NORTHEAST
SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
4 Angela's Way Burlington CT 06013
860-209-4690
denise@northeastsitesolutions.com

November 26, 2018

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
99 Briar Hill Road, Groton CT 06340
Latitude: 41.3851388
Longitude: -72.0698611
T-Mobile Site # CTNL223A_L700 4X2

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 177-foot level of the existing 250-foot lattice tower at 99 Briar Hill Road, Groton CT 06340. The tower is owned by Citadel Broadcasting Co. The property is owned by Citadel Broadcasting Co. T-Mobile now intends to add three (3) new 600/700 MHz antenna and add three (3) RRU. The new antennas would be installed at the 179-foot level of the tower.

Planned Modifications:

Remove:

Remove and Replace:

Install New: (3) RFS APXAARR24-43-U-NA20 Antenna
(3) Radio 4449 B71+B12
(1) 1-5/8" Hybrid Cable

Existing to Remain:
(1) 1-5/8" Hybrid Cable
(3)AIR32 B66Aa/B2a Antenna
(3)AIR21 B2A /B4P Antenna
(1) 1-5/8" Hybrid Cable

This facility was approved by the Town of Groton PZC. File No. 262 – Special permit was approved by the Town of Groton to install new tower, not to exceed 250 feet in height. Please see attached documentation.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to Town Manager John Burt, Elected Official and Kevin Quinn, Zoning Manager for the Town of Groton, as well as the property owner and the tower owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S;A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site. ·

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Denise Sabo

Mobile: 860-209-4690
Fax: 413-521-0558
Office: 4 Angela's Way, Burlington CT 06013
Email: denise@northeastsitesolutions.com

Attachments

cc: John Burt- Town Manager - as elected official
Kevin Quinn- Zoning Manager
Citadel Broadcasting Co - as tower owner and property owner

Exhibit A

KQ

TOWN OF GROTON

ZONING COMMISSION

NOTICE OF GRANT OF SPECIAL PERMIT #262

This is to certify that on November 6, 2002 the Zoning Commission of the Town of Groton granted a Special Permit under Section 7.1-41 of the Zoning Regulations as follows:

1. Owner of Record: Citadel Communications (Miguel Nobre, Applicant)

2. Description of the premises: 99 Briar Hill Road

3. Description of the special permit: To allow for a new tower structure for FM radio stations with the following conditions:

    1. Tower height shall not exceed 250 feet (10 feet less than the existing installation).

    2. A subdued, non-reflective grey color will be required for the new tower and tower to remain at the site. Lighting for both towers if required by FAA, shall incorporate white strobe lights during the day and red lighting at night. Any modification to this lighting scheme shall require commission approval.

    3. Technical study information provided shall be endorsed by a State of Connecticut Registered Professional Engineer and address any potential interference problems.

    4. Existing towers slated for removal shall be removed no later than 6 months from the completion of new tower construction.

    5. Repainting of the tower to remain shall be accomplished within 6 months of completion of new tower construction.

ZONING COMMISSION

by Michael J. Murphy

Michael J. Murphy, AICP
Assistant Director of Planning
and Development

Date: November 7, 2002

NOTE: This notice is to be recorded on the Land Records of the Town of Groton, indexed in the grantor's index under the name of the record owner.

Town of Groton

Building Inspection

BUILDING/ZONING PERMIT APPLICATION

Please Print

(office use only)

Permit No. 03-611 Date Permit Issued 11/19/03

Bldg. Zon. C.O. State

Estimated Cost $ 128,378.00 Fee 1300 10 26 20.64 $ 1356.64

Address of Building 99 BRIAR HILL ROAD, GROTON, CT

Zone RU-20 Pin # 1780.19-61-6743

Owner CITADEL COMMUNICATIONS Address 7 GOVERNOR WINTHROP BLVD NEW LONDON, CT. 06320 Ph. # 860.443.1980

Contractor ..... Address .....

Nature of Proposed Work and Use REPLACE EXISTING 250' GUYED TOWER WITH NEW STRUCTURALLY SOUND TOWER

Plans: Yes ☑ No ☐ Type of Construction ..... Residential ☐ Commercial ☑ Size .....

No. of Stories Ø No. of Rooms Ø No. of Baths Ø

Garage Ø Breezeway Ø Fireplace Ø Heat Ø

ZONING PERMIT

(To be filled out in conjunction with a building permit involving any new structure, addition to an existing structure, or change of use.)

Flood Hazard District ..... HDC # ..... ZBA # .....

Site Plan Approval # ..... Special Zoning Permit # .....

Wetlands ..... Coastal Area Management .....

Site Suitability # ..... Sewer # ..... A2 Survey .....

Zoning Official Signature .....

CERTIFICATION: I hereby certify that: ☒ I am the owner of record of the named property or ☐ that the proposed work is authorized by the owner of record and/or I have been authorized to make this application as an authorized agent, and we agree to conform to all applicable laws, codes, regulations and ordinances. All information contained within is true and accurate to the best of my knowledge aud belief.

Bob Cox	8604431980	
Print Name in Ink	Phone #	Lic. #
		10-20-2003
Signature (in INK) of Owner/Authorized Agent		Date
	11/19/03	
Building Official	Completed Application Received Date	

Exhibit B

Back

Parcel Detail

99 BRIAR HILL RD

Property Information

PIN: 178019616743
PROPERTY TYPE: COMMERCIAL
DISTRICT: CENTER GROTON FIRE DISTRICT
OWNER: CITADEL BROADCASTING CO
ACREAGE: 6.1AC.
ZONING: RU-20
USE CODE: MANUFACTURING WAREHOUSE FACILITIES
CT GRAND LIST CODE: INDUSTRIAL
LIVING UNITS: 1
NEIGHBORHOOD: 3100
DEED BOOK/PAGE: 709/691
LAND VALUE: $226,500
BUILDING VALUE: $55,900
TOTAL VALUE: $282,400
GROSS ASSESSED VALUE: $197,680

Sales Information

SALE DATE: 4/20/2000
SALE PRICE: $10,000
DEED BOOK/PAGE: 709/691

SALE DATE: 6/3/1997
SALE PRICE: $100,000
DEED BOOK/PAGE: 644/197

GrotonGIS Lite

PIN: 178019616743
TYPE: COMMERCIAL
DISTRICT: CENTER GROTON FIRE DISTRICT
ACREAGE: 6.1 AC.
ZONING: RU-20

Get More Info | Zoom To Extent | Clear Selection

Exhibit C

ANTENNA UPGRADES BY

T-Mobile

T-MOBILE NORTHEAST LLC

PROJECT: L700 4X2

SITE NUMBER: CTNL223A

SITE NAME: CITADEL GROTON GUYED

SITE ADDRESS: 99 BRIAR HILL ROAD

GROTON, CT 06340

(RF CONFIGURATION 795ADB)

PROJECT SCOPE:

UPGRADE OF EXISTING WIRELESS FACILITY AS FOLLOWS:
ADD (3) ANTENNAS,
ADD (3) REMOTE RADIO UNITS (RRU) BEHIND ANTENNAS,
ADD (1) 6X12 FIBER HYBRID CABLE,
REPLACE 6201 CABINET WITH 6102 CABINET.

PROJECT NOTES:

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION:
   HANDICAPPED ACCESS IS NOT REQUIRED.
   POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.
   NO OUTDOOR STORAGE OR ANY
   SOLID WASTE RECEPTACLES REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACES THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
3. DEVELOPMENT AND USE OF THE SITE WILL CONFORM TO ALL APPLICABLE CODES, ORDINANCES AND SPECIFICATIONS.
4. REFER TO STRUCTURAL ANALYSIS REPORT TITLED "STRUCTURAL ANALYSIS REPORT - UPGRADE, GUYED TOWER" SITE ID: CTNL223A, DATED AUGUST 16, 2018, PREPARED BY DESTEK ENGINEERING.

APPLICABLE STATE ADOPTION CODES:

2016 CONNECTICUT STATE BUILDING CODE (CSBC).

ANSI/TIA-222-G-2005 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

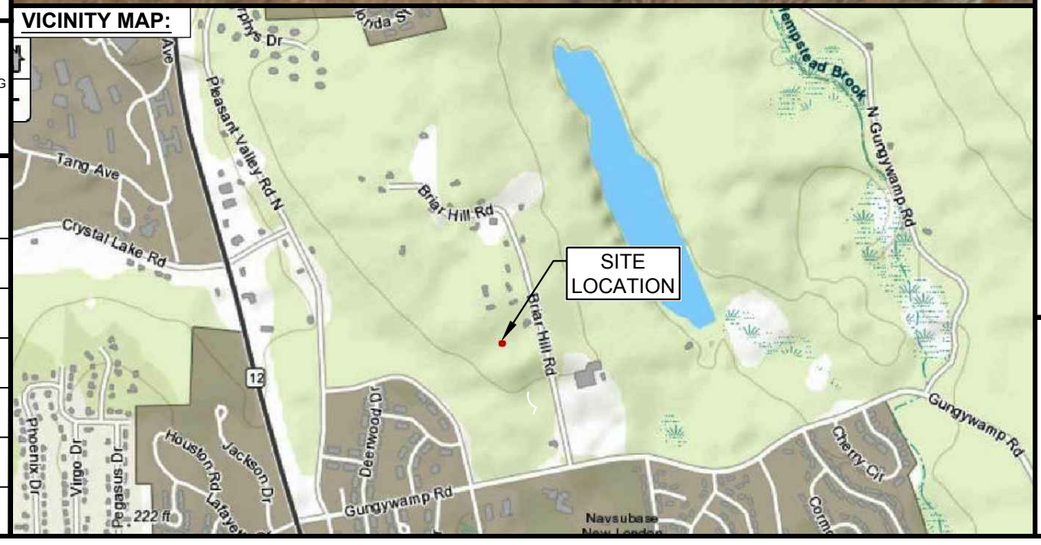
2014 NATIONAL ELECTRICAL CODE (NFPA 70) FOR POWER AND GROUNDING REQUIREMENTS.

APPROVALS:

FSA CM	DATE
RF ENGINEER	DATE
FOPS	DATE
T-MOBILE ENGINEERING AND DEVELOPMENT	DATE
	DATE
	DATE

SITE IMAGE:

VICINITY MAP:



PROJECT INFORMATION:

ADDRESS:	99 BRIAR HILL ROAD GROTON, CT 06340
STRUCTURE TYPE:	GUYED TOWER
COORDINATES:	41.385100 N -72.069900 W

PROJECT TEAM:

APPLICANT:	T-MOBILE NORTHEAST, LLC. 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 860-692-7100
LANDLORD:	CITADEL BROADCASTING CO FRANK DOREMUS CHIEF ENGINEER FOR CUMULUS AND TOWNSQUARE MOBILE - 508-965-7751 OFFICE - 508-999-6690 EXT 3022 EMAIL - FRANK.DOREMUS@TOWNSQUAREMEDIA.COM
PROJECT MANAGER:	NORTHEAST SITE SOLUTIONS 420 MAIN STREET, BLDG 4 STURBRIDGE, MA 01566 SHELDON FREINCLE SHELDON@NORTHEASTSITE SOLUTIONS.COM 201-776-8521
CONSULTANTS:	FORESITE LLC 462 WALNUT ST NEWTON, MA 02460 SAEED MOSSAVAT SMOSSAVAT@FORESITELLC.COM 617-212-3123

SHEET INDEX:

APPLICANT:

T-Mobile

T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER

NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
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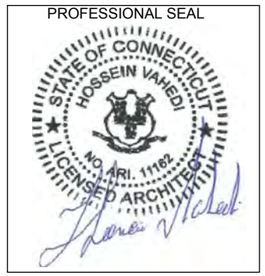
PROFESSIONAL SEAL



REV	DESCRIPTION	DATE
A	PRELIMINARY	08/29/18
B	CABINET SWAP	09/11/18
0	SIGNED AND SEALED	09/24/18
1	REMOVED COAXIAL CABLES	10/18/18
2	CHANGED ANTENNA RAD	10/23/18

SITE NUMBER: CTNL223A
SITE NAME: CITADEL GROTON GUYED
SITE ADDRESS: 99 BRIAR HILL ROAD
GROTON, CT 06340

SHEET TITLE:

T-1: TITLE SHEET

GENERAL NOTES:

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.

2. THE ARCHITECT/ENGINEER HAS MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.

3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE CLIENT'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.

5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS.

6. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S / VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.

7. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS DURING CONSTRUCTION.

8. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJEC

9. THE CONTRACTOR SHALL NOTIFY THE CLIENT'S REPRESENTATIVE IN WRITING WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE CLIENT'S REPRESENTATIVE.

10. THE WORK SHALL CONFORM TO THE CODES AND STANDARDS OF THE FOLLOWING AGENCIES AS FURTHER CITED HEREIN:

A. ASTM: AMERICAN SOCIETY FOR TESTING AND MATERIALS, AS PUBLISHED IN "COMPILATION OF ASTM STANDARDS BUILDING CODES" OR LATEST EDITION.

B. AWS: AMERICAN WELDING SOCIETY INC. AS PUBLISHED IN "STANDARD D1.1–08, STRUCTURAL WELDING CODE" OR LATEST EDITION.

C. AISC: AMERICAN INSTITUTE FOR STEEL CONSTRUCTION AS PUBLISHED IN "CODE FOR STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"; "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (LATEST EDITION).

11. BOLTING:

A. BOLTS SHALL BE CONFORMING TO ASTM A325 HIGH STRENGTH, HOT DIP GALVANIZED WITH ASTM A153 HEAVY HEX TYPE NUTS.

B. BOLTS SHALL BE 3/4"ø MINIMUM (UNLESS OTHERWISE NOTED)

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

12. FABRICATION:

A. FABRICATION OF STEEL SHALL CONFORM TO THE AISC AND AWS STANDARDS AND CODES (LATEST EDITION).

B. ALL STRUCTURAL STEEL SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 (LATEST EDITION), UNLESS OTHERWISE NOTED.

13. ERECTION OF STEEL:

A. PROVIDE ALL ERECTION EQUIPMENT, BRACING, PLANKING, FIELD BOLTS, NUTS, WASHERS, DRIFT PINS, AND SIMILAR MATERIALS WHICH DO NOT FORM A PART OF THE COMPLETED CONSTRUCTION BUT ARE NECESSARY FOR ITS PROPER ERECTION.

B. ERECT AND ANCHOR ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC REFERENCE STANDARDS. ALL WORK SHALL BE ACCURATELY SET TO ESTABLISHED LINES AND ELEVATIONS AND RIGIDLY FASTENED IN PLACE WITH SUITABLE ATTACHMENTS TO THE CONSTRUCTION OF THE BUILDING.

C. TEMPORARY BRACING, GUYING AND SUPPORT SHALL BE PROVIDED TO KEEP THE STRUCTURE SAFE AND ALIGNED AT ALL TIMES DURING CONSTRUCTION, AND TO PREVENT DANGER TO PERSONS AND PROPERTY. CHECK ALL TEMPORARY LOADS AND STAY WITHIN SAFE CAPACITY OF ALL BUILDING COMPONENTS.

14. ANTENNA INSTALLATION:

A. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND CLIENT'S REPRESENTATIVE SPECIFICATIONS.

B. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

C. INSTALL COAXIAL / FIBER CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS.

15. ANTENNA AND COAXIAL / FIBER CABLE GROUNDING:

A. ALL EXTERIOR #6 GREEN GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREWS CONNECTOR/SPLICE WEATHERPROOFING KIT TYPE #221213 OR EQUAL.

B. ALL COAXIAL / FIBER CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL / FIBER CABLE (NOT WITHIN BENDS).

16. RELATED WORK, FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH OTHER TRADES PRIOR TO BID:

A. FLASHING OF OPENING INTO OUTSIDE WALLS

B. SEALING AND CAULKING ALL OPENINGS

C. PAINTING

D. CUTTING AND PATCHING

17. REQUIREMENTS OF REGULATORY AGENCIES:

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.

B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATION IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES, AND SPECIAL CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

C. TIA–EIA – 222 (LATEST EDITION). STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.

D. FAA – FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7460–IH, OBSTRUCTION MARKING AND LIGHTING.

E. FCC – FEDERAL COMMUNICATIONS COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATION FOR ANTENNA STRUCTURES AND FORM 715A, HIGH INTENSITY OBSTRUCTION LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES.

F. AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS (LATEST EDITION).

G. NEC – NATIONAL ELECTRICAL CODE – ON TOWER LIGHTING KITS.

H. UL – UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.

I. IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.

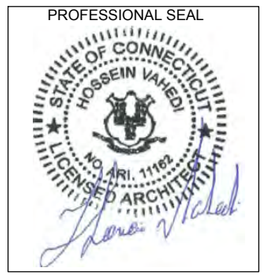
J. 2009 LIFE SAFETY CODE NFPA – 101.

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL



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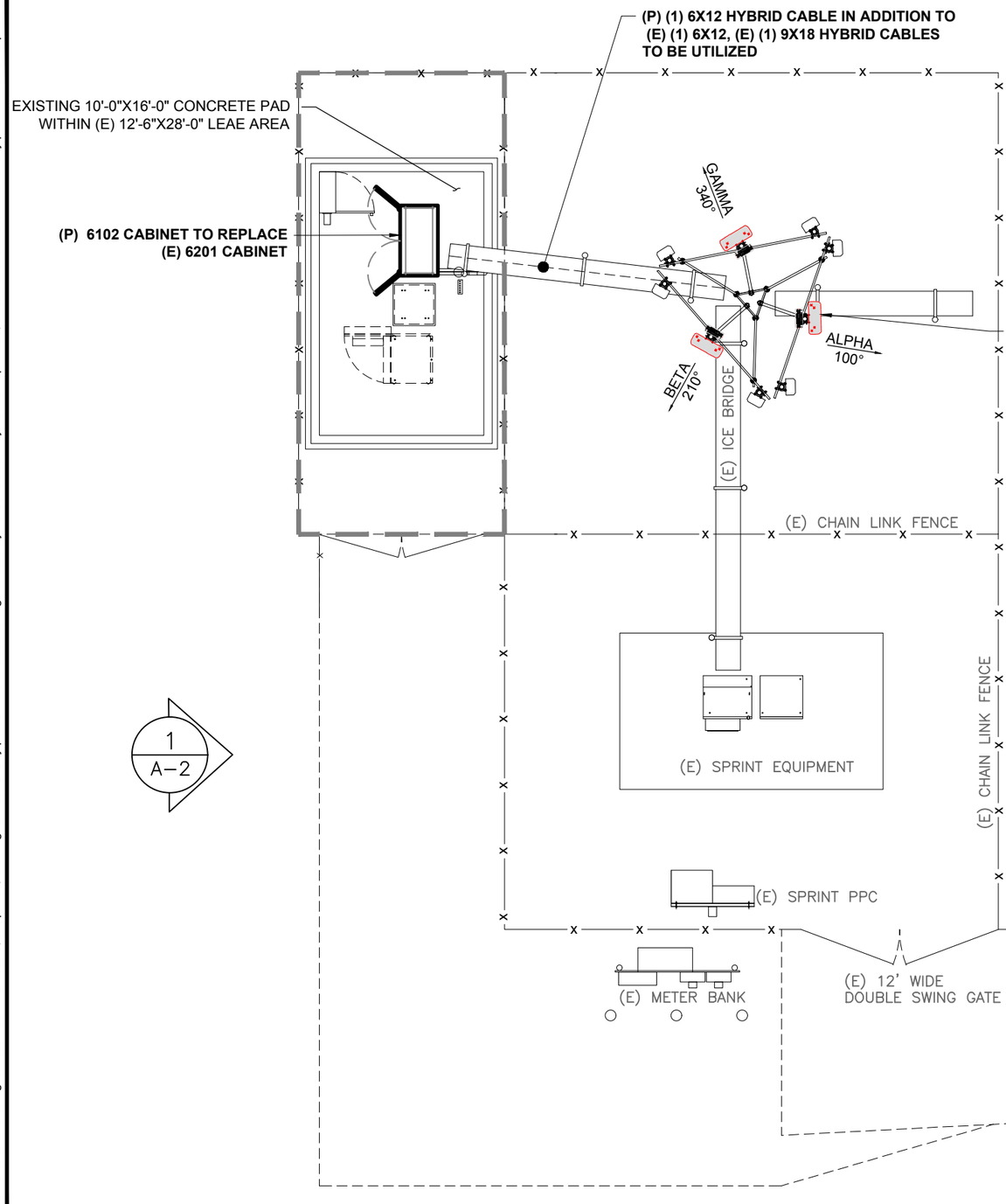
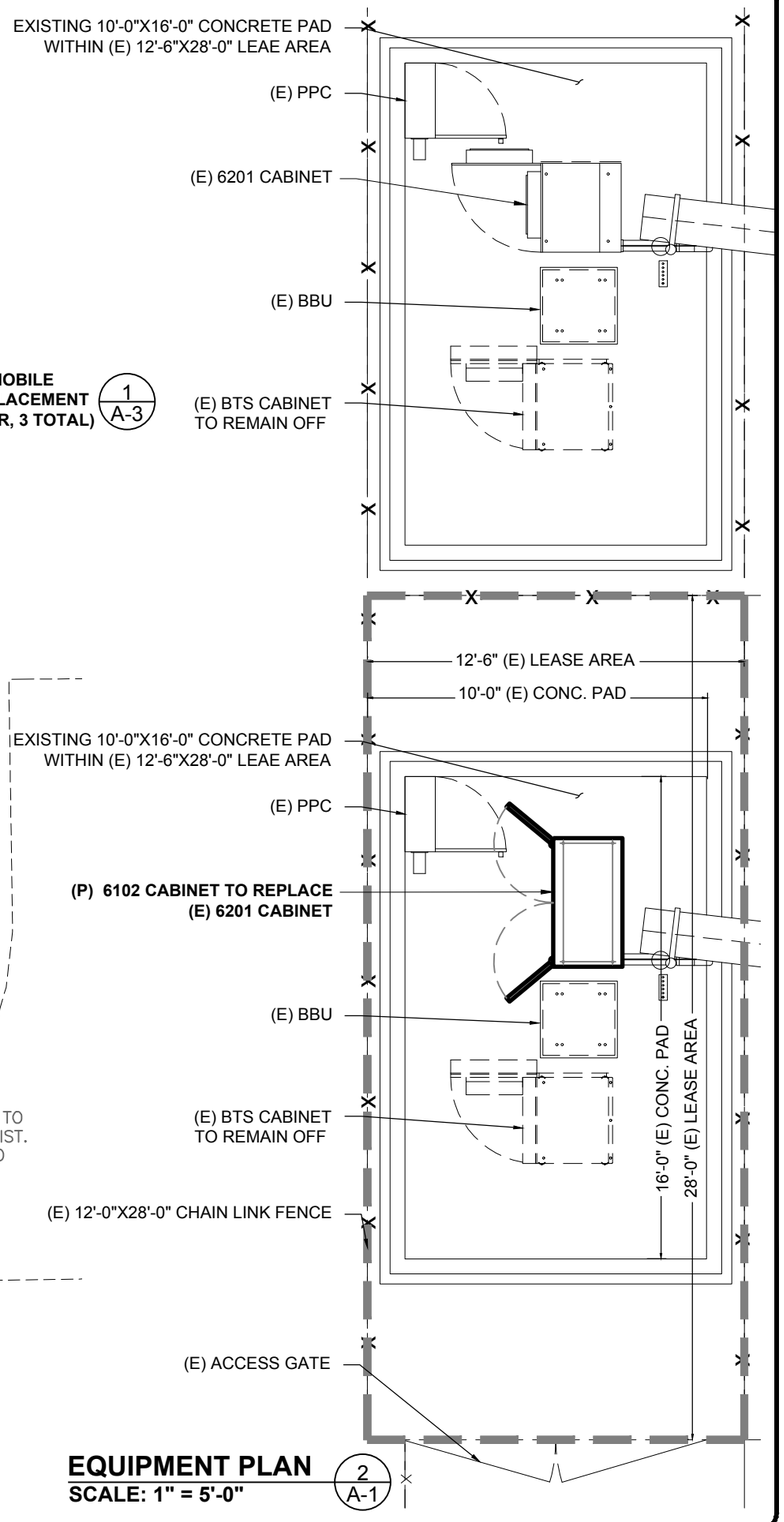
SITE NAME: CITADEL GROTON GUYED
SITE ADDRESS: 99 BRIAR HILL ROAD
GROTON, CT 06340

SHEET TITLE:
N-1: NOTES AND DISCLAIMERS



SITE PLAN
SCALE: 1/8" = 1'-0" (1 / A-1)



EQUIPMENT PLAN
SCALE: 1" = 5'-0" (2 / A-1)

APPLICANT:
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
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860-692-7100

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PROFESSIONAL SEAL
STATE OF CONNECTICUT · HOSSEIN VAHEDI · NO. ARI. 11162 · LICENSED ARCHITECT

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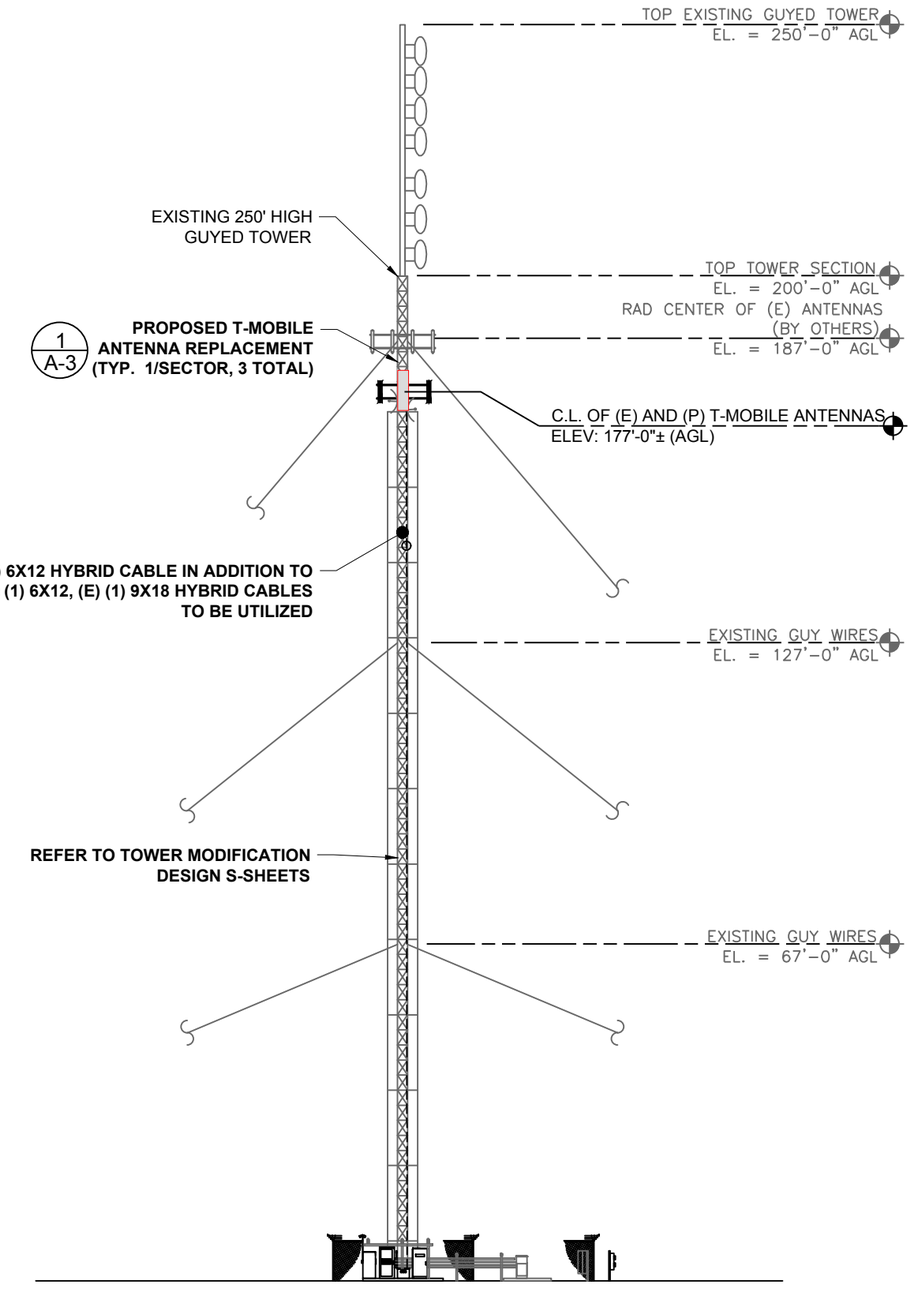
SHEET TITLE:
A-1: PLAN

NOTE: REFER TO STRUCTURAL MODIFICATION DESIGN OF TOWER S-SHEETS.



ELEVATION 1 A-2
SCALE: 1" = 30'-0"

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
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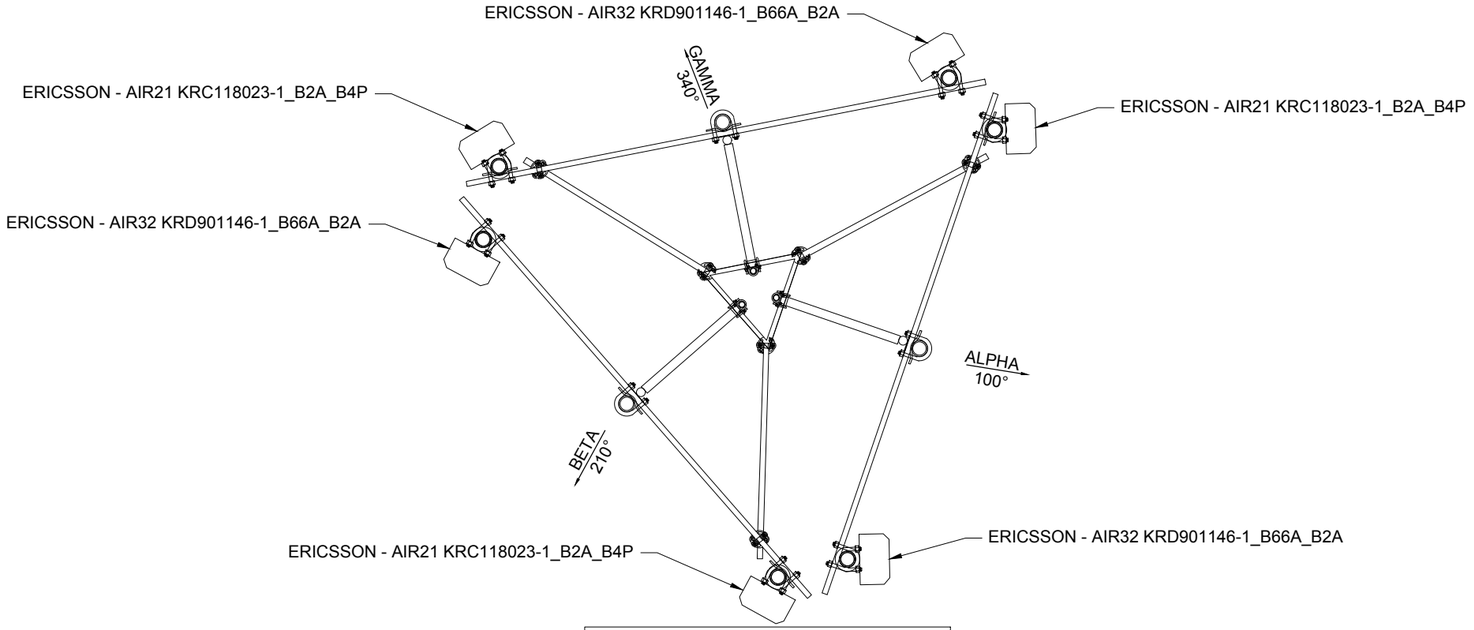
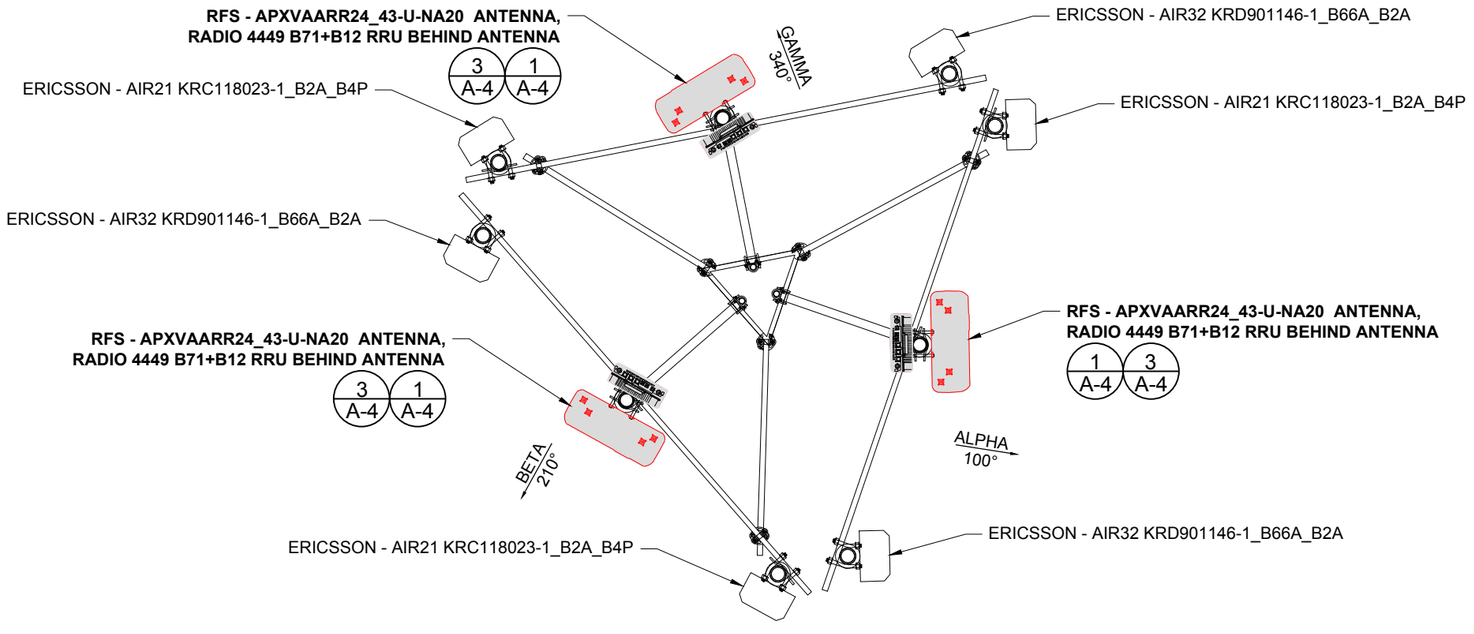
SHEET TITLE:
A-2: ELEVATION



EXISTING ANTENNA PLAN



FINAL ANTENNA PLAN

ANTENNA PLAN
SCALE: NTS
1 A-3

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

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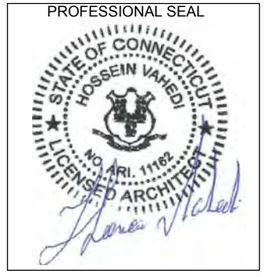
617-212-3123

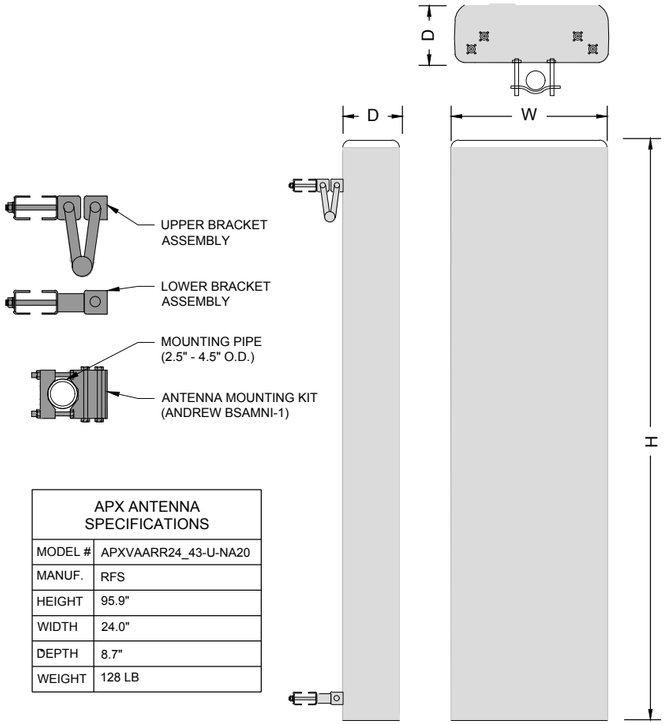
PROFESSIONAL SEAL



REV	DESCRIPTION	DATE
A	PRELIMINARY	08/29/18
B	CABINET SWAP	09/11/18
0	SIGNED AND SEALED	09/24/18
1	REMOVED COAXIAL CABLES	10/18/18
2	CHANGED ANTENNA RAD	10/23/18

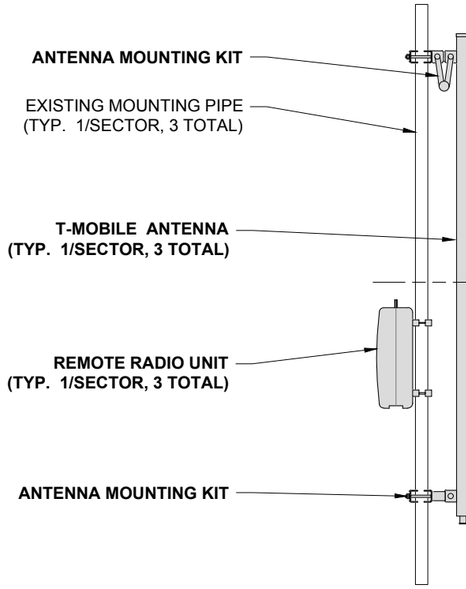
SITE NUMBER: CTNL223A
SITE NAME: CITADEL GROTON GUYED
SITE ADDRESS: 99 BRIAR HILL ROAD
GROTON, CT 06340

SHEET TITLE:
A-3: ANTENNA PLAN



APX ANTENNA SPECIFICATIONS	
MODEL #	APXVAARR24_43-U-NA20
MANUF.	RFS
HEIGHT	95.9"
WIDTH	24.0"
DEPTH	8.7"
WEIGHT	128 LB

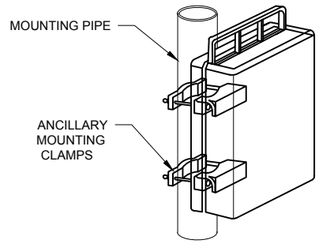
RFS ANTENNA
N.T.S
1 A-4



STRUCTURAL NOTES:
PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO ROOFTOP STRUCTURAL ANALYSIS REPORT AND MOUNT ASSESSMENT TO DETERMINE IF THERE IS ANY SUPPLEMENTAL OF SPECIAL INSTALLATION REQUIRED FOR TOWER EQUIPMENT AND FOR CABLE BUNDLING, SHIELDING, MOUNTING, OR RELOCATION ARRANGEMENTS.

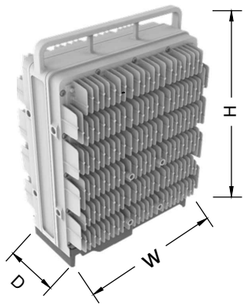
ANTENNA INSTALLATION SPECIAL WORK NOTE:
ANTENNA INSTALLATION WORKING POINT IS THE STRUCTURAL FACE FRAME VERTICAL CENTERLINE OF THE EXISTING ANTENNA SUPPORT ASSEMBLY. UNLESS NOTED OTHERWISE, VERTICALLY CENTERED PROPOSED PIPE MASTS AND ANTENNAS ON THIS WORKING POINT.

ANTENNA MOUNTING DETAIL
N.T.S
2 A-4

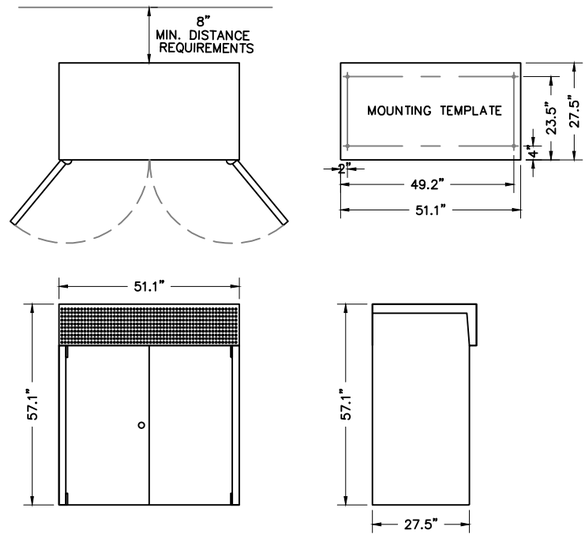


REMOTE RADIO UNIT MOUNTING DETAIL

REMOTE RADIO UNIT SPECIFICATIONS	
MODEL #	RADIO 4449 B71+B12
MANUF.	ERICSSON
HEIGHT	14.9"
WIDTH	13.2"
DEPTH	10.4"
WEIGHT	74 LB



REMOTE RADIO UNIT
N.T.S
3 A-4



ERICSSON RBS 6102 EQUIPMENT CABINET
N.T.S
4 A-4

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
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860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
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203-275-6669

CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
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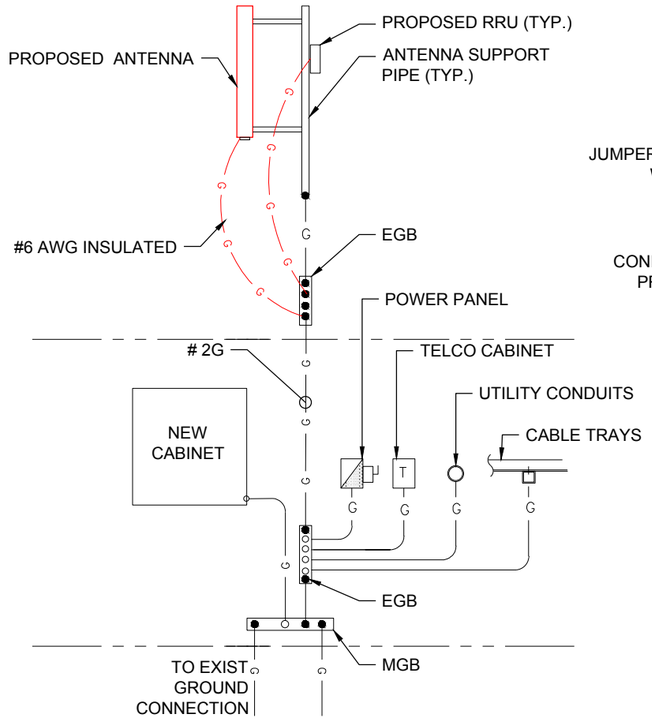
GROTON, CT 06340

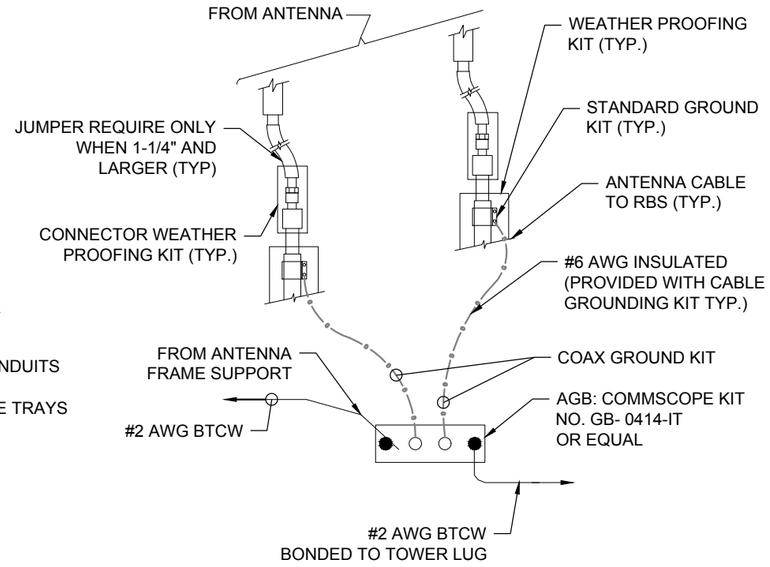
SHEET TITLE:
A-4: DETAILS

ELECTRICAL & GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PRODUCED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATION INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) ND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
8. RUN ELECTRICAL CONDUIT OR CABLING BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE ARE PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELECOM CABINET AND RBS CABINET AS INDICATED ON DRAWING A -1. PROVIDE FULL LENGTH PULL ROPE INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NAME 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUNDING COAX CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURES COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSTALLATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE GROUND.
14. ALL GROUND CONNECTION TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AS RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY BOND ANY METER OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PROCEDURES (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN RBS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTION.
19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20 BOND ANTENNA EGB'S AND MGB TO WATER MAIN.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

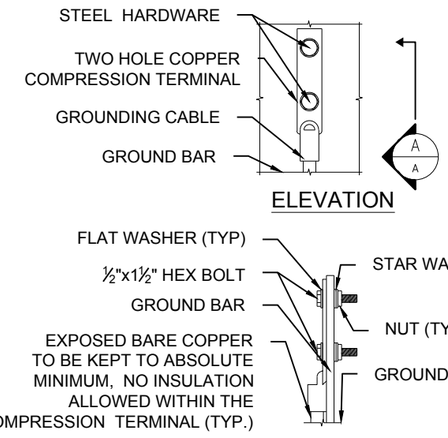


GROUNDING RISER DIAGRAM (1 / E-1)
SCALE: N.T.S



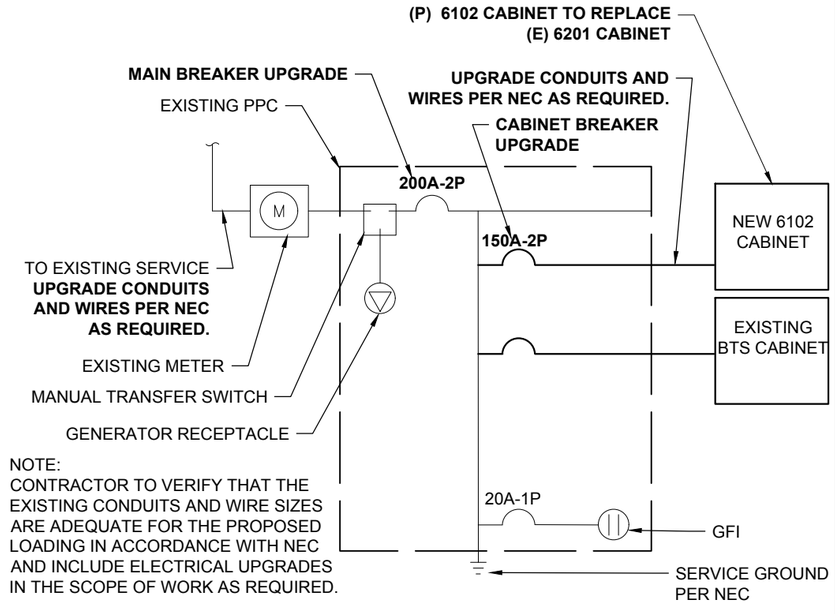
NOTES:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB

TOWER TOP CABLE GROUNDING DETAIL (2 / E-1)
SCALE: N.T.S



NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

TYPICAL GROUND BAR CONNECTIONS DETAIL (3 / E-1)
SCALE: N.T.S



NOTE:
CONTRACTOR TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

ONE LINE DIAGRAM (4 / E-1)
SCALE: N.T.S

APPLICANT:
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NEWTON, MA 02460
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PROFESSIONAL SEAL
STATE OF CONNECTICUT
HOSSEIN VAHEDI
NO. ARI. 11162
LICENSED ARCHITECT

REV	DESCRIPTION	DATE
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GROTON, CT 06340

SHEET TITLE:
E-1: GROUNDING AND ELECTRICAL DETAILS

NOTES:

1. UPGRADE DESIGN VALID FOR APPURTENANCES LISTED IN DESTEK ANALYSIS REPORT DATED 08/16/2018. CONTRACTOR TO REVIEW AND SHOULD ADHERE TO THE REPORT.

2. CONTRACTOR TO REMOVE AND REATTACH EXISTING APPURTENANCES AS NEEDED.

3. ALL DIMENSIONS ARE BASED ON A STRUCTURAL ANALYSIS REPORT PREPARED BY DESTEK, DATED 08/16/2018.

4. CONTRACTOR TO FIELD VERIFY EXISTING TOWER MEMBER SIZES AND TOWER DIMENSIONS IN THE VICINITY OF THE UPGRADE, BEFORE FABRICATION OF STEEL AND COMMENCEMENT OF WORK. ANY DISCREPANCY SHOULD BE REPORTED TO DESTEK IMMEDIATELY FOR FURTHER EVALUATION.

5. DO NOT PERFORM THE WORK ON THE TOWER WHEN WINDS GUST MORE THAN 15 MPH AT THE GROUND LEVEL.

6. CONTRACTOR SHALL PLUMB THE TOWER AND RE-TENSION ALL GUY WIRES IN ACCORDANCE WITH THE CHART ON S2.

7. NEW TOWER REACTIONS:

BASE COMPRESSION:	137 KIPS
GUY ANCHOR UPLIFT:	35.5 KIPS
GUY ANCHOR SHEAR:	36.9 KIPS

8. CONTRACTOR TO HAVE THE SAFETY CLIMB INTACT AND FUNCTIONAL AFTER WORK IS COMPLETE.

9. TOWER WILL BECOME UNSTABLE WHEN MEMBERS ARE DISCONNECTED OR BEING REPLACED. CONTRACTOR IS FULLY RESPONSIBLE TO MAINTAIN STABILITY OF THE TOWER DURING WORK AND SHOULD CONSULT WITH AN ENGINEER.

10. DESTEK DISCLAIMS ANY LIABILITY ARISING FROM THE ORIGINAL MATERIAL, FABRICATION OR ERECTION OF THE TOWER.

11. GUY WIRES
INITIAL TENSIONS SHALL BE READ ON CALM DAYS WITH WIND VELOCITIES OF 15 MPH OR LESS.
a. GALVANIZED STEEL GUY CABLES SHALL CONFORM TO THE REQUIREMENTS OF THE "STANDARD SPECIFICATION FOR ZINC COATED STEEL STRUCTURAL WIRE ROPE" ASTM A475. ROPE SHALL BE 6X7 (6 STRANDS, 7 WIRES PER STRAND (EHS)), MULTIPLE STRAND WITH WIRE STRAND CORE.
b. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INSURE THE STABILITY AND SAFETY OF THE TOWER INCLUDING THE ADEQUACY OF TEMPORARY OR INCOMPLETE CONNECTIONS DURING CONSTRUCTION. PROVISIONS MUST BE MADE TO PROTECT ALL PROPERTY IN VICINITY OF THE TOWER.
c. THE CONTRACTOR SHALL PLUMB THE TOWER AND ADJUST ALL GUY CABLES IN ACCORDANCE WITH THE GUY-TENSIONING CHART ON SHEET S3 GIVEN FIELD CONDITIONS NOTED IN 11.a.
d. DESTEK DISCLAIMS ANY LIABILITY ARISING FROM THE ORIGINAL MATERIAL, FABRICATION OR ERECTION OF THE TOWER.

12. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION), OSHA, AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.

1. DESIGN INFORMATION AND GENERAL REQUIREMENTS

1.1 CODES
a. 2016 CONNECTICUT STATE BUILDING CODE, INTERNATIONAL CODE COUNCIL AND CONNECTICUT DEPARTMENT OF ADMINISTRATIVE SERVICES
b. MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES, ASCE/SEI 7-10, AMERICAN SOCIETY OF CIVIL ENGINEERS
c. STEEL CONSTRUCTION MANUAL, 14TH EDITION, AMERICAN INSTITUTE OF STEEL CONSTRUCTION
d. STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, ANSI/TIA-222-G, TELECOMMUNICATIONS INDUSTRY ASSOCIATION

1.2 GENERAL
a. PRIOR TO PURCHASE OR FABRICATION OF MATERIAL, THE CONTRACTOR SHALL PERFORM AN INSPECTION VERIFYING MEMBER DIMENSIONS AND BOLT SIZES. SHOULD THE CONTRACTOR DISCOVER ANY DAMAGED OR MISSING MEMBERS OR THE MEMBER OR BOLT SIZES DO NOT MATCH THOSE LISTED, DESTEK SHALL BE NOTIFIED IMMEDIATELY.
b. CONTRACTOR TO REPLACE ALL BOLTS REMOVED WITH NEW BOLTS OF SAME TYPE, UNLESS NOTED OTHERWISE.

1.3 LOADS & DESIGN CRITERIA
WIND LOADING: V=105MPH; EXPOSURE CATEGORY B, STRUCTURE CLASS II

2. STRUCTURAL STEEL

2.1 MATERIALS
a. STRUCTURAL STEEL . . . . . ASTM A992
ANGLE & PLATE . . . . . ASTM A36
PIPE . . . . . ASTM A53 GRADE B (OR Fy>35KSI)
HSS ROUND . . . . . ASTM A500 GRADE B (Fy>42KSI)
BARS (SOLID RODS) . . . . . ASTM A36
b. BOLTS . . . . . ASTM A325N U.N.O.
c. WELDING ELECTRODES . . . . . AWS A5.1 (E70XX)
d. STEEL CONSTRUCTION SHALL CONFORM TO "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, ANSI/AISC 360-10"
e. WELDING SHALL CONFORM TO AWS D1.1/D1.3/D1.7 AS APPLICABLE.
f. THE FABRICATOR SHALL FURNISH CHECKED SHOP AND ERECTION DRAWINGS TO THE ENGINEER, AND OBTAIN APPROVAL PRIOR TO FABRICATING ANY STRUCTURAL STEEL. SHOP DRAWINGS SHALL CONFORM TO "DETAILING FOR STEEL CONSTRUCTION, 2ND EDITION"
g. POOR MATCHING OF HOLES SHALL BE CORRECTED BY DRILLING TO THE NEXT LARGER SIZE. WELDING FOR RE-DRILLING WILL NOT BE PERMITTED.

2.2 CONNECTIONS
a. SHOP CONNECTIONS MAY BE BOLTED OR WELDED
b. FIELD CONNECTIONS BOLTED WITH A325-N BOLTS, (INSTALLED SNUG TIGHT) UNLESS OTHERWISE SPECIFIED OR IF WELDED CONNECTIONS ARE NOTED ON DRAWINGS
c. FIELD CONNECTIONS SHALL BE MADE WITH A325-N BOLTS AND HARDENED WASHERS EXCEPT AS INDICATED ON THE DESIGN DRAWINGS
d. CONNECTIONS NOT SHOWN ON DRAWINGS SHALL BE DESIGNED BY THE STEEL FABRICATOR. CONNECTIONS SHALL BE DESIGNED IN ACCORDANCE WITH AISC "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS" AND "AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"
e. DO NOT FIELD CUT OR ALTER STRUCTURAL MEMBERS WITHOUT PRIOR WRITTEN APPROVAL OF ENGINEER.
f. BOLT HOLES SHALL BE CUT, DRILLED OR PUNCHED AT RIGHT ANGLES TO THE SURFACE OF THE METAL AND SHALL NOT BE MADE OR ENLARGED BY BURNING. HOLES SHALL BE CLEAN CUT WITHOUT TORN OR RAGGED EDGES. OUTSIDE BURRS RESULTING FROM DRILLING OR REAMING OPERATION SHALL BE REMOVED WITH A TOOL MAKING A 1/16 INCH BEVEL. BOLT HOLES SHALL BE 1/16 INCH OVERSIZE.

2.3 FINISHES
a. STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED AFTER FABRICATION PER ASTM A123
b. BOLTS AND NUTS SHALL BE HOT DIP GALVANIZED PER ASTM A153.
c. ALL SURFACES DAMAGED DURING THE WORK SHALL BE PAINTED WITH COLD GALVANIZING COMPOUND TWICE. THE PAINT SHOULD BE AT LEAST 93% PURE ZINC. RUST-OLEUM PROFESSIONAL, (MODEL# 7585838) OR SIMILAR.

2.4 WELDING
a. CONTRACTOR TO TAKE ALL NECESSARY PRECAUTIONS FOR FIRE PREVENTION DURING WELDING, SUCH AS; INSTALLING 3000 (NFPA 701) FIRE BLANKET AROUND COAX. MORE SPLATTER AND SPARKS SHOULD BE ANTICIPATED WHILE WELDING ON GALVANIZED SURFACE. COAX IS FLAMMABLE AND SHALL CATCH FIRE IF NOT PROTECTED. WATER SHALL BE ON SITE OF ADEQUATE AMOUNT AND AVAILABLE AT SHORT NOTICE AT ALL TIMES DURING WELDING ACTIVITY. CONTRACTOR SHOULD BE ABLE TO TRANSPORT THE WATER TO THE HEIGHT WELDING BEING PERFORMED.
b. WELDING ON GALVANIZED SURFACE SHOULD BE DONE WITH EXTREME CAUTION. IF THE WELD MATERIAL IS CONTAMINATED WITH ZINC, IT DOES NOT PROVIDE A STRUCTURAL WELD. GRIND GALVANIZING BEFORE WELDING.
c. WELDING CERTIFICATE MUST BE PROVIDED PRIOR TO WELDING. ALL WELDING SHALL BE PERFORMED BY AWS QUALIFIED WELDER WHO HAS EXPERIENCE WITH GALVANIZED SURFACES.

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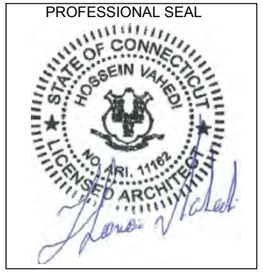

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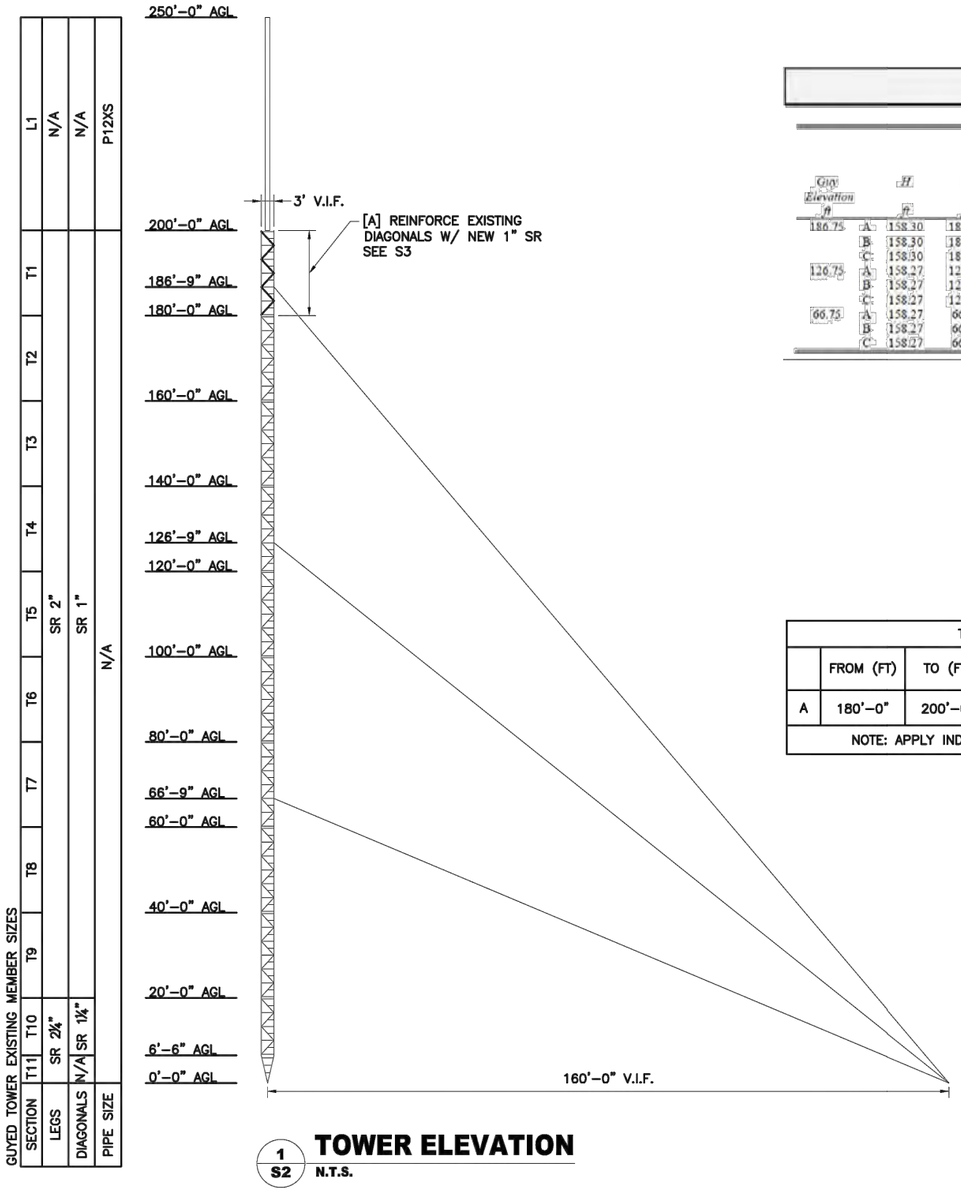
SHEET TITLE:
S-1: STRUCTURAL UPGRADE DETAILS



1 S2 **TOWER ELEVATION**
N.T.S.

Guy-Tensioning Information

Guy Elevation ft		H ft	V ft	Temperature At Time Of Tensioning: 0 F Initial Tension lb	0 F Intercept ft	20 F Initial Tension lb	20 F Intercept ft	40 F Initial Tension lb	40 F Intercept ft	60 F Initial Tension lb	60 F Intercept ft	80 F Initial Tension lb	80 F Intercept ft	100 F Initial Tension lb	100 F Intercept ft	120 F Initial Tension lb	120 F Intercept ft
186.75	A	158.30	186.75	4180	4.73	3950	5.01	3724	5.31	3500	5.64	3280	6.01	3060	6.44	2849	6.90
	B	158.30	186.75	4180	4.73	3950	5.01	3724	5.31	3500	5.64	3280	6.01	3060	6.44	2849	6.90
	C	158.30	186.75	4180	4.73	3950	5.01	3724	5.31	3500	5.64	3280	6.01	3060	6.44	2849	6.90
126.75	A	158.27	126.75	4498	3.03	4160	3.28	3827	3.56	3500	3.89	3181	4.28	2872	4.73	2576	5.27
	B	158.27	126.75	4498	3.03	4160	3.28	3827	3.56	3500	3.89	3181	4.28	2872	4.73	2576	5.27
	C	158.27	126.75	4498	3.03	4160	3.28	3827	3.56	3500	3.89	3181	4.28	2872	4.73	2576	5.27
66.75	A	158.27	66.75	2842	2.06	2584	2.26	2330	2.51	2080	2.81	1837	3.18	1605	3.64	1388	4.20
	B	158.27	66.75	2842	2.06	2584	2.26	2330	2.51	2080	2.81	1837	3.18	1605	3.64	1388	4.20
	C	158.27	66.75	2842	2.06	2584	2.26	2330	2.51	2080	2.81	1837	3.18	1605	3.64	1388	4.20

TOWER MODIFICATION SCHEDULE

	FROM (FT)	TO (FT)	MODIFICATION	REFERENCE SHEET
A	180'–0"	200'–0"	REINFORCE EXISTING DIAGONALS W/ NEW 1" SR	S3

NOTE: APPLY INDICATED MODIFICATIONS TO ALL 3 TOWER FACES

APPLICANT:
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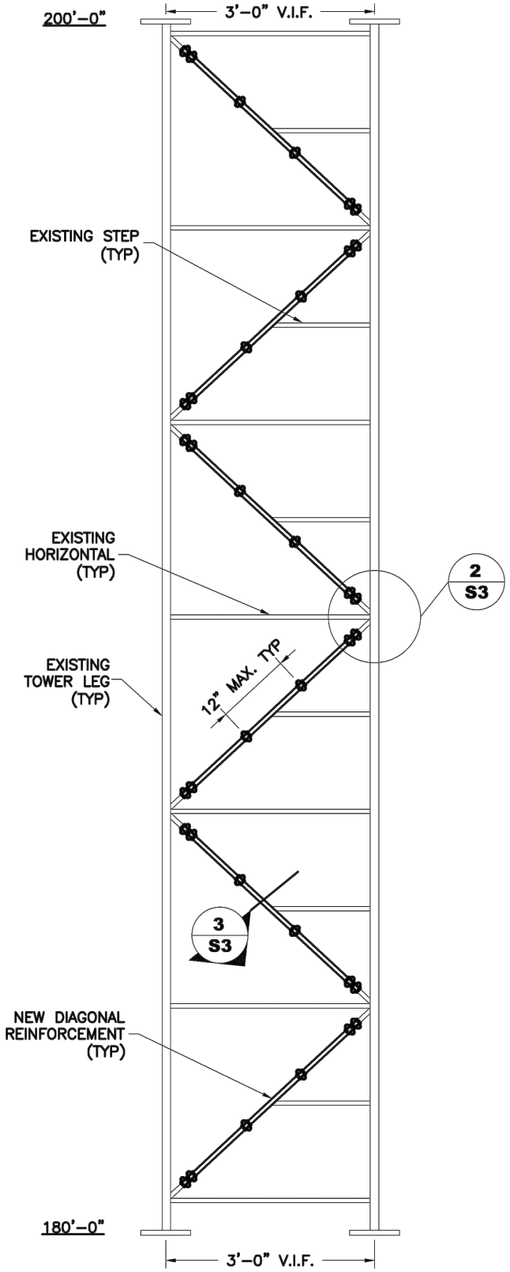
PROFESSIONAL SEAL
STATE OF CONNECTICUT
HOSSEIN VAHEDI
NO. ARI. 11162
LICENSED ARCHITECT

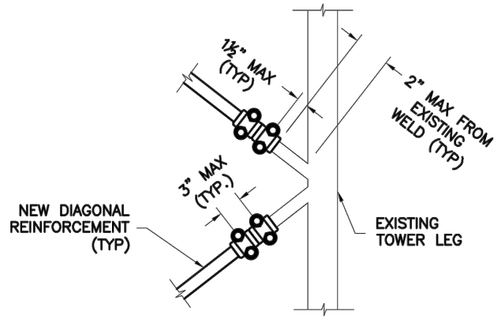
REV	DESCRIPTION	DATE
A	PRELIMINARY	08/29/18
B	CABINET SWAP	09/11/18
0	SIGNED AND SEALED	09/24/18
1	REMOVED COAXIAL CABLES	10/18/18
2	CHANGED ANTENNA RAD	10/23/18

SITE NUMBER: CTNL223A
SITE NAME: CITADEL GROTON GUYED
SITE ADDRESS: 99 BRIAR HILL ROAD
GROTON, CT 06340

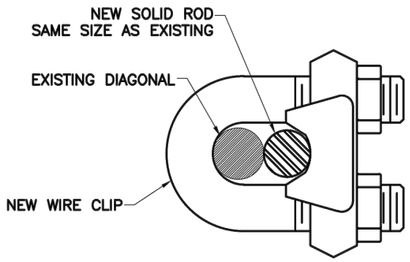
SHEET TITLE:
S-2: STRUCTURAL UPGRADE DETAILS



1 S3 ELEVATION VIEW
N.T.S.



2 S3 SOLID ROD END CONNECTION
N.T.S.



3 S3 SOLID ROD CONNECTION
N.T.S.

SOLID ROD ATTACHMENT NOTES:
1. IF EXISTING SOLID ROD MEMBERS ARE BENT, THEY WILL NEED STRAIGHTENING PRIOR TO ATTACHMENT OF NEW MEMBERS. PLEASE CONTACT DESTEK PRIOR TO INSTALLATION.

2. NEW SOLID ROD SHALL BE INSTALLED PARALLEL & STRAIGHT AGAINST EXISTING SOLID ROD MEMBER.

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL

REV	DESCRIPTION	DATE
A	PRELIMINARY	08/29/18
B	CABINET SWAP	09/11/18
0	SIGNED AND SEALED	09/24/18
1	REMOVED COAXIAL CABLES	10/18/18
2	CHANGED ANTENNA RAD	10/23/18

SITE NUMBER: CTNL223A
SITE NAME: CITADEL GROTON GUYED
SITE ADDRESS: 99 BRIAR HILL ROAD
GROTON, CT 06340

SHEET TITLE:
S-3: STRUCTURAL UPGRADE DETAILS

Exhibit D

STRUCTURAL ANALYSIS REPORT – UPGRADE – REV.
GUYED TOWER

Prepared For:

T-Mobile Northeast, LLC
35 Griffin Road South
Bloomfield, CT 06002

Structure Rating:

Guyed Tower: **Pass**

Sincerely,
Destek Engineering, LLC
License No: PEC0001429

10-24-2018

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: 27057

Site ID: CTNL223A
Site Name: Citadel Groton Guyed
99 Briar Hill Road
Groton, CT 06340

CONTENTS

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066-Tel: (770) 693-0835

1.0 SUBJECT AND REFERENCES

The purpose of this analysis is to evaluate the structural capacity of the 250' tall guyed tower located at 99 Briar Hill Road, Groton, CT 06340 for the additions and alterations proposed by T-Mobile.

The structural analysis is based on the following documentation provided to Destek Engineering, LLC (Destek):

- RFDS provided by T-Mobile, dated 5/16/2018.
- Structural Analysis Report prepared by Destek, dated 9/15/2016.
- Construction Drawings prepared by Atlantis Design Group, Inc., dated 9/15/2016.
- Photographs provided by Foresite, LLC.

1.1 STRUCTURE

The subject structure is a three-sided, 200' tall guyed lattice tower with a 50' pole extension. The base tower has a 3'-0" face width, and the pole extension has a 1'-0" diameter. Solid round legs are K-braced along the length of the base tower with solid round diagonals. The tower is guyed at (3) different elevations: 66'-9", 126'-9", 186'-9" above grade level. All the guy wires are terminated at anchors 160' away from the tower base. Please refer to the software output in Appendix A for tower geometry, member sizes, and other details.

2.0 EXISTING AND PROPOSED APPURTENANCES

Existing Configuration of T-Mobile Appurtenances:

Rad Center (ft.)	Antennas & Equipment	Coax	Mounts
177	(3) Ericsson AIR21 B2A/B4P (3) Ericsson AIR32 B66A/B2A	(1) 9x18 Hybrid (1) 6x12 Hybrid	(3) Sector Mounts

Proposed and Final Configuration of T-Mobile Appurtenances:

Rad Center (ft.)	Antennas & Equipment	Coax	Mounts
177	(3) RFS APXVAARR24_43-U-NA20 (3) Ericsson AIR21 B2A/B4P (3) Ericsson AIR32 B66A/B2A (1) Radio 4449 B71+B12	(1) 9x18 Hybrid (2) 6x12 Hybrid	(3) Sector Mounts

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066-Tel: (770) 693-0835

Appurtenances by Others:

Rad Center (ft.)	Antennas & Equipment	Coax	Mounts
250	(1) 4' Lightning Rod (1) Beacon	(1) 3/4" Conduit	Pole Mounted
237.5	(1) 6810	(1) 1-5/8"	(1) Pole Mount
215	(1) 6810-2	(1) 1-5/8"	(1) Pole Mount
199	(1) PR-950 Grid Dish	(1) 1-5/8"	Leg Mounted
187	(2) DB844G65ZAXY (1) DB980H90E-M (2) APXVSPP18-C (1) KMW ET-XU-42-15-37-18 (3) 1900 MHz RRH (3) 800 MHz RRH (3) APXV9TM14-ALU-120 (3) TD-RRH8x20	(6) 1-5/8" (3) 1-1/4" Hybrid (1) 3/8" Hybrid	(1) Delta Mount
172	(1) PR-950 Grid Dish	(1) 7/8"	Leg Mounted
170	--	(3) Tuning Wires	--
150	(1) 4' Grid Dish	(1) 1/2"	Leg Mounted
130	(1) 8' Omni	(1) 7/8"	(1) Standoff Mount
123	(3) Beacon Spurs	(1) 3/4" Conduit	Leg Mounted

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066-Tel: (770) 693-0835

3.0 CODES AND LOADING

The tower was analyzed per *TIA/EIA-222-G* as referenced by the *2016 Connecticut State Building Code* with all of the adopted Addendums and Supplements. The following wind loading was used in compliance with the standard for Groton, CT:

- Basic wind speed 105 mph without ice (V)
- Basic wind speed 50 mph with 0.75" escalating ice (V_i)
- Exposure Category: B
- Topographic Category: 1
- Structure Class: II

The following load combinations were used with wind blowing at 0°, 30°, 60°, and 90°, measured from a line normal to the face of the tower:

- 1.2 D + 1.0 D_g + 1.6 W_0
- 0.9 D + 1.0 D_g + 1.6 W_0
- 1.2 D + 1.0 D_g + 1.0 D_i + 1.0 W_i + 1.0 T_i

D: Dead load of structures and appurtenances, excluding guy assemblies
D_g: Dead load of guy assemblies
D_i: Weight of ice due to factored ice thickness (based upon t_i)
T_i: Load effects due to temperature
W_0: Wind load without ice (based upon V)
W_i: Wind load with ice (based upon V_i)

4.0 STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING STRUCTURES

The analysis is based on the information provided to Destek and is assumed to be current and correct. Unless otherwise noted, the structure and the foundation system are assumed to be in good condition, free of defects and can achieve theoretical strength.

It is assumed that the structure has been maintained and shall be maintained during its service. The superstructure and the foundation system are assumed to be designed with proper engineering practice and fabricated, constructed and erected in accordance with the design documents. Destek will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, etc. or lack of maintenance.

The analysis does not include a qualification of the mounts attached on the structure or their connections. The analysis is performed to verify the capacity of the main structural members, which is the current practice in the tower industry.

DESTEK ENGINEERING, LLC
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The analysis results presented in this report are only applicable for the previously mentioned existing and proposed additions and alterations. Any deviation of the proposed equipment and placement, etc., will require Destek to generate an additional structural analysis.

5.0 ANALYSIS AND ASSUMPTIONS

The tower was analyzed by utilizing tnxTower, a non-linear, three-dimensional, finite element-analysis software package, a product of Tower Numerics, Inc. Software output for this analysis is provided in Appendix A of this report.

The tower and foundation were constructed in accordance with their original design and maintained per the manufacturer's specifications. Tower is plumb and free of twist.

6.0 RESULTS AND CONCLUSION

Based on a structural analysis per *ANSI/TIA-222-G*, the existing guyed tower **will have adequate** structural capacity for the proposed changes by T-Mobile once the tower is upgraded according to the attached Destek drawings dated 10/24/2018. For the code specified load combinations and as a maximum, the tower diagonals from 160' to 180' are stressed to **93.0%** of their structural capacity. The tower legs, girts, and guy wires are stressed to **87.8%**, **48.1%**, and **87.9%** of capacity, respectively.

Information regarding the tower base and anchor foundations was not available at the time of this analysis, thus a qualification of the foundations could not be completed.

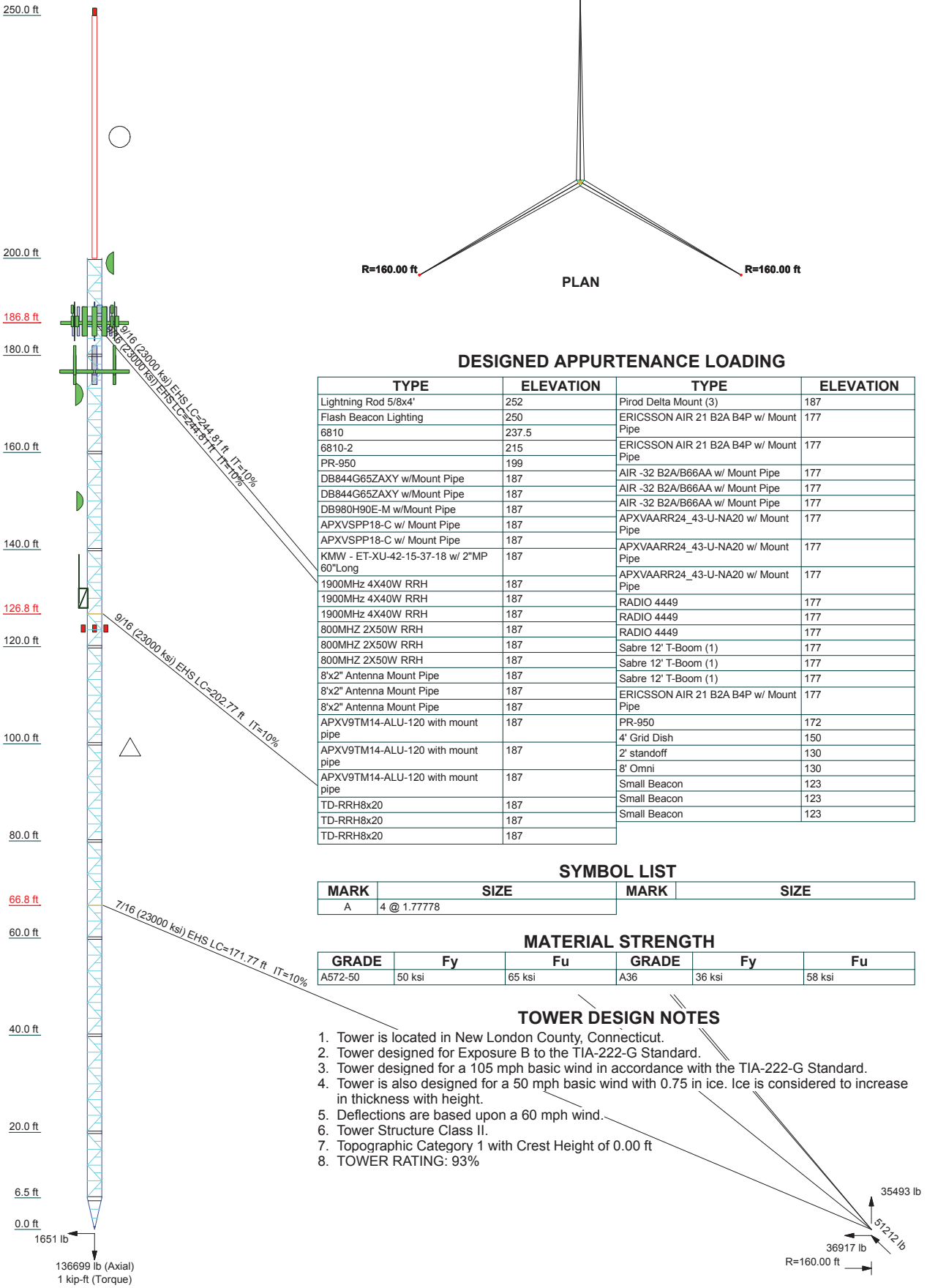
Therefore, the proposed additions and alterations by T-Mobile **can** be implemented as intended and with the conditions outlined in this report.

Should you have any questions about this report, please contact us at (770) 693-0835.

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066-Tel: (770) 693-0835

APPENDIX A
SOFTWARE OUTPUT

Section		T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1	L1
Legs			SR 2 1/4					SR 2					P12x.5
Leg Grade							A572-50						A53-B-35
Diagonals		N.A.	SR 1 1/4					SR 1					N.A.
Diagonal Grade		N.A.					A36						N.A.
Top Girts		8x3/8					SR 7/8					L3x3x3/8	N.A.
Bottom Girts		8x3/8					SR 7/8						N.A.
Horizontals		8x3/8					SR 7/8						N.A.
Sec. Horizontals		N.A.					SR 7/8						N.A.
Top Guy Pull-Offs				N.A.		3 1/2x1 3/8		N.A.	3 1/2x1 3/8	N.A.		SR 1	N.A.
Face Width (ft)								58 @ 3.25				3	1.0625
# Panels @ (ft)		A											N.A.
Weight (lb)	15054.7	479.6	917.6	1051.6	1051.6	1206.3	1051.6	1051.6	1206.3	1051.6	1051.6	1497.7	3437.6



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4'	252	Pirod Delta Mount (3)	187
Flash Beacon Lighting	250	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	177
6810	237.5	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	177
6810-2	215	AIR -32 B2A/B66AA w/ Mount Pipe	177
PR-950	199	AIR -32 B2A/B66AA w/ Mount Pipe	177
DB844G65ZAXY w/Mount Pipe	187	AIR -32 B2A/B66AA w/ Mount Pipe	177
DB844G65ZAXY w/Mount Pipe	187	APXVAARR24_43-U-NA20 w/ Mount Pipe	177
DB980H90E-M w/Mount Pipe	187	APXVAARR24_43-U-NA20 w/ Mount Pipe	177
APXVSPP18-C w/ Mount Pipe	187	APXVAARR24_43-U-NA20 w/ Mount Pipe	177
APXVSPP18-C w/ Mount Pipe	187	RADIO 4449	177
KMW - ET-XU-42-15-37-18 w/ 2"MP 60"Long	187	RADIO 4449	177
1900MHz 4X40W RRH	187	RADIO 4449	177
1900MHz 4X40W RRH	187	Sabre 12' T-Boom (1)	177
1900MHz 4X40W RRH	187	Sabre 12' T-Boom (1)	177
800MHZ 2X50W RRH	187	Sabre 12' T-Boom (1)	177
800MHZ 2X50W RRH	187	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	177
800MHZ 2X50W RRH	187	PR-950	172
8'x2" Antenna Mount Pipe	187	4' Grid Dish	150
8'x2" Antenna Mount Pipe	187	2' standoff	130
8'x2" Antenna Mount Pipe	187	8' Omni	130
APXV9TM14-ALU-120 with mount pipe	187	Small Beacon	123
APXV9TM14-ALU-120 with mount pipe	187	Small Beacon	123
APXV9TM14-ALU-120 with mount pipe	187	Small Beacon	123
TD-RRH8x20	187		
TD-RRH8x20	187		
TD-RRH8x20	187		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	4 @ 1.77778		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 93%

ALL REACTIONS ARE FACTORED

Destek Engineering, LLC
1281 Kennestone Circle, Suite 100
Marietta, GA 30066
Phone: (770) 693 0835
FAX:

Job: *CTNL223A - Citadel Groton Guyed*		
Project: *1875058*		
Client: T-Mobile	Drawn by: Ahmet Colakoglu	App'd:
Code: TIA-222-G	Date: 10/24/18	Scale: NTS
Path: C:\Destek Dropbox\rserver\ForeSite LLC\2018\1875058 - CTNL223A\TNXTower\Upgrade\CTNL223A - Upgrade.eri		Dwg No. E-1

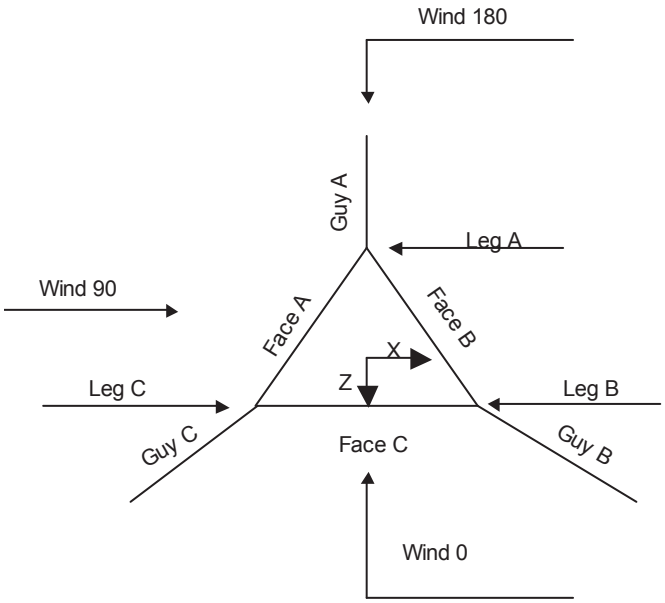
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 250.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 3.00 ft at the top and tapered at the base.
An index plate is provided at the 3x guyed -tower connection.
There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

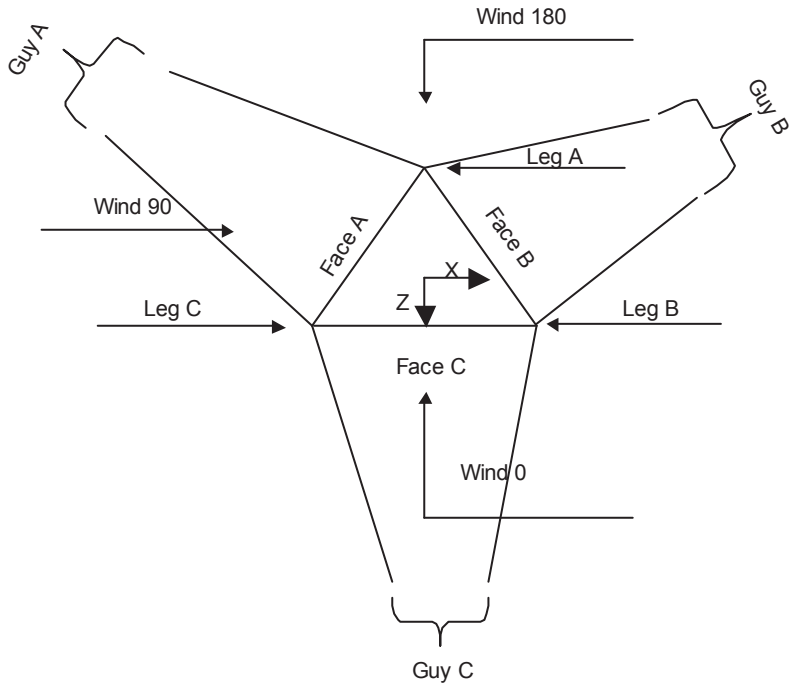
Tower is located in New London County, Connecticut.
Basic wind speed of 105 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Safety factor used in guy design is 1.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area	√	SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys	√	Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity	√	Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)	√	Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
√	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



Corner & Starmount Guyed Tower



Face Guyed

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	250.00-200.00	50.00	P12x.5	A53-B-35 (35 ksi)	

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 250.00-200.00				1	1	1.05			

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	200.00-180.00			3.00	1	20.00
T2	180.00-160.00			3.00	1	20.00
T3	160.00-140.00			3.00	1	20.00
T4	140.00-120.00			3.00	1	20.00
T5	120.00-100.00			3.00	1	20.00
T6	100.00-80.00			3.00	1	20.00
T7	80.00-60.00			3.00	1	20.00
T8	60.00-40.00			3.00	1	20.00
T9	40.00-20.00			3.00	1	20.00
T10	20.00-6.50			3.00	1	13.50
T11	6.50-0.00			3.00	1	6.50

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	200.00-180.00	3.25	K Brace Left	No	Yes+Steps	3.0000	3.0000
T2	180.00-160.00	3.25	K Brace Left	No	Yes+Steps	3.0000	3.0000
T3	160.00-140.00	3.25	K Brace Left	No	Yes+Steps	3.0000	3.0000
T4	140.00-120.00	3.25	K Brace Left	No	Yes+Steps	3.0000	3.0000
T5	120.00-100.00	3.25	K Brace Left	No	Yes+Steps	3.0000	3.0000
T6	100.00-80.00	3.25	K Brace Left	No	Yes+Steps	3.0000	3.0000
T7	80.00-60.00	3.25	K Brace Left	No	Yes+Steps	3.0000	3.0000
T8	60.00-40.00	3.25	K Brace Left	No	Yes+Steps	3.0000	3.0000
T9	40.00-20.00	3.25	K Brace Left	No	Yes+Steps	3.0000	3.0000
T10	20.00-6.50	3.25	K Brace Left	No	Yes+Steps	3.0000	3.0000
T11	6.50-0.00	1.78	K Brace Left	No	Yes	7.0000	7.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 200.00-180.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T2 180.00-160.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T3 160.00-140.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T4 140.00-120.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T5 120.00-100.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T6 100.00-80.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T7 80.00-60.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T8 60.00-40.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T9 40.00-20.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T10 20.00-6.50	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1 1/4	A36 (36 ksi)
T11 6.50-0.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 200.00-180.00	Equal Angle	L3x3x3/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T2 180.00-160.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T3 160.00-140.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T4 140.00-120.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T5 120.00-100.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T6 100.00-80.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T7 80.00-60.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T8 60.00-40.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T9 40.00-20.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T10 20.00-6.50	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T11 6.50-0.00	Flat Bar	8x3/8	A36 (36 ksi)	Flat Bar	8x3/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 200.00-180.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T2 180.00-160.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T3 160.00-140.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T4 140.00-120.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T5 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T6 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T7 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T8 60.00-40.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T9 40.00-20.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T10 20.00-6.50	None	Flat Bar		A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T11 6.50-0.00	None	Flat Bar		A36 (36 ksi)	Flat Bar	8x3/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 200.00-180.00	Solid Round	7/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T2 180.00-160.00	Solid Round	7/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T3 160.00-140.00	Solid Round	7/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T4 140.00-120.00	Solid Round	7/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T5 120.00-100.00	Solid Round	7/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T6 100.00-80.00	Solid Round	7/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T7 80.00-60.00	Solid Round	7/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T8 60.00-40.00	Solid Round	7/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T9 40.00-20.00	Solid Round	7/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T10 20.00-6.50	Solid Round	7/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T11 6.50-0.00	Solid Round	7/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 200.00-180.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T2 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T3 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T4 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T5 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T6 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T7 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T8 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T9 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T10 20.00-6.50	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T11 6.50-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	No	1	1	0.495	1	1	1	1	1
200.00-180.00				1	0.495	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
180.00-160.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T9	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T10	Yes	Yes	1	1	1	1	1	1	1	1
20.00-6.50				1	1	1	1	1	1	1
T11 6.50-0.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 200.00-180.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 20.00-6.50	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 6.50-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 200.00-180.00	Flange	0.7500 A325N	3	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0
T2 180.00-160.00	Flange	0.7500 A325N	3	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0
T3 160.00-140.00	Flange	0.7500 A325N	3	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0
T4 140.00-120.00	Flange	0.7500 A325N	3	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0
T5 120.00-100.00	Flange	0.7500 A325N	3	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0
T6 100.00-80.00	Flange	0.7500 A325N	3	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0
T7 80.00-60.00	Flange	0.7500 A325N	3	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0
T8 60.00-40.00	Flange	0.7500 A325N	3	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0
T9 40.00-20.00	Flange	0.7500 A325N	3	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0
T10 20.00-6.50	Flange	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T11 6.50-0.00	Flange	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0

Guy Data

Guy Elevation ft	Guy Grade	Guy Size	Initial Tension lb	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
186.75	EHS	A 9/16 (23000 ksi)	3500.00	10%	23000	0.671	244.63	160.00	0.0000	0.00	100%
		B 9/16 (23000 ksi)	3500.00	10%	23000	0.671	244.63	160.00	0.0000	0.00	100%
		C 9/16 (23000 ksi)	3500.00	10%	23000	0.671	244.63	160.00	0.0000	0.00	100%
126.75	EHS	A 9/16 (23000 ksi)	3500.00	10%	23000	0.671	202.61	160.00	0.0000	0.00	100%
		B 9/16 (23000 ksi)	3500.00	10%	23000	0.671	202.61	160.00	0.0000	0.00	100%
		C 9/16 (23000 ksi)	3500.00	10%	23000	0.671	202.61	160.00	0.0000	0.00	100%
66.75	EHS	A 7/16 (23000 ksi)	2080.00	10%	21000	0.399	171.63	160.00	0.0000	0.00	100%
		B 7/16 (23000 ksi)	2080.00	10%	21000	0.399	171.63	160.00	0.0000	0.00	100%
		C 7/16 (23000 ksi)	2080.00	10%	21000	0.399	171.63	160.00	0.0000	0.00	100%

Guy Data *(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
186.75	Torque Arm	6.00	0.0000	Channel	A36 (36 ksi)	Channel	C12x20.7
126.75	Corner						
66.75	Corner						

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
186.75	A572-50	Solid Round			No	A36	Solid Round	1

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
126.75	(50 ksi) A572-50 (50 ksi)	Solid Round			Yes	(36 ksi) A36 (36 ksi)	Flat Bar	3 1/2x1 3/8
66.75	(50 ksi) A572-50 (50 ksi)	Solid Round			Yes	(36 ksi) A36 (36 ksi)	Flat Bar	3 1/2x1 3/8

Guy Data *(cont'd)*

Guy Elevation ft	Cable Weight A lb	Cable Weight B lb	Cable Weight C lb	Cable Weight D lb	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
186.75	164.14	164.14	164.14		5.64 4.1 sec/pulse	5.64 4.1 sec/pulse	5.64 4.1 sec/pulse	
126.75	135.95	135.95	135.95		3.89 3.4 sec/pulse	3.89 3.4 sec/pulse	3.89 3.4 sec/pulse	
66.75	68.48	68.48	68.48		2.81 2.9 sec/pulse	2.81 2.9 sec/pulse	2.81 2.9 sec/pulse	

Guy Data *(cont'd)*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
186.75	Yes	Yes	1	1	1	1	1	1
126.75	No	No			1	1	1	1
66.75	No	No			1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
186.75	0.0000 A325N	0	0.0000	1	0.0000 A325N	0	0.0000	1	0.0000 A325N	0	0.0000	1
126.75	0.0000 A325N	0	0.0000	1	0.0000 A325N	0	0.0000	1	0.0000 A325N	0	0.0000	1
66.75	0.0000 A325N	0	0.0000	1	0.0000 A325N	0	0.0000	1	0.0000 A325N	0	0.0000	1

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
186.75	A	93.38	23	5	1.6644
	B	93.38	23	5	1.6644
	C	93.38	23	5	1.6644
126.75	A	63.38	21	5	1.6011
	B	63.38	21	5	1.6011
	C	63.38	21	5	1.6011
66.75	A	33.38	17	4	1.5017
	B	33.38	17	4	1.5017
	C	33.38	17	4	1.5017

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top / Bottom lb	F_x lb	F_y lb	F_z lb	M_x kip-ft	M_y kip-ft	M_z kip-ft
186.75	A	49.7141	3625.21 3500.00	-43.65	2799.63	-2302.68	-4.85	6.98	-8.40
	A	49.7141	3625.21 3500.00	43.65	2799.63	-2302.68	-4.85	-6.98	8.40
	B	49.7141	3625.21 3500.00	2016.00	2799.63	1113.54	9.70	6.98	0.00
	B	49.7141	3625.21 3500.00	1972.36	2799.63	1189.14	-4.85	-6.98	-8.40
	C	49.7141	3625.21 3500.00	-1972.36	2799.63	1189.14	-4.85	6.98	8.40
	C	49.7141	3625.21 3500.00	-2016.00	2799.63	1113.54	9.70	-6.98	0.00
			Sum:	0.00	16797.75	0.00	-0.00	0.00	0.00
126.75	A	38.6897	3584.98 3500.00	0.00	2282.31	-2764.62	-3.95	0.00	0.00
	B	38.6897	3584.98 3500.00	2394.23	2282.31	1382.31	1.98	0.00	-3.42
	C	38.6897	3584.98 3500.00	-2394.23	2282.31	1382.31	1.98	0.00	3.42
			Sum:	0.00	6846.94	0.00	0.00	0.00	0.00
66.75	A	22.8677	2106.61 2080.00	0.00	847.68	-1928.54	-1.47	0.00	0.00
	B	22.8677	2106.61 2080.00	1670.16	847.68	964.27	0.73	0.00	-1.27
	C	22.8677	2106.61 2080.00	-1670.16	847.68	964.27	0.73	0.00	1.27
			Sum:	0.00	2543.03	0.00	0.00	0.00	0.00

Guy-Mast Forces (Excluding Wind) - Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top / Bottom lb	F_x lb	F_y lb	F_z lb	M_x kip-ft	M_y kip-ft	M_z kip-ft
186.75	A	49.7141	7747.48	-88.72	6173.09	-4680.65	-10.69	14.20	-18.52

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	lb	lb	lb	lb	kip-ft	kip-ft	kip-ft
			6777.75						
	A	49.7141	7747.48	88.72	6173.09	-4680.65	-10.69	-14.20	18.52
			6777.75						
	B	49.7141	7747.48	4097.92	6173.09	2263.49	21.38	14.20	0.00
			6777.75						
	B	49.7141	7747.48	4009.20	6173.09	2417.16	-10.69	-14.20	-18.52
			6777.75						
	C	49.7141	7747.48	-4009.20	6173.09	2417.16	-10.69	14.20	18.52
			6777.75						
	C	49.7141	7747.48	-4097.92	6173.09	2263.49	21.38	-14.20	0.00
			6777.75						
			Sum:	0.00	37038.55	0.00	-0.00	0.00	0.00
126.75	A	38.6897	7384.79	0.00	4916.74	-5510.07	-8.52	0.00	0.00
			6764.06						
	B	38.6897	7384.79	4771.86	4916.74	2755.03	4.26	0.00	-7.38
			6764.06						
	C	38.6897	7384.79	-4771.86	4916.74	2755.03	4.26	-0.00	7.38
			6764.06						
			Sum:	0.00	14750.22	-0.00	0.00	0.00	0.00
66.75	A	22.8677	4771.45	0.00	2141.13	-4264.07	-3.71	0.00	0.00
			4507.76						
	B	22.8677	4771.45	3692.80	2141.13	2132.04	1.85	0.00	-3.21
			4507.76						
	C	22.8677	4771.45	-3692.80	2141.13	2132.04	1.85	-0.00	3.21
			4507.76						
			Sum:	0.00	6423.38	-0.00	0.00	0.00	0.00

Guy-Mast Forces (Excluding Wind) - Service

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	lb	lb	lb	lb	kip-ft	kip-ft	kip-ft
186.75	A	49.7141	3625.21	-43.65	2799.63	-2302.68	-4.85	6.98	-8.40
			3500.00						
	A	49.7141	3625.21	43.65	2799.63	-2302.68	-4.85	-6.98	8.40
			3500.00						
	B	49.7141	3625.21	2016.00	2799.63	1113.54	9.70	6.98	0.00
			3500.00						
	B	49.7141	3625.21	1972.36	2799.63	1189.14	-4.85	-6.98	-8.40
			3500.00						
	C	49.7141	3625.21	-1972.36	2799.63	1189.14	-4.85	6.98	8.40
			3500.00						
	C	49.7141	3625.21	-2016.00	2799.63	1113.54	9.70	-6.98	0.00
			3500.00						
			Sum:	0.00	16797.75	0.00	-0.00	0.00	0.00
126.75	A	38.6897	3584.98	0.00	2282.31	-2764.62	-3.95	0.00	0.00
			3500.00						
	B	38.6897	3584.98	2394.23	2282.31	1382.31	1.98	0.00	-3.42
			3500.00						
	C	38.6897	3584.98	-2394.23	2282.31	1382.31	1.98	0.00	3.42
			3500.00						
			Sum:	0.00	6846.94	0.00	0.00	0.00	0.00

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	lb	lb	lb	lb	kip-ft	kip-ft	kip-ft
66.75	A	22.8677	2106.61 2080.00	0.00	847.68	-1928.54	-1.47	0.00	0.00
	B	22.8677	2106.61 2080.00	1670.16	847.68	964.27	0.73	0.00	-1.27
	C	22.8677	2106.61 2080.00	-1670.16	847.68	964.27	0.73	0.00	1.27
			Sum:	0.00	2543.03	0.00	0.00	0.00	0.00

Guy-Tensioning Information

Guy Elevation		H	V	Temperature At Time Of Tensioning: 0 F Initial Tension	0 F Intercept	20 F Initial Tension	20 F Intercept	40 F Initial Tension	40 F Intercept	60 F Initial Tension	60 F Intercept	80 F Initial Tension	80 F Intercept	100 F Initial Tension	100 F Intercept	120 F Initial Tension	120 F Intercept
ft		ft	ft	lb	ft	lb	ft	lb	ft	lb	ft	lb	ft	lb	ft	lb	ft
186.75	A	158.30	186.75	4180	4.73	3950	5.01	3724	5.31	3500	5.64	3280	6.01	3060	6.44	2849	6.90
	B	158.30	186.75	4180	4.73	3950	5.01	3724	5.31	3500	5.64	3280	6.01	3060	6.44	2849	6.90
	C	158.30	186.75	4180	4.73	3950	5.01	3724	5.31	3500	5.64	3280	6.01	3060	6.44	2849	6.90
126.75	A	158.27	126.75	4498	3.03	4160	3.28	3827	3.56	3500	3.89	3181	4.28	2872	4.73	2576	5.27
	B	158.27	126.75	4498	3.03	4160	3.28	3827	3.56	3500	3.89	3181	4.28	2872	4.73	2576	5.27
	C	158.27	126.75	4498	3.03	4160	3.28	3827	3.56	3500	3.89	3181	4.28	2872	4.73	2576	5.27
66.75	A	158.27	66.75	2842	2.06	2584	2.26	2330	2.51	2080	2.81	1837	3.18	1605	3.64	1388	4.20
	B	158.27	66.75	2842	2.06	2584	2.26	2330	2.51	2080	2.81	1837	3.18	1605	3.64	1388	4.20
	C	158.27	66.75	2842	2.06	2584	2.26	2330	2.51	2080	2.81	1837	3.18	1605	3.64	1388	4.20

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8	B	No	Ar (CaAa)	200.00 - 6.50	0.0000	0.1	1	1	0.3750	0.3750		0.22
3/4" Rigid Conduit	C	No	Ar (CaAa)	200.00 - 6.50	0.0000	0	1	1	1.0500	1.0500		1.05
3/4" Rigid Conduit ***	C	No	Ar (CaAa)	123.00 - 6.50	0.0000	0.2	1	1	1.0500	1.0500		1.05
LDF7-50A(1-5/8")	C	No	Ar (CaAa)	200.00 - 6.50	0.0000	0.3	1	1	1.9800	1.9800		1.04
LDF7-50A(1-5/8")	B	No	Ar (CaAa)	200.00 - 6.50	0.0000	0.4	2	2	1.9800	1.9800		1.04
LDF7-50A(1-5/8")	A	No	Ar (CaAa)	187.00 - 6.50	0.0000	0.25	6	3	1.9800	1.9800		1.04
LDF6-50A(1-1/4")	A	No	Ar (CaAa)	187.00 - 6.50	0.0000	0.25	3	3	1.5500	1.5500		0.66
RFFT-36SM-001-xxM(3/8")	A	No	Ar (CaAa)	187.00 - 6.50	0.0000	0.4	1	1	0.4000	0.4000		0.30
MLCH HYBRID 6X12(1-3/8") (1E + 1P)	A	No	Ar (CaAa)	177.00 - 6.50	0.0000	0.3	2	2	1.4300	1.4300		1.72
9x18 MLE	A	No	Ar (CaAa)	177.00 - 6.50	0.0000	0.35	1	1	1.5700	1.5700		1.07

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Hybrid Line - 40mm												
LDF5-50A(7/8")	C	No	Ar (CaAa)	172.00 - 6.50	0.0000	0.25	1	1	1.1100	1.1100		0.54
LDF5-50A(7/8")	C	No	Ar (CaAa)	130.00 - 6.50	0.0000	0.4	1	1	1.1100	1.1100		0.54
1/2 ***	C	No	Ar (CaAa)	150.00 - 6.50	0.0000	0.4	1	1	0.5800	0.5800		0.25
3/8	A	No	Ar (CaAa)	170.00 - 6.50	0.0000	0.5	1	1	0.3750	0.3750		0.26
3/8	B	No	Ar (CaAa)	170.00 - 6.50	0.0000	0.5	1	1	0.3750	0.3750		0.26
3/8	C	No	Ar (CaAa)	170.00 - 6.50	0.0000	0.5	1	1	0.3750	0.3750		0.26

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	250.00-200.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T1	200.00-180.00	A	0.000	0.000	11.851	0.000	59.64
		B	0.000	0.000	8.670	0.000	46.00
		C	0.000	0.000	6.060	0.000	41.80
T2	180.00-160.00	A	0.000	0.000	41.766	0.000	249.50
		B	0.000	0.000	9.045	0.000	48.60
		C	0.000	0.000	7.767	0.000	50.88
T3	160.00-140.00	A	0.000	0.000	43.470	0.000	265.60
		B	0.000	0.000	9.420	0.000	51.20
		C	0.000	0.000	9.610	0.000	60.30
T4	140.00-120.00	A	0.000	0.000	43.470	0.000	265.60
		B	0.000	0.000	9.420	0.000	51.20
		C	0.000	0.000	11.615	0.000	71.35
T5	120.00-100.00	A	0.000	0.000	43.470	0.000	265.60
		B	0.000	0.000	9.420	0.000	51.20
		C	0.000	0.000	14.510	0.000	94.60
T6	100.00-80.00	A	0.000	0.000	43.470	0.000	265.60
		B	0.000	0.000	9.420	0.000	51.20
		C	0.000	0.000	14.510	0.000	94.60
T7	80.00-60.00	A	0.000	0.000	43.470	0.000	265.60
		B	0.000	0.000	9.420	0.000	51.20
		C	0.000	0.000	14.510	0.000	94.60
T8	60.00-40.00	A	0.000	0.000	43.470	0.000	265.60
		B	0.000	0.000	9.420	0.000	51.20
		C	0.000	0.000	14.510	0.000	94.60
T9	40.00-20.00	A	0.000	0.000	43.470	0.000	265.60
		B	0.000	0.000	9.420	0.000	51.20
		C	0.000	0.000	14.510	0.000	94.60
T10	20.00-6.50	A	0.000	0.000	29.342	0.000	179.28
		B	0.000	0.000	6.359	0.000	34.56
		C	0.000	0.000	9.794	0.000	63.85
T11	6.50-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	250.00-200.00	A	1.818	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T1	200.00-180.00	A	1.787	0.000	0.000	28.090	0.000	500.92
		B		0.000	0.000	35.439	0.000	451.99
		C		0.000	0.000	20.356	0.000	330.15
T2	180.00-160.00	A	1.767	0.000	0.000	112.187	0.000	1867.01
		B		0.000	0.000	39.134	0.000	495.05
		C		0.000	0.000	29.680	0.000	455.13
T3	160.00-140.00	A	1.745	0.000	0.000	120.389	0.000	1963.98
		B		0.000	0.000	42.717	0.000	535.43
		C		0.000	0.000	41.024	0.000	600.10
T4	140.00-120.00	A	1.720	0.000	0.000	119.584	0.000	1938.88
		B		0.000	0.000	42.350	0.000	525.94
		C		0.000	0.000	50.496	0.000	724.11
T5	120.00-100.00	A	1.692	0.000	0.000	118.659	0.000	1910.25
		B		0.000	0.000	41.927	0.000	515.16
		C		0.000	0.000	61.884	0.000	884.15
T6	100.00-80.00	A	1.658	0.000	0.000	117.568	0.000	1876.79
		B		0.000	0.000	41.429	0.000	502.59
		C		0.000	0.000	60.943	0.000	858.93
T7	80.00-60.00	A	1.617	0.000	0.000	116.233	0.000	1836.27
		B		0.000	0.000	40.819	0.000	487.43
		C		0.000	0.000	59.790	0.000	828.58
T8	60.00-40.00	A	1.564	0.000	0.000	114.498	0.000	1784.34
		B		0.000	0.000	40.026	0.000	468.09
		C		0.000	0.000	58.292	0.000	789.98
T9	40.00-20.00	A	1.486	0.000	0.000	111.976	0.000	1710.26
		B		0.000	0.000	38.873	0.000	440.69
		C		0.000	0.000	56.112	0.000	735.57
T10	20.00-6.50	A	1.369	0.000	0.000	73.038	0.000	1081.81
		B		0.000	0.000	25.075	0.000	270.90
		C		0.000	0.000	35.672	0.000	444.13
T11	6.50-0.00	A	1.190	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	250.00-200.00	0.0000	0.0000	0.0000	0.0000
T1	200.00-180.00	0.6480	-0.7408	0.8480	0.1820
T2	180.00-160.00	-1.4490	-5.2227	-0.7332	-3.3969
T3	160.00-140.00	-1.6422	-5.0442	-1.0864	-3.0596
T4	140.00-120.00	-1.8493	-4.5559	-1.4961	-2.5016
T5	120.00-100.00	-2.1915	-4.2096	-1.9394	-2.0619
T6	100.00-80.00	-2.1915	-4.2096	-1.9504	-2.0901
T7	80.00-60.00	-2.1115	-4.0906	-1.8915	-2.0561
T8	60.00-40.00	-2.1915	-4.2096	-1.9804	-2.1716
T9	40.00-20.00	-2.1915	-4.2096	-2.0041	-2.2413
T10	20.00-6.50	-2.1217	-4.0856	-1.9843	-2.2942

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T11	6.50-0.00	0.0000	0.0000	0.0000	0.0000

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	Safety Line 3/8	180.00 - 200.00	0.6000	0.4802
T1	2	3/4" Rigid Conduit	180.00 - 200.00	0.6000	0.4802
T1	5	LDF7-50A(1-5/8")	180.00 - 200.00	0.6000	0.4802
T1	6	LDF7-50A(1-5/8")	180.00 - 200.00	0.6000	0.4802
T1	7	LDF7-50A(1-5/8")	180.00 - 187.00	0.6000	0.4802
T1	8	LDF6-50A(1-1/4")	180.00 - 187.00	0.6000	0.4802
T1	9	RFFT-36SM-001-xxM(3/8")	180.00 - 187.00	0.6000	0.4802
T2	1	Safety Line 3/8	160.00 - 180.00	0.6000	0.4914
T2	2	3/4" Rigid Conduit	160.00 - 180.00	0.6000	0.4914
T2	5	LDF7-50A(1-5/8")	160.00 - 180.00	0.6000	0.4914
T2	6	LDF7-50A(1-5/8")	160.00 - 180.00	0.6000	0.4914
T2	7	LDF7-50A(1-5/8")	160.00 - 180.00	0.6000	0.4914
T2	8	LDF6-50A(1-1/4")	160.00 - 180.00	0.6000	0.4914
T2	9	RFFT-36SM-001-xxM(3/8")	160.00 - 180.00	0.6000	0.4914
T2	10	MLCH HYBRID 6X12(1-3/8")	160.00 - 177.00	0.6000	0.4914
T2	11	9x18 MLE Hybrid Line - 40mm	160.00 - 177.00	0.6000	0.4914
T2	12	LDF5-50A(7/8")	160.00 - 172.00	0.6000	0.4914
T2	16	3/8	160.00 - 170.00	0.6000	0.4914
T2	17	3/8	160.00 - 170.00	0.6000	0.4914
T2	18	3/8	160.00 - 170.00	0.6000	0.4914
T3	1	Safety Line 3/8	140.00 - 160.00	0.6000	0.4954
T3	2	3/4" Rigid Conduit	140.00 - 160.00	0.6000	0.4954
T3	5	LDF7-50A(1-5/8")	140.00 - 160.00	0.6000	0.4954

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	6	LDF7-50A(1-5/8")	140.00 - 160.00	0.6000	0.4954
T3	7	LDF7-50A(1-5/8")	140.00 - 160.00	0.6000	0.4954
T3	8	LDF6-50A(1-1/4")	140.00 - 160.00	0.6000	0.4954
T3	9	RFFT-36SM-001-xxM(3/8")	140.00 - 160.00	0.6000	0.4954
T3	10	MLCH HYBRID 6X12(1-3/8")	140.00 - 160.00	0.6000	0.4954
T3	11	9x18 MLE Hybrid Line - 40mm	140.00 - 160.00	0.6000	0.4954
T3	12	LDF5-50A(7/8")	140.00 - 160.00	0.6000	0.4954
T3	14	1/2	140.00 - 150.00	0.6000	0.4954
T3	16	3/8	140.00 - 160.00	0.6000	0.4954
T3	17	3/8	140.00 - 160.00	0.6000	0.4954
T3	18	3/8	140.00 - 160.00	0.6000	0.4954
T4	1	Safety Line 3/8	120.00 - 140.00	0.6000	0.4761
T4	2	3/4" Rigid Conduit	120.00 - 140.00	0.6000	0.4761
T4	3	3/4" Rigid Conduit	120.00 - 123.00	0.6000	0.4761
T4	5	LDF7-50A(1-5/8")	120.00 - 140.00	0.6000	0.4761
T4	6	LDF7-50A(1-5/8")	120.00 - 140.00	0.6000	0.4761
T4	7	LDF7-50A(1-5/8")	120.00 - 140.00	0.6000	0.4761
T4	8	LDF6-50A(1-1/4")	120.00 - 140.00	0.6000	0.4761
T4	9	RFFT-36SM-001-xxM(3/8")	120.00 - 140.00	0.6000	0.4761
T4	10	MLCH HYBRID 6X12(1-3/8")	120.00 - 140.00	0.6000	0.4761
T4	11	9x18 MLE Hybrid Line - 40mm	120.00 - 140.00	0.6000	0.4761
T4	12	LDF5-50A(7/8")	120.00 - 140.00	0.6000	0.4761
T4	13	LDF5-50A(7/8")	120.00 - 130.00	0.6000	0.4761
T4	14	1/2	120.00 - 140.00	0.6000	0.4761
T4	16	3/8	120.00 - 140.00	0.6000	0.4761
T4	17	3/8	120.00 - 140.00	0.6000	0.4761
T4	18	3/8	120.00 - 140.00	0.6000	0.4761
T5	1	Safety Line 3/8	100.00 - 120.00	0.6000	0.5050
T5	2	3/4" Rigid Conduit	100.00 - 120.00	0.6000	0.5050
T5	3	3/4" Rigid Conduit	100.00 - 120.00	0.6000	0.5050
T5	5	LDF7-50A(1-5/8")	100.00 - 120.00	0.6000	0.5050

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	6	LDF7-50A(1-5/8")	100.00 - 120.00	0.6000	0.5050
T5	7	LDF7-50A(1-5/8")	100.00 - 120.00	0.6000	0.5050
T5	8	LDF6-50A(1-1/4")	100.00 - 120.00	0.6000	0.5050
T5	9	RFFT-36SM-001-xxM(3/8")	100.00 - 120.00	0.6000	0.5050
T5	10	MLCH HYBRID 6X12(1-3/8")	100.00 - 120.00	0.6000	0.5050
T5	11	9x18 MLE Hybrid Line - 40mm	100.00 - 120.00	0.6000	0.5050
T5	12	LDF5-50A(7/8")	100.00 - 120.00	0.6000	0.5050
T5	13	LDF5-50A(7/8")	100.00 - 120.00	0.6000	0.5050
T5	14	1/2	100.00 - 120.00	0.6000	0.5050
T5	16	3/8	100.00 - 120.00	0.6000	0.5050
T5	17	3/8	100.00 - 120.00	0.6000	0.5050
T5	18	3/8	100.00 - 120.00	0.6000	0.5050
T6	1	Safety Line 3/8	80.00 - 100.00	0.6000	0.5111
T6	2	3/4" Rigid Conduit	80.00 - 100.00	0.6000	0.5111
T6	3	3/4" Rigid Conduit	80.00 - 100.00	0.6000	0.5111
T6	5	LDF7-50A(1-5/8")	80.00 - 100.00	0.6000	0.5111
T6	6	LDF7-50A(1-5/8")	80.00 - 100.00	0.6000	0.5111
T6	7	LDF7-50A(1-5/8")	80.00 - 100.00	0.6000	0.5111
T6	8	LDF6-50A(1-1/4")	80.00 - 100.00	0.6000	0.5111
T6	9	RFFT-36SM-001-xxM(3/8")	80.00 - 100.00	0.6000	0.5111
T6	10	MLCH HYBRID 6X12(1-3/8")	80.00 - 100.00	0.6000	0.5111
T6	11	9x18 MLE Hybrid Line - 40mm	80.00 - 100.00	0.6000	0.5111
T6	12	LDF5-50A(7/8")	80.00 - 100.00	0.6000	0.5111
T6	13	LDF5-50A(7/8")	80.00 - 100.00	0.6000	0.5111
T6	14	1/2	80.00 - 100.00	0.6000	0.5111
T6	16	3/8	80.00 - 100.00	0.6000	0.5111
T6	17	3/8	80.00 - 100.00	0.6000	0.5111
T6	18	3/8	80.00 - 100.00	0.6000	0.5111
T7	1	Safety Line 3/8	60.00 - 80.00	0.6000	0.4955
T7	2	3/4" Rigid Conduit	60.00 - 80.00	0.6000	0.4955
T7	3	3/4" Rigid Conduit	60.00 - 80.00	0.6000	0.4955
T7	5	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.4955
T7	6	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.4955
T7	7	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.4955
T7	8	LDF6-50A(1-1/4")	60.00 - 80.00	0.6000	0.4955
T7	9	RFFT-36SM-001-xxM(3/8")	60.00 - 80.00	0.6000	0.4955
T7	10	MLCH HYBRID 6X12(1-3/8")	60.00 - 80.00	0.6000	0.4955
T7	11	9x18 MLE Hybrid Line - 40mm	60.00 - 80.00	0.6000	0.4955
T7	12	LDF5-50A(7/8")	60.00 - 80.00	0.6000	0.4955
T7	13	LDF5-50A(7/8")	60.00 - 80.00	0.6000	0.4955
T7	14	1/2	60.00 - 80.00	0.6000	0.4955
T7	16	3/8	60.00 - 80.00	0.6000	0.4955
T7	17	3/8	60.00 - 80.00	0.6000	0.4955
T7	18	3/8	60.00 - 80.00	0.6000	0.4955
T8	1	Safety Line 3/8	40.00 - 60.00	0.6000	0.5284
T8	2	3/4" Rigid Conduit	40.00 - 60.00	0.6000	0.5284

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	3	3/4" Rigid Conduit	40.00 - 60.00	0.6000	0.5284
T8	5	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.5284
T8	6	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.5284
T8	7	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.5284
T8	8	LDF6-50A(1-1/4")	40.00 - 60.00	0.6000	0.5284
T8	9	RFFT-36SM-001-xxM(3/8")	40.00 - 60.00	0.6000	0.5284
T8	10	MLCH HYBRID 6X12(1-3/8")	40.00 - 60.00	0.6000	0.5284
T8	11	9x18 MLE Hybrid Line - 40mm	40.00 - 60.00	0.6000	0.5284
T8	12	LDF5-50A(7/8")	40.00 - 60.00	0.6000	0.5284
T8	13	LDF5-50A(7/8")	40.00 - 60.00	0.6000	0.5284
T8	14	1/2	40.00 - 60.00	0.6000	0.5284
T8	16	3/8	40.00 - 60.00	0.6000	0.5284
T8	17	3/8	40.00 - 60.00	0.6000	0.5284
T8	18	3/8	40.00 - 60.00	0.6000	0.5284
T9	1	Safety Line 3/8	20.00 - 40.00	0.6000	0.5427
T9	2	3/4" Rigid Conduit	20.00 - 40.00	0.6000	0.5427
T9	3	3/4" Rigid Conduit	20.00 - 40.00	0.6000	0.5427
T9	5	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.5427
T9	6	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.5427
T9	7	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.5427
T9	8	LDF6-50A(1-1/4")	20.00 - 40.00	0.6000	0.5427
T9	9	RFFT-36SM-001-xxM(3/8")	20.00 - 40.00	0.6000	0.5427
T9	10	MLCH HYBRID 6X12(1-3/8")	20.00 - 40.00	0.6000	0.5427
T9	11	9x18 MLE Hybrid Line - 40mm	20.00 - 40.00	0.6000	0.5427
T9	12	LDF5-50A(7/8")	20.00 - 40.00	0.6000	0.5427
T9	13	LDF5-50A(7/8")	20.00 - 40.00	0.6000	0.5427
T9	14	1/2	20.00 - 40.00	0.6000	0.5427
T9	16	3/8	20.00 - 40.00	0.6000	0.5427
T9	17	3/8	20.00 - 40.00	0.6000	0.5427
T9	18	3/8	20.00 - 40.00	0.6000	0.5427
T10	1	Safety Line 3/8	6.50 - 20.00	0.6000	0.5452
T10	2	3/4" Rigid Conduit	6.50 - 20.00	0.6000	0.5452
T10	3	3/4" Rigid Conduit	6.50 - 20.00	0.6000	0.5452
T10	5	LDF7-50A(1-5/8")	6.50 - 20.00	0.6000	0.5452
T10	6	LDF7-50A(1-5/8")	6.50 - 20.00	0.6000	0.5452
T10	7	LDF7-50A(1-5/8")	6.50 - 20.00	0.6000	0.5452
T10	8	LDF6-50A(1-1/4")	6.50 - 20.00	0.6000	0.5452
T10	9	RFFT-36SM-001-xxM(3/8")	6.50 - 20.00	0.6000	0.5452
T10	10	MLCH HYBRID 6X12(1-3/8")	6.50 - 20.00	0.6000	0.5452
T10	11	9x18 MLE Hybrid Line - 40mm	6.50 - 20.00	0.6000	0.5452
T10	12	LDF5-50A(7/8")	6.50 - 20.00	0.6000	0.5452
T10	13	LDF5-50A(7/8")	6.50 - 20.00	0.6000	0.5452
T10	14	1/2	6.50 - 20.00	0.6000	0.5452
T10	16	3/8	6.50 - 20.00	0.6000	0.5452
T10	17	3/8	6.50 - 20.00	0.6000	0.5452
T10	18	3/8	6.50 - 20.00	0.6000	0.5452

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Lightning Rod 5/8x4'	C	None		0.0000	252.00	No Ice	0.25	0.25	31.00
						1/2" Ice	0.66	0.66	33.82
						1" Ice	0.97	0.97	39.29
Flash Beacon Lighting	B	None		0.0000	250.00	No Ice	2.70	2.70	50.00
						1/2" Ice	3.10	3.10	70.00
						1" Ice	3.50	3.50	90.00
***									
6810	B	From Face	3.00 0.00 0.00	0.0000	237.50	No Ice 1/2" Ice 1" Ice	22.30 40.14 57.98	22.30 40.14 57.98	354.00 460.20 566.40
6810-2	B	From Face	3.00 0.00 0.00	0.0000	215.00	No Ice 1/2" Ice 1" Ice	10.80 19.44 28.08	10.80 19.44 28.08	247.00 321.10 395.20
***									
Pirod Delta Mount (3)	C	From Face	3.00 0.00 0.00	0.0000	187.00	No Ice 1/2" Ice 1" Ice	32.94 47.60 62.26	32.94 47.60 62.26	740.00 1000.00 1260.00
DB844G65ZAXY w/Mount Pipe	A	From Face	3.00 0.00 0.00	0.0000	187.00	No Ice 1/2" Ice 1" Ice	5.05 5.68 6.19	5.28 6.31 7.06	41.55 92.81 150.42
DB844G65ZAXY w/Mount Pipe	B	From Face	3.00 0.00 0.00	0.0000	187.00	No Ice 1/2" Ice 1" Ice	5.05 5.68 6.19	5.28 6.31 7.06	41.55 92.81 150.42
DB980H90E-M w/Mount Pipe	C	From Face	3.00 0.00 0.00	0.0000	187.00	No Ice 1/2" Ice 1" Ice	4.27 4.86 5.37	3.86 4.95 5.75	34.05 72.67 117.82
APXVSPP18-C w/ Mount Pipe	A	From Face	3.00 -2.00 0.00	0.0000	187.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	82.55 150.56 226.53
APXVSPP18-C w/ Mount Pipe	B	From Face	3.00 -2.00 0.00	0.0000	187.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	82.55 150.56 226.53
KMW - ET-XU-42-15-37-18 w/ 2"MP 60"Long	C	From Face	3.00 -2.00 0.00	0.0000	187.00	No Ice 1/2" Ice 1" Ice	8.68 9.18 9.68	4.50 5.17 5.85	78.25 137.30 202.77
1900MHz 4X40W RRH	A	From Leg	3.00 1.00 0.00	0.0000	187.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	59.50 82.63 109.00
1900MHz 4X40W RRH	B	From Leg	3.00 1.00 0.00	0.0000	187.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	59.50 82.63 109.00
1900MHz 4X40W RRH	C	From Leg	3.00 1.00 0.00	0.0000	187.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	59.50 82.63 109.00
800MHZ 2X50W RRH	A	From Leg	3.00 1.00 2.50	0.0000	187.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	53.00 74.19 98.39
800MHZ 2X50W RRH	B	From Leg	3.00 1.00 2.50	0.0000	187.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	53.00 74.19 98.39
800MHZ 2X50W RRH	C	From Leg	3.00 1.00 2.50	0.0000	187.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	53.00 74.19 98.39
8'x2" Antenna Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	187.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	30.00 44.34 63.96
8'x2" Antenna Mount Pipe	B	From Leg	3.00	0.0000	187.00	No Ice	1.90	1.90	30.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1/2" Ice	2.73	2.73	44.34
			0.00			1" Ice	3.40	3.40	63.96
8'x2" Antenna Mount Pipe	C	From Leg	3.00	0.0000	187.00	No Ice	1.90	1.90	30.00
			0.00			1/2" Ice	2.73	2.73	44.34
			0.00			1" Ice	3.40	3.40	63.96
***									
APXV9TM14-ALU-120 with mount pipe	A	From Face	3.00	0.0000	187.00	No Ice	8.20	6.75	128.00
			2.00			1/2" Ice	8.85	7.59	201.91
			0.00			1" Ice	9.50	8.43	275.82
APXV9TM14-ALU-120 with mount pipe	B	From Face	3.00	0.0000	187.00	No Ice	8.20	6.75	128.00
			2.00			1/2" Ice	8.85	7.59	201.91
			0.00			1" Ice	9.50	8.43	275.82
APXV9TM14-ALU-120 with mount pipe	C	From Face	3.00	0.0000	187.00	No Ice	8.20	6.75	128.00
			2.00			1/2" Ice	8.85	7.59	201.91
			0.00			1" Ice	9.50	8.43	275.82
TD-RRH8x20	A	From Leg	3.00	0.0000	187.00	No Ice	3.70	1.29	66.14
			-1.00			1/2" Ice	3.95	1.46	90.08
			0.00			1" Ice	4.20	1.64	117.36
TD-RRH8x20	B	From Leg	3.00	0.0000	187.00	No Ice	3.70	1.29	66.14
			-1.00			1/2" Ice	3.95	1.46	90.08
			0.00			1" Ice	4.20	1.64	117.36
TD-RRH8x20	C	From Leg	3.00	0.0000	187.00	No Ice	3.70	1.29	66.14
			-1.00			1/2" Ice	3.95	1.46	90.08
			0.00			1" Ice	4.20	1.64	117.36
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	3.00	0.0000	177.00	No Ice	6.33	5.64	112.18
			0.00			1/2" Ice	6.78	6.43	169.02
			0.00			1" Ice	7.21	7.13	232.59
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	3.00	0.0000	177.00	No Ice	6.33	5.64	112.18
			0.00			1/2" Ice	6.78	6.43	169.02
			0.00			1" Ice	7.21	7.13	232.59
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	3.00	0.0000	177.00	No Ice	6.33	5.64	112.18
			0.00			1/2" Ice	6.78	6.43	169.02
			0.00			1" Ice	7.21	7.13	232.59
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Leg	3.00	0.0000	177.00	No Ice	6.75	6.07	153.07
			0.00			1/2" Ice	7.20	6.87	214.04
			0.00			1" Ice	7.65	7.58	281.89
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Leg	3.00	0.0000	177.00	No Ice	6.75	6.07	153.07
			0.00			1/2" Ice	7.20	6.87	214.04
			0.00			1" Ice	7.65	7.58	281.89
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Leg	3.00	0.0000	177.00	No Ice	6.75	6.07	153.07
			0.00			1/2" Ice	7.20	6.87	214.04
			0.00			1" Ice	7.65	7.58	281.89
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	3.00	0.0000	177.00	No Ice	20.48	11.02	160.82
			0.00			1/2" Ice	21.23	12.55	297.10
			2.00			1" Ice	21.99	14.10	444.18
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	3.00	0.0000	177.00	No Ice	20.48	11.02	160.82
			0.00			1/2" Ice	21.23	12.55	297.10
			2.00			1" Ice	21.99	14.10	444.18
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	3.00	0.0000	177.00	No Ice	20.48	11.02	160.82
			0.00			1/2" Ice	21.23	12.55	297.10
			2.00			1" Ice	21.99	14.10	444.18
RADIO 4449	A	From Leg	3.00	0.0000	177.00	No Ice	3.50	2.36	85.00
			0.00			1/2" Ice	3.74	2.57	114.30
			2.00			1" Ice	3.99	2.78	147.22
RADIO 4449	B	From Leg	3.00	0.0000	177.00	No Ice	3.50	2.36	85.00
			0.00			1/2" Ice	3.74	2.57	114.30

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			2.00			1" Ice	3.99	2.78	147.22
RADIO 4449	C	From Leg	3.00	0.0000	177.00	No Ice	3.50	2.36	85.00
			0.00			1/2" Ice	3.74	2.57	114.30
			2.00			1" Ice	3.99	2.78	147.22
Sabre 12' T-Boom (1)	A	From Leg	2.50	0.0000	177.00	No Ice	22.00	11.00	471.00
			0.00			1/2" Ice	29.10	14.60	690.00
			0.00			1" Ice	36.20	18.20	909.00
Sabre 12' T-Boom (1)	B	From Leg	2.50	0.0000	177.00	No Ice	22.00	11.00	471.00
			0.00			1/2" Ice	29.10	14.60	690.00
			0.00			1" Ice	36.20	18.20	909.00
Sabre 12' T-Boom (1)	C	From Leg	2.50	0.0000	177.00	No Ice	22.00	11.00	471.00
			0.00			1/2" Ice	29.10	14.60	690.00
			0.00			1" Ice	36.20	18.20	909.00
***									
2' standoff	C	From Leg	1.00	0.0000	130.00	No Ice	1.80	1.80	33.00
			0.00			1/2" Ice	3.30	3.30	59.00
			0.00			1" Ice	4.80	4.80	85.00
8' Omni	C	From Leg	2.00	0.0000	130.00	No Ice	2.40	2.40	30.00
			0.00			1/2" Ice	3.19	3.19	47.51
			4.00			1" Ice	3.98	3.98	65.02
***									
Small Beacon	A	From Leg	1.00	0.0000	123.00	No Ice	0.31	0.31	7.00
			0.00			1/2" Ice	0.40	0.40	11.00
			0.00			1" Ice	0.49	0.49	15.00
Small Beacon	B	From Leg	1.00	0.0000	123.00	No Ice	0.31	0.31	7.00
			0.00			1/2" Ice	0.40	0.40	11.00
			0.00			1" Ice	0.49	0.49	15.00
Small Beacon	C	From Leg	1.00	0.0000	123.00	No Ice	0.31	0.31	7.00
			0.00			1/2" Ice	0.40	0.40	11.00
			0.00			1" Ice	0.49	0.49	15.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
PR-950	B	Grid	From Leg	1.00	0.0000		199.00	4.65	No Ice	17.00	38.00
				0.00					1/2" Ice	17.61	91.75
				0.00					1" Ice	18.22	145.50
PR-950	C	Grid	From Leg	1.00	0.0000		172.00	4.65	No Ice	17.00	38.00
				0.00					1/2" Ice	17.61	91.75
				0.00					1" Ice	18.22	145.50
4' Grid Dish	C	Grid	From Leg	1.00	0.0000		150.00	4.00	No Ice	12.57	100.00
				0.00					1/2" Ice	13.10	167.00
				0.00					1" Ice	13.62	234.00

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy
3	1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy
4	1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy
5	1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy
6	1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy
7	1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy
8	1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy
9	1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy
10	1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy
11	1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy
12	1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy
13	1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy
14	1.2 Dead+1.0 Ice+1.0 Temp+Guy
15	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy
16	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy
17	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy
18	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy
19	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy
20	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy
21	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy
22	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy
23	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy
24	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy
25	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy
26	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy
27	Dead+Wind 0 deg - Service+Guy
28	Dead+Wind 30 deg - Service+Guy
29	Dead+Wind 60 deg - Service+Guy
30	Dead+Wind 90 deg - Service+Guy
31	Dead+Wind 120 deg - Service+Guy
32	Dead+Wind 150 deg - Service+Guy
33	Dead+Wind 180 deg - Service+Guy
34	Dead+Wind 210 deg - Service+Guy
35	Dead+Wind 240 deg - Service+Guy
36	Dead+Wind 270 deg - Service+Guy
37	Dead+Wind 300 deg - Service+Guy
38	Dead+Wind 330 deg - Service+Guy

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	250 - 200	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-7315.29	-4.48	2.47
			Max. Mx	5	-4798.73	-135.22	0.68
			Max. My	2	-4785.07	-4.63	134.60
			Max. Vy	5	4561.52	-135.22	0.68
			Max. Vx	2	-4574.42	-4.63	134.60
			Max. Torque	7			7.71
T1	200 - 180	Leg	Max Tension	8	74701.29	-0.28	-0.38
			Max. Compression	2	-79536.09	-0.14	0.09
			Max. Mx	22	-20998.25	-2.72	1.40
			Max. My	16	-23838.40	0.04	-2.97
			Max. Vy	22	-11962.43	0.27	-0.20

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	17	-13395.57	-0.00	0.38
		Diagonal	Max Tension	7	10075.95	0.00	0.00
			Max. Compression	13	-10062.58	0.00	0.00
			Max. Mx	20	4654.30	0.02	0.00
			Max. My	15	2084.97	0.00	-0.00
			Max. Vy	20	-14.35	0.00	0.00
			Max. Vx	15	0.25	0.00	0.00
		Horizontal	Max Tension	2	1377.61	0.00	0.00
			Max. Compression	2	-1377.61	0.00	0.00
			Max. Mx	14	287.22	0.01	0.00
			Max. My	2	1377.61	0.00	-0.00
			Max. Vy	14	-12.58	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Secondary Horizontal	Max Tension	18	0.09	-0.00	-0.00
			Max. Compression	24	-0.08	-0.00	-0.00
			Max. Mx	2	0.01	0.01	0.00
			Max. My	2	0.01	0.01	0.00
			Max. Vy	24	7.88	-0.00	-0.00
			Max. Vx	2	-0.07	0.00	0.00
		Top Girt	Max Tension	26	8254.61	0.00	0.00
			Max. Compression	7	-1710.59	0.00	0.00
			Max. Mx	14	7388.70	-0.02	0.00
			Max. My	2	-12.19	0.00	0.00
			Max. Vy	14	-33.32	0.00	0.00
			Max. Vx	2	-0.00	0.00	0.00
		Bottom Girt	Max Tension	8	2862.14	0.00	0.00
			Max. Compression	2	-2703.45	0.00	0.00
			Max. Mx	14	54.44	0.01	0.00
			Max. My	9	2426.58	0.00	-0.00
			Max. Vy	14	-12.58	0.00	0.00
			Max. Vx	9	0.00	0.00	0.00
		Guy A	Bottom Tension	9	18344.34		
			Top Tension	9	18467.35		
			Top Cable Vert	9	14153.93		
			Top Cable Norm	9	11862.10		
			Top Cable Tan	9	3.69		
			Bot Cable Vert	9	-13836.78		
			Bot Cable Norm	9	12042.62		
			Bot Cable Tan	9	183.34		
		Guy B	Bottom Tension	11	17890.39		
			Top Tension	11	18013.41		
			Top Cable Vert	11	13810.22		
			Top Cable Norm	11	11565.50		
			Top Cable Tan	11	2.84		
			Bot Cable Vert	11	-13493.07		
			Bot Cable Norm	11	11746.03		
			Bot Cable Tan	11	184.19		
		Guy C	Bottom Tension	3	18319.75		
			Top Tension	3	18442.76		
			Top Cable Vert	3	14135.30		
			Top Cable Norm	3	11846.05		
			Top Cable Tan	3	3.78		
			Bot Cable Vert	3	-13818.15		
			Bot Cable Norm	3	12026.57		
			Bot Cable Tan	3	183.25		
		Top Guy Pull-Off	Max Tension	5	10783.09	0.00	0.00
			Max. Compression	11	-10729.63	0.00	0.00
			Max. Mx	25	2891.04	0.01	0.00
			Max. My	9	-4311.90	0.00	-0.00
			Max. Vy	25	14.18	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	9	0.00	0.00	0.00
		Torque Arm Top	Max Tension	7	12611.27	0.00	0.00
			Max. Compression	7	-5947.11	0.00	0.00
			Max. Mx	7	483.71	-43.07	0.00
			Max. My	9	-2515.24	-22.34	-0.00
			Max. Vy	7	14395.62	-43.07	0.00
			Max. Vx	9	-0.01	-22.34	-0.00
T2	180 - 160	Leg	Max Tension	8	30116.30	0.02	-0.15
			Max. Compression	6	-65384.45	0.21	0.36
			Max. Mx	11	-50760.35	-0.60	-0.13
			Max. My	8	30111.60	-0.20	0.58
			Max. Vy	5	-2927.30	-0.21	-0.02
			Max. Vx	8	-2936.48	0.02	-0.15
		Diagonal	Max Tension	9	8073.52	0.00	0.00
			Max. Compression	3	-8377.82	0.00	0.00
			Max. Mx	20	-1604.90	0.02	0.00
			Max. My	15	257.75	0.00	-0.00
			Max. Vy	20	14.13	0.00	0.00
			Max. Vx	15	-0.18	0.00	0.00
		Horizontal	Max Tension	4	2201.94	0.00	0.00
			Max. Compression	10	-1923.26	0.00	0.00
			Max. Mx	14	375.83	0.01	0.00
			Max. My	3	2021.28	0.00	-0.00
			Max. Vy	14	12.42	0.00	0.00
			Max. Vx	3	0.00	0.00	0.00
		Secondary Horizontal	Max Tension	18	0.05	-0.00	-0.00
			Max. Compression	24	-0.05	-0.00	-0.00
			Max. Mx	2	0.00	0.00	0.00
			Max. My	2	0.00	0.00	0.00
			Max. Vy	24	7.78	-0.00	-0.00
			Max. Vx	2	-0.04	0.00	0.00
		Top Girt	Max Tension	2	2440.40	0.00	0.00
			Max. Compression	8	-2447.13	0.00	0.00
			Max. Mx	14	52.41	0.01	0.00
			Max. My	9	-2034.67	0.00	-0.00
			Max. Vy	14	12.42	0.00	0.00
			Max. Vx	9	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	723.59	0.00	0.00
			Max. Compression	3	-458.95	0.00	0.00
			Max. Mx	14	67.93	0.01	0.00
			Max. My	9	591.74	0.00	-0.00
			Max. Vy	14	12.42	0.00	0.00
			Max. Vx	9	0.00	0.00	0.00
T3	160 - 140	Leg	Max Tension	8	13313.94	-0.07	-0.06
			Max. Compression	6	-64150.60	-0.12	0.13
			Max. Mx	10	-60029.57	-0.28	-0.15
			Max. My	7	-54342.27	-0.03	0.28
			Max. Vy	10	-954.30	-0.04	-0.16
			Max. Vx	2	-1021.17	0.00	0.14
		Diagonal	Max Tension	2	2409.09	0.00	0.00
			Max. Compression	10	-2760.88	0.00	0.00
			Max. Mx	20	-107.07	0.02	0.00
			Max. My	15	338.68	0.00	-0.00
			Max. Vy	20	-13.91	0.00	0.00
			Max. Vx	15	0.14	0.00	0.00
		Horizontal	Max Tension	6	1085.71	0.00	0.00
			Max. Compression	6	-1085.71	0.00	0.00
			Max. Mx	14	439.89	0.01	0.00
			Max. My	2	1069.49	0.00	0.00
			Max. Vy	14	-12.25	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	6	0.04	0.00	-0.00
			Max. Compression	10	-0.04	-0.00	-0.00
			Max. Mx	2	0.00	0.00	0.00
			Max. My	2	0.00	0.00	0.00
			Max. Vy	24	7.67	-0.00	-0.00
			Max. Vx	2	-0.03	0.00	0.00
		Top Girt	Max Tension	3	581.56	0.00	0.00
			Max. Compression	8	-538.59	0.00	0.00
			Max. Mx	14	59.51	0.01	0.00
			Max. My	9	-398.97	0.00	-0.00
			Max. Vy	14	-12.25	0.00	0.00
			Max. Vx	9	0.00	0.00	0.00
		Bottom Girt	Max Tension	10	901.11	0.00	0.00
			Max. Compression	3	-584.76	0.00	0.00
			Max. Mx	14	75.83	0.01	0.00
			Max. My	9	-16.67	0.00	-0.00
			Max. Vy	14	-12.25	0.00	0.00
			Max. Vx	9	0.00	0.00	0.00
T4	140 - 120	Leg	Max Tension	8	21367.72	0.06	-0.11
			Max. Compression	6	-74905.92	-0.21	0.13
			Max. Mx	6	-2597.43	-0.48	-0.20
			Max. My	2	-3551.57	0.06	0.47
			Max. Vy	5	-1454.73	-0.48	-0.05
			Max. Vx	2	1461.98	0.07	0.42
		Diagonal	Max Tension	3	4323.64	0.00	0.00
			Max. Compression	9	-4721.69	0.00	0.00
			Max. Mx	24	1.42	0.02	0.00
			Max. My	15	393.87	0.00	-0.00
			Max. Vy	24	-13.68	0.00	0.00
			Max. Vx	15	0.10	0.00	0.00
		Horizontal	Max Tension	6	1297.41	0.00	0.00
			Max. Compression	6	-1297.41	0.00	0.00
			Max. Mx	14	542.61	0.01	0.00
			Max. My	2	1281.43	0.00	0.00
			Max. Vy	14	12.05	0.00	0.00
			Max. Vx	2	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	6	0.03	-0.00	-0.00
			Max. Compression	10	-0.04	-0.00	-0.00
			Max. Mx	18	0.01	-0.00	-0.00
			Max. My	2	0.00	0.00	0.00
			Max. Vy	18	7.55	-0.00	-0.00
			Max. Vx	2	-0.02	0.00	0.00
		Top Girt	Max Tension	3	756.35	0.00	0.00
			Max. Compression	10	-876.95	0.00	0.00
			Max. Mx	14	77.73	0.01	0.00
			Max. My	9	206.35	0.00	-0.00
			Max. Vy	14	12.05	0.00	0.00
			Max. Vx	9	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	1374.35	0.00	0.00
			Max. Compression	2	-1320.97	0.00	0.00
			Max. Mx	25	-208.46	0.01	0.00
			Max. My	9	1190.25	0.00	-0.00
			Max. Vy	25	12.05	0.00	0.00
			Max. Vx	9	0.00	0.00	0.00
		Guy A	Bottom Tension	9	11344.99		
			Top Tension	9	11429.35		
			Top Cable Vert	9	7222.41		
			Top Cable Norm	9	8858.08		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Top Cable Tan	9	34.33		
			Bot Cable Vert	9	-6986.02		
			Bot Cable Norm	9	8938.52		
			Bot Cable Tan	9	84.52		
		Guy B	Bottom Tension	11	11428.00		
			Top Tension	11	11512.35		
			Top Cable Vert	11	7274.07		
			Top Cable Norm	11	8923.06		
			Top Cable Tan	11	33.85		
			Bot Cable Vert	11	-7037.68		
			Bot Cable Norm	11	9003.50		
			Bot Cable Tan	11	85.00		
		Guy C	Bottom Tension	3	11381.46		
			Top Tension	3	11465.82		
			Top Cable Vert	3	7245.11		
			Top Cable Norm	3	8886.63		
			Top Cable Tan	3	34.22		
			Bot Cable Vert	3	-7008.72		
			Bot Cable Norm	3	8967.07		
			Bot Cable Tan	3	84.63		
		Top Guy Pull-Off	Max Tension	9	4718.20	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	2738.35	0.04	0.00
			Max. My	9	518.27	0.00	-0.00
			Max. Vy	14	-48.23	0.00	0.00
			Max. Vx	9	0.00	0.00	0.00
T5	120 - 100	Leg	Max Tension	8	5323.81	0.07	-0.03
			Max. Compression	6	-67198.42	0.12	0.37
			Max. Mx	4	-32103.14	0.40	-0.18
			Max. My	7	-58792.14	0.07	0.41
			Max. Vy	5	-1453.13	-0.11	-0.06
			Max. Vx	2	1465.43	0.18	0.05
		Diagonal	Max Tension	9	4019.59	0.00	0.00
			Max. Compression	3	-4415.55	0.00	0.00
			Max. Mx	23	-1366.73	0.01	0.00
			Max. My	15	99.00	0.00	-0.00
			Max. Vy	23	-13.42	0.00	0.00
			Max. Vx	15	0.07	0.00	0.00
		Horizontal	Max Tension	6	1119.59	0.00	0.00
			Max. Compression	6	-1119.59	0.00	0.00
			Max. Mx	14	573.47	0.01	0.00
			Max. My	2	1095.26	0.00	0.00
			Max. Vy	14	11.83	0.00	0.00
			Max. Vx	2	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	6	0.02	-0.00	-0.00
			Max. Compression	10	-0.02	-0.00	-0.00
			Max. Mx	19	0.01	-0.00	-0.00
			Max. My	2	0.00	0.00	0.00
			Max. Vy	19	7.42	-0.00	-0.00
			Max. Vx	2	-0.01	0.00	0.00
		Top Girt	Max Tension	2	1356.10	0.00	0.00
			Max. Compression	8	-1158.52	0.00	0.00
			Max. Mx	25	366.84	0.01	0.00
			Max. My	9	-977.52	0.00	-0.00
			Max. Vy	25	11.83	0.00	0.00
			Max. Vx	9	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	822.99	0.00	0.00
			Max. Compression	2	-747.26	0.00	0.00
			Max. Mx	25	-106.94	0.01	0.00
			Max. My	2	292.41	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	25	11.83	0.00	0.00
			Max. Vx	2	-0.00	0.00	0.00
T6	100 - 80	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-46006.73	0.05	0.26
			Max. Mx	3	-40156.16	0.27	-0.16
			Max. My	7	-40851.26	0.02	0.26
			Max. Vy	6	-769.01	-0.10	-0.10
			Max. Vx	2	820.78	0.16	0.02
		Diagonal	Max Tension	9	2090.11	0.00	0.00
			Max. Compression	3	-2504.85	0.00	0.00
			Max. Mx	26	-260.29	0.01	0.00
			Max. My	16	-136.21	0.00	-0.00
			Max. Vy	26	-13.14	0.00	0.00
			Max. Vx	16	0.06	0.00	0.00
		Horizontal	Max Tension	6	772.53	0.00	0.00
			Max. Compression	6	-772.53	0.00	0.00
			Max. Mx	25	609.09	0.01	0.00
			Max. My	2	753.83	0.00	0.00
			Max. Vy	25	-11.57	0.00	0.00
			Max. Vx	2	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	6	0.01	-0.00	-0.00
			Max. Compression	10	-0.02	-0.00	-0.00
			Max. Mx	20	0.00	-0.00	0.00
			Max. My	2	0.00	-0.00	0.00
			Max. Vy	20	7.26	-0.00	0.00
			Max. Vx	2	-0.00	0.00	0.00
		Top Girt	Max Tension	2	794.07	0.00	0.00
			Max. Compression	8	-589.80	0.00	0.00
			Max. Mx	25	267.55	0.01	0.00
			Max. My	9	-493.09	0.00	-0.00
			Max. Vy	25	-11.57	0.00	0.00
			Max. Vx	9	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	249.96	0.00	0.00
			Max. Compression	2	-191.72	0.00	0.00
			Max. Mx	25	3.15	0.01	0.00
			Max. My	6	176.28	0.00	-0.00
			Max. Vy	25	-11.57	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
T7	80 - 60	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	21	-44260.97	0.21	0.00
			Max. Mx	10	-27416.89	0.34	-0.17
			Max. My	2	-27281.13	-0.02	0.34
			Max. Vy	11	1018.04	0.19	-0.13
			Max. Vx	2	962.57	0.08	0.25
		Diagonal	Max Tension	3	2717.10	0.00	0.00
			Max. Compression	9	-3167.30	0.00	0.00
			Max. Mx	26	-1048.66	0.01	0.00
			Max. My	16	-475.25	0.00	-0.00
			Max. Vy	26	12.82	0.00	0.00
			Max. Vx	16	0.05	0.00	0.00
		Horizontal	Max Tension	17	748.09	0.00	0.00
			Max. Compression	17	-748.09	0.00	0.00
			Max. Mx	25	669.14	0.01	0.00
			Max. My	13	608.95	0.00	0.00
			Max. Vy	25	-11.25	0.00	0.00
			Max. Vx	13	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	6	0.01	-0.00	-0.00
			Max. Compression	10	-0.01	-0.00	-0.00
			Max. Mx	19	0.01	-0.00	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	0.00	-0.00	0.00
			Max. Vy	19	7.06	-0.00	-0.00
			Max. Vx	2	-0.00	0.00	0.00
		Top Girt	Max Tension	4	260.63	0.00	0.00
			Max. Compression	8	-147.19	0.00	0.00
			Max. Mx	25	162.83	0.01	0.00
			Max. My	6	24.57	0.00	-0.00
			Max. Vy	25	-11.25	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	916.06	0.00	0.00
			Max. Compression	2	-815.77	0.00	0.00
			Max. Mx	25	-88.99	0.01	0.00
			Max. My	6	-721.68	0.00	0.00
			Max. Vy	25	-11.25	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Guy A	Bottom Tension	21	5577.35		
			Top Tension	8	5687.83		
			Top Cable Vert	21	2508.27		
			Top Cable Norm	21	5104.90		
			Top Cable Tan	21	0.12		
			Bot Cable Vert	8	-2122.40		
			Bot Cable Norm	8	5157.74		
			Bot Cable Tan	8	0.07		
		Guy B	Bottom Tension	25	5589.87		
			Top Tension	12	5701.89		
			Top Cable Vert	25	2513.72		
			Top Cable Norm	25	5117.89		
			Top Cable Tan	25	0.12		
			Bot Cable Vert	12	-2127.24		
			Bot Cable Norm	12	5169.28		
			Bot Cable Tan	12	0.16		
		Guy C	Bottom Tension	17	5598.33		
			Top Tension	4	5706.51		
			Top Cable Vert	17	2515.50		
			Top Cable Norm	17	5122.16		
			Top Cable Tan	17	0.02		
			Bot Cable Vert	4	-2130.52		
			Bot Cable Norm	4	5177.08		
			Bot Cable Tan	4	0.12		
		Top Guy Pull-Off	Max Tension	22	2823.65	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	25	2032.97	0.04	0.00
			Max. My	6	329.14	0.00	-0.00
			Max. Vy	25	-46.89	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
T8	60 - 40	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	21	-49322.19	0.22	0.01
			Max. Mx	11	-30426.02	-0.32	-0.12
			Max. My	7	-28171.24	0.06	0.31
			Max. Vy	11	1013.69	-0.07	-0.12
			Max. Vx	2	961.63	0.15	0.01
		Diagonal	Max Tension	9	2424.90	0.00	0.00
			Max. Compression	3	-2878.66	0.00	0.00
			Max. Mx	26	-367.98	0.01	0.00
			Max. My	15	-1.29	0.00	-0.00
			Max. Vy	26	12.42	0.00	0.00
			Max. Vx	15	0.05	0.00	0.00
		Horizontal	Max Tension	17	843.51	0.00	0.00
			Max. Compression	17	-843.51	0.00	0.00
			Max. Mx	25	664.50	0.01	0.00
			Max. My	16	833.50	0.00	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	25	10.86	0.00	0.00
			Max. Vx	16	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	18	0.01	-0.00	-0.00
			Max. Compression	24	-0.01	-0.00	-0.00
			Max. Mx	19	0.01	-0.00	-0.00
			Max. My	2	0.00	-0.00	0.00
			Max. Vy	19	6.80	-0.00	-0.00
			Max. Vx	2	-0.00	0.00	0.00
		Top Girt	Max Tension	2	867.65	0.00	0.00
			Max. Compression	8	-670.34	0.00	0.00
			Max. Mx	25	267.78	0.01	0.00
			Max. My	6	-292.17	0.00	-0.00
			Max. Vy	25	10.86	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	388.95	0.00	0.00
			Max. Compression	2	-295.54	0.00	0.00
			Max. Mx	25	20.15	0.01	0.00
			Max. My	16	-49.35	0.00	-0.00
			Max. Vy	25	10.86	0.00	0.00
			Max. Vx	16	-0.00	0.00	0.00
T9	40 - 20	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	21	-49935.13	-0.28	0.01
			Max. Mx	20	-48889.51	0.28	0.00
			Max. My	21	-39713.97	-0.11	0.27
			Max. Vy	4	391.77	-0.09	-0.13
			Max. Vx	8	487.66	-0.05	0.10
		Diagonal	Max Tension	12	816.82	0.00	0.00
			Max. Compression	8	-1360.52	0.00	0.00
			Max. Mx	26	221.02	0.01	0.00
			Max. My	15	-50.91	0.00	-0.00
			Max. Vy	26	-11.86	0.00	0.00
			Max. Vx	15	0.05	0.00	0.00
		Horizontal	Max Tension	21	864.90	0.00	0.00
			Max. Compression	21	-864.90	0.00	0.00
			Max. Mx	19	815.32	0.01	0.00
			Max. My	16	848.07	0.00	-0.00
			Max. Vy	19	10.30	0.00	0.00
			Max. Vx	16	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	18	0.02	-0.00	-0.00
			Max. Compression	24	-0.02	-0.00	-0.00
			Max. Mx	18	0.02	-0.00	-0.00
			Max. My	2	0.00	-0.00	0.00
			Max. Vy	18	6.45	-0.00	-0.00
			Max. Vx	2	-0.00	0.00	0.00
		Top Girt	Max Tension	2	349.33	0.00	0.00
			Max. Compression	8	-148.03	0.00	0.00
			Max. Mx	23	39.88	0.01	0.00
			Max. My	8	-148.03	0.00	-0.00
			Max. Vy	23	10.30	0.00	0.00
			Max. Vx	8	0.00	0.00	0.00
		Bottom Girt	Max Tension	19	308.56	0.00	0.00
			Max. Compression	12	-241.43	0.00	0.00
			Max. Mx	25	125.89	0.01	0.00
			Max. My	16	126.76	0.00	-0.00
			Max. Vy	25	10.30	0.00	0.00
			Max. Vx	16	-0.00	0.00	0.00
T10	20 - 6.5	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	21	-49537.52	0.23	-0.06
			Max. Mx	17	-47123.37	-1.53	0.73

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	21	-47283.99	0.14	-1.69
			Max. Vy	17	6409.25	-1.53	0.73
			Max. Vx	21	7352.64	0.14	-1.69
		Diagonal	Max Tension	12	1704.59	0.00	0.00
			Max. Compression	8	-2089.78	0.00	0.00
			Max. Mx	22	337.40	0.02	0.00
			Max. My	15	10.57	0.00	-0.00
			Max. Vy	22	-14.51	0.00	0.00
			Max. Vx	15	-0.06	0.00	0.00
		Horizontal	Max Tension	21	853.74	0.00	0.00
			Max. Compression	21	-853.74	0.00	0.00
			Max. Mx	19	816.62	0.01	0.00
			Max. My	16	835.08	0.00	-0.00
			Max. Vy	19	-9.50	0.00	0.00
			Max. Vx	16	0.00	0.00	0.00
		Secondary Horizontal	Max Tension	18	0.02	-0.00	-0.00
			Max. Compression	24	-0.02	-0.00	-0.00
			Max. Mx	18	0.02	-0.00	-0.00
			Max. My	2	0.00	-0.00	0.00
			Max. Vy	18	5.94	-0.00	-0.00
			Max. Vx	2	-0.00	0.00	0.00
		Top Girt	Max Tension	12	512.99	0.00	0.00
			Max. Compression	6	-205.22	0.00	0.00
			Max. Mx	14	153.51	0.01	0.00
			Max. My	8	327.58	0.00	-0.00
			Max. Vy	14	-9.50	0.00	0.00
			Max. Vx	8	0.00	0.00	0.00
		Bottom Girt	Max Tension	21	4397.71	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	4010.93	0.01	0.00
			Max. My	16	4232.88	0.00	-0.00
			Max. Vy	14	-9.50	0.00	0.00
			Max. Vx	16	0.00	0.00	0.00
T11	6.5 - 0	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	21	-49147.38	-0.09	-0.17
			Max. Mx	21	-47577.09	1.69	0.13
			Max. My	12	-23217.49	-0.04	0.26
			Max. Vy	20	5147.61	-1.42	0.09
			Max. Vx	8	771.04	-0.13	-0.24
		Horizontal	Max Tension	21	873.24	0.12	0.01
			Max. Compression	21	-873.24	-0.31	-0.01
			Max. Mx	12	549.05	-0.38	-0.02
			Max. My	12	549.05	-0.38	-0.02
			Max. Vy	12	-609.94	-0.38	-0.02
			Max. Vx	12	-41.60	-0.38	-0.02
		Top Girt	Max Tension	23	3162.66	-0.91	-0.01
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	16	3077.87	-1.07	-0.02
			Max. My	16	3077.87	-1.07	-0.02
			Max. Vy	15	-241.64	-1.02	-0.01
			Max. Vx	16	-14.29	-1.00	-0.02
		Bottom Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	19	-512.48	-0.06	0.01
			Max. Mx	12	-319.53	-0.60	-0.02
			Max. My	12	-319.53	-0.60	-0.02
			Max. Vy	12	-3367.24	-0.60	-0.02
			Max. Vx	12	-169.55	-0.60	-0.02

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Mast	Max. Vert	15	136698.71	-32.99	438.80
	Max. H_x	12	74796.75	1404.45	814.73
	Max. H_z	2	92062.17	-11.33	1196.94
	Max. M_x	1	0.00	-6.78	-11.18
	Max. M_z	1	0.00	-6.78	-11.18
	Max. Torsion	8	0.55	-16.43	-1650.64
	Min. Vert	1	50833.99	-6.78	-11.18
	Min. H_x	4	74846.34	-1421.40	798.62
	Min. H_z	8	74811.96	-16.43	-1650.64
	Min. M_x	1	0.00	-6.78	-11.18
	Min. M_z	1	0.00	-6.78	-11.18
	Min. Torsion	12	-0.53	1404.45	814.73
Guy C @ 160 ft Elev 0 ft Azimuth 240 deg	Max. Vert	10	-773.06	-529.96	306.12
	Max. H_x	10	-773.06	-529.96	306.12
	Max. H_z	3	-35336.42	-31654.48	18787.54
	Min. Vert	5	-35493.37	-32202.86	18057.96
	Min. H_x	5	-35493.37	-32202.86	18057.96
	Min. H_z	10	-773.06	-529.96	306.12
Guy B @ 160 ft Elev 0 ft Azimuth 120 deg	Max. Vert	6	-774.41	534.32	308.39
	Max. H_x	11	-35477.76	32214.36	18064.74
	Max. H_z	13	-35250.51	31542.09	18753.34
	Min. Vert	11	-35477.76	32214.36	18064.74
	Min. H_x	6	-774.41	534.32	308.39
	Min. H_z	6	-774.41	534.32	308.39
Guy A @ 160 ft Elev 0 ft Azimuth 0 deg	Max. Vert	2	-776.58	0.22	-616.05
	Max. H_x	11	-18626.94	815.88	-19314.85
	Max. H_z	2	-776.58	0.22	-616.05
	Min. Vert	9	-35335.25	443.02	-36790.49
	Min. H_x	5	-18609.81	-815.78	-19262.88
	Min. H_z	9	-35335.25	443.02	-36790.49

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	50833.99	6.78	11.18	0.00	0.00	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy	92062.17	11.33	-1196.94	0.00	0.00	0.25
1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy	86582.54	866.44	-1030.61	0.00	0.00	0.20
1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy	74846.34	1421.40	-798.62	0.00	0.00	0.04
1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy	86859.74	1337.34	-201.63	0.00	0.00	-0.41
1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy	92271.72	1053.54	620.65	0.00	0.00	-0.41

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy	86454.04	500.36	1287.52	0.00	0.00	-0.35
1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy	74811.96	16.43	1650.64	0.00	0.00	-0.55
1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy	86576.42	-468.07	1278.44	0.00	0.00	-0.22
1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy	92381.91	-1024.64	609.52	0.00	0.00	0.13
1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy	86858.39	-1319.46	-210.56	0.00	0.00	0.42
1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy	74796.75	-1404.45	-814.73	0.00	0.00	0.53
1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy	86461.07	-845.67	-1049.43	0.00	0.00	0.35
1.2 Dead+1.0 Ice+1.0 Temp+Guy	133614.89	44.46	65.28	0.00	0.00	-0.01
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy	136698.71	32.99	-438.80	0.00	0.00	0.39
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy	136106.94	294.59	-379.40	0.00	0.00	0.41
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy	135666.22	483.60	-185.00	0.00	0.00	0.15
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	136122.74	556.11	75.63	0.00	0.00	-0.16
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy	136674.44	476.51	330.29	0.00	0.00	-0.29
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy	136074.05	307.22	516.25	0.00	0.00	-0.31
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	135621.22	47.70	580.18	0.00	0.00	-0.39
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy	136067.85	-212.58	511.79	0.00	0.00	-0.37
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy	136662.37	-393.66	317.20	0.00	0.00	-0.14
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	136112.18	-471.66	63.66	0.00	0.00	0.11
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy	135659.32	-400.53	-195.41	0.00	0.00	0.21
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy	136099.48	-214.30	-387.38	0.00	0.00	0.27
Dead+Wind 0 deg - Service+Guy	51140.38	6.76	-364.67	0.00	0.00	0.04
Dead+Wind 30 deg - Service+Guy	51166.34	190.68	-308.75	0.00	0.00	0.02
Dead+Wind 60 deg - Service+Guy	51206.23	323.28	-170.84	0.00	0.00	-0.04
Dead+Wind 90 deg - Service+Guy	51168.65	375.99	12.95	0.00	0.00	-0.08
Dead+Wind 120 deg - Service+Guy	51142.98	332.03	199.88	0.00	0.00	-0.09
Dead+Wind 150 deg - Service+Guy	51166.48	193.62	332.13	0.00	0.00	-0.07
Dead+Wind 180 deg - Service+Guy	51206.51	7.27	377.44	0.00	0.00	-0.05
Dead+Wind 210 deg - Service+Guy	51166.57	-178.59	330.23	0.00	0.00	-0.02
Dead+Wind 240 deg - Service+Guy	51141.49	-317.36	197.74	0.00	0.00	0.03
Dead+Wind 270 deg - Service+Guy	51165.85	-362.45	11.28	0.00	0.00	0.08
Dead+Wind 300 deg -	51203.47	-310.06	-173.09	0.00	0.00	0.08

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Service+Guy Dead+Wind 330 deg - Service+Guy	51163.56	-177.25	-311.44	0.00	0.00	0.07

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-26247.69	0.00	0.40	26247.68	0.18	0.002%
2	26.68	-31334.31	-32978.79	-26.68	31334.29	32978.75	0.000%
3	16546.81	-31177.58	-28618.24	-16546.79	31177.57	28618.18	0.000%
4	28606.77	-31020.85	-16499.83	-28606.27	31020.84	16500.59	0.002%
5	33157.92	-31177.58	7.80	-33157.75	31177.54	-7.76	0.000%
6	28635.53	-31334.31	16507.99	-28635.40	31334.26	-16507.92	0.000%
7	16417.79	-31177.58	28558.13	-16417.65	31177.54	-28558.01	0.000%
8	-39.09	-31020.85	32927.68	38.93	31020.85	-32927.65	0.000%
9	-16517.92	-31177.58	28634.75	16517.87	31177.57	-28634.70	0.000%
10	-28708.52	-31334.31	16580.94	28708.38	31334.27	-16580.86	0.000%
11	-33157.86	-31177.58	47.70	33157.68	31177.55	-47.64	0.000%
12	-28566.23	-31020.85	-16431.29	28565.49	31020.85	16432.46	0.003%
13	-16495.95	-31177.58	-28513.11	16495.91	31177.55	28512.93	0.000%
14	0.00	-92835.60	0.00	-0.04	92835.59	-0.27	0.000%
15	90.68	-92992.03	-12798.34	-90.69	92992.02	12798.21	0.000%
16	6549.00	-92835.59	-11073.20	-6549.03	92835.59	11073.13	0.000%
17	11127.42	-92679.16	-6412.98	-11127.45	92679.15	6412.97	0.000%
18	12906.05	-92835.60	-136.53	-12905.99	92835.58	136.58	0.000%
19	11184.77	-92992.03	6200.97	-11184.65	92992.01	-6200.90	0.000%
20	6368.78	-92835.60	11040.75	-6368.71	92835.59	-11040.72	0.000%
21	-11.61	-92679.16	12693.69	11.57	92679.15	-12693.72	0.000%
22	-6390.49	-92835.60	11070.00	6390.42	92835.59	-11069.99	0.000%
23	-11140.67	-92992.03	6280.22	11140.56	92992.02	-6280.15	0.000%
24	-12873.73	-92835.59	-77.33	12873.68	92835.59	77.40	0.000%
25	-11077.53	-92679.16	-6370.77	11077.54	92679.16	6370.80	0.000%
26	-6467.09	-92835.59	-11041.38	6467.11	92835.59	11041.31	0.000%
27	5.44	-26279.67	-6730.36	-5.44	26279.67	6730.11	0.001%
28	3376.90	-26247.69	-5840.46	-3376.90	26247.69	5840.25	0.001%
29	5838.12	-26215.70	-3367.31	-5838.03	26215.70	3367.27	0.000%
30	6766.92	-26247.69	1.59	-6766.73	26247.68	-1.48	0.001%
31	5843.99	-26279.68	3368.98	-5843.90	26279.67	-3368.93	0.000%
32	3350.57	-26247.69	5828.19	-3350.38	26247.68	-5828.09	0.001%
33	-7.98	-26215.70	6719.94	7.98	26215.70	-6719.85	0.000%
34	-3371.00	-26247.69	5843.83	3370.83	26247.69	-5843.73	0.001%
35	-5858.88	-26279.67	3383.86	5858.66	26279.67	-3383.74	0.001%
36	-6766.91	-26247.69	9.73	6766.74	26247.69	-9.62	0.001%
37	-5829.84	-26215.70	-3353.32	5829.77	26215.70	3353.28	0.000%
38	-3366.52	-26247.69	-5819.00	3366.53	26247.69	5818.80	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	9	0.00000001	0.00013799

2	Yes	23	0.00000001	0.00011628
3	Yes	23	0.00000001	0.00008607
4	Yes	16	0.00009722	0.00013565
5	Yes	22	0.00004316	0.00009500
6	Yes	22	0.00005335	0.00014816
7	Yes	22	0.00004276	0.00014332
8	Yes	16	0.00000001	0.00009569
9	Yes	23	0.00000001	0.00008796
10	Yes	22	0.00005202	0.00013929
11	Yes	22	0.00004268	0.00008577
12	Yes	15	0.00008544	0.00011493
13	Yes	22	0.00004223	0.00014173
14	Yes	11	0.00015000	0.00010030
15	Yes	19	0.00013616	0.00011803
16	Yes	19	0.00000001	0.00007114
17	Yes	16	0.00000001	0.00007808
18	Yes	19	0.00000001	0.00006364
19	Yes	19	0.00014092	0.00010996
20	Yes	19	0.00000001	0.00008176
21	Yes	16	0.00000001	0.00011769
22	Yes	19	0.00000001	0.00006777
23	Yes	19	0.00013920	0.00008084
24	Yes	19	0.00000001	0.00005218
25	Yes	16	0.00000001	0.00009802
26	Yes	19	0.00000001	0.00007149
27	Yes	13	0.00000001	0.00013952
28	Yes	13	0.00000001	0.00011227
29	Yes	13	0.00000001	0.00007531
30	Yes	13	0.00000001	0.00013347
31	Yes	14	0.00000001	0.00007274
32	Yes	13	0.00000001	0.00013959
33	Yes	13	0.00000001	0.00007916
34	Yes	13	0.00000001	0.00010965
35	Yes	13	0.00000001	0.00012595
36	Yes	13	0.00000001	0.00010956
37	Yes	13	0.00000001	0.00007996
38	Yes	13	0.00000001	0.00012017

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	250 - 200	8.399	29	0.6575	0.2563
T1	200 - 180	2.677	33	0.2447	0.2149
T2	180 - 160	1.859	29	0.1541	0.1305
T3	160 - 140	1.376	37	0.1050	0.0970
T4	140 - 120	1.017	37	0.0702	0.0710
T5	120 - 100	0.805	37	0.0316	0.0541
T6	100 - 80	0.725	37	0.0172	0.0467
T7	80 - 60	0.654	37	0.0193	0.0403
T8	60 - 40	0.572	37	0.0208	0.0369
T9	40 - 20	0.465	27	0.0363	0.0336
T10	20 - 6.5	0.267	27	0.0573	0.0283
T11	6.5 - 0	0.091	27	0.0644	0.0261

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
252.00	Lightning Rod 5/8x4'	29	8.399	0.6575	0.2568	38071
250.00	Flash Beacon Lighting	29	8.399	0.6575	0.2568	38071
237.50	6810	29	6.657	0.5394	0.2639	15228
215.00	6810-2	29	3.916	0.3471	0.2543	5438
199.00	PR-950	33	2.618	0.2391	0.2110	4110
187.00	Pirod Delta Mount (3)	33	2.079	0.1807	0.1575	9285
186.75	Guy	33	2.070	0.1796	0.1565	9543
177.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	29	1.777	0.1445	0.1220	30390
172.00	PR-950	37	1.649	0.1305	0.1118	30900
150.00	4' Grid Dish	37	1.181	0.0880	0.0841	29906
130.00	2' standoff	37	0.892	0.0500	0.0612	29014
126.75	Guy	37	0.859	0.0434	0.0586	28929
123.00	Small Beacon	37	0.827	0.0364	0.0560	28887
66.75	Guy	37	0.601	0.0195	0.0378	311813

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	250 - 200	63.513	6	3.8241	1.3356
T1	200 - 180	28.538	6	1.9488	1.4290
T2	180 - 160	21.314	6	1.5011	1.0039
T3	160 - 140	15.831	10	1.2225	0.7906
T4	140 - 120	11.320	10	0.9447	0.6201
T5	120 - 100	8.093	10	0.5996	0.4993
T6	100 - 80	6.142	10	0.3923	0.4154
T7	80 - 60	4.755	10	0.2948	0.3394
T8	60 - 40	3.692	10	0.2302	0.2733
T9	40 - 20	2.740	10	0.2585	0.2182
T10	20 - 6.5	1.506	10	0.3336	0.1692
T11	6.5 - 0	0.505	10	0.3623	0.1475

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
252.00	Lightning Rod 5/8x4'	6	63.513	3.8241	1.6333	8409
250.00	Flash Beacon Lighting	6	63.513	3.8241	1.6333	8409
237.50	6810	6	53.378	3.2989	1.6688	3363
215.00	6810-2	6	36.912	2.4256	1.6222	1199
199.00	PR-950	6	28.083	1.9212	1.4098	903
187.00	Pirod Delta Mount (3)	6	23.507	1.6336	1.1444	1960
186.75	Guy	6	23.425	1.6284	1.1389	2012
177.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	10	20.433	1.4517	0.9568	6242
172.00	PR-950	10	19.019	1.3775	0.8950	5697

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	4' Grid Dish	10	13.434	1.0939	0.7042	3947
130.00	2' standoff	10	9.531	0.7676	0.5524	3321
126.75	Guy	10	9.025	0.7093	0.5338	3273
123.00	Small Beacon	10	8.487	0.6461	0.5140	3226
66.75	Guy	10	4.022	0.2447	0.2943	20337

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	200	Leg	A325N	0.7500	3	10039.70	29820.60	0.337	1	Bolt Tension
T2	180	Leg	A325N	0.7500	3	6266.00	29820.60	0.210	1	Bolt Tension
T3	160	Leg	A325N	0.7500	3	7127.84	29820.60	0.239	1	Bolt Tension
T4	140	Leg	A325N	0.7500	3	7466.25	29820.60	0.250	1	Bolt Tension
T5	120	Leg	A325N	0.7500	3	5111.62	29820.60	0.171	1	Bolt Tension
T6	100	Leg	A325N	0.7500	3	4214.10	29820.60	0.141	1	Bolt Tension
T7	80	Leg	A325N	0.7500	3	4917.89	29820.60	0.165	1	Bolt Tension
T8	60	Leg	A325N	0.7500	3	5480.24	29820.60	0.184	1	Bolt Tension
T9	40	Leg	A325N	0.7500	3	5502.87	29820.60	0.185	1	Bolt Tension

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T_u lb	Allowable ϕT_n lb	Required S.F.	Actual S.F.
T1	186.75 (A) (491)	9/16 (23000 ksi) EHS	3500.00	35000.04	18467.40	21000.00	1.000	1.137
	186.75 (A) (492)	9/16 (23000 ksi) EHS	3500.00	35000.04	17659.60	21000.00	1.000	1.189
	186.75 (B) (487)	9/16 (23000 ksi) EHS	3500.00	35000.04	17587.90	21000.00	1.000	1.194
	186.75 (B) (488)	9/16 (23000 ksi) EHS	3500.00	35000.04	18013.40	21000.00	1.000	1.166
	186.75 (C) (483)	9/16 (23000 ksi) EHS	3500.00	35000.04	18061.50	21000.00	1.000	1.163
	186.75 (C) (484)	9/16 (23000 ksi) EHS	3500.00	35000.04	18442.80	21000.00	1.000	1.139
T4	126.75 (A) (500)	9/16 (23000 ksi) EHS	3500.00	35000.04	11429.30	21000.00	1.000	1.837
	126.75 (B) (499)	9/16 (23000 ksi) EHS	3500.00	35000.04	11512.40	21000.00	1.000	1.824
	126.75 (C) (495)	9/16 (23000 ksi) EHS	3500.00	35000.04	11465.80	21000.00	1.000	1.832
T7	66.75 (A) (506)	7/16 (23000 ksi) EHS	2080.00	20800.02	5687.83	12480.00	1.000	2.194
	66.75 (B) (505)	7/16 (23000 ksi) EHS	2080.00	20800.02	5701.90	12480.00	1.000	2.189
	66.75 (C) (501)	7/16 (23000 ksi) EHS	2080.00	20800.02	5706.51	12480.00	1.000	2.187

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T_u lb	Allowable ϕT_n lb	Required S.F.	Actual S.F.

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
L1	250 - 200 (1)	P12x.5	50.00	0.00	0.0	19.2423	-4798.73	606131.00	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	250 - 200 (1)	P12x.5	135.23	197.07	0.686	0.00	197.07	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	250 - 200 (1)	P12x.5	4561.56	303066.00	0.015	3.87	297.74	0.013

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	250 - 200 (1)	0.008	0.686	0.000	0.015	0.013	0.695	1.000	4.8.2

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	2	20.00	3.25	78.0 K=1.00	3.1416	-79536.10	90608.40	0.878 [1]
T2	180 - 160	2	20.00	3.25	78.0 K=1.00	3.1416	-64342.00	90608.40	0.710 [1]
T3	160 - 140	2	20.00	3.25	78.0 K=1.00	3.1416	-62683.70	90608.40	0.692 [1]
T4	140 - 120	2	20.00	3.25	78.0 K=1.00	3.1416	-74905.90	90608.40	0.827 [1]
T5	120 - 100	2	20.00	3.25	78.0 K=1.00	3.1416	-64639.60	90608.40	0.713 [1]
T6	100 - 80	2	20.00	3.25	78.0 K=1.00	3.1416	-44602.30	90608.40	0.492 [1]
T7	80 - 60	2	20.00	3.25	78.0 K=1.00	3.1416	-43191.00	90608.40	0.477 [1]
T8	60 - 40	2	20.00	3.25	78.0 K=1.00	3.1416	-48700.30	90608.40	0.537 [1]
T9	40 - 20	2	20.00	3.25	78.0 K=1.00	3.1416	-49935.10	90608.40	0.551 [1]
T10	20 - 6.5	2 1/4	13.50	3.25	69.3 K=1.00	3.9761	-49290.80	125898.00	0.392 [1]
T11	6.5 - 0	2 1/4	6.73	1.84	39.2 K=1.00	3.9761	-49147.40	159864.00	0.307 [1]

[1] $P_u / \phi P_n$ controls

Leg Bending Design Data (Compression)

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	200 - 180	2	0.00	5.00	0.000	0.00	5.00	0.000
T2	180 - 160	2	0.00	5.00	0.000	0.00	5.00	0.000
T3	160 - 140	2	0.00	5.00	0.000	0.00	5.00	0.000
T4	140 - 120	2	0.00	5.00	0.000	0.00	5.00	0.000
T5	120 - 100	2	0.00	5.00	0.000	0.00	5.00	0.000
T6	100 - 80	2	0.00	5.00	0.000	0.00	5.00	0.000
T7	80 - 60	2	0.00	5.00	0.000	0.00	5.00	0.000
T8	60 - 40	2	0.00	5.00	0.000	0.00	5.00	0.000
T9	40 - 20	2	0.00	5.00	0.000	0.00	5.00	0.000
T10	20 - 6.5	2 1/4	0.00	7.12	0.000	0.00	7.12	0.000
T11	6.5 - 0	2 1/4	0.00	7.12	0.000	0.00	7.12	0.000

Leg Interaction Design Data (Compression)

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	200 - 180	2	0.878	0.000	0.000	0.878 [1]	1.000	4.8.1
T2	180 - 160	2	0.710	0.000	0.000	0.710 [1]	1.000	4.8.1
T3	160 - 140	2	0.692	0.000	0.000	0.692 [1]	1.000	4.8.1
T4	140 - 120	2	0.827	0.000	0.000	0.827 [1]	1.000	4.8.1

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T5	120 - 100	2	0.713	0.000	0.000	0.713 [1]	1.000	4.8.1
T6	100 - 80	2	0.492	0.000	0.000	0.492 [1]	1.000	4.8.1
T7	80 - 60	2	0.477	0.000	0.000	0.477 [1]	1.000	4.8.1
T8	60 - 40	2	0.537	0.000	0.000	0.537 [1]	1.000	4.8.1
T9	40 - 20	2	0.551	0.000	0.000	0.551 [1]	1.000	4.8.1
T10	20 - 6.5	2 1/4	0.392	0.000	0.000	0.392 [1]	1.000	4.8.1
T11	6.5 - 0	2 1/4	0.307	0.000	0.000	0.307 [1]	1.000	4.8.1

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	1	4.42	4.18	99.3 K=0.50	0.7854	-10062.60	15150.10	0.664 [1]
T2	180 - 160	1	4.42	4.18	140.4 K=0.70	0.7854	-8377.82	9006.87	0.930 [1]
T3	160 - 140	1	4.42	4.18	140.4 K=0.70	0.7854	-2760.88	9006.87	0.307 [1]
T4	140 - 120	1	4.42	4.18	140.4 K=0.70	0.7854	-4721.69	9006.87	0.524 [1]
T5	120 - 100	1	4.42	4.18	140.4 K=0.70	0.7854	-4415.55	9006.87	0.490 [1]
T6	100 - 80	1	4.42	4.18	140.4 K=0.70	0.7854	-2504.85	9006.87	0.278 [1]
T7	80 - 60	1	4.42	4.18	140.4 K=0.70	0.7854	-3167.30	9006.87	0.352 [1]
T8	60 - 40	1	4.42	4.18	140.4 K=0.70	0.7854	-2878.66	9006.87	0.320 [1]
T9	40 - 20	1	4.42	4.18	140.4 K=0.70	0.7854	-1360.52	9006.87	0.151 [1]
T10	20 - 6.5	1 1/4	4.42	4.15	111.5 K=0.70	1.2272	-2089.78	20674.10	0.101 [1]

[1] $P_u / \phi P_n$ controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	7/8	3.00	2.83	155.4 K=1.00	0.6013	-1377.61	5623.21	0.245 [1]
T2	180 - 160	7/8	3.00	2.83	108.8 K=0.70	0.6013	-1923.26	10447.40	0.184 [1]
T3	160 - 140	7/8	3.00	2.83	108.8 K=0.70	0.6013	-1085.71	10447.40	0.104 [1]
T4	140 - 120	7/8	3.00	2.83	108.8 K=0.70	0.6013	-1297.41	10447.40	0.124 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T5	120 - 100	7/8	3.00	2.83	108.8 K=0.70	0.6013	-1119.59	10447.40	0.107 [1]
T6	100 - 80	7/8	3.00	2.83	108.8 K=0.70	0.6013	-772.53	10447.40	0.074 [1]
T7	80 - 60	7/8	3.00	2.83	108.8 K=0.70	0.6013	-748.09	10447.40	0.072 [1]
T8	60 - 40	7/8	3.00	2.83	108.8 K=0.70	0.6013	-843.51	10447.40	0.081 [1]
T9	40 - 20	7/8	3.00	2.83	108.8 K=0.70	0.6013	-864.90	10447.40	0.083 [1]
T10	20 - 6.5	7/8	3.00	2.81	108.0 K=0.70	0.6013	-853.74	10543.30	0.081 [1]
T11	6.5 - 0	8x3/8	1.91	1.72	191.0 K=1.00	3.0000	-873.24	18583.70	0.047 [1]

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	7/8	1.50	1.42	77.7 K=1.00	0.6013	-0.08	14175.20	0.000 [1]
T2	180 - 160	7/8	1.50	1.42	77.7 K=1.00	0.6013	-0.05	14175.20	0.000 [1]
T3	160 - 140	7/8	1.50	1.42	77.7 K=1.00	0.6013	-0.04	14175.20	0.000 [1]
T4	140 - 120	7/8	1.50	1.42	77.7 K=1.00	0.6013	-0.04	14175.20	0.000 [1]
T5	120 - 100	7/8	1.50	1.42	77.7 K=1.00	0.6013	-0.02	14175.20	0.000 [1]
T6	100 - 80	7/8	1.50	1.42	77.7 K=1.00	0.6013	-0.02	14175.20	0.000 [1]
T7	80 - 60	7/8	1.50	1.42	77.7 K=1.00	0.6013	-0.01	14175.20	0.000 [1]
T8	60 - 40	7/8	1.50	1.42	77.7 K=1.00	0.6013	-0.01	14175.20	0.000 [1]
T9	40 - 20	7/8	1.50	1.42	77.7 K=1.00	0.6013	-0.02	14175.20	0.000 [1]
T10	20 - 6.5	7/8	1.50	1.41	77.2 K=1.00	0.6013	-0.02	14241.40	0.000 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	L3x3x3/8	3.00	2.83	89.0	2.1100	-1710.59	45070.00	0.038 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	180 - 160	7/8	3.00	2.83	K=1.54 108.8 K=0.70	0.6013	-2447.13	10447.40	0.234 [1]
T3	160 - 140	7/8	3.00	2.83	108.8 K=0.70	0.6013	-538.59	10447.40	0.052 [1]
T4	140 - 120	7/8	3.00	2.83	108.8 K=0.70	0.6013	-876.95	10447.40	0.084 [1]
T5	120 - 100	7/8	3.00	2.83	108.8 K=0.70	0.6013	-1158.52	10447.40	0.111 [1]
T6	100 - 80	7/8	3.00	2.83	108.8 K=0.70	0.6013	-589.80	10447.40	0.056 [1]
T7	80 - 60	7/8	3.00	2.83	108.8 K=0.70	0.6013	-147.19	10447.40	0.014 [1]
T8	60 - 40	7/8	3.00	2.83	108.8 K=0.70	0.6013	-670.34	10447.40	0.064 [1]
T9	40 - 20	7/8	3.00	2.83	108.8 K=0.70	0.6013	-148.03	10447.40	0.014 [1]
T10	20 - 6.5	7/8	3.00	2.81	108.0 K=0.70	0.6013	-205.22	10543.30	0.019 [1]

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	7/8	3.00	2.83	155.4 K=1.00	0.6013	-2703.45	5623.21	0.481 [1]
T2	180 - 160	7/8	3.00	2.83	108.8 K=0.70	0.6013	-458.95	10447.40	0.044 [1]
T3	160 - 140	7/8	3.00	2.83	108.8 K=0.70	0.6013	-584.77	10447.40	0.056 [1]
T4	140 - 120	7/8	3.00	2.83	108.8 K=0.70	0.6013	-1320.97	10447.40	0.126 [1]
T5	120 - 100	7/8	3.00	2.83	108.8 K=0.70	0.6013	-747.26	10447.40	0.072 [1]
T6	100 - 80	7/8	3.00	2.83	108.8 K=0.70	0.6013	-191.72	10447.40	0.018 [1]
T7	80 - 60	7/8	3.00	2.83	108.8 K=0.70	0.6013	-815.77	10447.40	0.078 [1]
T8	60 - 40	7/8	3.00	2.83	108.8 K=0.70	0.6013	-295.54	10447.40	0.028 [1]
T9	40 - 20	7/8	3.00	2.83	108.8 K=0.70	0.6013	-241.43	10447.40	0.023 [1]
T11	6.5 - 0	8x3/8	0.27	0.08	9.1 K=1.00	3.0000	-512.48	96780.90	0.005 [1]

[1] P_u / ϕP_n controls

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	1	3.00	2.83	95.2 K=0.70	0.7854	-10729.60	15791.60	0.679 [1]

[1] P_u / ϕP_n controls

Top Guy Pull-Off Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	200 - 180	1	0.00	0.45	0.000	0.00	0.45	0.000

Top Guy Pull-Off Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	200 - 180	1	0.679	0.000	0.000	0.679 [1]	1.000	4.8.1

[1] P_u / ϕP_n controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180 (485)	C12x20.7	3.00	2.92	43.8 K=1.00	6.0900	-5357.46	178357.00	0.030
T1	200 - 180 (486)	C12x20.7	3.00	2.92	43.8 K=1.00	6.0900	-5361.10	178357.00	0.030
T1	200 - 180 (489)	C12x20.7	3.00	2.92	43.8 K=1.00	6.0900	-5751.72	178357.00	0.032
T1	200 - 180 (490)	C12x20.7	3.00	2.92	43.8 K=1.00	6.0900	-5743.05	178357.00	0.032
T1	200 - 180 (493)	C12x20.7	3.00	2.92	43.8 K=1.00	6.0900	-5940.97	178357.00	0.033
T1	200 - 180 (494)	C12x20.7	3.00	2.92	43.8 K=1.00	6.0900	-5946.40	178357.00	0.033

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	200 - 180 (485)	C12x20.7	-40.57	58.05	0.699	0.00	9.42	0.000
T1	200 - 180 (486)	C12x20.7	-40.68	58.05	0.701	-0.00	9.42	0.000
T1	200 - 180 (489)	C12x20.7	-41.90	58.05	0.722	0.00	9.42	0.000
T1	200 - 180 (490)	C12x20.7	-41.65	58.05	0.718	-0.00	9.42	0.000
T1	200 - 180 (493)	C12x20.7	-42.26	58.05	0.728	0.00	9.42	0.000
T1	200 - 180 (494)	C12x20.7	-42.39	58.05	0.730	-0.00	9.42	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	200 - 180 (485)	C12x20.7	0.030	0.699	0.000	0.714	1.000	4.8.1
T1	200 - 180 (486)	C12x20.7	0.030	0.701	0.000	0.716	1.000	4.8.1
T1	200 - 180 (489)	C12x20.7	0.032	0.722	0.000	0.738	1.000	4.8.1
T1	200 - 180 (490)	C12x20.7	0.032	0.718	0.000	0.734	1.000	4.8.1
T1	200 - 180 (493)	C12x20.7	0.033	0.728	0.000	0.745	1.000	4.8.1
T1	200 - 180 (494)	C12x20.7	0.033	0.730	0.000	0.747	1.000	4.8.1

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	2	20.00	3.25	78.0	3.1416	74701.30	141372.00	0.528 [1]
T2	180 - 160	2	20.00	0.25	6.0	3.1416	30116.30	141372.00	0.213 [1]
T3	160 - 140	2	20.00	3.25	78.0	3.1416	13313.90	141372.00	0.094 [1]
T4	140 - 120	2	20.00	3.25	78.0	3.1416	21429.00	141372.00	0.152 [1]
T5	120 - 100	2	20.00	0.25	6.0	3.1416	5323.81	141372.00	0.038 [1]

[1] P_u / ϕP_n controls

Leg Bending Design Data (Tension)

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	200 - 180	2	0.00	5.00	0.000	0.00	5.00	0.000
T2	180 - 160	2	0.00	5.00	0.000	0.00	5.00	0.000
T3	160 - 140	2	0.00	5.00	0.000	0.00	5.00	0.000
T4	140 - 120	2	0.00	5.00	0.000	0.00	5.00	0.000
T5	120 - 100	2	0.00	5.00	0.000	0.00	5.00	0.000

Leg Interaction Design Data (Tension)

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	200 - 180	2	0.528	0.000	0.000	0.528 [1]	1.000	4.8.1
T2	180 - 160	2	0.213	0.000	0.000	0.213 [1]	1.000	4.8.1
T3	160 - 140	2	0.094	0.000	0.000	0.094 [1]	1.000	4.8.1
T4	140 - 120	2	0.152	0.000	0.000	0.152 [1]	1.000	4.8.1
T5	120 - 100	2	0.038	0.000	0.000	0.038 [1]	1.000	4.8.1

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	1	4.42	4.18	200.5	0.7854	10076.00	25446.90	0.396 [1]
T2	180 - 160	1	4.42	4.18	200.5	0.7854	8073.52	25446.90	0.317 [1]
T3	160 - 140	1	4.42	4.18	200.5	0.7854	2409.09	25446.90	0.095 [1]
T4	140 - 120	1	4.42	4.18	200.5	0.7854	4323.64	25446.90	0.170 [1]
T5	120 - 100	1	4.42	4.18	200.5	0.7854	4019.58	25446.90	0.158 [1]
T6	100 - 80	1	4.42	4.18	200.5	0.7854	2090.11	25446.90	0.082 [1]
T7	80 - 60	1	4.42	4.18	200.5	0.7854	2717.10	25446.90	0.107 [1]
T8	60 - 40	1	4.42	4.18	200.5	0.7854	2424.90	25446.90	0.095 [1]
T9	40 - 20	1	4.42	4.18	200.5	0.7854	816.82	25446.90	0.032 [1]
T10	20 - 6.5	1 1/4	4.42	4.15	159.2	1.2272	1704.59	39760.80	0.043 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	7/8	3.00	2.83	155.4	0.6013	1377.61	19482.80	0.071 [1]
T2	180 - 160	7/8	3.00	2.83	155.4	0.6013	2201.94	19482.80	0.113 [1]
T3	160 - 140	7/8	3.00	2.83	155.4	0.6013	1085.71	19482.80	0.056 [1]
T4	140 - 120	7/8	3.00	2.83	155.4	0.6013	1297.41	19482.80	0.067 [1]
T5	120 - 100	7/8	3.00	2.83	155.4	0.6013	1119.59	19482.80	0.057 [1]
T6	100 - 80	7/8	3.00	2.83	155.4	0.6013	772.53	19482.80	0.040 [1]
T7	80 - 60	7/8	3.00	2.83	155.4	0.6013	748.09	19482.80	0.038 [1]
T8	60 - 40	7/8	3.00	2.83	155.4	0.6013	843.51	19482.80	0.043 [1]
T9	40 - 20	7/8	3.00	2.83	155.4	0.6013	864.90	19482.80	0.044 [1]
T10	20 - 6.5	7/8	3.00	2.81	154.3	0.6013	853.74	19482.80	0.044 [1]
T11	6.5 - 0	8x3/8	1.09	0.90	100.0	3.0000	873.24	97200.00	0.009 [1]

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	7/8	1.50	1.42	77.7	0.6013	0.09	19482.80	0.000 [1]
T2	180 - 160	7/8	1.50	1.42	77.7	0.6013	0.05	19482.80	0.000 [1]
T3	160 - 140	7/8	1.50	1.42	77.7	0.6013	0.04	19482.80	0.000 [1]
T4	140 - 120	7/8	1.50	1.42	77.7	0.6013	0.03	19482.80	0.000 [1]
T5	120 - 100	7/8	1.50	1.42	77.7	0.6013	0.02	19482.80	0.000 [1]
T6	100 - 80	7/8	1.50	1.42	77.7	0.6013	0.01	19482.80	0.000 [1]
T7	80 - 60	7/8	1.50	1.42	77.7	0.6013	0.01	19482.80	0.000 [1]
T8	60 - 40	7/8	1.50	1.42	77.7	0.6013	0.01	19482.80	0.000 [1]
T9	40 - 20	7/8	1.50	1.42	77.7	0.6013	0.02	19482.80	0.000 [1]
T10	20 - 6.5	7/8	1.50	1.41	77.2	0.6013	0.02	19482.80	0.000 [1]

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	L3x3x3/8	3.00	2.83	37.2	2.1100	8254.61	68364.00	0.121 [1]
T2	180 - 160	7/8	3.00	2.83	155.4	0.6013	2440.40	19482.80	0.125 [1]
T3	160 - 140	7/8	3.00	2.83	155.4	0.6013	581.56	19482.80	0.030 [1]
T4	140 - 120	7/8	3.00	2.83	155.4	0.6013	756.35	19482.80	0.039 [1]
T5	120 - 100	7/8	3.00	2.83	155.4	0.6013	1356.10	19482.80	0.070 [1]
T6	100 - 80	7/8	3.00	2.83	155.4	0.6013	794.07	19482.80	0.041 [1]
T7	80 - 60	7/8	3.00	2.83	155.4	0.6013	260.63	19482.80	0.013 [1]
T8	60 - 40	7/8	3.00	2.83	155.4	0.6013	867.65	19482.80	0.045 [1]
T9	40 - 20	7/8	3.00	2.83	155.4	0.6013	349.33	19482.80	0.018 [1]
T10	20 - 6.5	7/8	3.00	2.81	154.3	0.6013	512.99	19482.80	0.026 [1]
T11	6.5 - 0	8x3/8	2.73	2.54	281.9	3.0000	3162.66	97200.00	0.033 [1]

[1] $P_u / \phi P_n$ controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	7/8	3.00	2.83	155.4	0.6013	2862.14	19482.80	0.147 [1]
T2	180 - 160	7/8	3.00	2.83	155.4	0.6013	723.59	19482.80	0.037 [1]
T3	160 - 140	7/8	3.00	2.83	155.4	0.6013	901.11	19482.80	0.046 [1]
T4	140 - 120	7/8	3.00	2.83	155.4	0.6013	1374.35	19482.80	0.071 [1]
T5	120 - 100	7/8	3.00	2.83	155.4	0.6013	822.99	19482.80	0.042 [1]
T6	100 - 80	7/8	3.00	2.83	155.4	0.6013	249.96	19482.80	0.013 [1]
T7	80 - 60	7/8	3.00	2.83	155.4	0.6013	916.06	19482.80	0.047 [1]
T8	60 - 40	7/8	3.00	2.83	155.4	0.6013	388.95	19482.80	0.020 [1]
T9	40 - 20	7/8	3.00	2.83	155.4	0.6013	308.56	19482.80	0.016 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T10	20 - 6.5	7/8	3.00	2.81	154.3	0.6013	4397.71	19482.80	0.226 [1]

[1] P_u / ϕP_n controls

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	1	3.00	2.83	136.0	0.7854	10783.10	25446.90	0.424 [1]
T4	140 - 120	3 1/2x1 3/8	3.00	2.83	85.7	4.8125	4718.20	155925.00	0.030 [1]
T7	80 - 60	3 1/2x1 3/8	3.00	2.83	85.7	4.8125	2823.65	155925.00	0.018 [1]

[1] P_u / ϕP_n controls

Top Guy Pull-Off Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	200 - 180	1	0.00	0.45	0.000	0.00	0.45	0.000
T4	140 - 120	3 1/2x1 3/8	0.00	11.37	0.000	0.00	4.47	0.000
T7	80 - 60	3 1/2x1 3/8	0.00	11.37	0.000	0.00	4.47	0.000

Top Guy Pull-Off Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	200 - 180	1	0.424	0.000	0.000	0.424 [1]	1.000	4.8.1
T4	140 - 120	3 1/2x1 3/8	0.030	0.000	0.000	0.030 [1]	1.000	4.8.1
T7	80 - 60	3 1/2x1 3/8	0.018	0.000	0.000	0.018 [1]	1.000	4.8.1

[1] P_u / ϕP_n controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180 (485)	C12x20.7	3.00	2.92	43.8	6.0900	78.97	197316.00	0.000
T1	200 - 180 (486)	C12x20.7	3.00	2.92	43.8	6.0900	484.30	197316.00	0.002

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180 (489)	C12x20.7	3.00	2.92	43.8	6.0900	4546.24	197316.00	0.023
T1	200 - 180 (490)	C12x20.7	3.00	2.92	43.8	6.0900	521.35	197316.00	0.003
T1	200 - 180 (493)	C12x20.7	3.00	2.92	43.8	6.0900	68.49	197316.00	0.000
T1	200 - 180 (494)	C12x20.7	3.00	2.92	43.8	6.0900	4815.17	197316.00	0.024

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	200 - 180 (485)	C12x20.7	-42.28	58.05	0.728	-0.00	9.42	0.000
T1	200 - 180 (486)	C12x20.7	-43.07	58.05	0.742	0.00	9.42	0.000
T1	200 - 180 (489)	C12x20.7	-34.87	58.05	0.601	-0.00	9.42	0.000
T1	200 - 180 (490)	C12x20.7	-42.75	58.05	0.736	-0.00	9.42	0.000
T1	200 - 180 (493)	C12x20.7	-42.31	58.05	0.729	0.00	9.42	0.000
T1	200 - 180 (494)	C12x20.7	-35.30	58.05	0.608	0.00	9.42	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	200 - 180 (485)	C12x20.7	0.000	0.728	0.000	0.729	1.000	4.8.1
T1	200 - 180 (486)	C12x20.7	0.002	0.742	0.000	0.743	1.000	4.8.1
T1	200 - 180 (489)	C12x20.7	0.023	0.601	0.000	0.612	1.000	4.8.1
T1	200 - 180 (490)	C12x20.7	0.003	0.736	0.000	0.738	1.000	4.8.1
T1	200 - 180 (493)	C12x20.7	0.000	0.729	0.000	0.729	1.000	4.8.1
T1	200 - 180 (494)	C12x20.7	0.024	0.608	0.000	0.620	1.000	4.8.1

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	250 - 200	Pole	P12x.5	1	-4798.73	606131.00	69.5	Pass
T1	200 - 180	Leg	2	4	-79536.10	90608.40	87.8	Pass
T2	180 - 160	Leg	2	51	-64342.00	90608.40	71.0	Pass
T3	160 - 140	Leg	2	99	-62683.70	90608.40	69.2	Pass
T4	140 - 120	Leg	2	147	-74905.90	90608.40	82.7	Pass
T5	120 - 100	Leg	2	195	-64639.60	90608.40	71.3	Pass
T6	100 - 80	Leg	2	243	-44602.30	90608.40	49.2	Pass
T7	80 - 60	Leg	2	290	-43191.00	90608.40	47.7	Pass
T8	60 - 40	Leg	2	338	-48700.30	90608.40	53.7	Pass
T9	40 - 20	Leg	2	388	-49935.10	90608.40	55.1	Pass
T10	20 - 6.5	Leg	2 1/4	436	-49290.80	125898.00	39.2	Pass
T11	6.5 - 0	Leg	2 1/4	470	-49147.40	159864.00	30.7	Pass
T1	200 - 180	Diagonal	1	33	-10062.60	15150.10	66.4	Pass
T2	180 - 160	Diagonal	1	96	-8377.82	9006.87	93.0	Pass
T3	160 - 140	Diagonal	1	107	-2760.88	9006.87	30.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T4	140 - 120	Diagonal	1	157	-4721.69	9006.87	52.4	Pass
T5	120 - 100	Diagonal	1	240	-4415.55	9006.87	49.0	Pass
T6	100 - 80	Diagonal	1	288	-2504.85	9006.87	27.8	Pass
T7	80 - 60	Diagonal	1	301	-3167.30	9006.87	35.2	Pass
T8	60 - 40	Diagonal	1	384	-2878.66	9006.87	32.0	Pass
T9	40 - 20	Diagonal	1	396	-1360.52	9006.87	15.1	Pass
T10	20 - 6.5	Diagonal	1 1/4	444	-2089.78	20674.10	10.1	Pass
T1	200 - 180	Horizontal	7/8	16	-1377.61	5623.21	24.5	Pass
T2	180 - 160	Horizontal	7/8	93	-1923.26	10447.40	18.4	Pass
T3	160 - 140	Horizontal	7/8	111	-1085.71	10447.40	10.4	Pass
T4	140 - 120	Horizontal	7/8	160	-1297.41	10447.40	12.4	Pass
T5	120 - 100	Horizontal	7/8	208	-1119.59	10447.40	10.7	Pass
T6	100 - 80	Horizontal	7/8	255	-772.53	10447.40	7.4	Pass
T7	80 - 60	Horizontal	7/8	303	-748.09	10447.40	7.2	Pass
T8	60 - 40	Horizontal	7/8	358	-843.51	10447.40	8.1	Pass
T9	40 - 20	Horizontal	7/8	407	-864.90	10447.40	8.3	Pass
T10	20 - 6.5	Horizontal	7/8	455	-853.74	10543.30	8.1	Pass
T11	6.5 - 0	Horizontal	8x3/8	482	-873.24	18583.70	4.7	Pass
T1	200 - 180	Secondary Horizontal	7/8	21	-0.06	14175.20	0.1	Pass
T2	180 - 160	Secondary Horizontal	7/8	97	-0.05	14175.20	0.1	Pass
T3	160 - 140	Secondary Horizontal	7/8	145	-0.04	14175.20	0.1	Pass
T4	140 - 120	Secondary Horizontal	7/8	193	-0.04	14175.20	0.1	Pass
T5	120 - 100	Secondary Horizontal	7/8	206	-0.01	14175.20	0.1	Pass
T6	100 - 80	Secondary Horizontal	7/8	254	-0.01	14175.20	0.1	Pass
T7	80 - 60	Secondary Horizontal	7/8	302	-0.01	14175.20	0.1	Pass
T8	60 - 40	Secondary Horizontal	7/8	350	0.01	19482.80	0.1	Pass
T9	40 - 20	Secondary Horizontal	7/8	398	0.02	19482.80	0.1	Pass
T10	20 - 6.5	Secondary Horizontal	7/8	460	0.02	19482.80	0.1	Pass
T1	200 - 180	Top Girt	L3x3x3/8	6	8254.61	68364.00	12.1	Pass
T2	180 - 160	Top Girt	7/8	55	-2447.13	10447.40	23.4	Pass
T3	160 - 140	Top Girt	7/8	103	-538.59	10447.40	5.2	Pass
T4	140 - 120	Top Girt	7/8	149	-876.95	10447.40	8.4	Pass
T5	120 - 100	Top Girt	7/8	199	-1158.52	10447.40	11.1	Pass
T6	100 - 80	Top Girt	7/8	247	-589.80	10447.40	5.6	Pass
T7	80 - 60	Top Girt	7/8	293	-147.19	10447.40	1.4	Pass
T8	60 - 40	Top Girt	7/8	343	-670.34	10447.40	6.4	Pass
T9	40 - 20	Top Girt	7/8	391	349.33	19482.80	1.8	Pass
T10	20 - 6.5	Top Girt	7/8	438	512.99	19482.80	2.6	Pass
T11	6.5 - 0	Top Girt	8x3/8	472	3162.66	97200.00	3.3	Pass
T1	200 - 180	Bottom Girt	7/8	10	-2703.45	5623.21	48.1	Pass
T2	180 - 160	Bottom Girt	7/8	57	-458.95	10447.40	4.4	Pass
T3	160 - 140	Bottom Girt	7/8	104	-584.77	10447.40	5.6	Pass
T4	140 - 120	Bottom Girt	7/8	154	-1320.97	10447.40	12.6	Pass
T5	120 - 100	Bottom Girt	7/8	202	-747.26	10447.40	7.2	Pass
T6	100 - 80	Bottom Girt	7/8	250	-191.72	10447.40	1.8	Pass
T7	80 - 60	Bottom Girt	7/8	298	-815.77	10447.40	7.8	Pass
T8	60 - 40	Bottom Girt	7/8	346	-295.54	10447.40	2.8	Pass
T9	40 - 20	Bottom Girt	7/8	393	-241.43	10447.40	2.3	Pass
T10	20 - 6.5	Bottom Girt	7/8	441	4397.71	19482.80	22.6	Pass
T11	6.5 - 0	Bottom Girt	8x3/8	475	-506.58	96780.90	5.8	Pass
T1	200 - 180	Guy A@186.75	9/16 (23000 ksi)	491	18467.40	21000.00	87.9	Pass
T4	140 - 120	Guy A@126.75	9/16 (23000 ksi)	500	11429.30	21000.00	54.4	Pass
T7	80 - 60	Guy A@66.75	7/16 (23000 ksi)	506	5687.83	12480.00	45.6	Pass
T1	200 - 180	Guy B@186.75	9/16 (23000 ksi)	488	18013.40	21000.00	85.8	Pass
T4	140 - 120	Guy B@126.75	9/16 (23000 ksi)	499	11512.40	21000.00	54.8	Pass
T7	80 - 60	Guy B@66.75	7/16 (23000 ksi)	505	5701.90	12480.00	45.7	Pass
T1	200 - 180	Guy C@186.75	9/16 (23000 ksi)	484	18442.80	21000.00	87.8	Pass
T4	140 - 120	Guy C@126.75	9/16 (23000 ksi)	495	11465.80	21000.00	54.6	Pass
T7	80 - 60	Guy C@66.75	7/16 (23000 ksi)	501	5706.51	12480.00	45.7	Pass
T1	200 - 180	Top Guy Pull-Off@186.75	1	23	-10729.60	15791.60	67.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T4	140 - 120	Top Guy Pull-Off@126.75	3 1/2x1 3/8	497	4718.20	155925.00	3.0	Pass
T7	80 - 60	Top Guy Pull-Off@66.75	3 1/2x1 3/8	503	2823.65	155925.00	1.8	Pass
T1	200 - 180	Torque Arm Top@186.75	C12x20.7	494	-5946.40	178357.00	74.7	Pass
							Summary	
						Pole (L1)	69.5	Pass
						Leg (T1)	87.8	Pass
						Diagonal (T2)	93.0	Pass
						Horizontal (T1)	24.5	Pass
						Secondary Horizontal (T1)	0.1	Pass
						Top Girt (T2)	23.4	Pass
						Bottom Girt (T1)	48.1	Pass
						Guy A (T1)	87.9	Pass
						Guy B (T1)	85.8	Pass
						Guy C (T1)	87.8	Pass
						Top Guy Pull-Off (T1)	67.9	Pass
						Torque Arm Top (T1)	74.7	Pass
						Bolt Checks	33.7	Pass
						RATING =	**93.0**	**Pass**

NOTES:

1. UPGRADE DESIGN VALID FOR APPURTENANCES LISTED IN DESTEK ANALYSIS REPORT DATED 10/24/2018. CONTRACTOR TO REVIEW AND SHOULD ADHERE TO THE REPORT.

2. CONTRACTOR TO REMOVE AND REATTACH EXISTING APPURTENANCES AS NEEDED.

3. ALL DIMENSIONS ARE BASED ON A STRUCTURAL ANALYSIS REPORT PREPARED BY DESTEK, DATED 10/24/2018.

4. CONTRACTOR TO FIELD VERIFY EXISTING TOWER MEMBER SIZES AND TOWER DIMENSIONS IN THE VICINITY OF THE UPGRADE, BEFORE FABRICATION OF STEEL AND COMMENCEMENT OF WORK. ANY DISCREPANCY SHOULD BE REPORTED TO DESTEK IMMEDIATELY FOR FURTHER EVALUATION.

5. DO NOT PERFORM THE WORK ON THE TOWER WHEN WINDS GUST MORE THAN 15 MPH AT THE GROUND LEVEL.

6. CONTRACTOR SHALL PLUMB THE TOWER AND RE-TENSION ALL GUY WIRES IN ACCORDANCE WITH THE CHART ON S2.

7. NEW TOWER REACTIONS:

BASE COMPRESSION:	137 KIPS
GUY ANCHOR UPLIFT:	35.5 KIPS
GUY ANCHOR SHEAR:	36.9 KIPS

8. CONTRACTOR TO HAVE THE SAFETY CLIMB INTACT AND FUNCTIONAL AFTER WORK IS COMPLETE.

9. TOWER WILL BECOME UNSTABLE WHEN MEMBERS ARE DISCONNECTED OR BEING REPLACED. CONTRACTOR IS FULLY RESPONSIBLE TO MAINTAIN STABILITY OF THE TOWER DURING WORK AND SHOULD CONSULT WITH AN ENGINEER.

10. DESTEK DISCLAIMS ANY LIABILITY ARISING FROM THE ORIGINAL MATERIAL, FABRICATION OR ERECTION OF THE TOWER.

11. GUY WIRES
INITIAL TENSIONS SHALL BE READ ON CALM DAYS WITH WIND VELOCITIES OF 15 MPH OR LESS.
a. GALVANIZED STEEL GUY CABLES SHALL CONFORM TO THE REQUIREMENTS OF THE "STANDARD SPECIFICATION FOR ZINC COATED STEEL STRUCTURAL WIRE ROPE" ASTM A475. ROPE SHALL BE 6X7 (6 STRANDS, 7 WIRES PER STRAND (EHS)), MULTIPLE STRAND WITH WIRE STRAND CORE.
b. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INSURE THE STABILITY AND SAFETY OF THE TOWER INCLUDING THE ADEQUACY OF TEMPORARY OR INCOMPLETE CONNECTIONS DURING CONSTRUCTION. PROVISIONS MUST BE MADE TO PROTECT ALL PROPERTY IN VICINITY OF THE TOWER.
c. THE CONTRACTOR SHALL PLUMB THE TOWER AND ADJUST ALL GUY CABLES IN ACCORDANCE WITH THE GUY-TENSIONING CHART ON SHEET S3 GIVEN FIELD CONDITIONS NOTED IN 11.a.
d. DESTEK DISCLAIMS ANY LIABILITY ARISING FROM THE ORIGINAL MATERIAL, FABRICATION OR ERECTION OF THE TOWER.

12. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION), OSHA, AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.

1. DESIGN INFORMATION AND GENERAL REQUIREMENTS

1.1 CODES
a. 2016 CONNECTICUT STATE BUILDING CODE, INTERNATIONAL CODE COUNCIL AND CONNECTICUT DEPARTMENT OF ADMINISTRATIVE SERVICES
b. MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES, ASCE/SEI 7-10, AMERICAN SOCIETY OF CIVIL ENGINEERS
c. STEEL CONSTRUCTION MANUAL, 14TH EDITION, AMERICAN INSTITUTE OF STEEL CONSTRUCTION
d. STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, ANSI/TIA-222-G, TELECOMMUNICATIONS INDUSTRY ASSOCIATION

1.2 GENERAL
a. PRIOR TO PURCHASE OR FABRICATION OF MATERIAL, THE CONTRACTOR SHALL PERFORM AN INSPECTION VERIFYING MEMBER DIMENSIONS AND BOLT SIZES. SHOULD THE CONTRACTOR DISCOVER ANY DAMAGED OR MISSING MEMBERS OR THE MEMBER OR BOLT SIZES DO NOT MATCH THOSE LISTED, DESTEK SHALL BE NOTIFIED IMMEDIATELY.
b. CONTRACTOR TO REPLACE ALL BOLTS REMOVED WITH NEW BOLTS OF SAME TYPE, UNLESS NOTED OTHERWISE.

1.3 LOADS & DESIGN CRITERIA
WIND LOADING: V=105MPH; EXPOSURE CATEGORY B, STRUCTURE CLASS II

2. STRUCTURAL STEEL

2.1 MATERIALS
a. STRUCTURAL STEEL . . . . . ASTM A992
ANGLE & PLATE . . . . . ASTM A36
PIPE . . . . . ASTM A53 GRADE B (OR Fy>35KSI)
HSS ROUND . . . . . ASTM A500 GRADE B (Fy>42KSI)
BARS (SOLID RODS) . . . . . ASTM A36
b. BOLTS . . . . . ASTM A325N U.N.O.
c. WELDING ELECTRODES . . . . . AWS A5.1 (E70XX)
d. STEEL CONSTRUCTION SHALL CONFORM TO "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, ANSI/AISC 360-10"
e. WELDING SHALL CONFORM TO AWS D1.1/D1.3/D1.7 AS APPLICABLE.
f. THE FABRICATOR SHALL FURNISH CHECKED SHOP AND ERECTION DRAWINGS TO THE ENGINEER, AND OBTAIN APPROVAL PRIOR TO FABRICATING ANY STRUCTURAL STEEL. SHOP DRAWINGS SHALL CONFORM TO "DETAILING FOR STEEL CONSTRUCTION, 2ND EDITION"
g. POOR MATCHING OF HOLES SHALL BE CORRECTED BY DRILLING TO THE NEXT LARGER SIZE. WELDING FOR RE-DRILLING WILL NOT BE PERMITTED.

2.2 CONNECTIONS
a. SHOP CONNECTIONS MAY BE BOLTED OR WELDED
b. FIELD CONNECTIONS BOLTED WITH A325-N BOLTS, (INSTALLED SNUG TIGHT) UNLESS OTHERWISE SPECIFIED OR IF WELDED CONNECTIONS ARE NOTED ON DRAWINGS
c. FIELD CONNECTIONS SHALL BE MADE WITH A325-N BOLTS AND HARDENED WASHERS EXCEPT AS INDICATED ON THE DESIGN DRAWINGS
d. CONNECTIONS NOT SHOWN ON DRAWINGS SHALL BE DESIGNED BY THE STEEL FABRICATOR. CONNECTIONS SHALL BE DESIGNED IN ACCORDANCE WITH AISC "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS" AND "AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"
e. DO NOT FIELD CUT OR ALTER STRUCTURAL MEMBERS WITHOUT PRIOR WRITTEN APPROVAL OF ENGINEER.
f. BOLT HOLES SHALL BE CUT, DRILLED OR PUNCHED AT RIGHT ANGLES TO THE SURFACE OF THE METAL AND SHALL NOT BE MADE OR ENLARGED BY BURNING. HOLES SHALL BE CLEAN CUT WITHOUT TORN OR RAGGED EDGES. OUTSIDE BURRS RESULTING FROM DRILLING OR REAMING OPERATION SHALL BE REMOVED WITH A TOOL MAKING A 1/16 INCH BEVEL. BOLT HOLES SHALL BE 1/16 INCH OVERSIZE.

2.3 FINISHES
a. STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED AFTER FABRICATION PER ASTM A123
b. BOLTS AND NUTS SHALL BE HOT DIP GALVANIZED PER ASTM A153.
c. ALL SURFACES DAMAGED DURING THE WORK SHALL BE PAINTED WITH COLD GALVANIZING COMPOUND TWICE. THE PAINT SHOULD BE AT LEAST 93% PURE ZINC. RUST-OLEUM PROFESSIONAL, (MODEL# 7585838) OR SIMILAR.

2.4 WELDING
a. CONTRACTOR TO TAKE ALL NECESSARY PRECAUTIONS FOR FIRE PREVENTION DURING WELDING, SUCH AS; INSTALLING 3000 (NFPA 701) FIRE BLANKET AROUND COAX. MORE SPLATTER AND SPARKS SHOULD BE ANTICIPATED WHILE WELDING ON GALVANIZED SURFACE. COAX IS FLAMMABLE AND SHALL CATCH FIRE IF NOT PROTECTED. WATER SHALL BE ON SITE OF ADEQUATE AMOUNT AND AVAILABLE AT SHORT NOTICE AT ALL TIMES DURING WELDING ACTIVITY. CONTRACTOR SHOULD BE ABLE TO TRANSPORT THE WATER TO THE HEIGHT WELDING BEING PERFORMED.
b. WELDING ON GALVANIZED SURFACE SHOULD BE DONE WITH EXTREME CAUTION. IF THE WELD MATERIAL IS CONTAMINATED WITH ZINC, IT DOES NOT PROVIDE A STRUCTURAL WELD. GRIND GALVANIZING BEFORE WELDING.
c. WELDING CERTIFICATE MUST BE PROVIDED PRIOR TO WELDING. ALL WELDING SHALL BE PERFORMED BY AWS QUALIFIED WELDER WHO HAS EXPERIENCE WITH GALVANIZED SURFACES.

DRAWINGS PLOTTED TO SCALE ON 11x17 SHEETS

DESTEK ENGINEERING
DESTEK ENGINEERING, LLC
1281 KENNESTONE CIRCLE
SUITE 100
MARIETTA, GA 30066
TEL NO: 770-693-0835
ADMIN@DESTEKENGINEERING.COM
LICENSE NO: PEC0001429

PREPARED FOR:
T-Mobile Northeast, LLC
35 Griffin Road South
Bloomfield, CT 06002

NUM	DATE	DESCRIPTION:
A	10/24/18	ISSUED FOR CONSTRUCTION

CTNL223A - CITADEL GROTON GUYED

ADDRESS:
115 BRIAR HILL ROAD
GROTON, CT 06340

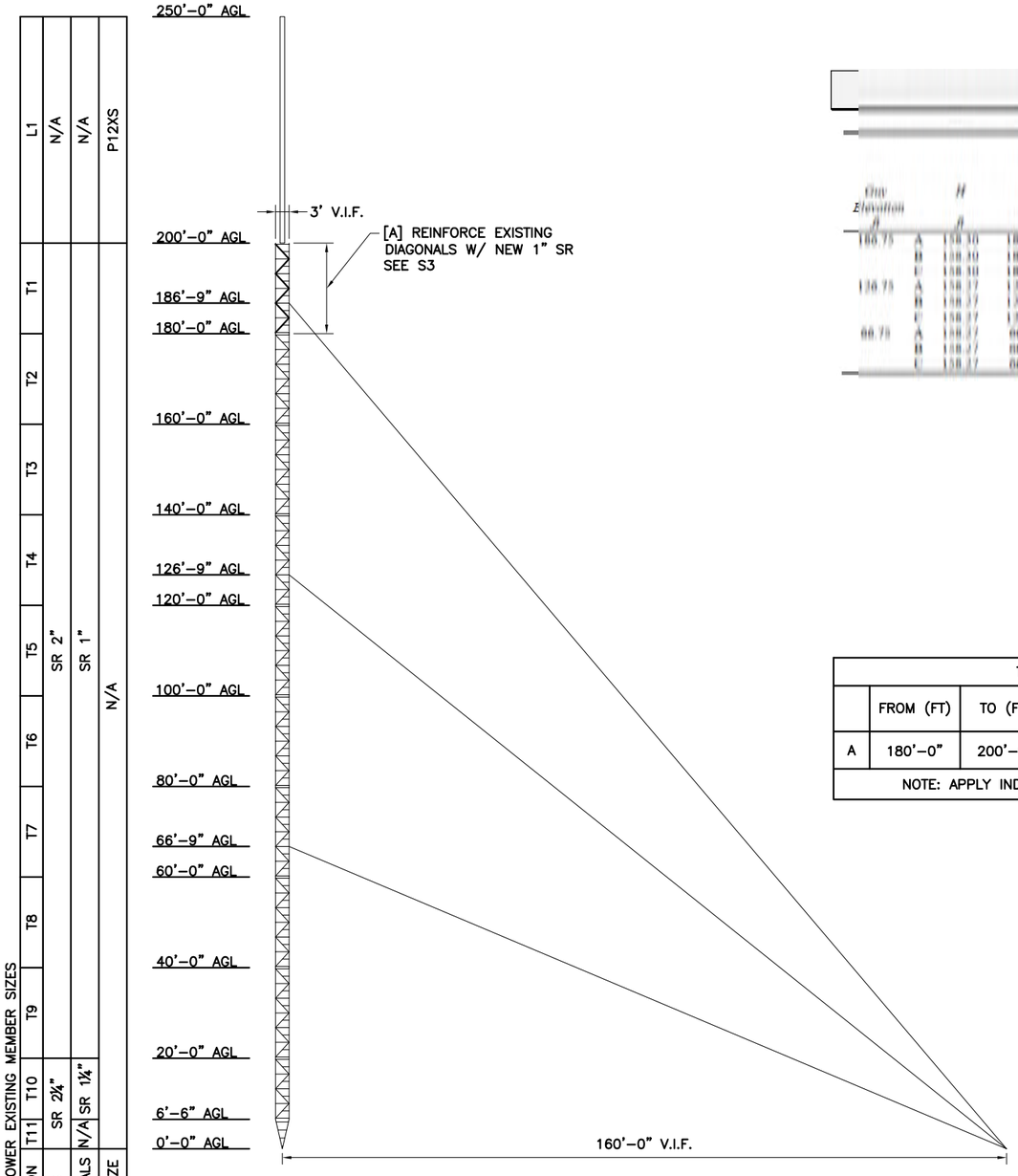
STATE OF CONNECTICUT
AHMET COLAKOGLU
PEN. 27057
LICENSED PROFESSIONAL ENGINEER
10-24-2018

Ahmet Colakoglu, PE
CT License No: 27057

DESIGNED: EM
DRAWN: EM
CHECKED: AC

JOB #: 1875058

S1
NOTES



1 / S2 **TOWER ELEVATION** N.T.S.

Guy-Tensioning Information

Guy Elevation ft		H ft	V ft	Temperature At Time Of Tensioning: 0 F Initial Tension lb	0 F Intercept ft	20 F Initial Tension lb	20 F Intercept ft	40 F Initial Tension lb	40 F Intercept ft	60 F Initial Tension lb	60 F Intercept ft	80 F Initial Tension lb	80 F Intercept ft	100 F Initial Tension lb	100 F Intercept ft	120 F Initial Tension lb	120 F Intercept ft
186.75	A	138.30	186.75	4180	4.73	3950	5.01	3720	5.31	3500	5.64	3280	6.01	3060	6.44	2840	6.90
	B	138.30	186.75	4180	4.73	3950	5.01	3720	5.31	3500	5.64	3280	6.01	3060	6.44	2840	6.90
	C	138.30	186.75	4180	4.73	3950	5.01	3720	5.31	3500	5.64	3280	6.01	3060	6.44	2840	6.90
126.75	A	138.27	126.75	4498	3.03	4160	3.38	3827	3.76	3500	4.19	3181	4.73	2873	5.37	2576	5.37
	B	138.27	126.75	4498	3.03	4160	3.38	3827	3.76	3500	4.19	3181	4.73	2873	5.37	2576	5.37
	C	138.27	126.75	4498	3.03	4160	3.38	3827	3.76	3500	4.19	3181	4.73	2873	5.37	2576	5.37
66.75	A	138.27	66.75	2843	2.06	2584	2.28	2330	2.51	2080	2.81	1837	3.18	1605	3.64	1388	4.20
	B	138.27	66.75	2843	2.06	2584	2.28	2330	2.51	2080	2.81	1837	3.18	1605	3.64	1388	4.20
	C	138.27	66.75	2843	2.06	2584	2.28	2330	2.51	2080	2.81	1837	3.18	1605	3.64	1388	4.20

TOWER MODIFICATION SCHEDULE				
	FROM (FT)	TO (FT)	MODIFICATION	REFERENCE SHEET
A	180'-0"	200'-0"	REINFORCE EXISTING DIAGONALS W/ NEW 1" SR	S3
NOTE: APPLY INDICATED MODIFICATIONS TO ALL 3 TOWER FACES				

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PREPARED FOR:
T-Mobile Northeast, LLC
35 Griffin Road South
Bloomfield, CT 06002

NUM	DATE	DESCRIPTION:
A	10/24/18	ISSUED FOR CONSTRUCTION

CTNL223A – CITADEL GROTON GUYED

ADDRESS:
115 BRIAR HILL ROAD
GROTON, CT 06340

DESIGNED: EM
DRAWN: EM
CHECKED: AC

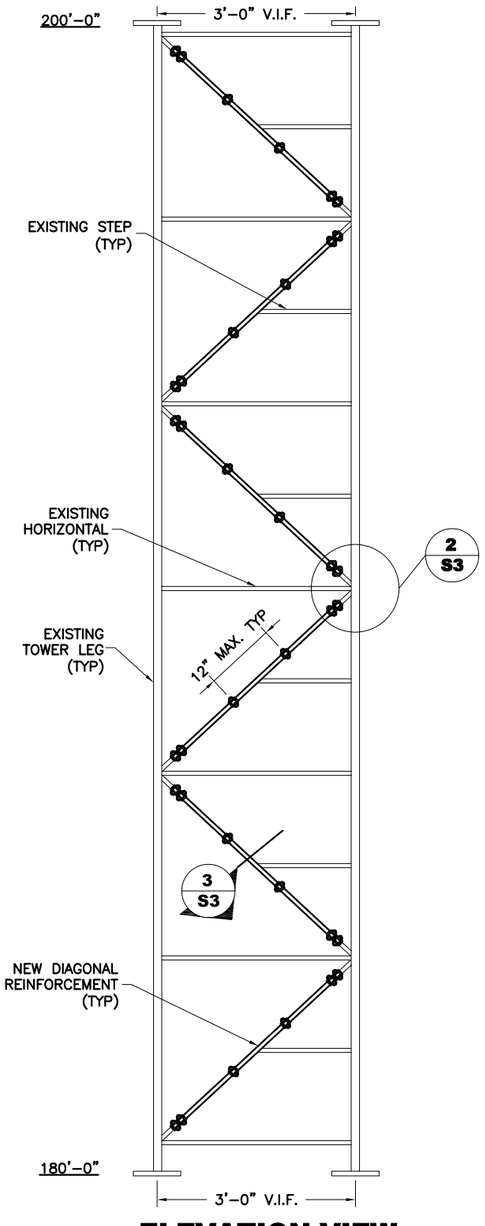
JOB #: 1875058

S2 ELEVATION

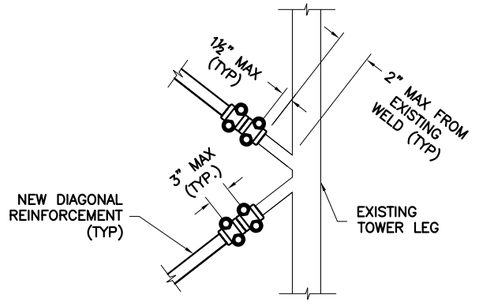
STATE OF CONNECTICUT
AHMET COLAKOGLU
PEN. 27057
LICENSED PROFESSIONAL ENGINEER
10-24-2018

Ahmet Colakoglu, PE
CT License No: 27057

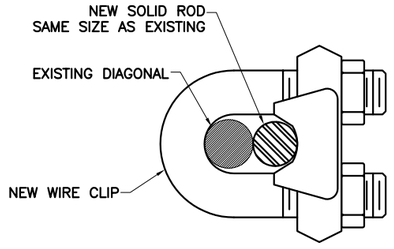
DRAWINGS PLOTTED TO SCALE ON 11x17 SHEETS



1 S3 ELEVATION VIEW
N.T.S.



2 S3 SOLID ROD END CONNECTION
N.T.S.



3 S3 SOLID ROD CONNECTION
N.T.S.

SOLID ROD ATTACHMENT NOTES:
1. IF EXISTING SOLID ROD MEMBERS ARE BENT, THEY WILL NEED STRAIGHTENING PRIOR TO ATTACHMENT OF NEW MEMBERS. PLEASE CONTACT DESTEK PRIOR TO INSTALLATION.

2. NEW SOLID ROD SHALL BE INSTALLED PARALLEL & STRAIGHT AGAINST EXISTING SOLID ROD MEMBER.

DESTEK ENGINEERING
DESTEK ENGINEERING, LLC
1281 KENNESTONE CIRCLE
SUITE 100
MARIETTA, GA 30066
TEL NO: 770-693-0835
ADMIN@DESTEKENGINEERING.COM
LICENSE NO: PEC0001429

PREPARED FOR:
T-Mobile Northeast, LLC
35 Griffin Road South
Bloomfield, CT 06002

NUM	DATE	DESCRIPTION:
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ADDRESS:
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STATE OF CONNECTICUT
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LICENSED PROFESSIONAL ENGINEER
10-24-2018

Ahmet Colakoglu, PE
CT License No: 27057

DESIGNED: EM
DRAWN: EM
CHECKED: AC

JOB #: 1875058

S3 STRUCTURAI DETAILS

DRAWINGS PLOTTED TO SCALE ON 11x17 SHEETS

Exhibit E

October 24, 2018

To: T-Mobile Northeast, LLC
35 Griffin Road South
Bloomfield, CT 06002

Subject: Mount Assessment – CTNL223A (Destek Job #: 1875058)

Per your request, Destek Engineering, LLC (Destek) has performed a structural assessment of the antenna mounting system which supports the T-Mobile Equipment at the referenced site. We have evaluated the subject mount for the additions and alterations specified in the RFDS, which is referenced in Table 1. This assessment is based on the documents and information listed in Table 1 and is in accordance with the mount loading and evaluation criteria stated in Table 2.

Based on our experience with similar mount structures and with respect to the changes in applied loads, Destek opines that the mount **WILL BE ADEQUATE** ***once for all sectors: the antennas are redistributed in the mount faces not closer than 4 feet apart min., the largest antenna (RFS APXVAARR24-43-U-NA20) is located at the center of the mount, and a second 2.0 STD stiff-arm is installed similar to the existing but bracing the opposite end.***

This assessment is only valid for the loading scenario described herein. Variations between this document and actual field conditions will void this assessment. It is assumed that all structural members and connections of the subject mount are in good condition and the mount has been properly designed, constructed and assembled. Discrepancies between this document and field conditions should be immediately brought to our attention. It is assumed that the tower and other components of the site have been analyzed and qualified by others.

We at *Destek Engineering, LLC* appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other project, please do not hesitate to contact us.

Sincerely,
Destek Engineering, LLC
License No: PEC00001429

10-24-2018

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: 27057

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 - Tel: (770) 693-0835

References and Loading

Table 1: Documents and Information Provided

DOCUMENT	PREPARED BY	DATE
Structural Analysis Report	Destek Engineering, LLC	09/15/2016
RFDS	T-Mobile	05/16/2018
Site Photos	ForeSite LLC	02/27/2017

Table 2: Mount Loading and Evaluation Criteria

LOCATION	Groton, New London County, CT
BUILDING CODE AND TOWER STANDARD	2016 Connecticut State Building Code and TIA-222-G
RAD CENTER	177 ft
STRUCTURE TYPE	Guyed Tower
EXPOSURE CATEGORY	B
WIND LOADING	135 mph ultimate basic wind (105 mph nominal wind speed)
ICE LOADING	0.75 inch ice with 50 mph basic wind. Ice is considered to increase in thickness with height
CLASS	II
TOPOGRAPHIC CATEGORY	1

Table 2.1 –Existing Appurtenance Configuration

QTY	MODEL
3	AIR32 KRD901146-1 B66A B2A – Antennas
3	AIR21 KRC118023-1 B2A B4P – Antennas

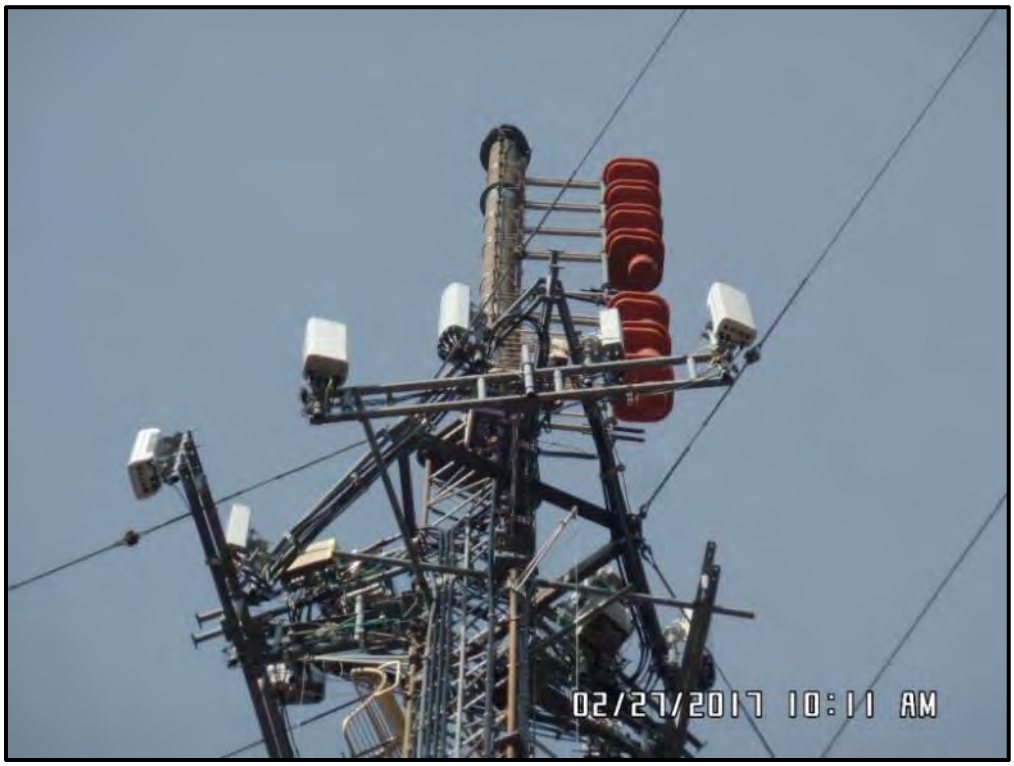
Table 2.2 – Proposed and Final Appurtenance Configuration

QTY	MODEL
3	AIR32 KRD901146-1 B66A B2A – Antennas
3	AIR21 KRC118023-1 B2A B4P - Antennas
3	APXVAARR24-43-U-NA20 – Antennas*
3	Radio 4449 B71 + B12 – RRUs**

*** To be mounted centered on the sector mount face**
****To be mounted behind the antenna**

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 - Tel: (770) 693-0835

Mount Photos



Gamma Sector Mount. Note antennas must be redistributed in mount face

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 - Tel: (770) 693-0835

Exhibit F

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CTNL223A

Citadel Groton Guyed
99 Briar Hill Road
Groton, CT 06340

November 14, 2018

EBI Project Number: 6218007158

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	7.63 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

November 14, 2018

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CTNL223A – Citadel Groton Guyed**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **99 Briar Hill Road, Groton, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **99 Briar Hill Road, Groton, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 1 UMTS channel (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

2) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

8) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antennas used in this modeling are the **Ericsson AIR32 KRD901146-1 B66A/B2A** & **Ericsson AIR21 KRC118023-1 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **RFS APXVAARR24_43-U-NA20** for 600 MHz and 700 MHz channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antenna mounting height centerline of the proposed antennas is **177 feet** above ground level (AGL).

11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

12) All calculations were done with respect to uncontrolled / general population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A	Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A	Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	177 feet	Height (AGL):	177 feet	Height (AGL):	177 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	200	Total TX Power(W):	200	Total TX Power(W):	200
ERP (W):	7,780.90	ERP (W):	7,780.90	ERP (W):	7,780.90
Antenna A1 MPE%	**0.96**	Antenna B1 MPE%	**0.96**	Antenna C1 MPE%	**0.96**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 KRC118023-1 B2A/B4P	Make / Model:	Ericsson AIR21 KRC118023-1 B2A/B4P	Make / Model:	Ericsson AIR21 KRC118023-1 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	177 feet	Height (AGL):	177 feet	Height (AGL):	177 feet
Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	40	Total TX Power(W):	40	Total TX Power(W):	40
ERP (W):	1,556.18	ERP (W):	1,556.18	ERP (W):	1,556.18
Antenna A2 MPE%	**0.19**	Antenna B2 MPE%	**0.19**	Antenna C2 MPE%	**0.19**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	dBd	Gain:	dBd	Gain:	dBd
Height (AGL):	177 feet	Height (AGL):	177 feet	Height (AGL):	177 feet
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,443.03	ERP (W):	2,443.03	ERP (W):	2,443.03
Antenna A3 MPE%	**0.71**	Antenna B3 MPE%	**0.71**	Antenna C3 MPE%	**0.71**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**1.86 %**
WSUB	**2.54** %
WQGN	**0.79** %
WNLC	**1.76** %
Sprint	**0.68** %
Site Total MPE %:	**7.63 %**

T-Mobile Sector A Total:	1.86 %
T-Mobile Sector B Total:	1.86 %
T-Mobile Sector C Total:	1.86 %
Site Total:	7.63 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile PCS - 1900 MHz LTE	2	1,556.18	177	3.83	PCS - 1900 MHz	1000.00	0.38%
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	177	5.74	AWS - 2100 MHz	1000.00	0.57%
T-Mobile PCS - 1900 MHz UMTS	1	1,556.18	177	1.91	PCS - 1900 MHz	1000.00	0.19%
T-Mobile 600 MHz LTE	2	788.97	177	1.94	600 MHz	400.00	0.49%
T-Mobile 700 MHz LTE	2	432.54	177	1.06	700 MHz	467.00	0.23%
						Total:	**1.86%**

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

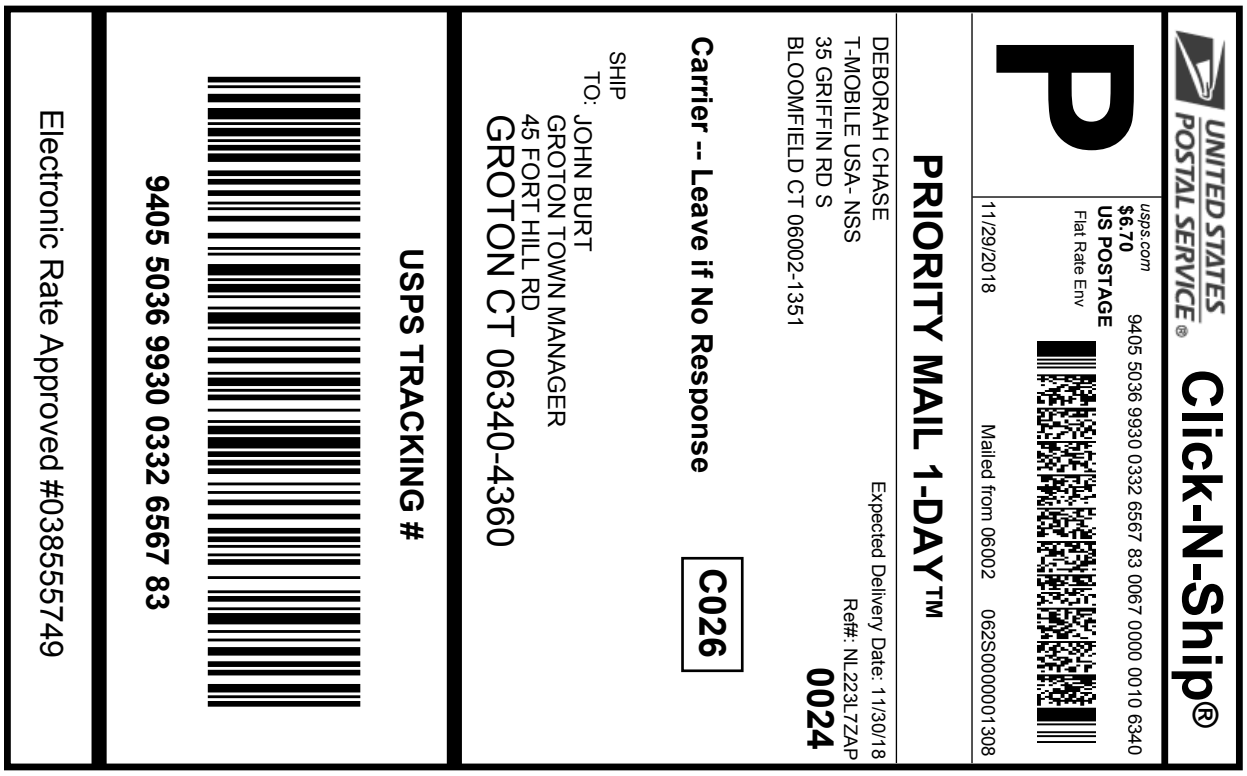
The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	1.86 %
Sector B:	1.86 %
Sector C:	1.86 %
T-Mobile Maximum MPE % (Per Sector):	1.86 %
Site Total:	7.63 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **7.63%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Exhibit G



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2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0332 6567 83

Trans. #:	449837271
Print Date:	11/29/2018
Ship Date:	11/29/2018
Expected Delivery Date:	11/30/2018

Priority Mail® Postage:	**$6.70**
Total	**$6.70**

From: DEBORAH CHASE
T-MOBILE USA- NSS
35 GRIFFIN RD S
BLOOMFIELD CT 06002-1351

Ref#: NL223L7ZAP

To: JOHN BURT
GROTON TOWN MANAGER
45 FORT HILL RD
GROTON CT 06340-4360

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

Thank you for shipping with the United States Postal Service!
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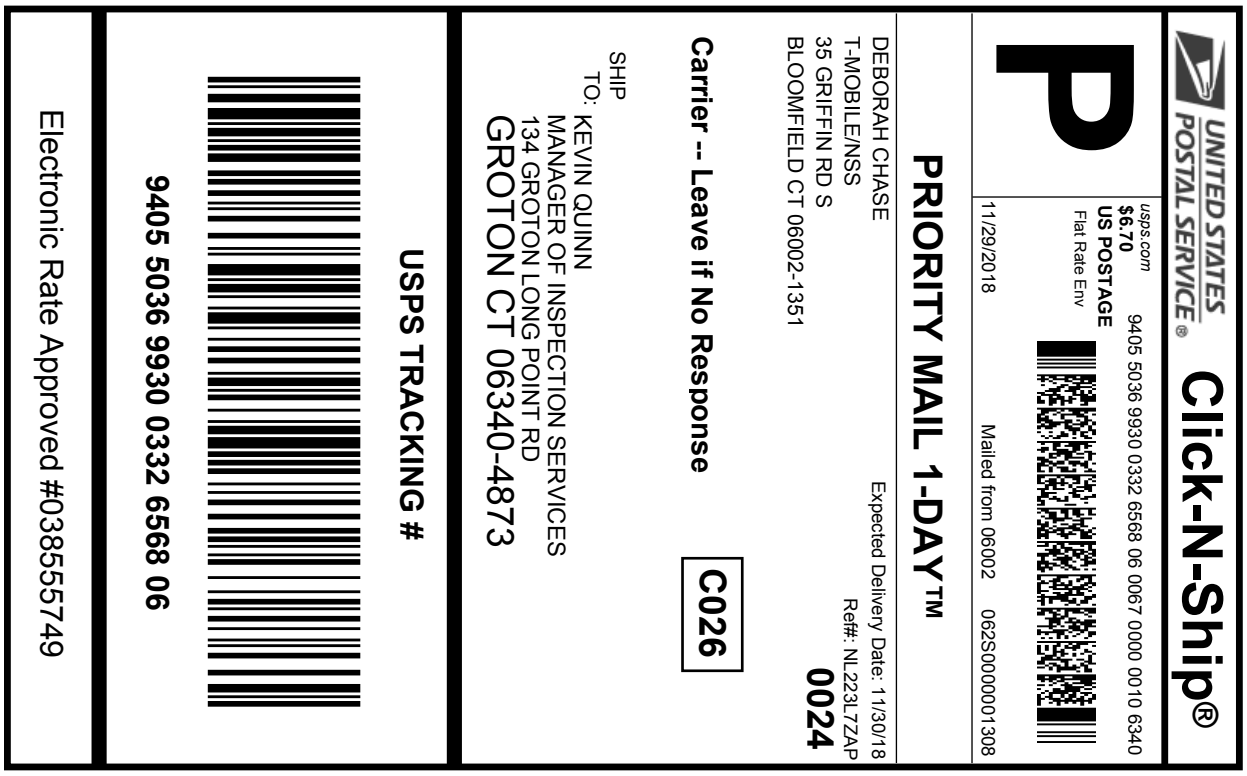

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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0332 6568 06

Trans. #:	449837271
Print Date:	11/29/2018
Ship Date:	11/29/2018
Expected Delivery Date:	11/30/2018

Priority Mail® Postage:	**$6.70**
Total	**$6.70**

From: DEBORAH CHASE
T-MOBILE/NSS
35 GRIFFIN RD S
BLOOMFIELD CT 06002-1351

Ref#: NL223L7ZAP

To: KEVIN QUINN
MANAGER OF INSPECTION SERVICES
134 GROTON LONG POINT RD
GROTON CT 06340-4873

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

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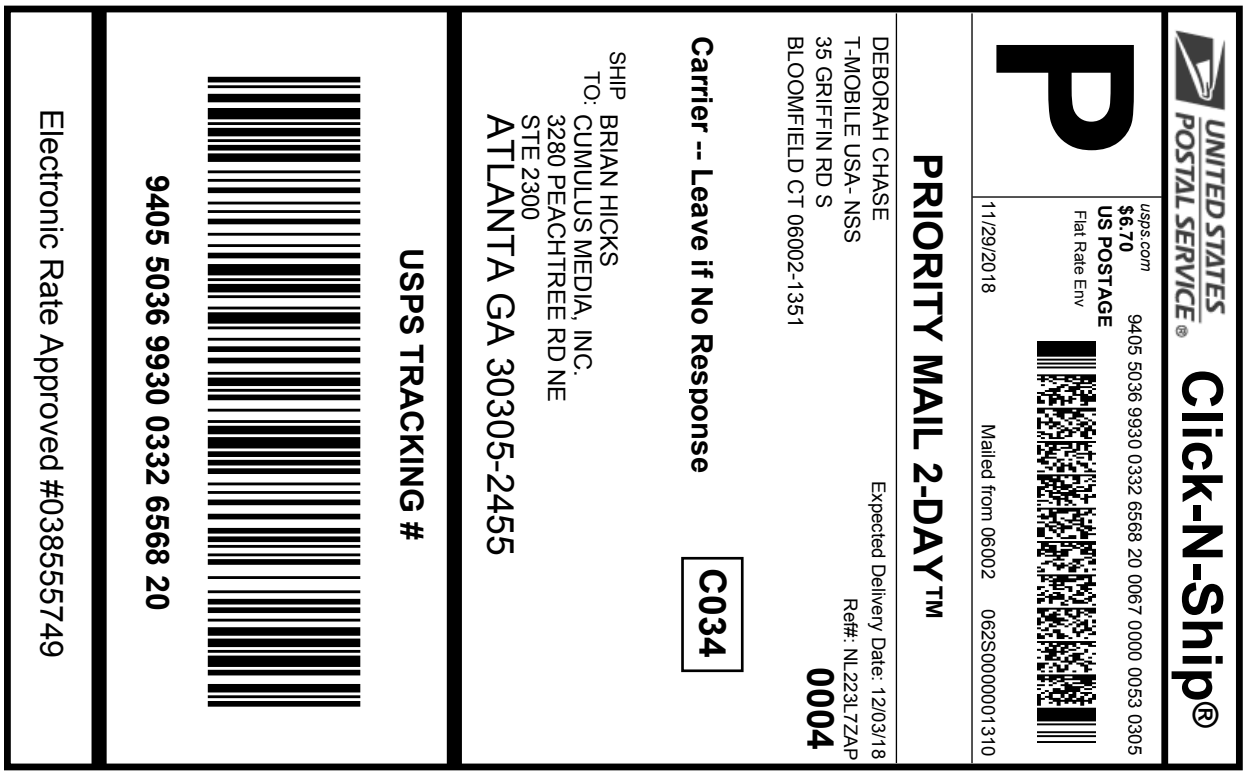

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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0332 6568 20

Trans. #:	449837271
Print Date:	11/29/2018
Ship Date:	11/29/2018
Expected Delivery Date:	12/03/2018

Priority Mail® Postage:	**$6.70**
Total	**$6.70**

From: DEBORAH CHASE
T-MOBILE USA- NSS
35 GRIFFIN RD S
BLOOMFIELD CT 06002-1351

Ref#: NL223L7ZAP

To: BRIAN HICKS
CUMULUS MEDIA, INC.
3280 PEACHTREE RD NE
STE 2300
ATLANTA GA 30305-2455

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

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