
MAXIMUM FROST PENETRATION DEPTH LESS THAN FOUNDATION DEPTH

THE PURCHASER SHALL VERIFY THAT ACTUAL SITE SOIL PARAMETERS MEET OR EXCEED ANSI/TIA-222-G/H PRESUMPTIVE CLAY SOIL DESIGN PARAMETERS AND THAT THE DEPTH OF STANDARD FOUNDATIONS ARE APPROPRIATE BASED ON THE FROST PENETRATION AND/OR ZONE OF SEASONAL MOISTURE VARIATION AT THE SITE. FOUNDATION DESIGN MODIFICATIONS MAY BE REQUIRED IN THE EVENT PRESUMPTIVE CLAY SOIL PARAMETERS ARE NOT APPLICABLE FOR THE ACTUAL SUBSURFACE CONDITIONS ENCOUNTERED.

A SITE-SPECIFIC INVESTIGATION IS REQUIRED FOR CLASS III STRUCTURES IN ACCORDANCE WITH

ANSI/TIA-222-G/H.

FOUNDATION DESIGNS ASSUME FIELD INSPECTIONS WILL BE PERFORMED BY THE PURCHASERS REPRESENTATIVE TO VERIFY THAT CONSTRUCTION MATERIALS, INSTALLATION METHODS AND ASSUMED DESIGN PARAMETERS ARE ACCEPTABLE BASED ON THE CONDITIONS EXISTING AT THE SITE.

WORK SHALL BE IN ACCORDANCE WITH THE PROJECT CONSTRUCTION DOCUMENTS, LOCAL CODES, SAFETY REGULATIONS AND UNLESS OTHERWISE NOTED, THE LATEST EDITION OF ACI 318, INCLUDING CODE REQUIREMENTS FOR REINFORCED CONCRETE. PROCEDURES FOR THE PROTECTION OF EXCAVATIONS, EXISTING CONDITIONS AND UTILITIES SHALL BE ESTABLISHED PRIOR TO FOUNDATION INSTALLATION. CONCRETE MATERIALS SHALL CONFORM TO THE APPROPRIATE STATE REQUIREMENTS FOR EXPOSED STRUCTURAL CONCRETE.

PROPORTIONS OF CONCRETE MATERIALS SHALL BE OBTAINABLE FOR THE INSTALLATION METHODS UTILIZED AND SHALL RESULT IN DURABLE CONCRETE FOR RESISTANCE TO LOCAL AND IMPACTIVE AGGRESSIVE ACTIONS. THE DURABILITY REQUIREMENT OF ACI 318 SHALL BE SATISFIED BASED ON THE CONDITIONS EXISTING AT THE SITE. AS A MINIMUM, CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI (27.6 MPa) IN 28 DAYS.

MINIMUM SIZE OF AGGREGATE SHALL NOT EXCEED 1/4 THE MINIMUM SPACING BETWEEN REINFORCING BARS. THE MAXIMUM SPACING OF AGGREGATE SHALL BE LIMITED TO 1/4 THE MINIMUM SPACING BETWEEN REINFORCING BARS. SUCH AS VIBRATING SHALL BE UTILIZED TO INSURE FREE FLOW OF CONCRETE. AIR ENTRAINMENT SHALL BE PROVIDED FOR REINFORCED CONCRETE TO THE REQUIREMENTS OF ASTM A818 UNLESS OTHERWISE INDICATED. UNLESS OTHERWISE SPECIFIED IN THE CONSTRUCTION DOCUMENTS, ALL REINFORCING SHALL BE PROVIDED TO FULLY DEVELOP THE DESIGN STRENGTH OF THE REINFORCING.

REINFORCING BARS SHALL BE PROVIDED TO FULLY DEVELOP THE DESIGN STRENGTH OF THE REINFORCING. REINFORCING SHALL BE PROVIDED TO FULLY DEVELOP THE DESIGN STRENGTH OF THE REINFORCING. REINFORCING SHALL BE PROVIDED TO FULLY DEVELOP THE DESIGN STRENGTH OF THE REINFORCING.

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13. SPACERS SHALL BE ATTACHED INTERMITTENTLY THROUGHOUT THE ENTIRE LENGTH OF VERTICAL REINFORCING CAGES TO INSURE CONCENTRIC PLACEMENT OF CAGES IN EXCAVATIONS.

14. FOUNDATION DESIGNS ASSUME STRUCTURAL BACKFILL TO BE COMPACTED IN 8 INCH (200 mm) MAXIMUM LAYERS TO 95% OF MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D998. ADDITIONALLY, STRUCTURAL BACKFILL MUST HAVE A MINIMUM COMPACTED UNIT WEIGHT OF 110 POUNDS PER CUBIC FOOT (17 kN/m³).

15. FOUNDATION DESIGNS ASSUME AN INSTALLATION ON A PROPERLY DRAINED LEVEL SITE.

16. FOUNDATION INSTALLATION SHALL BE SUPERVISED BY PERSONNEL KNOWLEDGEABLE AND EXPERIENCED WITH THE PROPOSED FOUNDATION TYPE. CONSTRUCTION SHALL BE IN ACCORDANCE WITH GENERALLY ACCEPTED INSTALLATION PRACTICES.

17. ALL CONSTRUCTION AND SAFETY EQUIPMENT AND TEMPORARY SUPPORTS REQUIRED FOR CONSTRUCTION SHALL BE DETERMINED, FURNISHED AND INSTALLED BY THE CONTRACTOR BASED ON THE MEANS AND METHODS CHOSEN BY THE CONTRACTOR. ALL CONSTRUCTION ACTIVITIES SHALL BE PERFORMED BY COMPETENT, QUALIFIED AND TRAINED PERSONNEL.

18. FOR FOUNDATION AND ANCHOR TOLERANCES SEE ANCHOR ROD LAYOUT DRAWING.

19. LOOSE MATERIAL SHALL BE REMOVED FROM BOTTOM OF EXCAVATION PRIOR TO CONCRETE PLACEMENT. SIDES OF EXCAVATION SHALL BE ROUGH AND FREE OF LOOSE CUTTINGS.

20. CONCRETE SHALL BE PLACED IN A MANNER THAT WILL PREVENT SEGREGATION OF CONCRETE MATERIALS, INFILTRATION OF WATER OR SOIL, AND OTHER OCCURRENCES WHICH MAY DECREASE THE STRENGTH OR DURABILITY OF THE FOUNDATION.

21. FREE FALL CONCRETE MAY BE USED PROVIDED FALL IS VERTICAL DOWN WITHOUT HITTING SIDES OF EXCAVATION, FORMWORK, REINFORCING BARS, ANCHORAGES, FORM TIES, CAGE BRACING OR OTHER OBSTRUCTIONS. UNDER NO CIRCUMSTANCES SHALL CONCRETE FALL THROUGH WATER.

22. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED SOIL EXCEPT FOR PIERS SUPPORTED ON SPREAD FOUNDATIONS. FORMS FOR PIERS SHALL BE REMOVED PRIOR TO PLACING STRUCTURAL BACKFILL.

23. CONSTRUCTION JOINTS, IF REQUIRED BY DRILLED PIER OR CAISSON FOUNDATIONS, SHALL BE AT LEAST 12 INCHES (305 mm) BELOW BOTTOM OF EMBEDMENTS AND MUST BE INTENTIONALLY ROUGHENED TO A FULL AMPLITUDE OF 1/4 INCH (6 mm). FOUNDATION DESIGN ASSUMES NO OTHER CONSTRUCTION JOINTS.

24. CONSTRUCTION JOINTS, IF REQUIRED AT THE BASE OF PIERS SUPPORTED ON SPREAD FOUNDATIONS, SHALL BE INTENTIONALLY ROUGHENED TO A FULL AMPLITUDE OF 1/4 INCH (6 mm). FOUNDATION DESIGN ASSUMES NO OTHER CONSTRUCTION JOINTS.

25. CASING, IF USED, SHALL NOT BE LEFT IN PLACE. EQUIPMENT, PROCEDURES, AND PROPORTIONS OF CONCRETE MATERIALS SHALL INSURE CONCRETE WILL NOT BE ADVERSELY DISTURBED UPON CASING REMOVAL. DRILLING FLUID, IF USED, SHALL BE FULLY DISPLACED BY CONCRETE AND SHALL NOT BE DETRIMENTAL TO CONCRETE OR SURROUNDING SOIL. CONTAMINATED CONCRETE SHALL BE REMOVED FROM TOP OF FOUNDATION AND REPLACED WITH FRESH CONCRETE.

26. TOP OF FOUNDATION SHALL BE SLOPED TO DRAIN WITH A FLOATED FINISHED. EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1/4" x 1/4" (6 mm x 6 mm) UNLESS OTHERWISE INDICATED.

27. FOR ANCHOR BLOCK TYPE FOUNDATIONS, FOR GUYED MASTS, ADDITIONAL CORROSION PROTECTION MAY BE REQUIRED FOR STEEL GUY ANCHORS IN DIRECT CONTACT WITH SOIL. DESIGN ASSUMES PERIODIC INSPECTIONS WILL BE PERFORMED OVER THE LIFE OF THE STRUCTURE TO DETERMINE IF ADDITIONAL ANCHOR CORROSION PROTECTION MEASURES SHALL BE IMPLEMENTED BASED ON OBSERVED SITE-SPECIFIC CONDITIONS.



ANSI/TIA-222-G/H
STANDARD FOUNDATION DESIGN NOTES

DATE: 11/29/2008

HA

80905-48



1 Fairholm Avenue
Peoria, IL 61603 USA
Phone 309-566-3000
FAX 309-566-3079
Toll Free 800-727-ROHN

October 16, 2020

Roon LLC
9101 Chesapeake Ave
Sparrow's Point, MD 21219

Attn: Bill Rothman

Reference: 195' Tapered Steel Pole
Site Name: Winifred
Allegheny County (Cumberland), MD
File # 235008

Dear Mr. Rothman

The referenced pole is designed to meet the specified loading requirements in accordance with ANSI/TIA-222-G for a 115 MPH ASCE 7-10 Factored wind speed with no ice and a 30 MPH 3-second gust wind speed with .75 inch radial ice, Structure Class: II; Exposure Category: C and Topographic Category: 1.

It is our understanding that the design of the referenced pole requires consideration of a contained fall radius in the event that a catastrophic wind speed would result in collapse. Although the pole is not designed to fall, stronger sections than required by analysis is provided in the lower sections of the pole. This will result in an increased safety factor in the lower sections. This design enables the pole to fall through a combination of bending and buckling in the upper portion of the pole under a catastrophic wind loading. Failure in this manner will result in the upper portion of the pole folding over the lower portion, resulting in a fall radius no greater than 25 ft. The failure mode will theoretically be a local buckling failure involving a crippling of the pole wall on one side of the pole as opposed to the pole shearing off or completely breaking off and hitting the ground.

Please contact us at your convenience should you have further questions concerning the safety of pole structures or other aspects of pole design.

Sincerely,


Habib Azouri, P.E.
Engineering Manager



cc: Ray Adams



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R4.

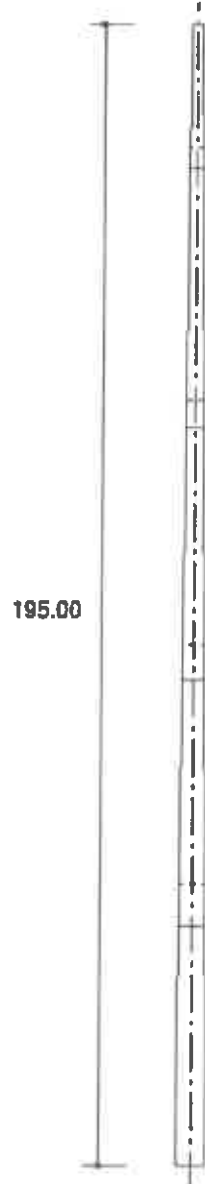
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 Site: WINIFRED- MD
 Engineer: SWG

DESIGN SPECIFICATION

Design Standard: ANS/AIA-222-G-2005 Add.2
 Ultimate Design Wind Speed (No Ice) = 115.0 (mph)
 Nominal Design Wind Speed (No Ice) = 89.1 (mph)
 Basic Wind Speed (With Ice) = 30.0 (mph)
 Design Ice Thickness = 0.75 (in)
 Structure Class = II
 Exposure Category = C
 Topographic Category = 1

Sct.	Length (ft)	Overlap (ft)	Top Dia. (in)	Bot Dia. (in)	Thick. (in)
5	24.62	0.00	22.75	28.26	0.2500
4	48.00	3.67	26.94	37.68	0.3125
3	48.00	4.92	35.95	46.69	0.4375
2	48.00	6.08	44.45	55.19	0.4375
1	48.21	7.17	52.71	63.50	0.5000



MAXIMUM BASE REACTIONS

Download (Kips) 154.9
 Shear (Kips) 49.5
 Moment (Kipsft) 7800.4

Adjusted Reactions
 163.8
 52.3
 8248.2



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 Engineer: SWG

Section A: PROJECT DATA

Project Title: 195 FT TSP
 Customer Name: ROCON LLC
 Site: WINIFRED- MD
 Contract No.: 235008
 Revision: 0
 Engineer: SWG
 Date: Aug 4 2020
 Time: 10:27:52 AM
 Project Notes: 65 FT FALL RADIU

Design Standard: ASCE/TIA-222-G-2005 Addendum 2

GENERAL DESIGN CONDITIONS

Start wind direction: 0.00 (Deg)
 End wind direction: 315.00 (Deg)
 Increment wind direction: 45.00 (Deg)
 Elevation above ground: 3.00 (ft)
 Gust Response Factor Gc: 1.10
 Structure class: II
 Exposure category: C
 Topographic category: 1
 Material Density: 490.0 (lbs/ft³)
 Young's Modulus: 29000.0 (ksi)
 Poisson Ratio: 0.30
 Weight Multiplier: 1.00

WIND ONLY CONDITIONS:
 Ultimate Design Wind Speed (No Ice): 115.00 (mph)
 Nominal Design Wind Speed (No Ice): 84.00 (mph)
 Directionality Factor Kd: 0.95
 Importance Factor I: 1.00
 Wind Load Factor: 1.00
 Dead Load Factor: 1.20

WIND AND ICE CONDITIONS:
 Basic Wind Speed (With Ice): 10.00 (mph)
 Directionality Factor Kd: 0.95
 Wind Load Importance Factor Iw: 1.00
 Ice Thickness Importance Factor Iit: 1.00
 Ice Thickness: 0.75 (in)
 Ice Density: 56.19 (lbs/ft³)
 Wind Load Factor: 1.00
 Dead Load Factor: 1.20
 Ice Load Factor: 1.00

WIND ONLY SERVICEABILITY CONDITIONS:
 Serviceability Wind Speed: 60.00 (mph)
 Directionality Factor Kd: 0.95
 Importance Factor I: 1.00
 Wind Load Factor: 1.00
 Dead Load Factor: 1.00

EARTHQUAKE CONDITIONS:
 Site class coefficient: 3
 Spectral response acceleration Sa: 0.138
 Spectral response acceleration S1: 0.233
 Acceleration-based site coefficient Fsl: 1.000
 Velocity-based site coefficient Fv: 1.000
 Design spectral response acceleration Sds: 0.126
 Design spectral response acceleration Sd1: 0.228



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Engineer: SWG

Seismic analysis method: 1
Fundamental frequency of structure f1: 0.371
Total seismic shear Vx (Kips): 1.12

Analysis performed using: TowerSoft Finite Element Analysis Program



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 Engineer: SWG

Section B: STRUCTURE GEOMETRY

Total Height (ft) 195.00
 Bottom Diameter (in) 63.50
 Top Diameter (in) 22.75

Sect. No.	Length (ft)	Overlap (ft)	Bot Dia. (in)	Top Dia. (in)	Thick. (in)	Sides	Joint Type	Yield Stress (ksi)	Mass (lbs)	Calculated Taper (in/ft)
1	24.42	0.00	28.24	22.75	0.2500	18-sided	Telescopic	55.0	1780.0	0.22372
2	18.00	1.67	37.68	26.94	0.3125	18-sided	Telescopic	65.0	3454.8	0.22372
3	19.00	4.92	46.69	35.95	0.4375	18-sided	Telescopic	65.0	9829.8	0.22372
4	19.00	0.00	55.19	44.45	0.4375	18-sided	Telescopic	65.0	13874.1	0.22372
5	18.21	7.17	63.50	52.71	0.5000	18-sided	Flange	65.0	15899.7	0.22372

Total Mass:

44877.4



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 Engineer: SWG

Section D: TRANSMISSION LINE DATA

Transmission Lines Position

No.	Bot El (ft)	Top El (ft)	Desc.	Radius (ft)	AS	Orient.	No.	Shielded	Shielded Lines	Antenna
1	0.00	195.00	3/8" CABLE	1.00	0.00	0.00	1	No	0	
2	0.00	195.00	LDF7P-50A	0.00	0.00	0.00	12	Yes	12	
3	0.00	185.00	LDF7P-50A	0.00	0.00	0.00	12	Yes	12	
4	0.00	175.00	LDF7P-50A	0.00	0.00	0.00	12	Yes	12	
5	0.00	165.00	LDF7P-50A	0.00	0.00	0.00	12	Yes	12	

Transmission Lines Details

No.	Desc.	Width (in)	Depth (in)	Unit Mass (lb/ft)
1	3/8" CABLE	0.38	0.38	1.00
2	LDF7P-50A	2.01	2.01	0.92
3	LDF7P-50A	2.01	2.01	0.92
4	LDF7P-50A	2.01	2.01	0.92
5	LDF7P-50A	2.01	2.01	0.92

Utilization of the cross-section: No EX Lines: 211654



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 Engineer: SWG

Section F: POINT LOAD DATA

Structure Assignm from Node:0.00

POINT LOADS

No.	Description	Elev. (ft)	Radius (ft)	Azim. (Deg)	Orient. (Deg)	Vertical Offset (ft)	Ex Line	Comments
1	LIGHTNING ROD	195.00	0.00	0.0	0.0	0.00		
2	CARRIER	185.00	1.00	0.0	0.0	0.00		
3	CARRIER	185.00	1.00	120.0	120.0	0.00		
4	CARRIER	175.00	1.00	240.0	240.0	0.00		
5	CARRIER	165.00	1.00	0.0	0.0	0.00		

POINT LOADS WIND AREAS AND WEIGHTS

No.	Description	Frontal Base Area (ft^2)	Lateral Base Area (ft^2)	Frontal Iced Area (ft^2)	Lateral Iced Area (ft^2)	Weight Base (Kips)	Weight Iced (Kips)	CB
1	LIGHTNING ROD	1.00	1.00	2.00	2.00	0.10	0.20	1.10
2	CARRIER	159.32	159.32	271.57	271.57	4.89	17.20	1.10
3	CARRIER	159.32	159.32	271.57	271.57	4.89	17.20	1.10
4	CARRIER	159.32	159.32	271.57	271.57	4.89	17.20	1.10
5	CARRIER	159.32	159.32	271.57	271.57	4.89	17.20	1.10



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 Engineer: SWG

Section H: STRUCTURE DISPLACEMENT DATA
 Load Combination Wind Only - Serviceability

Wind Direction	Maximum displacements					
Elev. (ft)	W-E Disp (in)	N-S Disp (in)	Vert. Disp (in)	N-S Rot (deg)	W-E Rot (deg)	Twist Rot (deg)
195.00	-39.4	39.4	-1.0	2.89	2.91	0.02
180.81	-36.9	36.9	-1.0	2.89	2.80	-0.09
166.62	-34.4	34.4	-0.9	2.87	2.88	-0.01
152.43	-31.9	31.9	-0.8	2.85	2.88	-0.03
138.23	-29.4	29.2	-0.8	2.82	2.82	-0.01
124.04	-26.9	26.9	-0.7	2.77	2.78	-0.01
109.85	-24.4	24.8	-0.7	2.73	2.74	-0.01
95.65	-21.9	21.4	-0.6	2.62	2.63	-0.01
81.46	-19.4	19.2	-0.5	2.49	2.50	-0.01
67.27	-16.9	16.2	-0.4	2.34	2.34	-0.01
53.08	-14.4	14.4	-0.3	2.17	2.17	-0.01
38.89	-11.9	11.9	-0.3	1.99	2.00	-0.01
24.70	-9.4	9.4	-0.3	1.88	1.88	0.00
10.51	-7.0	7.0	-0.2	1.76	1.76	0.00
0.00	-4.5	4.5	-0.2	1.63	1.63	0.00
195.00	39.4	39.4	1.0	2.89	2.91	0.02
180.81	36.9	36.9	1.0	2.89	2.80	-0.09
166.62	34.4	34.4	0.9	2.87	2.88	-0.01
152.43	31.9	31.9	0.8	2.85	2.88	-0.03
138.23	29.4	29.2	0.8	2.82	2.82	-0.01
124.04	26.9	26.9	0.7	2.77	2.78	-0.01
109.85	24.4	24.8	0.7	2.73	2.74	-0.01
95.65	21.9	21.4	0.6	2.62	2.63	-0.01
81.46	19.4	19.2	0.5	2.49	2.50	-0.01
67.27	16.9	16.2	0.4	2.34	2.34	-0.01
53.08	14.4	14.4	0.3	2.17	2.17	-0.01
38.89	11.9	11.9	0.3	1.99	2.00	-0.01
24.70	9.4	9.4	0.3	1.88	1.88	0.00
10.51	7.0	7.0	0.2	1.76	1.76	0.00
0.00	4.5	4.5	0.2	1.63	1.63	0.00
195.00	0.0	0.0	0.0	0.00	0.00	0.00



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Section K: POLE OUTPUT LOAD DATA
 Load Combination Max Envelope
 Wind Direction Maximum

Elev. (ft)	Axial Ld. (kips)	Shear Ld. (kips)	Torque (kip-ft)	Bend Mom. (kip-ft)
195.00	18.68	9.12	8.87	16.15
190.81	18.68	9.12	8.86	42.75
186.62	19.34	9.46	8.85	43.66
182.43	19.34	9.46	8.84	82.08
178.24	31.17	15.21	7.63	82.15
174.05	31.17	15.21	7.62	145.38
169.86	38.91	18.95	8.48	145.84
165.67	38.91	18.95	8.48	224.00
161.48	43.84	21.30	6.54	222.58
157.29	43.84	21.30	6.53	311.08
153.10	58.62	28.33	0.09	307.78
148.91	58.62	28.33	0.09	410.79
144.72	65.93	31.61	2.63	410.88
140.53	65.93	31.61	2.61	657.11
136.34	80.49	38.15	8.34	660.55
132.15	80.49	38.15	8.32	957.79
127.96	82.57	38.80	8.24	857.24
123.77	82.57	38.80	8.23	1260.75
119.58	84.75	39.42	8.15	1260.24
115.39	84.75	39.42	8.15	1567.40
111.20	87.01	40.03	8.08	1566.91
107.01	87.01	40.03	8.08	1870.88
102.82	88.90	40.50	8.03	1870.49
98.63	88.90	40.50	8.03	2075.81
94.44	91.56	41.08	7.99	2075.47
90.25	91.56	41.08	7.99	2377.09
86.06	94.89	41.81	7.95	2376.70
81.87	94.89	41.81	7.95	2682.26
77.68	97.76	42.45	7.92	2681.91
73.49	97.76	42.45	7.92	2983.43
69.30	100.73	43.08	7.89	2982.30
65.11	100.73	43.08	7.89	3308.33
60.92	103.79	43.71	7.86	3308.08
56.73	103.79	43.71	7.86	3629.26
52.54	106.65	44.26	7.84	3629.00
48.35	106.65	44.26	7.85	3935.33
44.16	110.32	44.84	7.83	3935.12
39.97	110.32	44.84	7.83	4204.41
35.78	114.23	45.40	7.82	4204.20
31.59	114.23	45.40	7.82	4517.47
27.40	117.37	45.88	7.81	4517.66
23.21	117.37	45.88	7.81	4835.44
19.02	120.60	46.34	7.80	4834.65
14.83	120.60	46.34	7.80	5154.86
10.64	123.89	46.79	7.79	5155.02
6.45	123.89	46.79	7.80	5478.53
2.26	127.32	47.21	7.79	5478.66
-1.93	127.32	47.21	7.79	5814.81
-6.12	132.27	47.67	7.79	5814.71
-10.31	132.27	47.67	7.79	6140.11
-14.50	137.36	48.08	7.79	6140.121
-18.69	137.36	48.08	7.79	6467.06
-22.88	141.17	48.41	7.79	6467.10
-27.07	141.17	48.41	7.79	6798.06
-31.26	145.04	48.70	7.79	6798.13
-35.45	145.04	48.70	7.79	7129.72
-39.64	148.98	48.95	7.79	7129.70



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6.84	148.96	48.93	7.79	3464.90
6.84	152.94	49.15	7.79	3464.90
0.00	152.94	49.18	7.79	3800.43
Base	154.92	49.33	7.79	3800.43



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Revision: 0
 Site: WINIFRED- MD
 Engineer: SWG

Section I: STRENGTH ASSESSMENT DATA
 Load Combination Max Envelope
 Wind Direction Maximum

Elev. (ft)	Axial Ld. (kips)	Axial Cap. (kips)	Moment (kip-ft)	Mod. Cap. (kip-ft)	Assess.
185.00	18.68	1325.40	18.15	611.91	0.044
190.00	18.68	1381.66	42.75	654.28	0.032
195.00	19.34	1381.66	82.56	688.28	0.069
196.62	19.34	1436.96	82.98	718.78	0.119
196.62	31.17	1436.96	62.22	718.78	0.120
197.48	31.17	1492.23	145.36	775.43	0.193
197.48	38.91	1492.23	145.84	775.43	0.196
178.23	38.91	1532.87	224.00	826.24	0.278
178.23	43.84	1532.87	222.58	826.24	0.278
174.04	43.84	1572.52	311.08	878.27	0.363
174.04	58.62	1572.52	307.75	878.27	0.362
170.38	65.93	2022.48	410.88	1137.89	0.371
162.49	65.93	2152.45	467.21	1288.67	0.519
162.49	80.49	2152.45	560.55	1288.67	0.525
154.61	80.49	2282.41	657.79	1450.97	0.672
154.61	82.57	2282.41	657.24	1450.97	0.672
144.73	82.57	2391.01	1060.75	1607.40	0.796
144.73	84.75	2391.01	1060.24	1607.40	0.797
130.84	84.75	2483.78	1567.40	1760.55	0.902
130.84	87.01	2483.78	1566.91	1760.55	0.903
120.96	87.01	2572.86	1878.85	1917.74	0.992
120.96	88.90	2572.86	1878.45	1917.74	0.993
124.24	91.56	3777.31	2078.47	2433.57	0.742
278.44	91.56	3948.10	2377.09	3007.00	0.776
238.64	94.89	3948.10	2378.70	3007.00	0.777
221.24	94.89	4118.88	2692.20	3372.38	0.804
210.24	97.76	4118.88	2691.91	3372.38	0.805
102.54	97.76	4289.68	2922.63	3659.40	0.827
103.84	100.73	4289.68	2922.30	3659.40	0.828
90.44	100.73	4460.47	3308.39	3958.14	0.845
96.44	103.79	4460.47	3308.04	3958.14	0.846
88.04	103.79	4625.27	3629.24	4253.84	0.863
88.04	106.65	4625.27	3629.00	4253.84	0.863
82.96	110.32	4652.16	3995.12	4534.70	0.910
76.01	110.32	4758.33	4701.41	4596.61	0.925
76.01	114.23	4758.33	4701.18	4596.61	0.926
49.06	114.23	4881.04	4517.47	4883.14	0.940
49.06	117.37	4881.04	4517.69	4883.14	0.941
62.11	117.37	4992.08	4834.46	5134.06	0.953
62.11	120.60	4992.08	4834.65	5134.06	0.954
52.16	120.60	5099.67	5054.86	5409.04	0.965
55.16	123.89	5099.67	5055.02	5409.04	0.965
48.21	123.89	5208.38	5478.53	5687.83	0.975
48.21	127.32	5208.38	5478.66	5687.83	0.976
42.04	132.27	4943.27	5814.77	5901.54	0.854
34.20	132.27	5370.88	6140.22	7244.18	0.858
34.20	137.36	5370.88	6140.25	7244.18	0.859
27.34	137.36	4895.14	4467.24	5882.64	0.863
27.34	141.17	4895.14	4467.17	5882.64	0.864
20.72	141.17	6016.97	6798.08	7944.31	0.867
20.72	145.04	6016.97	6798.13	7944.31	0.868
17.88	145.04	6735.99	7229.72	8500.87	0.871
13.64	148.98	6735.99	7129.75	8200.87	0.871
8.84	148.98	6852.25	7444.90	8661.45	0.874
8.84	152.94	6852.25	7444.90	8661.45	0.875
3.00	152.94	6965.73	7800.42	9073.87	0.877



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 Contract: 235008
 Project: 195 FT TSP
 Date and Time: 8/4/2020 10:28:13 AM

Revision: 0
 Site: WINIFRED- MD
 Engineer: SWG

Section M: SECTION PROPERTIES DATA

Elew. (ft)	Diam. (in)	Width (in)	Thick. (in)	W/t	Area (in^2)	S (in^3)
195.0	22.7	3.5	0.250	14.0	17.9	98.84
190.9	23.7	3.7	0.250	14.7	18.6	107.29
190.6	23.7	3.7	0.250	14.7	18.6	107.29
186.8	24.6	3.8	0.250	15.4	19.3	116.10
184.6	24.6	3.8	0.250	15.4	19.3	116.10
182.4	25.6	4.0	0.250	16.0	20.1	125.25
182.4	25.6	4.0	0.250	16.0	20.1	125.25
178.2	26.5	4.2	0.250	16.7	20.8	134.74
178.2	26.5	4.2	0.250	16.7	20.8	134.74
174.0	27.4	4.3	0.250	17.4	21.6	144.59
174.0	27.4	4.3	0.250	17.4	21.6	144.59
170.4	28.3	4.5	0.250	17.9	22.2	153.49
170.4	27.8	4.3	0.313	19.7	27.2	183.79
160.5	29.5	4.6	0.313	14.7	29.0	208.31
162.5	29.5	4.6	0.313	14.7	29.0	208.31
154.6	31.3	4.9	0.313	15.7	30.7	234.36
154.6	31.3	4.9	0.313	15.7	30.7	234.36
146.7	33.0	5.2	0.313	16.6	32.5	261.94
146.7	33.0	5.2	0.313	16.6	32.5	261.94
138.8	34.8	5.5	0.313	17.6	34.2	291.06
138.8	34.8	5.5	0.313	17.6	34.2	291.06
131.0	36.0	5.8	0.313	18.6	36.0	321.72
131.0	36.0	5.8	0.313	18.6	36.0	321.72
124.0	37.7	6.0	0.313	19.3	37.1	341.62
124.0	37.7	6.0	0.438	22.9	50.8	457.66
118.6	38.7	6.0	0.438	22.6	53.1	500.24
118.6	38.7	6.0	0.438	22.6	53.1	500.24
111.2	40.4	6.2	0.438	24.2	55.4	544.70
111.2	40.4	6.2	0.438	24.2	55.4	544.70
103.8	42.0	6.5	0.438	24.9	57.7	591.06
103.8	42.0	6.5	0.438	24.9	57.7	591.06
96.4	43.7	6.8	0.438	25.6	60.0	639.31
96.4	43.7	6.8	0.438	25.6	60.0	639.31
89.0	45.3	7.1	0.438	26.3	62.3	689.45
89.0	45.3	7.1	0.438	26.3	62.3	689.45
83.0	46.7	7.4	0.438	27.1	64.2	732.09
83.0	46.7	7.4	0.438	27.1	64.2	732.09
76.0	47.4	7.5	0.438	27.1	65.2	753.87
76.0	47.4	7.5	0.438	27.1	65.2	753.87
69.1	48.8	7.8	0.438	27.7	67.3	804.88
69.1	48.8	7.8	0.438	27.7	67.3	804.88
62.1	50.5	8.0	0.438	28.3	69.5	857.57
62.1	50.5	8.0	0.438	28.3	69.5	857.57
55.2	52.0	8.3	0.438	28.0	71.6	911.92
55.2	52.0	8.3	0.438	28.0	71.6	911.92
48.2	53.8	8.6	0.438	28.9	73.8	967.94
48.2	53.8	8.6	0.438	28.9	73.8	967.94
41.0	55.2	8.8	0.438	29.2	76.0	1027.46
41.0	55.3	8.6	0.500	27.2	85.4	1132.94
34.2	55.8	8.8	0.500	29.7	87.8	1198.59
34.2	55.8	8.8	0.500	29.7	87.8	1198.59
27.4	57.4	9.1	0.500	28.2	90.3	1266.08
27.4	57.4	9.1	0.500	28.2	90.3	1266.08
20.5	58.3	9.4	0.500	28.9	92.7	1335.43
20.5	58.3	9.4	0.500	28.9	92.7	1335.43
13.7	60.4	9.7	0.500	29.3	95.1	1406.62
13.7	60.4	9.7	0.500	29.3	95.1	1406.62
6.8	62.0	9.8	0.500	29.9	97.5	1479.66
6.8	62.0	9.8	0.500	29.9	97.5	1479.66



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File: W:\Jobs\2020\235008\ENGINEERING\235008.out
Contract: 235008
Project: 195 FT TSP
Date and Time: 8/4/2020 10:28:13 AM

Revision: 0
Site: WINIFRED- MD
Engineer: SWG

R19: 53.5 10.2 0.500 20.4 100.0 1554.35

Note: w/t values marked with * (asterisk) indicate width to thickness
exceeding maximum allowable values by standards.

Customer: ROCON LLC
 Project: 195 FT TSP
 Site: WINIFRED- MD
 Engr. File: 235008
 Build Code: ANSI/TIA-222-G-2005



Mat Foundation

ver.2.2.14

Design Parameters

Description	Load Case					Service
	1	2	3	4	5	
Total Moment, ft-kips	8,248.19	8,082.77	1,223.69	194.67	190.48	1,961.29
Total Shear, kips	52.36	52.30	6.80	1.12	1.12	12.55
Total Tower Wt, kips	92.32	69.21	163.81	87.44	65.58	72.86
Max. Uplift, kips	N/A	N/A	N/A	N/A	N/A	N/A
Shear, kips	N/A	N/A	N/A	N/A	N/A	N/A
Max Download, kips	N/A	N/A	N/A	N/A	N/A	N/A
Shear	N/A	N/A	N/A	N/A	N/A	N/A
Soil L.F.	1.20	0.90	1.20	1.20	0.90	1.00
Concrete L.F.	1.20	0.90	1.20	1.20	0.90	1.00

Foundation	
Hl. AGL, ft	0.50
Depth, ft.	6.00
Pole	
Butt OD, ft	5.29
Offset, in	.00
Soil	
Blow Count	N/A
Inplace Unit Wt, pcf	110.00
Submerged Unit Wt, pcf	60.00
Friction Angle, ϕ , deg.	30.00
Cohesion, ksf	N/A
Uplift Angle, deg.	30.00
Water Depth, ft	None
Ult Bearing Capacity, ksf	5.00

Mat	
Thickness, ft	2.00
Width, ft	30.50
EA, in	23.00
Batter, in/ft	0.00

Pier	
Height, ft	4.50
Diameter, ft	8.00
No. Piers	1
Shape	Square

Anchor Bolts	
Diameter, in	2.2500
No.	20
Length, in	84.00
Bolt Circle, in	70.00
Projection, in	13.00

Pocket	
Diameter, in	N/A
Thickness, ft	N/A

Concrete	
28 Day Strength, ksi	4.50
Dry Unit Wt, pcf	150.00
Wet Unit Wt, pcf	88.00

Rebar Fy	
Vertical, ksi	60.00
Circular, ksi	60.00
Horizontal, ksi	60.00

REV 'G' PRESUMPTIVE 'CLAY'

Results

ϕM_N - Parallel Axis 8,936.10 ft-kips
 ϕM_N - Diagonal Axis 9,088.12 ft-kips
 Moment - Interaction Ratio 0.943
 ϕV_N - Lateral Load 185.78 kips
 Lateral Load - Interaction Ratio 0.282

Final Mat Dimension : 30.50 x 30.50 x 2.00 ft. thick w/ (1) 8.00 ft. Square Pier

Final Pocket Dimension : Pockets not required

Total Volume of Concrete : 79.6 yd³

Designed By: SWG
 Date: 04 Aug, 20 @ 10:52 AM

Checked By: HA
 Date: 10/16/20

Customer: ROCON LLC
 Project: 195 FT TSP
 Site: WINIFRED- MD
 Engr. File: 235008
 Build Code: ANSI/TIA-222-G-2005



Mat Foundation

ver.2.2.14

OTM Capacity

Controlling Load Case: 2 [Wind w/Min. Dead Load]
 Foundation Width = 30.50 ft
 $M_U = 8,422.7$ ft-kips

	ϕM_N , ft-kips	x, ft	N	σ_{cr}
Parallel	8,936.1	6.374	0.209	5.00
Diagonal	9,088.1	13.942	0.323	5.00

$\phi M_N = 8,936.10$ ft-kips IRatio = 0.943
 $\phi V_N = 185.78$ kips IRatio = 0.282

Mat Design

$\gamma_c = 123.33$ pcf

Exterior Slab	x, ft	N	σ_R , ksf	P _s , kips	P _m , kips	Moment, ft-kips/ft		Shear, kips/ft	
						Download Side	Uplift Side	Download Side	Uplift Side
Parallel	7.704	0.253	3.10	21.27	0.00	134.39	63.32	18.73	10.62
Diagonal	15.253	0.354	3.13	21.27	0.00	84.15	36.67	18.78	8.35

Punching Shear	Download			Uplift			Description
	Interior	Edge	Corner	Interior	Edge	Corner	
b, ft	38.33	N/A	N/A	N/A	N/A	N/A	2-Way Shear
V _{su} , psi	137.22	N/A	N/A	N/A	N/A	N/A	
ϕV_c , psi	208.25	N/A	N/A	N/A	N/A	N/A	
IR	0.66	N/A	N/A	N/A	N/A	N/A	
0.5*M _u , ft-kips	2,545.1			N/A			Moment transfer to slab
B, ft	14.0			N/A			
M _u , ft-kips/ft	181.8			N/A			

Edge Distances: a = 15.25 ft. b = 15.25 ft. c = 15.25 ft.

Summary	Max. Value	Utilization
Slab Moment, ft-kips/ft	181.80	0.975
Slab Shear, kips/ft	18.78	0.722
Punching Shear, psi	137.22	0.659
Soil Bearing Required, σ_{cr} , ksf	4.17	0.834

Mat Reinforcement	
Min. Steel Area (Strength)	2.257 in ² /ft.
Min. Steel Area (Temperature)	.259 in ² /ft.
Steel Strain Actual	0.010
Minimum Steel Strain Required	0.005

56 - #10 Horizontal bars equally spaced @6.55 in., each way, top and bottom, total of 224, A_s = 2.326 in²/ft

Designed By: SWG
 Date: 04 Aug, 20 @ 10:52 AM

Checked By: 1-H
 Date: 10/16/20

Customer: ROCON LLC
Project: 195 FT TSP
Site: WINIFRED- MD
Engr. File: 235008
Build Code: ANSI/TIA-222-G-2005



Mat Foundation

ver.2.2.14

Pier Design

Controlling Load Case: 1 [Wind w/Max. Dead Load]

C = 92.32 kips	Vc = 52.36 kips	Mc = 8,483.81 ft-kips
T = .00 kips	Vt = .00 kips	Mt = .00 ft-kips
Fy = 60.00 ksi	Fyt = 60.00 ksi	L.F. = 1.00
H = 96.00 in.	Ds = 87.00 in.	F'c = 4.50 ksi
U = 1.00	Irs = Square	

*** NOTE: Pier cross section is Square ***

SUMMARY OF ANALYSIS

Minimum area of steel required	= 49.020 in ²	(Rhomin = 0.0053)
Area of steel provided.	= 50.671 in ²	(Rhoactual = 0.0055)
Maximum steel area limit	= 579.060 in ²	(Rhomax = 0.0628)

(40) #10 Vertical Bars equally spaced w/ #5 Circular Ties @ 6" on center.

CIRCULAR TIE DATA

$V_u < 0.85 * V_c / 2$, shear reinforcement is not required

Use maximum tie spacing specified in ACI 318,
Section 7.10.5 for compression reinforcement.

DEVELOPMENT LENGTH MODIFIERS FOR BAR DEVELOPMENT

Modifier for tension development = 1.000
Modifier for compression development = 0.692
REQUIRED Ld = MODIFIER * BASIC Ld * ACI 318 MODIFIERS, (12 in. min.)

Designed By: SWG
Date: 04 Aug.20 @ 10:52 AM

Checked By: HA
Date: 10/16/20

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