10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

Transcend Wireless

December 29, 2021

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

RE: Notice of Exempt Modification
330 Pokorny Road, Higganum, Connecticut 06441
Latitude: 41.263699
Longitude: -72.335932
T-Mobile Site#: CTHA563A - Sprint Keep Project

Dear Ms. Bachman:

T-Mobile/Sprint currently maintains six (6) antennas at the 155-foot level of the existing 280-foot Lattice Tower at 330 Pokorny Road, Higganum, Connecticut. The 280-foot Lattice Tower and ground space is owned and operated by Connecticut Light and Power (AKA Eversource). T-Mobile/Sprint now intends to remove all Sprint equipment including antennas, cables, and ground equipment. T-mobile will be adding six (6) antennas. The new antennas will be installed at the same 155-foot level. The new antennas support 5G services.

Planned Modifications:
Tower:
Remove
(6) Sprint Antennas
(9) Sprint RRHs
All Sprint Cables

Install New:
(3) APXVAALL24 43-U-NA20 Antennas
(3) AIR6449 Antennas
(3) Ericsson Radio 4460 B25+B66
(3) Ericsson 4480 B71+B85
(3) 6/24 Hybrid Cables

Ground:
Install New:

(1) 6160 Cabinet and (1) B160 Battery Cabinet
(1) 10'x4' Concrete Pad
(1) 25 KW Diesel Back-Up Generator

To Be Removed:
All Sprint Ground Equipment

This facility was not originally approved by the Connecticut Siting Council. However, the existing tower was approved by the Siting Council in Petition No. 1027 in 2012. The petition is attached.

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 First Selectman - Robert McGarry, Elected Official, and Bill Warner, Town Planner, as well as the tower and property 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,

Eric Breun
Transcend Wireless
Cell: 201-658-7728
Email: ebreun@transcendwireless.com

Attachments
cc: Robert McGarry – as First Selectman of Haddam/Higganum
Bill Warner - Town Planner
CL&P / Eversource - Tower/Property Owner

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS **1 OF 1**

SHIP TO:
FIRST SELECTMAN
ROBERT MCGARRY
30 FIELD PARK DRIVE
HADDAM CT 06438

CT 063 5-02

UPS GROUND
TRACKING #: 1Z V25 742 03 9605 7093

BILLING: P/P

Reference #1: CTHA563A

XOL 21.11.24 NV45 52.0A 12/2021*

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS **1 OF 1**

SHIP TO:
TOWN PLANNER
BILL WARNER
30 FIELD PARK DRIVE
HADDAM CT 06438

CT 063 5-02

UPS GROUND
TRACKING #: 1Z V25 742 03 9686 7084

BILLING: P/P

Reference #1: CTHA563A

XOL 21.11.24 NV45 52.0A 12/2021*

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
CHRIS GELINAS
CL&P / EVERSOURCE
107 SELDEN STREET
BERLIN CT 06037

CT 061 9-02

UPS GROUND

TRACKING #: 1Z V25 742 03 9526 7108

BILLING: P/P

Reference #1: CTHA563A

XOL 21.11.24 NV45 92.0A 12/2021*

TM

Hello, your package has been delivered.

Delivery Date: Thursday, 12/23/2021

Delivery Time: 11:11 AM

Left At: DOCK

Signed by: HAJ

TRANSCEND WIRELESS

Tracking Number:	1ZV257420395267108
Ship To:	CL&P / EVERSOURCE 107 SELDEN STREET BERLIN, CT 06037 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTHA563A

Hello, your package has been delivered.

Delivery Date: Monday, 12/27/2021

Delivery Time: 11:42 AM

TRANSCEND WIRELESS

Tracking Number:	1ZV257420396057093
Ship To:	ROBERT MCGARRY 30 FIELD PARK DRIVE HADDAM, CT 06438 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTHA563A

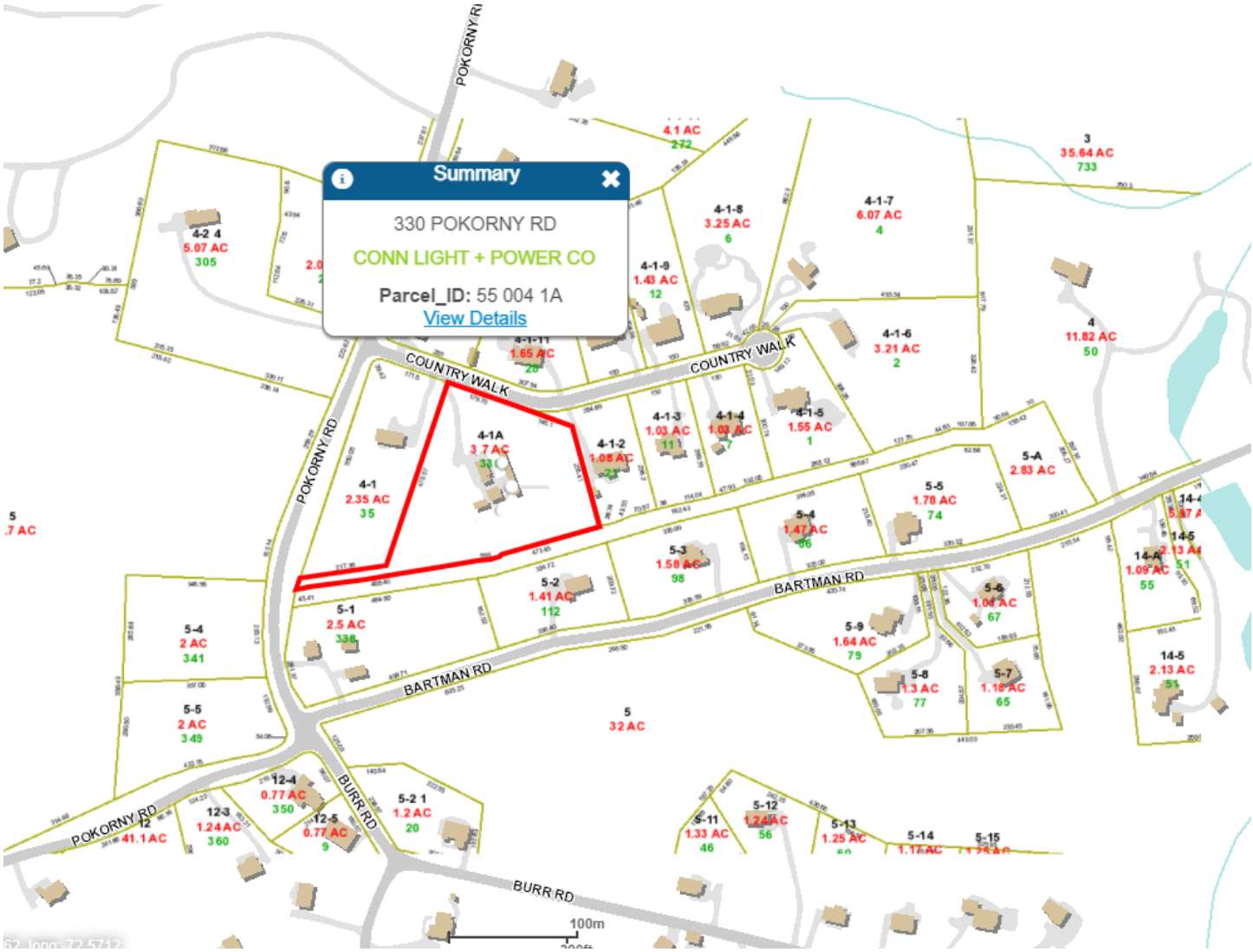
Hello, your package has been delivered.

Delivery Date: Monday, 12/27/2021

Delivery Time: 11:42 AM

TRANSCEND WIRELESS

Tracking Number:	1ZV257420396867084
Ship To:	BILL WARNER 30 FIELD PARK DRIVE HADDAM, CT 06438 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTHA563A


Summary
330 POKORNY RD
CONN LIGHT + POWER CO
Parcel_ID: 55 004 1A
View Details
POKORNY RD
COUNTRY WALK
BARTMAN RD
BURR RD
4-1A
3.7 AC
4-1
2.35 AC
35
4-1-2
1.08 AC
4-1-3
1.03 AC
4-1-4
1.03 AC
4-1-5
1.55 AC
1
4-1-6
3.21 AC
2
4-1-7
6.07 AC
4
4-1-8
3.25 AC
6
4-1-9
1.43 AC
12
4-1-11
1.65 AC
4.1 AC
272
3
35.64 AC
733
4
11.82 AC
50
4-2 4
5.07 AC
305
5-1
2.5 AC
338
5-2
1.41 AC
112
5-3
1.58 AC
98
5-4
1.47 AC
5-5
1.78 AC
74
5-A
2.83 AC
5-6
5-7
1.18 AC
65
5-8
1.3 AC
77
5-9
1.64 AC
79
5
32 AC
5-4
2 AC
341
5-5
2 AC
349
12-4
0.77 AC
350
12-3
1.24 AC
360
12-5
0.77 AC
9
5-2 1
1.2 AC
20
5-11
1.33 AC
46
5-12
1.24 AC
56
5-13
1.25 AC
5-14
5-15
14-A
1.09 AC
55
14-5
2.13 AC
51
100m

Parcel Information

Location:	330 POKORNY RD	Property Use:	Vacant Land	Primary Use:	Cell Tower
Unique ID:	P0506400	Map Block Lot:	55 004 1A	Acres:	3.70
490 Acres:	0.00	Zone:	R-2A	Volume / Page:	0132/0086
Developers Map / Lot:		Census:	5901		
Location:	330 POKORNY RD	Property Use:	Vacant Land	Primary Use:	Cell Tower
Unique ID:	P0506400	Map Block Lot:	55 004 1A	Acres:	3.70
490 Acres:	0.00	Zone:	R-2A	Volume / Page:	0132/0086
Developers Map / Lot:		Census:	5901		

Value Information

	Appraised Value	Assessed Value
Land	109,500	76,650
Buildings	0	0
Detached Outbuildings	923,830	646,680
Total	1,033,330	723,330

Owner's Information

Owner's Data
CONN LIGHT + POWER CO TAX DEPT PO BOX 270 HARTFORD, CT 06141

Detached Outbuildings

Type:	Year Built:	Length:	Width:	Area:
Frame Shed	1986	22.00	29.00	638
Cell Tower	2014	0.00	0.00	1

Owner History - Sales

Owner Name	Volume	Page	Sale Date	Deed Type	Sale Price
CONN LIGHT + POWER CO	0132	0086	08/29/1977		$0

Building Permits

Permit Number	Permit Type	Date Opened	Reason
13480	Miscellaneous		ADD VZW ANTENNA, RAISED STEEL PLATFORM WITH CANOPY AND GENERATOR

Petition No. 1027
Connecticut Light & Power
Haddam, Connecticut
Staff Report
May 10, 2012

On April 5, 2012, the Connecticut Siting Council (Council) received a petition from The Connecticut Light & Power (CL&P) for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the proposed replacement of an existing guyed lattice communications tower in Haddam, Connecticut. Council member Phil Ashton and Siting Analyst David Martin visited the site on May 4, 2012 to review the proposal. John Morissette and Steve Florio represented CL&P at the field review.

CL&P currently owns and operates a 280-foot guyed lattice wireless communications tower at 330 Pokorny Road in Haddam. The tower is host for a number of different antennas for several different users, including CL&P, the Connecticut State Police, Valley Shore Communications, and Sprint/Nextel. It provides critical microwave communication links for both CL&P and the State Police. A detailed structural analysis of the existing tower determined that it was overstressed and that there was no practical way of reinforcing the tower to bring it into compliance with state building code and CL&P engineering requirements.

CL&P proposes to replace the existing tower with a self-supporting lattice tower at the same height. The center of the replacement tower would be located approximately 50 feet to the west of the existing tower, which is the only location where it is possible to erect the new tower between the existing guy wires. CL&P would relocate the antennas on the existing tower onto the replacement tower. The replacement tower would also include a yield point to effectively reduce its potential fall zone and would be lit to comply with FAA requirements.

There are two fence lines on the CL&P property on which the existing tower is located. An outer fence encloses the locations where the guy wires are anchored to the ground. A smaller, inner fence encloses the existing tower and several equipment shelters. This inner fence would have to be extended a short distance to surround the proposed replacement tower. But the outer fence would remain at its current dimensions.

A number of large, single family homes have been built in the area surrounding CL&P's tower within the last twenty years. However, mature deciduous trees around the perimeter of CL&P's property help to minimize the visible impact of the tower on the nearest homes. Council member Ashton recommended that CL&P submit a D&M plan to show additional evergreen trees that would be planted within the facility's outer fence to help augment the existing vegetative screening of the tower.

The proposed replacement tower is not expected to have any substantial adverse environmental impacts. In fact, eliminating the existing guy wires will greatly reduce this wireless communications tower's potential for causing bird fatalities.

Steven Florio
Telecom Engineering
Construction Manager

107 Selden St
Berlin, CT 06037
Office: (860) 728-5611
Steven Florio@Eversource.com

Mr. Eric Breun
Site Acquisition Agent
Transcend Wireless, LLC.
10 Industrial Ave. Suite 3
Mahwah, New Jersey, 07430

RE: Letter of Authorization

Project: Sprint/ T-Mobile Site # CTHA563A
330 Pokorny Road
Haddam, CT.

Owner: Eversource Energy

Dear Mr. Bruen,

Eversource Energy, owner of the tower facility located at the address identified above, do hereby authorize Sprint/ T-Mobile, and/ or it's agent to use this authorization letter for the sole purpose of filing and consummating any land-use or building permit application(s) as may be required by the applicable permitting authorities for the Licensee's telecommunication's installation.

Sincerely,
Steven J. Florio

Steven J. Florio
Eversource Energy

REF: CENTEK Engineering, LLC.
Project # 21005.19
Structural Analysis REV.3, Dated 11/23/2021

Steven Florio
Telecom Engineering
Construction Manager

107 Selden St
Berlin, CT 06037
Office: (860) 728-5611
Steven Florio@Eversource.com

Sprint Now part of T-Mobile

SPRINT ID: CT33XC089
SITE ID: CTHA563A
330 POKORNY RD
HIGGANUM, CT 06441

T-MOBILE RAN TEMPLATE (PROVIDED BY RFDS)
67E5A998E 6160

T-MOBILE A+L TEMPLATE (PROVIDED BY RFDS)
67E5998E_1xAIR+1OP

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA–222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD–OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL, AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS–BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T–MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON–SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUITS AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1–800–922–4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH THE OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

TO: 330 POKORNY RD
HIGGANUM, CT 06441

1.	GET ON I–91 S IN WINSOR FROM DAY HILL RD.	4.30 MI.
2.	MERGE ONTO I–91 S.	7.30 MI.
3.	KEEP LEFT TO STAY ON I–91 S.	10.5 MI.
4.	USE THE LEFT 2 LANES TO TAKE EXIT 22S TO MERGE ONTO CT–9 S TOWARD MIDDLETOWN.	13.9 MI.
5.	TAKE EXIT 9 FOR CT–81 TOWARD KILLINGTON/ CLINTON.	0.20 MI.
6.	TURN RIGHT ONTO CT–81 S/KILLINGWORTH RD.	0.70 MI.
7.	TURN RIGHT ONTO POKORNY RD.	1.40 MI.

SITE COORDINATES: LATITUDE: 41° 26' 36.99" N
LONGITUDE: 72° 33' 59.32" W
GROUND ELEVATION: ±661' AMSL

COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH

VICINITY MAP

NORTH

PROJECT SUMMARY

THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

1. REMOVE EXISTING SPRINT EQUIPMENT
2. INSTALL (1) APXVAALL24_43–U–NA20 ANTENNA PER SECTOR. TOTAL (3)
3. INSTALL (1) AIR6449 B41 ANTENNA PER SECTOR. TOTAL (3)
4. INSTALL (1) RADIO 4460 B25+B66 PER SECTOR. TOTAL (3)
5. INSTALL (1) RADIO 4480 B71+B85 PER SECTOR. TOTAL (3)
6. INSTALL 150A BREAKER
7. REMOVE ALL EXISTING HYBRID, INSTALL (3) 6/24 4AWG HYBRIDS
8. INSTALL (1) T–MOBILE POWER ENCLOSURE 6160
9. INSTALL (1) T–MOBILE BATTERY CABINET B160
10. INSTALL 25KW DIESEL FUELED BACK–UP GENERATOR
11. INSTALL (1) 200A TRANSFER SWITCH
12. INSTALL 10' x 4' CONCRETE PAD.

PROJECT INFORMATION

SPRINT ID:	CT33XC089
SITE ID:	CTHA563A
SITE ADDRESS:	330 POKORNY RD HIGGANUM, CT 06441
APPLICANT:	T–MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	KYLE RICHERS TRANSCEND WIRELESS, LLC (908) 447–4716
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD RD. BRANFORD, CT 06405 CARLO F. CENTORE, PE (203) 488–0580 EXT. 122
PROJECT COORDINATES:	LATITUDE: 41°–26'–36.99" N LONGITUDE: 72°–33'–59.32" W GROUND ELEVATION: 661'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/03/21	JLW	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
	07/22/21	RYS	TJR	CONSTRUCTION DRAWINGS – REVISED PER NEW RFDS

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT · CARLO F. CENTORE · LICENSED PROFESSIONAL ENGINEER

Sprint Now part of T-Mobile · Transcend Wireless

CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T–MOBILE NORTHEAST LLC

SPRINT ID: CT33XC089
SITE ID: CTHA563A
330 POKORNY RD
HIGGANUM, CT 06441

DATE: 04/14/21
SCALE: AS NOTED
JOB NO. 21005.19

TITLE SHEET

T–1

Sheet No. 1 of 11

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2015 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE.

1. DESIGN CRITERIA:

- RISK CATEGORY II (BASED ON IBC TABLE 1604.5)
- ULTIMATE DESIGN SPEED (TOWER STRUCTURE): 128 MPH (Vasd) (EXPOSURE B/ IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10).

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
4. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
5. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

GENERAL NOTES

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10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS, ARE TO BE BROUGHT TO THE ATTENTION OF THE SITE OWNER'S CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON–SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1–800–922–4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
18. CONTRACTOR SHALL COMPLY WITH OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
19. THE COUNTY/CITY/TOWN WILL MAKE PERIODIC FIELD OBSERVATION AND INSPECTIONS TO MONITOR THE INSTALLATION, MATERIALS, WORKMANSHIP AND EQUIPMENT INCORPORATED INTO THE PROJECT TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS.
20. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325–N
   G. U–BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON–GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT–DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

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	07/22/21	RYS	TJR	CONSTRUCTION DRAWINGS – REVISED PER NEW RFDS

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SITE ID: CTHA563A
330 POKORNY RD
HIGGANUM, CT 06441

DATE: 04/14/21
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GENERAL NOTES AND SPECIFICATIONS

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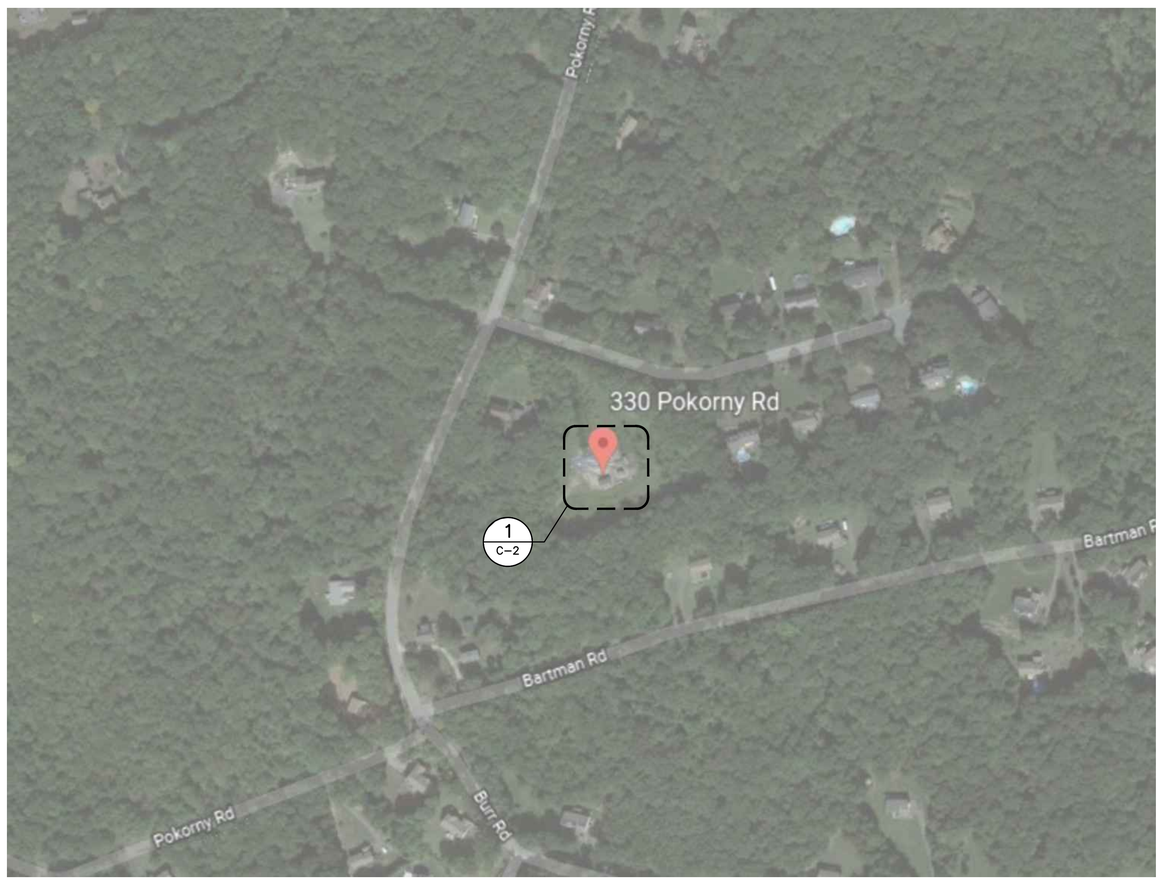
NOTE:
ALL COAX LENGTHS TO BE MEASURED
AND VERIFIED IN FIELD BEFORE ORDERING

ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) TMA (QTY)	(QTY) PROPOSED COAX
A1	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	155'	30°	(P) RADIO 4480 B71+B85 (1), (P) RADIO 4460 B25+B66 (1)		(1) 6/24 4AWG HYBRID CABLE (±300')
A2	PROPOSED	ERICSSON–AIR6449 B41	33.1 x 20.6 x 8.6	155'	30°			
B1	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	155'	150°	(P) RADIO 4480 B71+B85 (1), (P) RADIO 4460 B25+B66 (1)		(1) 6/24 4AWG HYBRID CABLE (±250')
B2	PROPOSED	ERICSSON–AIR6449 B41	33.1 x 20.6 x 8.6	155'	150°			
C1	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	155'	270°	(P) RADIO 4480 B71+B85 (1), (P) RADIO 4460 B25+B66 (1)		(1) 6/24 4AWG HYBRID CABLE (±300')
C2	PROPOSED	ERICSSON–AIR6449 B41	33.1 x 20.6 x 8.6	155'	270°			



1 / C–1 SITE LOCATION PLAN
SCALE: NOT TO SCALE

TRUE NORTH

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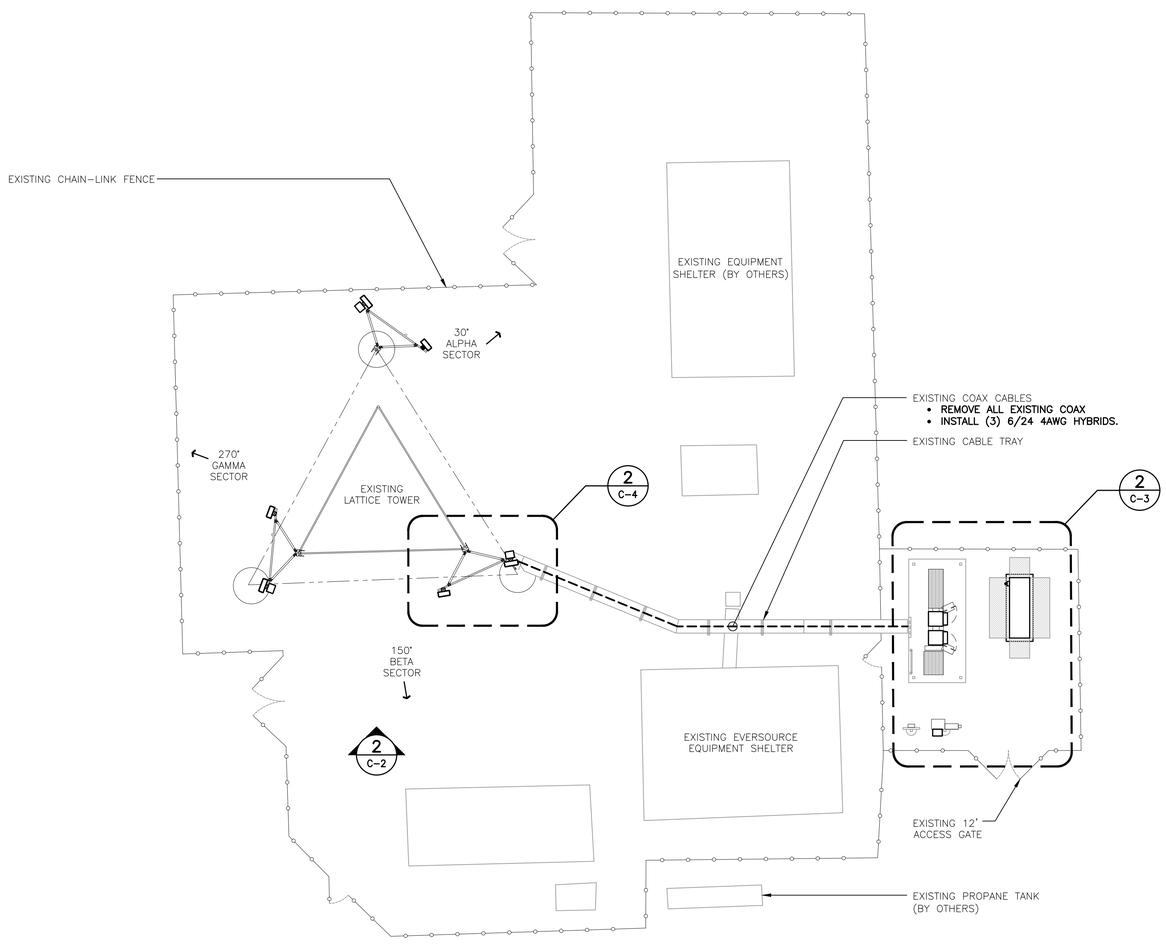
SITE LOCATION PLAN

C–1

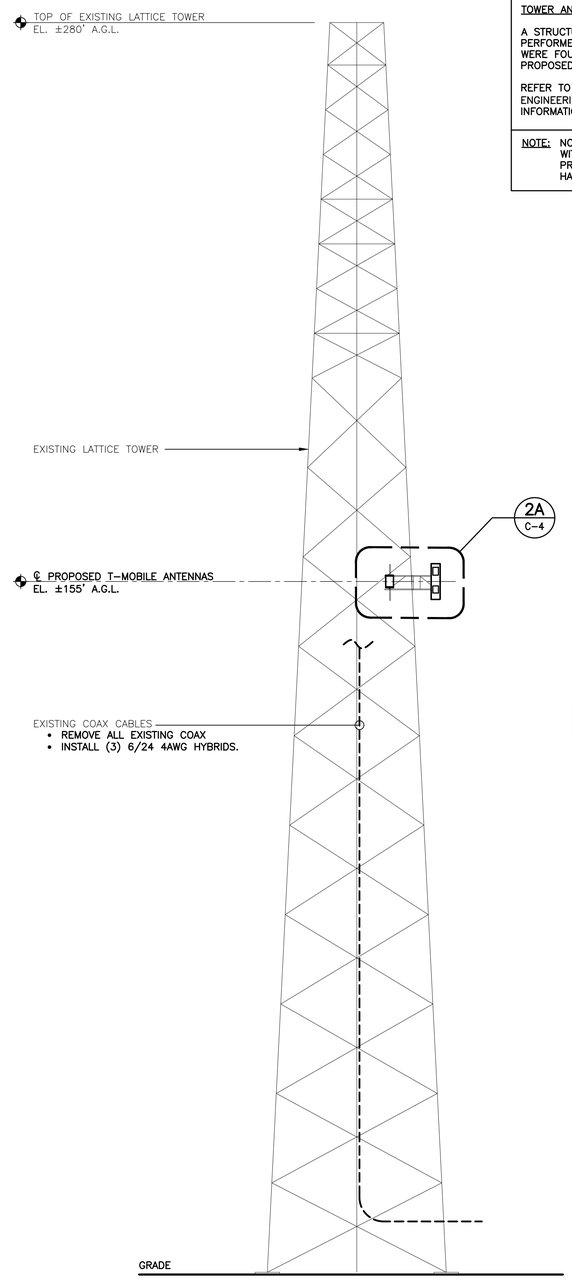
Sheet No. 3 of 11



1 C-2 **COMPOUND PLAN - PROPOSED**

SCALE: 3/32" = 1'

TRUE NORTH



NOTE: EXISTING EQUIPMENT (BY OTHERS) NOT SHOWN FOR CLARITY

2 C-2 **SOUTH ELEVATION - PROPOSED**

SCALE: 1/16" = 1'

STRUCTURAL COMPLIANCE

ANTENNA MOUNTS

A STRUCTURAL ANALYSIS OF THE ANTENNA MOUNTS WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING..

REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 21005.19) DATED 08/16/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TOWER AND TOWER FOUNDATION

A STRUCTURAL ANALYSIS OF THE TOWER AND TOWER FOUNDATION WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 21005.19) DATED 08/16/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

NOTE: NO EQUIPMENT SHALL BE INSTALLED ON THE HOSTING STRUCTURE WITHOUT A PASSING STRUCTURAL ANALYSIS REPORT AND CONTRACTOR PRIOR CONFIRMATION THAT ANY AND ALL REQUISITE MODIFICATIONS HAVE BEEN COMPLETED.

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COMPOUND PLAN AND ELEVATION

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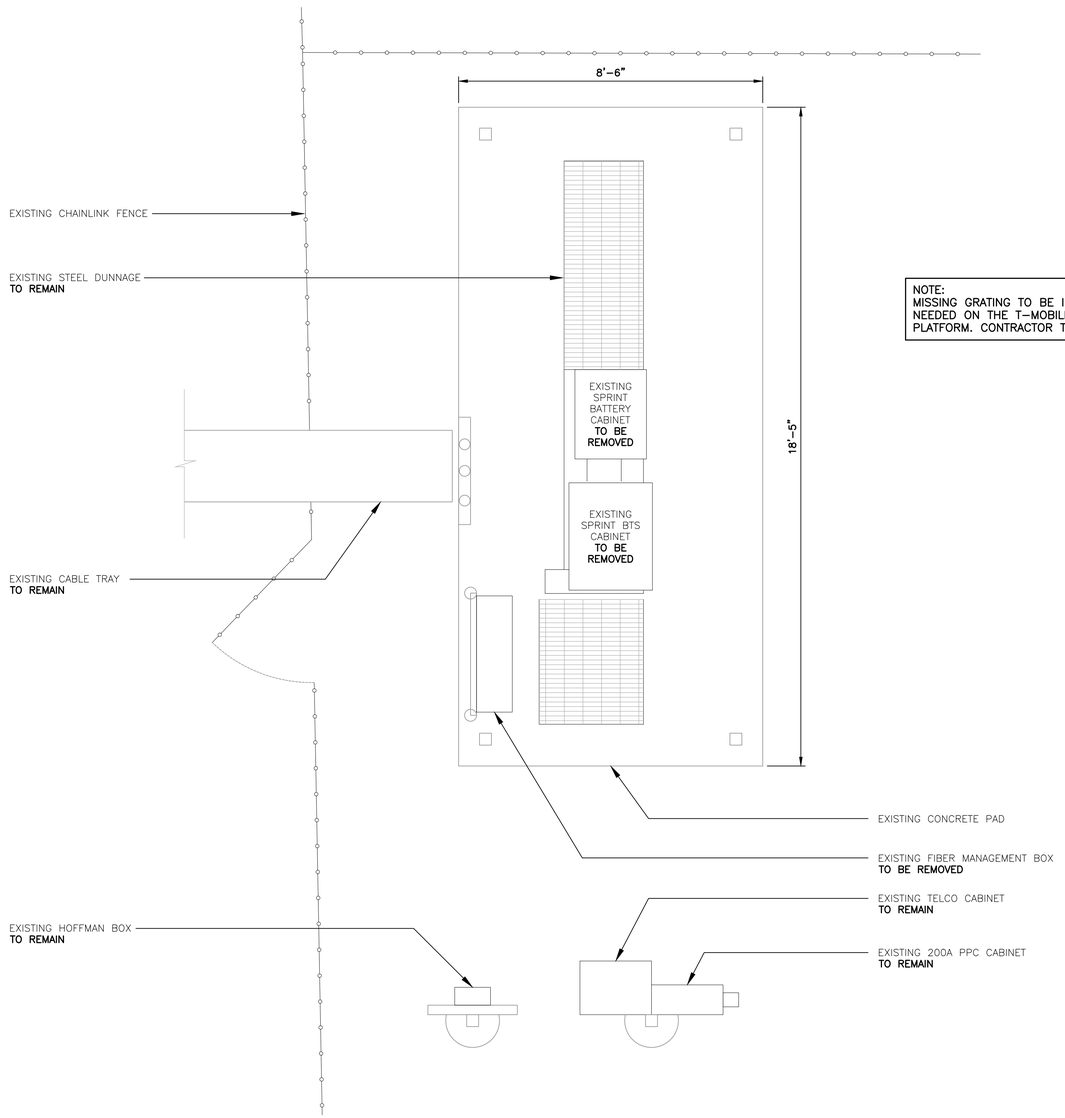
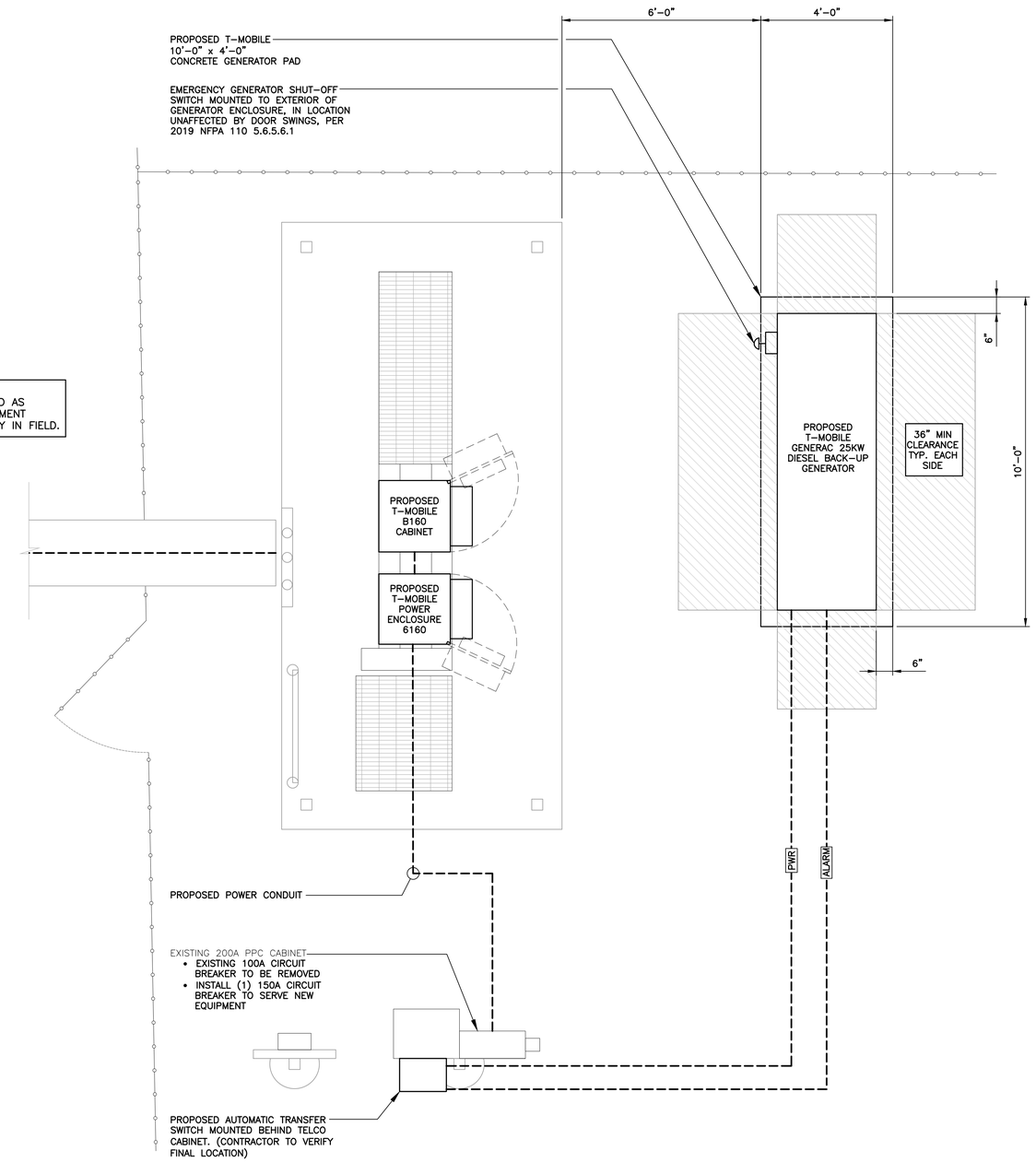
Sheet No. 4 of 11



1 C-3 **EXISTING EQUIPMENT PLAN**
SCALE: 1/2" = 1'
TRUE NORTH

NOTE:
MISSING GRATING TO BE INSTALLED AS NEEDED ON THE T-MOBILE EQUIPMENT PLATFORM. CONTRACTOR TO VERIFY IN FIELD.



2 C-3 **PROPOSED EQUIPMENT PLAN**
SCALE: 1/2" = 1'
TRUE NORTH

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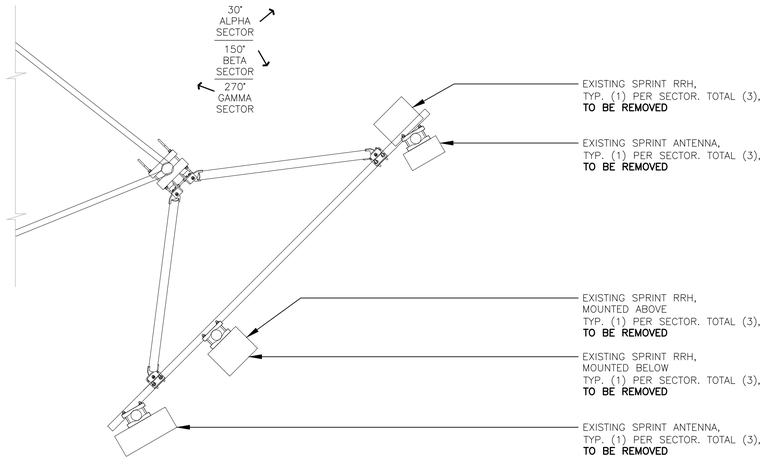
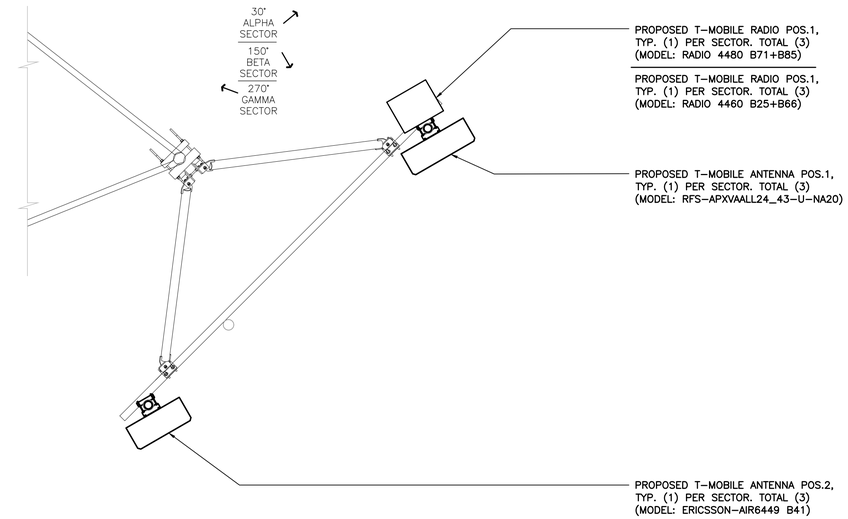
EQUIPMENT PLANS

C-3

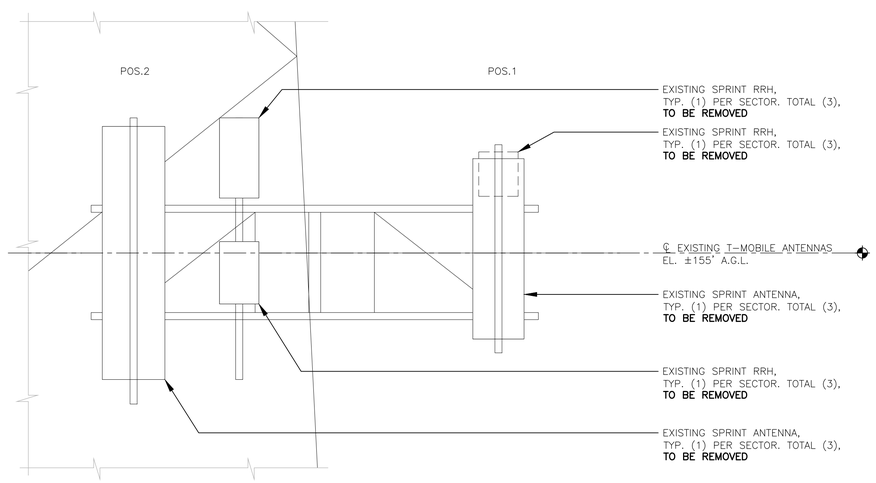
Sheet No. 5 of 11



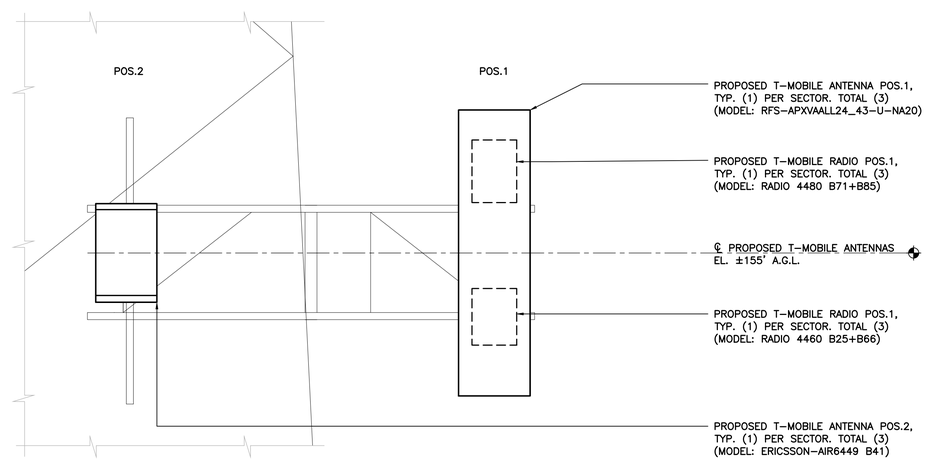
1 / C-4 **TYPICAL ANTENNA PLAN - EXISTING**
SCALE: 1/2" = 1'
TRUE NORTH



2 / C-4 **TYPICAL ANTENNA PLAN - PROPOSED**
SCALE: 1/2" = 1'
TRUE NORTH



1A / C-4 **TYPICAL ANTENNA ELEVATION - EXISTING**
SCALE: 1/2" = 1'



2A / C-4 **TYPICAL ANTENNA ELEVATION - PROPOSED**
SCALE: 1/2" = 1'

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ANTENNA PLANS AND ELEVATIONS

C-4

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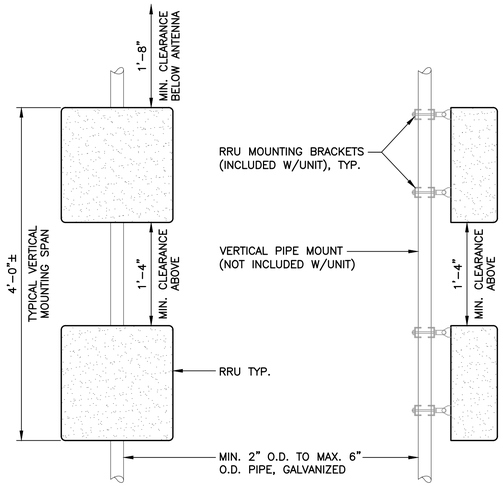
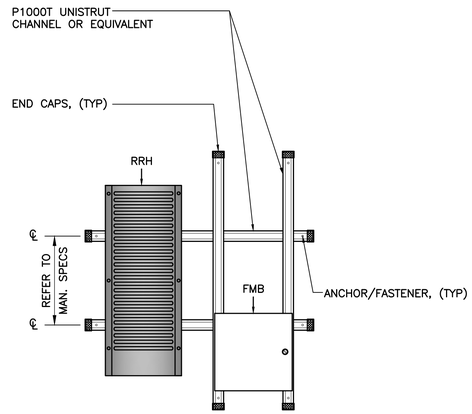


FRONT ELEVATION

SIDE ELEVATION

NOTES: (PIPE MOUNTING)

1. T-MOBILE SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.



FRONT ELEVATION

NOTES: (UNISTRUT MOUNTING)

1. INSTALL A MINIMUM OF (2) ANCHORS PER UNISTRUT (± 16"o/c MIN).
2. MOUNT RRU TO UNISTRUT WITH 3/8"ø UNISTRUT BOLTING HARDWARE AND SPRING NUTS. TYPICAL FOUR PER BRACKET.
3. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

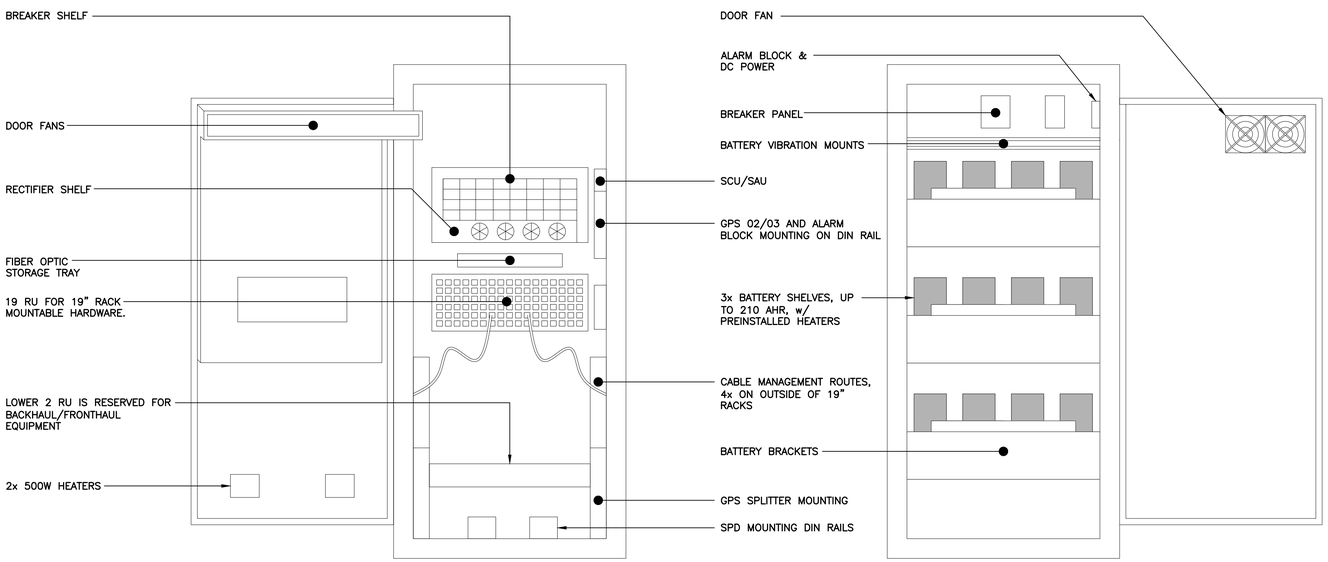
1 / C-5 TYPICAL RRU MOUNTING DETAIL

SCALE: NOT TO SCALE

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: AIR6449 B41	33.1"L x 20.6"W x 8.6"D	±104 LBS.
MAKE: RFS MODEL: APXVAALL24_43-U-NA20	95.9"L x 24.0"W x 8.5"D	±150 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

2 / C-5 PROPOSED ANTENNA DETAIL

SCALE: NOT TO SCALE



EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: ENCLOSURE 6160 CABINET	62.0"H x 26.0"W x 26.0"D	±1200 LBS

3 / C-5 ENCLOSURE 6160 CABINET DETAIL

SCALE: NOT TO SCALE

EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: BATTERY B160 CABINET	62.0"H x 26.0"W x 26.0"D	±1883 LBS

4 / C-5 BATTERY B160 CABINET DETAIL

SCALE: NOT TO SCALE

RADIO 4460 B25+B66

RADIO 4480 B71+B85

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4460 B25+B66	19.6"L x 15.7"W x 12.1"D	±109 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
MAKE: ERICSSON MODEL: RADIO 4480 B71+B85	21.8"L x 15.7"W x 7.5"D	±84 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.			

5 / C-5 PROPOSED RRU DETAIL

SCALE: NOT TO SCALE

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TYPICAL EQUIPMENT DETAILS

C-5

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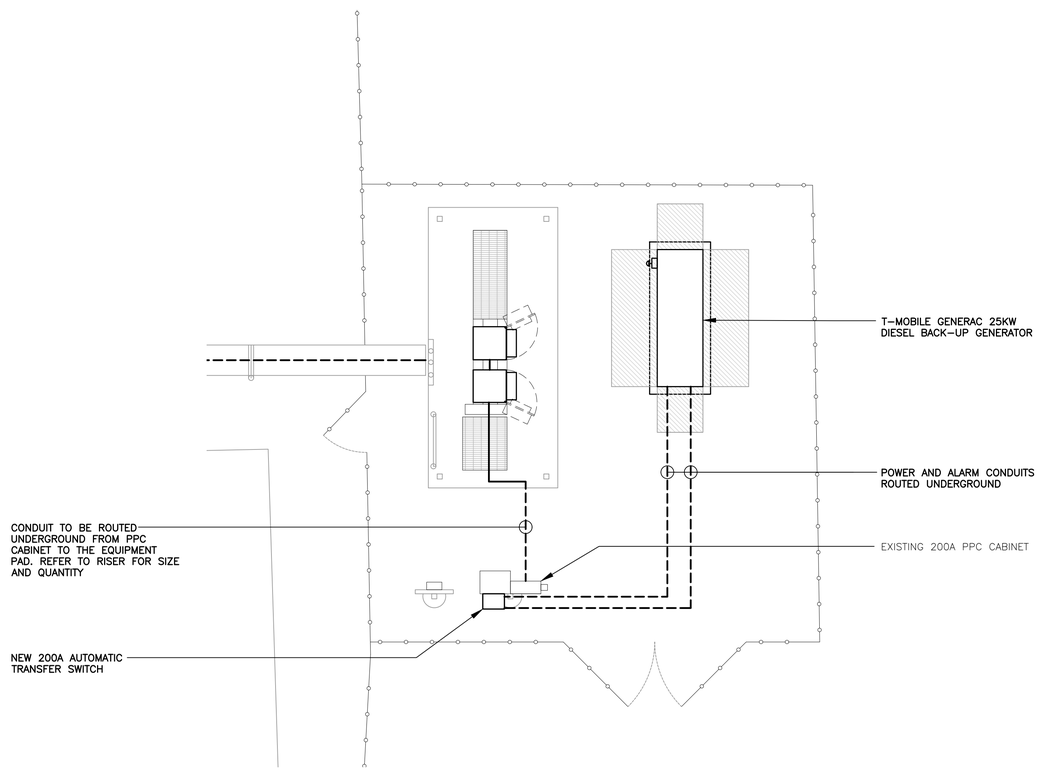


1 / E-1 **ELECTRICAL CONDUIT ROUTING PLAN**

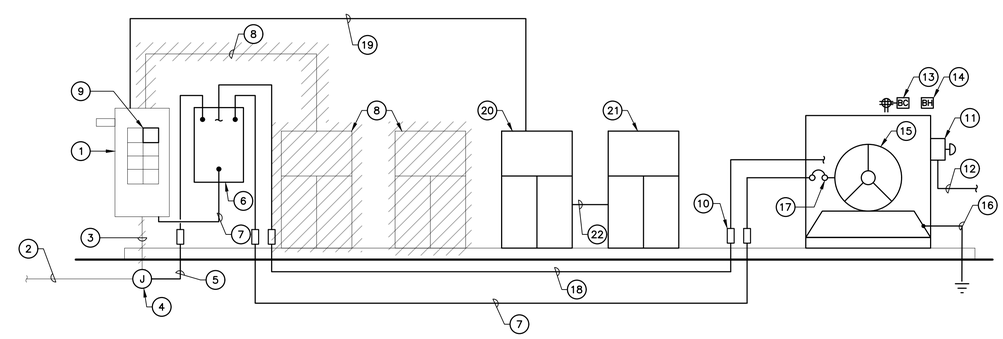
SCALE: 1/4" = 1'

RISER DIAGRAM NOTES

1. EXISTING PPC CABINET TO REMAIN.
2. EXISTING POWER CONDUIT AND CONDUCTORS PREVIOUSLY SERVING EXISTING PANEL.
3. SECTION OF CONDUIT AND CONDUCTORS TO BE REMOVED.
4. JUNCTION BOX SIZED PER NEC.
5. EXTEND EXISTING CONDUITS AND CONDUCTORS TO NEW ATS.
6. NEW 200A, 2 SOURCE AUTOMATIC TRANSFER SWITCH.
7. (3) #3/0 AWG, (1) #6 AWG GROUND, 2-1/2" CONDUIT.
8. EXISTING CABINETS AND ASSOCIATED CONDUITS, CONDUCTORS AND CIRCUIT BREAKERS TO BE REMOVED
9. NEW 150A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT.
10. EXPANSION COUPLING TYPICAL.
11. REMOTE GENERATOR SHUT OFF SWITCH IN BREAK GLASS ENCLOSURE MOUNTED TO EXTERIOR OF GENERATOR ENCLOSURE PER 2019 NFPA 110 5.6.5.6.1.
12. 3/4" CONDUIT AND CONDUCTORS REQUIRED FOR PROPER OPERATION OF EMERGENCY GENERATOR SHUT OFF SWITCH.

RISER DIAGRAM NOTES

13. GENERATOR BATTERY CHARGER AND CONVENIENCE GFCI OUTLET WIRED TO EXISTING PANEL. OUTLET TO BE MOUNTED IN WEATHERPROOF ENCLOSURE.
14. GENERATOR BLOCK HEATER WIRED TO EXISTING PANEL SERVING T-MOBILE EQUIPMENT.
15. EMERGENCY BACK UP GENERATOR.
16. GENERATOR GROUNDING PER NEC AND MANUFACTURER'S REQUIREMENTS. BOND TO EXISTING GROUNDING SYSTEM. (MINIMUM OF (1) #2 AWG GROUND)
17. GENERATOR OUTPUT CIRCUIT BREAKER.
18. 1" CONDUIT FOR GENERATOR CONTROL AND SIGNAL WIRING.
19. (1) 1/0 AWG, (1) #6 AWG GROUND, 1-1/2" CONDUIT.
20. NEW T-MOBILE EQUIPMENT CABINET
21. NEW T-MOBILE BATTERY CABINET
22. DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.



2 / E-1 **ELECTRICAL RISER DIAGRAM**

SCALE NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/03/21	JLW	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
	07/22/21	RYS	TJR	CONSTRUCTION DRAWINGS – REVISED PER NEW RFDS

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LICENSED PROFESSIONAL ENGINEER

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Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

SPRINT ID: CT33XC089
SITE ID: CTHA563A
330 POKORNY RD
HIGGANUM, CT 06441

DATE: 04/14/21
SCALE: AS NOTED
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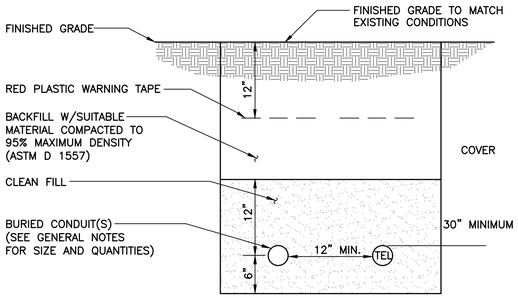
ELECTRICAL RISER DIAGRAM AND CONDUIT ROUTING

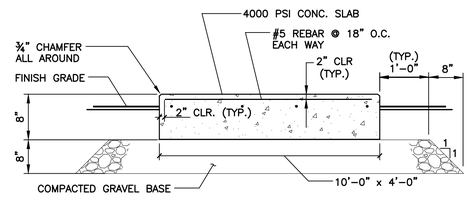
E-1

Sheet No. 8 of 11

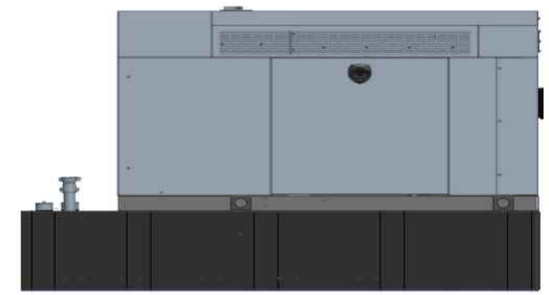


NOTES:
1. THE CLEAN FILL SHALL PASS THROUGH A 3/8" MESH SCREEN AND SHALL NOT CONTAIN SHARP STONES. OTHER BACKFILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIS OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION.
2. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.

1 / E-2 TYPICAL ELECTRICAL/TEL TRENCH DETAIL
SCALE: NOT TO SCALE



2 / E-2 TYPICAL CONCRETE PAD DETAIL
SCALE: NOT TO SCALE



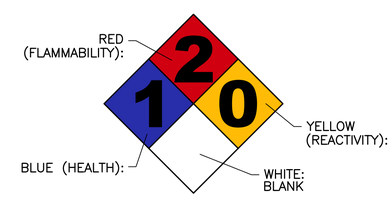
BACKUP POWER GENERATOR						
EQUIPMENT	POWER GENERATED	FUEL	MODEL NUMBER	FUEL TANK SIZE (GAL)	DIMENSIONS	WEIGHT
MAKE: GENERAC MODEL: RD025	25 KW, AC	DIESEL	7192-0	229	103.4"L x 35.0"W x 91.7"H	2123 LBS.

NOTES:
1. FUEL LEVEL/SECONDARY CONTAINMENT SHALL BE ALARMED AND IN COMMUNICATION WITH T-MOBILE'S NOC.
2. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION AND ALL OPTIONAL FEATURES WITH T-MOBILE'S CONSTRUCTION MANAGER PRIOR TO ORDERING.

3 / E-2 PROPOSED GENERATOR DETAIL
SCALE: NOT TO SCALE

AUTOMATIC TRANSFER SWITCH					
EQUIPMENT	PHASE	VOLTAGE	ENCLOSURE	AMP	DIMENSIONS
MAKE: GENERAC MODEL: RXSC200A3	1-PHASE	120/240	NEMA-3R	200	17.3"L x 12.5"W

4 / E-2 AUTOMATIC TRANSFER SWITCH DETAIL
SCALE: NOT TO SCALE



SIGN NAME:	REGULATORY, NFPA 704 HAZARD ID
DESCRIPTION:	MOUNT ON GENERATOR ACCESS DOOR. CONSULT WITH GENERATOR MANUFACTURER MSDS SHEET FOR BLUE AND RES POSITIONS
NOTES:	1) SIGNS EXPOSED TO WEATHER SHOULD BE CHECKED ANNUALLY FOR READABILITY. 2) SIGNS MUST BE UPDATED IF CHEMICAL STORAGE OR HAZARD INFORMATION FOR THE LOCATION CHANGES. 3) THE GC MUST REVIEW WITH LOCAL JURISDICTION WHEN FILLING FOR PERMITS, AS EACH JURISDICTION MAY HAVE DIFFERENT REQUIREMENTS AND COMPLY WITH POSTING REQUIREMENTS OR DIRECTIVES FROM THE LOCAL JURISDICTION.

5 / E-2 NFPA 704 DIAMOND SIGNAGE DETAIL
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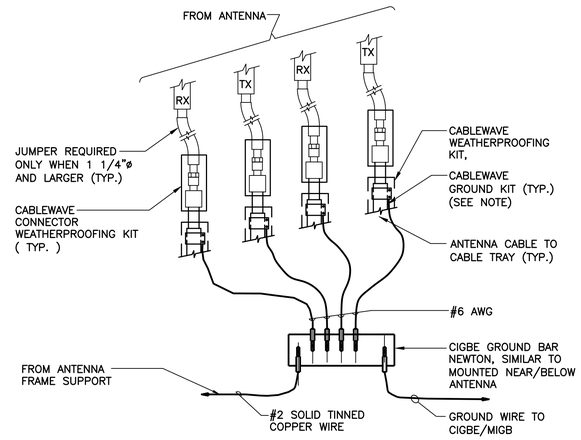
TYPICAL ELECTRICAL DETAILS

E-2

Sheet No. 9 of 11

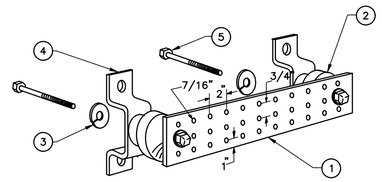


NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

1 / E-3 CONNECTION OF GROUND WIRES TO GROUND BAR

SCALE: NOT TO SCALE

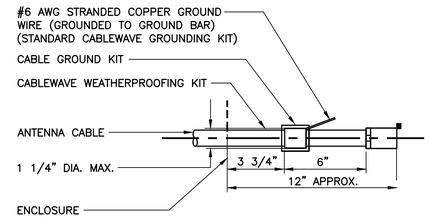


NOTES

1. TINNED COPPER GROUND BAR, 1/4" x 4" x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4.
3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056.
5. 5/8-11 x 1" STAINLESS STEEL TRUSS SPANNER MACHINE SCREWS.

2 / E-3 GROUND BAR DETAIL

SCALE: NOT TO SCALE

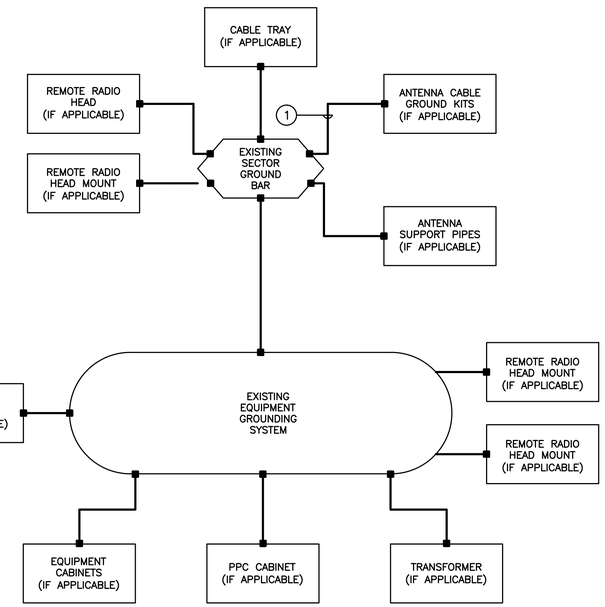


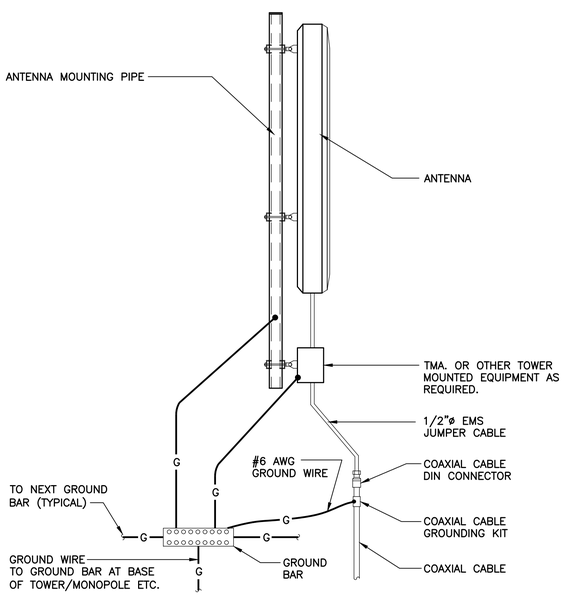
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

3 / E-3 ANTENNA CABLE GROUNDING DETAIL

SCALE: NOT TO SCALE



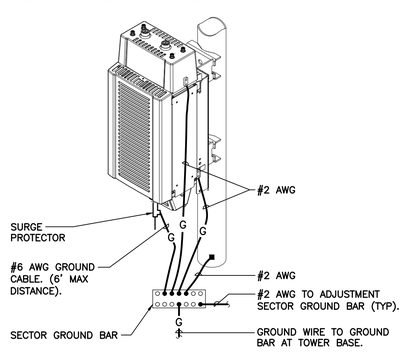


4 / E-3 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE

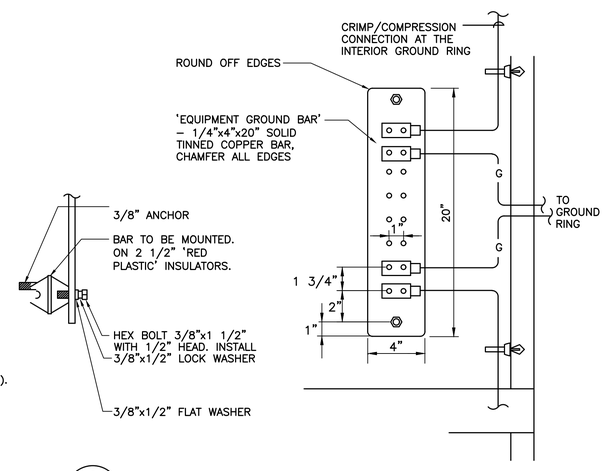
EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:

1. AT TOP OF THE CABINET
2. AT RIGHT SIDE OF THE CABINET.



5 / E-3 RRH POLE MOUNT GROUNDING

SCALE: NOT TO SCALE



6 / E-3 EQUIPMENT GROUND BAR DETAIL

SCALE: NOT TO SCALE

GROUNDING SCHEMATIC NOTES

1. #6 AWG

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. BOND CABLE TRAY SECTIONS TOGETHER WITH #6 AWG STRANDED GREEN INSULATED JUMPERS.
4. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
5. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
6. REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.
7. COORDINATE ALL ROOF MOUNTED EQUIPMENT WITH OWNER.
8. ALL ROOF MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
9. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

7 / E-3 ELECTRICAL SCHEMATIC DIAGRAM

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TYPICAL ELECTRICAL DETAILS

E-3

Sheet No. 10 of 11

ELECTRICAL SPECIFICATIONS

SECTION 16010

1.02. GENERAL REQUIREMENTS

A. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.

B. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNERS REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES THAT MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR THE SCHEDULING OF ALL INSPECTIONS THAT MAY BE REQUIRED BY THE LOCAL AUTHORITY.

D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.

E. NO MATERIAL OTHER THAN THAT CONTAINED IN THE "LATEST LIST OF ELECTRICAL FITTINGS" APPROVED BY THE UNDERWRITERS' LABORATORIES, SHALL BE USED IN ANY PART OF THE WORK. ALL MATERIAL FOR WHICH LABEL SERVICE HAS BEEN ESTABLISHED SHALL BEAR THE U.L. LABEL.

F. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.

G. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.

H. THE ELECTRICAL CONTRACTOR SHALL SUPPLY THREE (3) COMPLETE SETS OF APPROVED DRAWINGS, ENGINEERING DATA SHEETS, MAINTENANCE AND OPERATING INSTRUCTION MANUALS FOR ALL SYSTEMS AND THEIR RESPECTIVE EQUIPMENT. THESE MANUALS SHALL BE INSERTED IN VINYL COVERED 3-RING BINDERS AND TURNED OVER TO OWNER'S REPRESENTATIVE ONE (1) WEEK PRIOR TO FINAL PUNCH LIST.

I. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER AND WILL BE SUBJECT TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE.

J. ALL EQUIPMENT AND MATERIALS TO BE INSTALLED SHALL BE NEW, UNLESS OTHERWISE NOTED.

K. BEFORE FINAL PAYMENT, THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF PRINTS (AS-BUILTS), LEGIBLY MARKED IN RED PENCIL TO SHOW ALL CHANGES FROM THE ORIGINAL PLANS.

L. PROVIDE TEMPORARY POWER AND LIGHTING IN WORK AREAS AS REQUIRED.

M. SHOP DRAWINGS:

1. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF SHOP DRAWINGS ON ALL EQUIPMENT AND MATERIALS PROPOSED FOR USE ON THIS PROJECT, GIVING ALL DETAILS, WHICH INCLUDE DIMENSIONS, CAPACITIES, ETC.

2. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF ALL TEST REPORTS CALLED FOR IN THE SPECIFICATIONS AND DRAWINGS.

N. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH OWNER'S SPECIFICATIONS, AND REQUIREMENTS OF ALL LOCAL AUTHORITIES HAVING JURISDICTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH APPROPRIATE INDIVIDUALS TO OBTAIN ALL SUCH SPECIFICATIONS AND REQUIREMENTS. NOTHING CONTAINED IN, OR OMITTED FROM, THESE DOCUMENTS SHALL RELIEVE CONTRACTOR FROM THIS OBLIGATION.

SECTION 16111

1.01. CONDUITS

A. MINIMUM CONDUIT SIZE FOR BRANCH CIRCUITS, LOW VOLTAGE CONTROL AND ALARM CIRCUITS SHALL BE 3/4". CONDUITS SHALL BE PROPERLY FASTENED AS REQUIRED BY THE N.E.C.

B. THE INTERIOR OF RACEWAYS/ENCLOSURES INSTALLED UNDERGROUND SHALL BE CONSIDERED TO BE WET LOCATION, INSULATED CONDUCTORS SHALL BE LISTED FOR USE IN WET LOCATIONS. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

C. CONDUIT INSTALLED UNDERGROUND SHALL BE INSTALLED TO MEET MINIMUM COVER REQUIREMENTS OF TABLE 300.5.

D. PROVIDE RIGID GALVANIZED STEEL CONDUIT (RMC) FOR THE FIRST 10 FOOT SECTION WHEN LEAVING A BUILDING OR SECTIONS PASSING THROUGH FLOOR SLABS

E. ONLY LISTED PVC CONDUIT AND FITTINGS ARE PERMITTED FOR THE INSTALLATION OF ELECTRICAL CONDUCTORS, SUITABLE FOR UNDERGROUND APPLICATIONS.

CONDUIT SCHEDULE SECTION 16111

CONDUIT TYPE	NEC REFERENCE	APPLICATION	MIN. BURIAL DEPTH (PER NEC TABLE 300.5) [2,3]
EMT	ARTICLE 358	INTERIOR CIRCUITING, EQUIPMENT ROOMS, SHELTERS	N/A
RMC, RIGID GALV. STEEL	ARTICLE 344, 300.5, 300.50	ALL INTERIOR/ EXTERIOR CIRCUITING, ALL UNDERGROUND INSTALLATIONS.	6 INCHES
PVC, SCHEDULE 40	ARTICLE 352, 300.5, 300.50	INTERIOR/ EXTERIOR CIRCUITING AND GROUNDING SYSTEMS, UNDERGROUND INSTALLATIONS, WHERE NOT SUBJECT TO PHYSICAL DAMAGE. [1]	18 INCHES
PVC, SCHEDULE 80	ARTICLE 352, 300.5, 300.50	INTERIOR/ EXTERIOR CIRCUITING AND GROUNDING SYSTEMS, UNDERGROUND INSTALLATIONS, WHERE SUBJECT TO PHYSICAL DAMAGE. [1]	18 INCHES
LIQUID TIGHT FLEX. METAL	ARTICLE 350	SHORT LENGTHS (MAX. 3FT.) WIRING TO VIBRATING EQUIPMENT IN WET LOCATIONS.	N/A
FLEX. METAL	ARTICLE 348	SHORT LENGTHS (MAX. 3FT.) WIRING TO VIBRATING EQUIPMENT IN WET LOCATIONS.	N/A

[1] PHYSICAL DAMAGE IS SUBJECT TO THE AUTHORITY HAVING JURISDICTION.

[2] UNDERGROUND CONDUIT INSTALLED UNDER ROADS, HIGHWAYS, DRIVEWAYS, PARKING LOTS SHALL HAVE MINIMUM DEPTH OF 24".

[3] WHERE SOLID ROCK PREVENTS COMPLIANCE WITH MINIMUM COVER DEPTHS, WIRING SHALL BE INSTALLED IN PERMITTED RACEWAY FOR DIRECT BURIAL. THE RACEWAY SHALL BE COVERED BY A MINIMUM OF 2" OF CONCRETE EXTENDING DOWN TO ROCK.

SECTION 16123

1.01. CONDUCTORS

A. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS. #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:

	120/208/240V	277/480V
LINE	COLOR	COLOR
A	BLACK	BROWN
B	RED	ORANGE
C	BLUE	YELLOW
N	CONTINUOUS WHITE	GREY
G	CONTINUOUS GREEN	GREEN WITH YELLOW STRIPE

B. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.

SECTION 16130

1.01. BOXES

A. FURNISH AND INSTALL OUTLET BOXES FOR ALL DEVICES, SWITCHES, RECEPTACLES, ETC.. BOXES TO BE ZINC COATED STEEL.

B. FURNISH AND INSTALL PULL BOXES IN MAIN FEEDERS RUNS WHERE REQUIRED. PULL BOXES SHALL BE GALVANIZED STEEL WITH SCREW REMOVABLE COVERS, SIZE AND QUANTITY AS REQUIRED. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

SECTION 16140

1.01. WIRING DEVICES

A. THE FOLLOWING LIST IS PROVIDED TO CONVEY THE QUALITY AND RATING OF WIRING DEVICES WHICH ARE TO BE INSTALLED. A COMPLETE LIST OF ALL DEVICES MUST BE SUBMITTED BEFORE INSTALLATION FOR APPROVAL.

1. 15 MINUTE TIMER SWITCH – INTERMATIC #FF15M (INTERIOR LIGHTS)

2. DUPLEX RECEPTACLE – P&S #2095 (GFCI) SPECIFICATION GRADE

3. SINGLE POLE SWITCH – P&S #CSB20AC2 (20A-120V HARD USE) SPECIFICATION GRADE

4. DUPLEX RECEPTACLE – P&S #5362 (20A-120V HARD USE) SPECIFICATION GRADE

B. PLATES – ALL PLATES USED SHALL BE CORROSION RESISTANT TYPE 304 STAINLESS STEEL. PLATES SHALL BE FROM SAME MANUFACTURER AS SWITCHES AND RECEPTACLES. PROVIDE WEATHERPROOF HOUSING FOR DEVICES LOCATED IN WET LOCATIONS.

C. OTHER MANUFACTURERS OF THE SWITCHES, RECEPTACLES AND PLATES MAY BE SUBMITTED FOR APPROVAL BY THE ENGINEER.

SECTION 16170

1.01. DISCONNECT SWITCHES

A. FUSIBLE AND NON-FUSIBLE, 600V, HEAVY DUTY DISCONNECT SWITCHES SHALL BE AS MANUFACTURED BY SQUARE "D". PROVIDE FUSES AS CALLED FOR ON THE CONTRACT DRAWINGS. AMPERE RATING SHALL BE CONSISTENT WITH LOAD BEING SERVED. DISCONNECT SWITCH COVER SHALL BE MECHANICALLY INTERLOCKED TO PREVENT COVER FROM OPENING WHEN THE SWITCH IS IN THE "ON" POSITION. EXTERIOR APPLICATIONS SHALL BE NEMA 3R CONSTRUCTION WITH PADLOCK FEATURE.

SECTION 16190

1.01. SEISMIC RESTRAINT

A. ALL DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH ZONE 2 SEISMIC REQUIREMENTS.

SECTION 16195

1.01. LABELING AND IDENTIFICATION NOMENCLATURE FOR ELECTRICAL EQUIPMENT

A. CONTRACTOR SHALL FURNISH AND INSTALL NON-METALLIC ENGRAVED BACK-LIT NAMEPLATES ON ALL PANELS AND MAJOR ITEMS OF ELECTRICAL EQUIPMENT.

B. LETTERS TO BE WHITE ON BLACK BACKGROUND WITH LETTERS 1-1/2 INCH HIGH WITH 1/4 INCH MARGIN.

C. IDENTIFICATION NOMENCLATURE SHALL BE IN ACCORDANCE WITH OWNER'S STANDARDS.

SECTION 16450

1.01. GROUNDING

A. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.

B. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.

C. GROUNDING OF PANELBOARDS:

1. PANELBOARD SHALL BE GROUNDED BY TERMINATING THE PANELBOARD FEEDER'S EQUIPMENT GROUND CONDUCTOR TO THE EQUIPMENT GROUND BAR KIT(S) LUGGED TO THE CABINET. ENSURE THAT THE SURFACE BETWEEN THE KIT AND CABINET ARE BARE METAL TO BARE METAL. PRIME AND PAINT OVER TO PREVENT CORROSION.

2. CONDUIT(S) TERMINATING INTO THE PANELBOARD SHALL HAVE GROUNDING TYPE BUSHINGS. THE BUSHINGS SHALL BE BONDED TOGETHER WITH BARE #10 AWG COPPER CONDUCTOR WHICH IN TURN IS TERMINATED INTO THE PANELBOARD'S EQUIPMENT GROUND BAR KIT(S).

D. EQUIPMENT GROUNDING CONDUCTOR:

1. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122.

2. THE MINIMUM SIZE OF EQUIPMENT GROUND CONDUCTOR SHALL BE #12 AWG COPPER.

3. EACH FEEDER OR BRANCH CIRCUIT SHALL HAVE EQUIPMENT GROUND CONDUCTOR(S) INSTALLED IN THE SAME RACEWAY(S).

E. CELLULAR GROUNDING SYSTEM:

CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 10 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

PROVIDE THE CELLULAR GROUNDING SYSTEM AS SPECIFIED ON DRAWINGS, INCLUDING, BUT NOT LIMITED TO:

1. GROUND BARS

2. EXTERIOR GROUNDING (WHERE REQUIRED DUE TO MEASURED AC RESISTANCE GREATER THAN SPECIFIED).

3. ANTENNA GROUND CONNECTIONS AND PLATES.

F. CONTRACTOR, AFTER COMPLETION OF THE COMPLETE GROUNDING SYSTEM BUT PRIOR TO CONCEALMENT/BURIAL OF SAME, SHALL NOTIFY OWNER'S PROJECT ENGINEER WHO WILL HAVE A DESIGN ENGINEER VISIT SITE AND MAKE A VISUAL INSPECTION OF THE GROUNDING GRID AND CONNECTIONS OF THE SYSTEM.

G. ALL EQUIPMENT SHALL BE BONDED TO GROUND AS REQUIRED BY N.E.C., MFG. SPECIFICATIONS, AND OWNER'S SPECIFICATIONS.

SECTION 16470

1.01. DISTRIBUTION EQUIPMENT

A. REFER TO CONTRACT DRAWINGS FOR DETAILS AND SCHEDULES.

SECTION 16477

1.01. FUSES

A. FUSES SHALL BE NONRENEWABLE TYPE AS MANUFACTURED BY "BUSSMAN" OR APPROVED EQUAL. FUSES RATED TO 1/10 AMPERE UP TO 600 AMPERES SHALL BE EQUIVALENT TO BUSSMAN TYPE LPN-RK (250V) UL CLASS RK1, LOW PEAK, DUAL ELEMENT, TIME-DELAY FUSES. FUSES SHALL HAVE SEPARATE SHORT CIRCUIT AND OVERLOAD ELEMENTS AND HAVE AN INTERRUPTING RATING OF 200 KAIC. UPON COMPLETION OF WORK, PROVIDE ONE SPARE SET OF FUSES FOR EACH TYPE INSTALLED.

SECTION 16960

1.01. TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

TEST 1: THERMAL OVERLOAD AND MAGNETIC TRIP TEST, AND CABLE INSULATION TEST FOR ALL CIRCUIT BREAKERS RATED 100 AMPS OR GREATER.

TEST 2: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.

2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.

3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. THESE TESTS SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNER'S CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION REPRESENTATIVE AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM'S REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

SECTION 16961

1.01. TESTS BY CONTRACTOR

A. ALL TESTS AS REQUIRED UPON COMPLETION OF WORK, SHALL BE MADE BY THIS CONTRACTOR. THESE SHALL BE CONTINUITY AND INSULATION TESTS; TEST TO DETERMINE THE QUALITY OF MATERIALS, ETC. AND SHALL BE MADE IN ACCORDANCE WITH N.E.C. RECOMMENDATIONS. ALL FEEDERS AND BRANCH CIRCUIT WIRING (EXCEPT CLASS 2 SIGNAL CIRCUITS) MUST BE TESTED FREE FROM SHORT CIRCUIT AND GROUND FAULT CONDITIONS AT 500V IN A REASONABLY DRY AMBIENT OF APPROXIMATELY 70 DEGREES F.

B. CONTRACTOR SHALL PERFORM LOAD PHASE BALANCING TESTS. CIRCUITS SHALL BE CONNECTED TO THE PANELBOARDS SO THAT THE NEW LOAD IS DISTRIBUTED AS EQUALLY AS POSSIBLE BETWEEN EACH LOAD AND NEUTRAL. 10% SHALL BE CONSIDERED AS A REASONABLE AND ACCEPTABLE ALLOWANCE. BRANCH CIRCUITS SHALL BE BALANCED ON THEIR OWN PANELBOARDS; FEEDER LOADS SHALL, IN TURN, BE BALANCED ON THE SERVICE EQUIPMENT. REASONABLE LOAD TEST SHALL BE ARRANGED TO VERIFY LOAD BALANCE IF REQUESTED BY THE ENGINEER.

C. ALL TESTS, UPON REQUEST, SHALL BE REPEATED IN THE PRESENCE OF OWNER'S REPRESENTATIVE. ALL TESTS SHALL BE DOCUMENTED AND TURNED OVER TO OWNER. OWNER SHALL HAVE THE AUTHORITY TO STOP ANY OF THE WORK NOT BEING PROPERLY INSTALLED. ALL SUCH DETECTED WORK SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL EXPENSE TO THE OWNER AND THE TESTS SHALL BE REPEATED.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/03/21	JLW	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
	07/22/21	RYS	TJR	CONSTRUCTION DRAWINGS – REVISED PER NEW RFDS

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT LICENSED PROFESSIONAL ENGINEER

Sprint T-Mobile Transcend Wireless

CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

SPRINT ID: CT33XC089
SITE ID: CTHA563A
330 POKORNY RD
HIGGANUM, CT 06441

DATE: 04/14/21
SCALE: AS NOTED
JOB NO. 21005.19

ELECTRICAL SPECIFICATIONS

E-4

Sheet No. 11 of 11

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

T-Mobile Site #: CTHA563A

330 Pokorny Road
Haddam, CT

Centek Project No. 21005.19

~~Date: April 19, 2021~~
Date: August 16, 2021

Max Stress Ratio = 85%

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

August 16, 2021

Mr. Kyle Richers
Transcend Wireless
10 Industrial Ave., Suite 3
Mahwah, NJ 07430

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CTHA563A
330 Pokorny Road
Haddam, CT 06441

Centek Project No. 21005.19

Dear Mr. Richers,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting of three (3) V-frame sector mounts (SitePro P/N: VFA12) to support the proposed/existing equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- T-Mobile:
  V-Frames: Three (3) Ericsson AIR6449 panel antennas, three (3) RFS APXVAALL24_43-U-NA20 panel antennas, three (3) Ericsson 4460 remote radio heads and three (3) Ericsson 4480 remote radio heads mounted on three (3) V-Frames with a RAD center elevation of 155-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2015 International Building Code as modified by the 2018 Connecticut State Building Code considering a nominal design wind speed of 101 mph for Haddam as required in Appendix N of the 2018 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that the subject antenna mount has sufficient capacity to support the aforementioned antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Section 2 - Calculations

CENTEK engineering
Centered on Solutions™ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: TIA-222-G Loads

Location: Haddam, CT

Rev. 1: 8/16/21

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 21005.19

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed $V := 101$ mph (User Input - 2016 CSBC Appendix N)

Basic Wind Speed with Ice $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = Structure_Type := Lattice (User Input)

Structure Category = SC := II (User Input)

Exposure Category = Exp := C (User Input)

Structure Height = $h := 280$ ft (User Input)

Height to Center of Antennas = $z_{Ant} := 155$ ft (User Input)

Radial Ice Thickness = $t_i := 0.75$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = Id := 56.00 pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H = 0.85$ (User Input)

Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if } Structure\_Type = Pole \\ 0.85 & \text{if } Structure\_Type = Lattice \end{cases} = 0.85$$

(Per Table 2-2 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1$$

(Per Table 2-3 of TIA-222-G)

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1$$

$$K_{iz} := \left(\frac{z_{Ant}}{33}\right)^{0.1} = 1.167 \qquad t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.751$$

Velocity Pressure Coefficient Antennas =

$$Kz_{Ant} := 2.01\left(\left(\frac{z_{Ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.388$$

Velocity Pressure w/o Ice Antennas =

$$qz_{Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V^2 \cdot I_{Wind} = 30.809$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V_i^2 \cdot I_{Wind} = 7.55$$

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAALL24-43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 150$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 530$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.7$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 188$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 19$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 154$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.3$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 67$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 150$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 429$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 429$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR6449		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 33.1$	in	(User Input)
Antenna Width =	$W_{ant} := 20.5$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.3$	in	(User Input)
Antenna Weight =	$WT_{ant} := 103$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.6$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna = $SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 148$ lbs

Surface Area for One Antenna = $SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 60$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.1$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 47$ lbs

Surface Area for One Antenna w/ Ice = $SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 23$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 103$ lbs

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5632$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 4736$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 153$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 153$ lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model =	Ericsson 4460		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 19.6$	in	(User Input)
RRUS Width =	$W_{RRUS} := 15.7$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 12.1$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 109$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		(User Input)
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.2$		
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$		

Wind Load (without ice)

Surface Area for One RRUS =	$SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 2.1$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 67$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.6$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 52$	lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 3.1$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 24$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 2.5$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 19$	lbs

Gravity Load (without ice)

Weight of All RRUSs =	$WT_{RRUS} \cdot N_{RRUS} = 109$	lbs

Gravity Loads (ice only)

Volume of Each RRUS =	$V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 3723$	cu in
Volume of Ice on Each RRUS =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 3198$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 104$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 104$	lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model =	Ericsson 4480		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 21.8$	in	(User Input)
RRUS Width =	$W_{RRUS} := 15.7$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 7.5$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 84$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		(User Input)
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.4$		
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$		

Wind Load (without ice)

Surface Area for One RRUS =	$SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 2.4$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 75$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 36$	lbs

Wind Load (with ice)

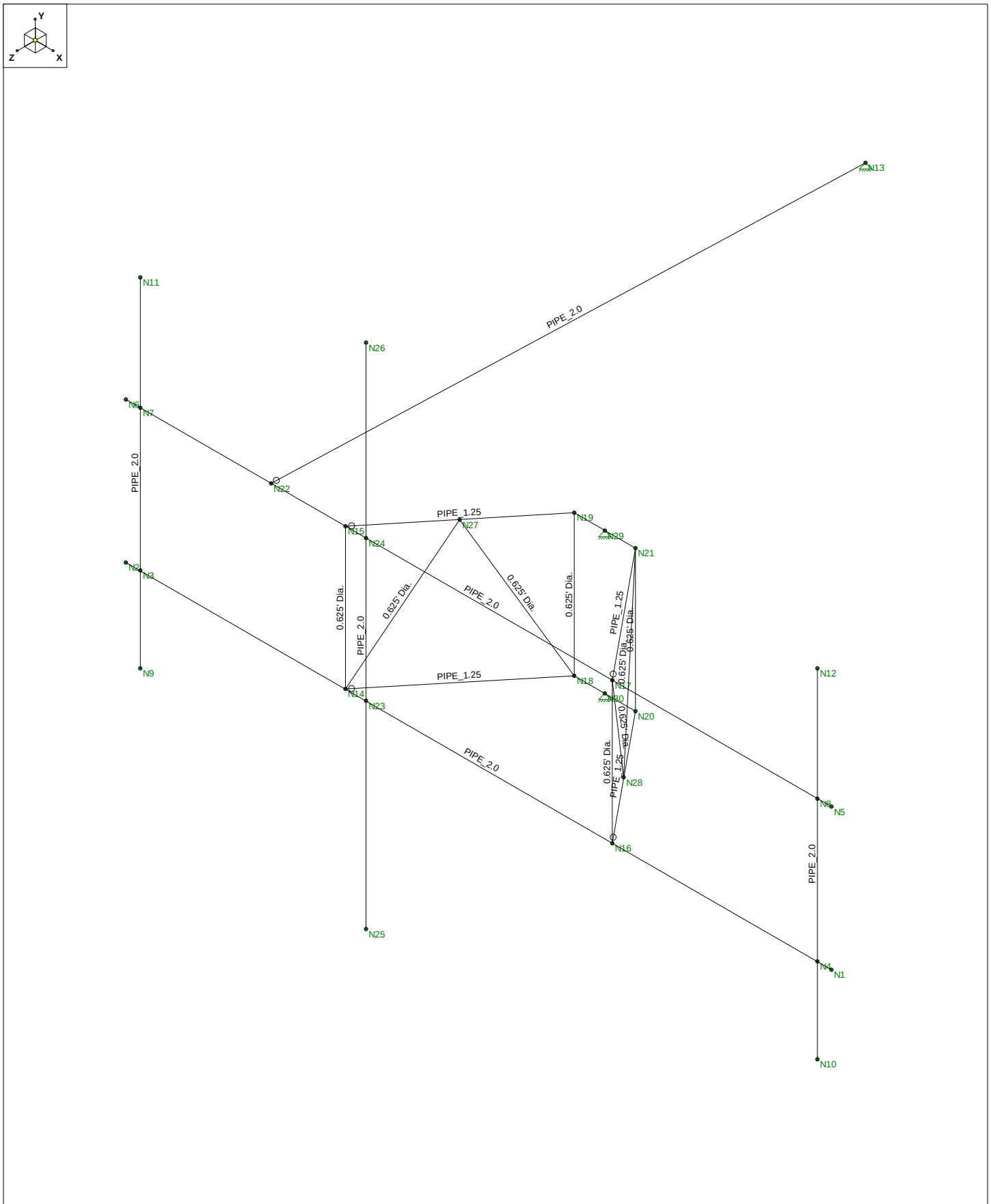
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 3.4$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 26$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.9$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 15$	lbs

Gravity Load (without ice)

Weight of All RRUSs =	$WT_{RRUS} \cdot N_{RRUS} = 84$	lbs

Gravity Loads (ice only)

Volume of Each RRUS =	$V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2567$	cu in
Volume of Ice on Each RRUS =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2778$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 90$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 90$	lbs



Envelope Only Solution

Centek Engineering		
TJL	CTHA563A	Aug 16, 2021 at 4:02 PM
21005.19	Member Framing	Mount.R3D

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	150.001
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	2
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Grade B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Antenna Mast	PIPE_2.0	Column	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
2	2" Pipe	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
3	1" Pipe	PIPE_1.0	Beam	Pipe	A53 Grade B	Typical	.469	.083	.083	.166
4	Outrigger_1.25" Pipe	PIPE_1.25	Beam	Pipe	A53 Grade B	Typical	.625	.184	.184	.368
5	Stabilizer	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
6	.625" Bar	0.625' Dia.	Column	BAR	A36 Gr.36	Typical	.307	.007	.007	.015

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	2" Pipe	12.5	Segment	Segment	Lbyy			2.1	2.1		Lateral
2	M2	2" Pipe	12.5	Segment	Segment	Lbyy			2.1	2.1		Lateral
3	M3	Stabilizer	10.186			Lbyy			1	1		Lateral
4	M4	Outrigger_1.25" Pipe	2.88	Segment	Segment	Lbyy			.8	.8		Lateral
5	M5	Outrigger_1.25" Pipe	2.88	Segment	Segment	Lbyy			.8	.8		Lateral
6	M6	Outrigger_1.25" Pipe	2.88	Segment	Segment	Lbyy			.8	.8		Lateral
7	M7	Outrigger_1.25" Pipe	2.88	Segment	Segment	Lbyy			.8	.8		Lateral
8	M8	.625" Bar	2.5						.65	.65		Lateral
9	M9	.625" Bar	2.5						.65	.65		Lateral
10	M10	.625" Bar	2.885						.65	.65		Lateral
11	M11	.625" Bar	2.885						.65	.65		Lateral
12	M12	.625" Bar	2.885						.65	.65		Lateral
13	M13	.625" Bar	2.885						.65	.65		Lateral
14	M14	.625" Bar	2.5						.65	.65		Lateral
15	M15	.625" Bar	2.5						.65	.65		Lateral
16	M16	Antenna Mast	6	Segment	Segment	Lbyy			2.1	2.1		Lateral
17	M17	Antenna Mast	9	Segment	Segment	Lbyy			2.1	2.1		Lateral
18	M18	Antenna Mast	6	Segment	Segment	Lbyy			2.1	2.1		Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
1	M1	N2	N1			2" Pipe	Beam	Pipe	A53 Grade B	Typical
2	M2	N6	N5			2" Pipe	Beam	Pipe	A53 Grade B	Typical
3	M3	N22	N13			Stabilizer	Beam	Pipe	A53 Grade B	Typical
4	M4	N15	N19			Outrigger_1.25" Pipe	Beam	Pipe	A53 Grade B	Typical
5	M5	N14	N18			Outrigger_1.25" Pipe	Beam	Pipe	A53 Grade B	Typical
6	M6	N16	N20			Outrigger_1.25" Pipe	Beam	Pipe	A53 Grade B	Typical
7	M7	N17	N21			Outrigger_1.25" Pipe	Beam	Pipe	A53 Grade B	Typical
8	M8	N15	N14			.625" Bar	Column	BAR	A36 Gr.36	Typical
9	M9	N17	N16			.625" Bar	Column	BAR	A36 Gr.36	Typical
10	M10	N14	N27			.625" Bar	Column	BAR	A36 Gr.36	Typical
11	M11	N27	N18			.625" Bar	Column	BAR	A36 Gr.36	Typical
12	M12	N21	N28			.625" Bar	Column	BAR	A36 Gr.36	Typical
13	M13	N28	N17			.625" Bar	Column	BAR	A36 Gr.36	Typical
14	M14	N21	N20			.625" Bar	Column	BAR	A36 Gr.36	Typical
15	M15	N19	N18			.625" Bar	Column	BAR	A36 Gr.36	Typical
16	M16	N11	N9			Antenna Mast	Column	Pipe	A53 Grade B	Typical
17	M17	N26	N25			Antenna Mast	Column	Pipe	A53 Grade B	Typical
18	M18	N12	N10			Antenna Mast	Column	Pipe	A53 Grade B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
19	M19	N19	N21			RIGID	None	None	RIGID	Typical
20	M20	N18	N20			RIGID	None	None	RIGID	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	6.25	.5	4.35	0	
2	N2	-6.25	.5	4.35	0	
3	N3	-6	.5	4.35	0	
4	N4	6	.5	4.35	0	
5	N5	6.25	3	4.35	0	
6	N6	-6.25	3	4.35	0	
7	N7	-6	3	4.35	0	
8	N8	6	3	4.35	0	
9	N9	-6	-1	4.35	0	
10	N10	6	-1	4.35	0	
11	N11	-6	5	4.35	0	
12	N12	6	5	4.35	0	
13	N13	-3.33	3	-5.83	0	
14	N14	-2.364742	.5	4.35	0	
15	N15	-2.364742	3	4.35	0	
16	N16	2.364742	.5	4.35	0	
17	N17	2.364742	3	4.35	0	
18	N18	-0.542286	.5	2.119738	0	
19	N19	-0.542286	3	2.119738	0	
20	N20	0.542286	.5	2.119744	0	
21	N21	0.542286	3	2.119744	0	
22	N22	-3.681667	3	4.35	0	
23	N23	-2	.5	4.35	0	
24	N24	-2	3	4.35	0	
25	N25	-2	-3	4.35	0	
26	N26	-2	6	4.35	0	
27	N27	-1.453514	3	3.234869	0	
28	N28	1.453514	.5	3.234872	0	
29	N29	0.	3	2.119741	0	
30	N30	0.	.5	2.119741	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N13	Reaction	Reaction	Reaction			
2	N18						
3	N19						
4	N20						
5	N21						
6	N29	Reaction	Reaction	Reaction			
7	N30	Reaction	Reaction	Reaction			

Member Point Loads (BLC 2 : Dead Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Y	-.052	.5
2	M16	Y	-.052	3.5
3	M17	Y	-.075	.5
4	M17	Y	-.075	7.5
5	M17	Y	-.109	1.5
6	M17	Y	-.084	4

Member Point Loads (BLC 3 : Ice Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Y	-.077	.5
2	M16	Y	-.077	3.5
3	M17	Y	-.215	.5
4	M17	Y	-.215	7.5
5	M17	Y	-.104	1.5
6	M17	Y	-.09	4

Member Point Loads (BLC 4 : Wind with Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	X	.012	.5
2	M16	X	.012	3.5
3	M17	X	.034	.5
4	M17	X	.034	7.5
5	M17	X	.019	1.5
6	M17	X	.015	4

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	X	.03	.5
2	M16	X	.03	3.5
3	M17	X	.094	.5
4	M17	X	.094	7.5
5	M17	X	.052	1.5
6	M17	X	.036	4

Member Point Loads (BLC 6 : Wind with Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Z	.024	.5
2	M16	Z	.024	3.5
3	M17	Z	.077	.5
4	M17	Z	.077	7.5

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Z	.074	.5
2	M16	Z	.074	3.5
3	M17	Z	.265	.5
4	M17	Z	.265	7.5

Member Distributed Loads (BLC 4 : Wind with Ice X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M16	X	.003	.003	0	0
2	M17	X	.003	.003	0	0
3	M18	X	.003	.003	0	0
4	M5	X	.003	.003	0	0
5	M4	X	.003	.003	0	0
6	M7	X	.003	.003	0	0
7	M6	X	.003	.003	0	0
8	M3	X	.003	.003	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M16	X	.009	.009	0	0
2	M17	X	.009	.009	0	0
3	M18	X	.009	.009	0	0
4	M5	X	.009	.009	0	0
5	M4	X	.009	.009	0	0
6	M7	X	.009	.009	0	0
7	M6	X	.009	.009	0	0
8	M3	X	.009	.009	0	0

Member Distributed Loads (BLC 6 : Wind with Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M2	Z	.003	.003	0	0
2	M1	Z	.003	.003	0	0
3	M8	Z	.003	.003	0	0
4	M4	Z	.003	.003	0	0
5	M5	Z	.003	.003	0	0
6	M15	Z	.003	.003	0	0
7	M7	Z	.003	.003	0	0
8	M6	Z	.003	.003	0	0
9	M14	Z	.003	.003	0	0
10	M9	Z	.003	.003	0	0
11	M12	Z	.003	.003	0	0
12	M13	Z	.003	.003	0	0
13	M11	Z	.003	.003	0	0
14	M10	Z	.003	.003	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M2	Z	.009	.009	0	0
2	M1	Z	.009	.009	0	0
3	M8	Z	.009	.009	0	0
4	M4	Z	.009	.009	0	0
5	M5	Z	.009	.009	0	0
6	M15	Z	.009	.009	0	0
7	M7	Z	.009	.009	0	0
8	M6	Z	.009	.009	0	0
9	M14	Z	.009	.009	0	0
10	M9	Z	.009	.009	0	0

Member Distributed Loads (BLC 7 : Wind Z) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
11	M12	Z	.009	.009	0	0
12	M13	Z	.009	.009	0	0
13	M11	Z	.009	.009	0	0
14	M10	Z	.009	.009	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib..	Area(...	Surfa...
1	Self Weight	DL		-1						
2	Dead Load	None					6			
3	Ice Load	None					6			
4	Wind with Ice X	None					6	8		
5	Wind X	None					6	8		
6	Wind with Ice Z	None					4	14		
7	Wind Z	None					4	14		

Load Combinations

	Description	Solve	P...	S...	B...	Fa...	BLC	Fact...	BLC	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2D + 1.6W (X-dir...	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-dir...	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.2D + 1.6W (Z-dire...	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9D + 1.6W (Z-dire...	Yes	Y		1	.9	2	.9	7	1.6														
6	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	6	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N13	max	.03	4	.022	4	-.137	3	0	6	0	6	0	6
2		min	-.053	2	.016	2	-.863	4	0	1	0	1	0	1
3	N29	max	1.553	6	-.08	2	.096	2	0	6	0	6	0	6
4		min	-.261	2	-.184	6	-1.451	6	0	1	0	1	0	1
5	N30	max	-.516	5	1.768	6	1.389	3	0	6	0	6	0	6
6		min	-1.629	3	.684	2	-.234	5	0	1	0	1	0	1
7	Totals:	max	0	6	1.605	3	0	3						
8		min	-1.153	1	.62	5	-1.921	5						

Envelope Joint Displacements

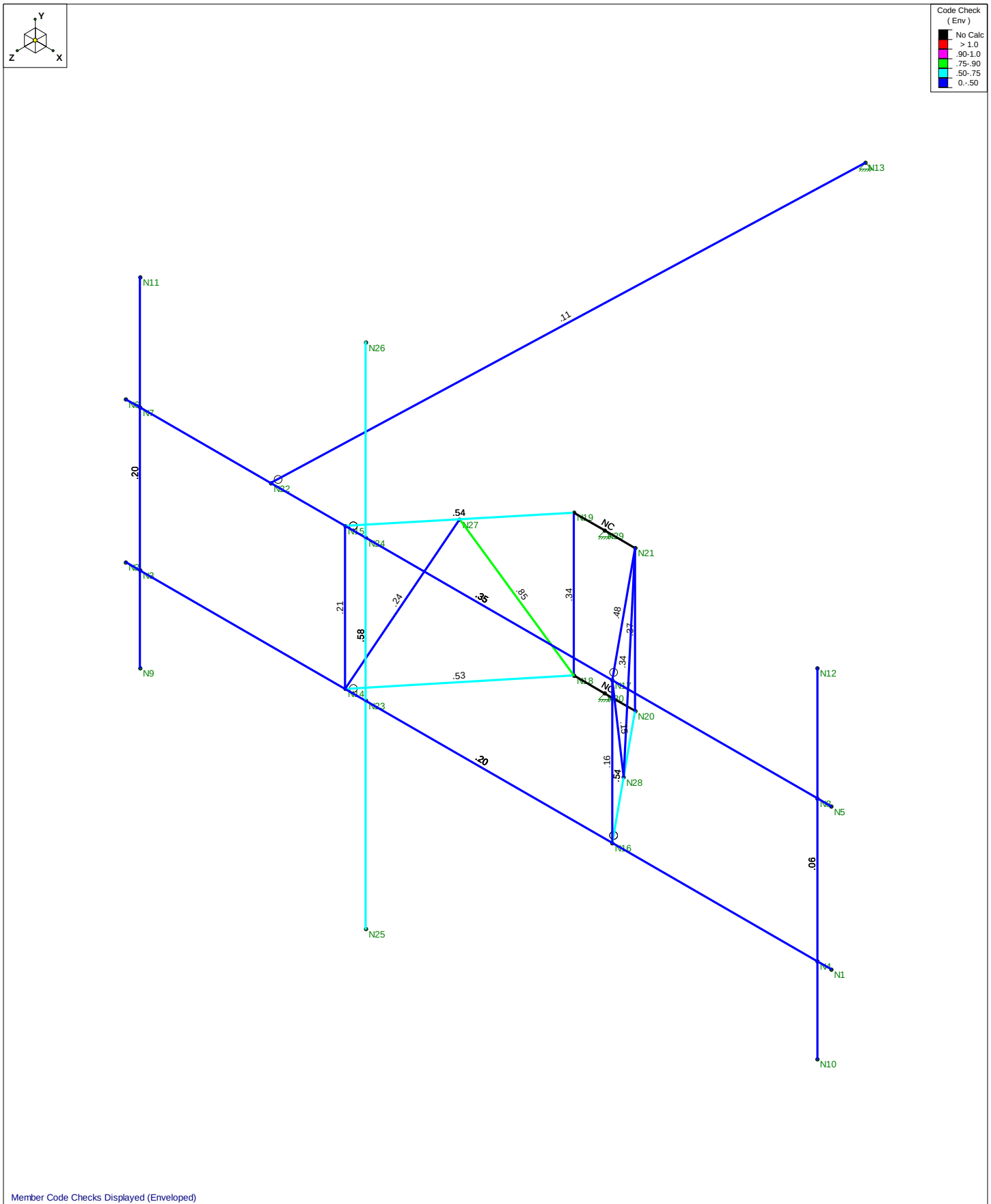
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
1	N1	max	.183	1	.431	6	-.053	6	9.957e-04	3	7.33e-03	1	5.714e-03	6
2		min	.104	6	.094	2	-.488	1	3.678e-04	5	2.647e-04	6	1.98e-03	2
3	N2	max	.183	1	-.177	2	.238	4	-1.63e-03	6	4.167e-03	4	7.245e-03	6
4		min	.105	6	-.606	6	-.008	2	-4.828e-03	4	-4.646e-03	2	2.472e-03	2
5	N3	max	.183	1	-.17	2	.226	4	-1.63e-03	6	4.167e-03	4	7.245e-03	6
6		min	.105	6	-.584	6	.006	2	-4.828e-03	4	-4.646e-03	2	2.472e-03	2
7	N4	max	.183	1	.414	6	-.053	6	9.957e-04	3	7.33e-03	1	5.714e-03	6
8		min	.104	6	.089	2	-.466	1	3.678e-04	5	2.648e-04	6	1.98e-03	2
9	N5	max	.11	2	.431	6	-.02	6	2.221e-03	4	7.704e-03	1	5.756e-03	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
10		min	-.071	6	.094	2	-.464	1	6.106e-04	2	4.66e-04	6	1.696e-03	2
11	N6	max	.11	2	-.176	2	.153	4	-2.211e-05	5	6.183e-03	4	7.035e-03	6
12		min	-.072	6	-.605	6	-.156	2	-4.69e-03	1	-4.722e-03	2	2.228e-03	2
13	N7	max	.11	2	-.17	2	.134	4	-2.211e-05	5	6.183e-03	4	7.035e-03	6
14		min	-.072	6	-.584	6	-.141	2	-4.69e-03	1	-4.722e-03	2	2.228e-03	2
15	N8	max	.11	2	.414	6	-.019	6	2.221e-03	4	7.704e-03	1	5.756e-03	6
16		min	-.071	6	.089	2	-.441	1	6.106e-04	2	4.661e-04	6	1.696e-03	2
17	N9	max	.248	3	-.17	2	.313	4	-1.63e-03	6	4.167e-03	4	7.245e-03	6
18		min	.182	5	-.584	6	.059	3	-4.828e-03	4	-4.646e-03	2	2.552e-03	2
19	N10	max	.23	1	.414	6	-.07	6	9.957e-04	3	7.33e-03	1	5.714e-03	6
20		min	.166	5	.089	2	-.48	1	3.678e-04	5	2.648e-04	6	2.06e-03	2
21	N11	max	.07	2	-.17	2	.157	5	1.297e-03	5	6.183e-03	4	7.046e-03	6
22		min	-.241	6	-.584	6	-.253	1	-4.693e-03	1	-4.722e-03	2	1.504e-03	2
23	N12	max	.073	2	.414	6	.011	6	2.221e-03	4	7.704e-03	1	5.757e-03	6
24		min	-.21	6	.089	2	-.425	2	6.107e-04	2	4.661e-04	6	1.506e-03	2
25	N13	max	0	6	0	6	0	6	4.212e-03	6	7.177e-03	2	9.78e-03	6
26		min	0	1	0	1	0	1	1.923e-03	2	-5.889e-04	6	3.459e-03	2
27	N14	max	.183	1	-.041	2	.145	1	-8.819e-04	3	1.82e-03	4	6.916e-03	6
28		min	.104	6	-.192	6	.033	6	-8.579e-03	4	-1.273e-04	2	2.359e-03	2
29	N15	max	.11	2	-.039	2	.103	2	6.398e-03	5	-3.918e-04	6	7.388e-03	6
30		min	-.072	6	-.195	6	.001	6	-1.534e-03	1	-3.881e-03	2	1.919e-03	2
31	N16	max	.183	1	.167	6	-.034	6	6.382e-04	3	7.574e-03	1	6.128e-03	6
32		min	.104	6	.033	2	-.146	1	-3.034e-03	5	9.361e-04	6	8.456e-04	2
33	N17	max	.11	2	.167	6	.002	6	4.002e-03	4	7.504e-03	1	5.956e-03	6
34		min	-.071	6	.033	2	-.105	2	5.852e-05	2	3.753e-04	6	1.289e-03	2
35	N18	max	0	6	-.022	2	.003	2	2.029e-03	3	4.966e-04	2	1.124e-02	6
36		min	0	1	-.073	6	-.05	6	5.954e-04	5	-7.671e-03	6	3.422e-03	2
37	N19	max	0	6	-.022	2	.057	6	-5.466e-04	5	8.715e-03	6	1.099e-02	6
38		min	0	1	-.072	6	.015	2	-1.256e-03	3	2.376e-03	2	3.335e-03	2
39	N20	max	0	6	.073	6	.05	6	2.029e-03	3	4.966e-04	2	1.124e-02	6
40		min	0	1	.022	2	-.003	2	5.954e-04	5	-7.671e-03	6	3.422e-03	2
41	N21	max	0	6	.072	6	-.015	2	-5.466e-04	5	8.715e-03	6	1.099e-02	6
42		min	0	1	.022	2	-.057	6	-1.256e-03	3	2.376e-03	2	3.335e-03	2
43	N22	max	.11	2	-.083	2	.007	2	4.072e-03	5	5.227e-04	4	9.636e-03	6
44		min	-.072	6	-.334	6	-.002	6	-2.677e-03	1	-6.565e-03	2	3.304e-03	2
45	N23	max	.183	1	-.031	2	.144	1	-7.677e-04	3	1.745e-03	4	6.173e-03	6
46		min	.104	6	-.164	6	.029	6	-9.188e-03	4	5.622e-04	3	2.645e-03	2
47	N24	max	.11	2	-.032	2	.116	2	7.226e-03	5	-2.903e-04	6	6.587e-03	6
48		min	-.072	6	-.165	6	.003	6	-1.207e-03	1	-1.924e-03	1	9.252e-04	2
49	N25	max	.458	1	-.031	2	.759	4	-7.603e-04	3	1.745e-03	4	7.33e-03	1
50		min	.24	5	-.165	6	.078	3	-1.753e-02	4	5.622e-04	3	3.091e-03	5
51	N26	max	.244	2	-.032	2	.647	5	2.041e-02	5	-2.903e-04	6	6.669e-03	6
52		min	-.311	6	-.165	6	-.008	3	-1.213e-03	1	-1.924e-03	1	-5.31e-03	2
53	N27	max	.049	1	-.032	2	.079	3	-4.537e-04	5	4.331e-03	2	7.004e-03	3
54		min	.019	6	-.133	6	.047	5	-2.151e-03	3	-3.959e-03	6	1.394e-03	5
55	N28	max	.058	2	.12	6	.054	6	2.747e-03	3	7.708e-03	1	6.325e-03	6
56		min	-.005	6	.028	2	-.05	2	1.003e-03	5	4.45e-03	5	1.382e-03	2
57	N29	max	0	6	0	6	0	6	-5.466e-04	5	8.715e-03	6	1.099e-02	6
58		min	0	1	0	1	0	1	-1.256e-03	3	2.376e-03	2	3.335e-03	2
59	N30	max	0	6	0	6	0	6	2.029e-03	3	4.966e-04	2	1.124e-02	6
60		min	0	1	0	1	0	1	5.954e-04	5	-7.671e-03	6	3.422e-03	2

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	Dir	...	phi*...	phi*...	phi*...	phi*...	Cb	Eqn
1	M11	0.625' Dia.	.851	2....	6	.024	0		3	3.341	9.94	.104	.104	1.7...	H1-...
2	M17	PIPE_2.0	.575	3	4	.120	3		4	19.964	32.13	1.872	1.872	2.9...	H1-...
3	M6	PIPE_1.25	.544	2.88	3	.132	2.88		6	19.044	19.688	.801	.801	2.5...	H1-...
4	M4	PIPE_1.25	.544	2.88	6	.111	1.44		6	19.044	19.688	.801	.801	1.9...	H1-...
5	M5	PIPE_1.25	.532	2.88	3	.081	2.88		4	17.237	19.688	.801	.801	1.6...	H1-...
6	M7	PIPE_1.25	.485	2.88	6	.059	0		3	17.237	19.688	.801	.801	1.6...	H1-...
7	M14	0.625' Dia.	.374	2.5	6	.104	0		6	4.378	9.94	.104	.104	2.2...	H1-...
8	M2	PIPE_2.0	.347	4....	1	.192	3....		4	31.905	32.13	1.872	1.872	3.3...	H1-...
9	M15	0.625' Dia.	.343	2.5	6	.104	2.5		6	4.378	9.94	.104	.104	2.2...	H1-...
10	M12	0.625' Dia.	.337	0	6	.023	0		2	3.341	9.94	.104	.104	1.9...	H1-...
11	M10	0.625' Dia.	.245	0	4	.023	0		6	3.341	9.94	.104	.104	3.0...	H1-...
12	M8	0.625' Dia.	.210	0	4	.029	0		4	4.378	9.94	.104	.104	2.1...	H1-...
13	M16	PIPE_2.0	.201	2	4	.066	2		4	26.005	32.13	1.872	1.872	4.9...	H1-...
14	M1	PIPE_2.0	.198	4....	1	.155	3....		1	11.708	32.13	1.872	1.872	2.2...	H1-...
15	M9	0.625' Dia.	.158	2.5	4	.007	2.5		4	4.378	9.94	.104	.104	2.2...	H1-...
16	M13	0.625' Dia.	.148	2....	4	.027	2....		6	3.341	9.94	.104	.104	2.8...	H1-...
17	M3	PIPE_2.0	.113	5....	1	.008	0		1	9.481	32.13	1.872	1.872	1.1...	H1-...
18	M18	PIPE_2.0	.065	4.5	4	.018	2		4	23.088	32.13	1.872	1.872	2.2...	H1-...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering		
TJL	CTHA563A	Aug 16, 2021 at 4:01 PM
21005.19	Unity Check	Mount.R3D

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

280' Existing Valmont Lattice Tower

Proposed T-Mobile
Antenna Upgrade

T-Mobile Site Ref: CTHA563A

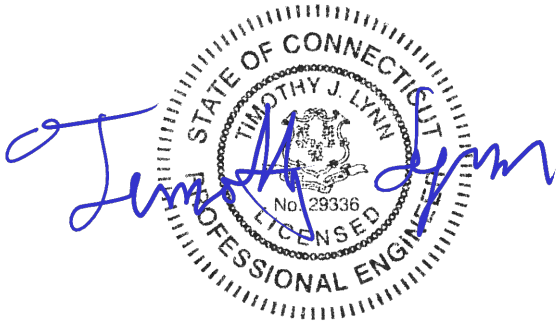
330 Pokorny Road
Haddam, CT

Centek Project No. 21005.19

~~Date: May 27, 2021~~

Rev 2: August 16, 2021

Max Stress Ratio = 77%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna installation proposed by T-Mobile on the existing lattice tower located in Haddam, Connecticut.

The host tower is a 280-ft, three legged, lattice tower originally manufactured by Valmont eng. file no. A-175068 dated 5/14/2012. The tower geometry, structure member sizes and foundation information were taken from the original design documents.

Antenna and appurtenance inventory were taken from a previous structural analysis report prepared by Black & Veatch job no. 405025 dated June 11, 2020.

The tower consists of fourteen (14) vertical sections consisting of steel truss legs conforming to ASTM A572 Gr. 50 and lateral bracing conforming to ASTM A36. The vertical tower sections are connected by bolted flange plates with the diagonal and horizontal bracing to pipe legs consisting of bolted connections. The width of the tower face is 12-ft at the top and 40-ft at the bottom.

Antenna and Appurtenance Summary

The existing and proposed loads considered in the analysis consist of the following:

- UNKNOWN (Existing):
  Antenna: Light Beacon mounted to the top of the tower.
  Cable: One (1) 3/8" ∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- VSC (Existing):
  Antenna: One (1) Celwave PD1142-2C Omni-directional whip antenna leg mounted with an elevation of ±279-ft above grade level.
  Coax Cable: One (1) 1-5/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- Eversource (Existing):
  Antenna: One (1) Decibel DB538 Omni-directional whip antenna leg mounted with an elevation of ±279-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- Eversource (Existing):
  Antenna: One (1) Telewave ANT150F6 Omni-directional whip antenna leg mounted with an elevation of ±279-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- EVERSOURCE (Existing):
  Antenna: Two (2) 8-ft microwave dishes pipe mounted with an elevation of ±276-ft above grade level.
  Cables: Two (2) EW63 cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Reserved):
  Antenna: One (1) 8-ft microwave dish pipe mounted with an elevation of ±276-ft above grade level.
  Cables: One (1) EW63 cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antenna: One (1) 8-ft microwave dish pipe mounted with an elevation of ±266-ft above grade level.
  Cables: One (1) EW63 cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- VSC (Existing):
  Antenna: Two (2) 10-ft dipoles mounted on one (1) 6-ft side arm with an elevation of ±161-ft above grade level.
  Coax Cable: Two (2) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antenna: Two (2) Decibel DB589-Y Omni-directional whip antennas (one upright and one inverted) and one (1) 12"x16"x6" TMA mounted on one (1) 6-ft side arm with an elevation of ±260-ft above grade level.
  Coax Cable: Two (2) 1-5/8" ∅ and one (1) 1/2" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antenna: One (1) Decibel DB212-C dipole antenna mounted on one (1) 6-ft side arm with an elevation of ±255-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antenna: One (1) Sinclair SD110-SFXPASNM dipole antenna mounted on one (1) 6-ft side arm with an elevation of ±241-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antenna: One (1) Kreco CO-41A Omni-directional whip antenna mounted on one (1) 6-ft side arm with an elevation of ±240-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- EVERSOURCE (Proposed):
  Antenna: One (1) 6-ft microwave dish pipe mounted with an elevation of ±240-ft above grade level.
  Cables: Two (2) E65 cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (Existing):
  Antenna: Two (2) Sinclair SE419-SF3P4LDF panel antennas (one upright and one inverted) and one (1) 12”x16”x6” TMA mounted on one (1) 6-ft side arm with an elevation of ±235-ft above grade level.
  Coax Cable: Two (2) 1-5/8” ∅ and two (2) 1/2” ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Reserved):
  Antenna: One (1) 8-ft microwave dish pipe mounted with an elevation of ±230-ft above grade level.
  Cables: One (1) EW63 cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antenna: One (1) Comprod 531-70HD dipole antenna mounted on one (1) 3-ft side arm with an elevation of ±230-ft above grade level.
  Coax Cable: One (1) 7/8” ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antenna: One (1) 8-ft microwave dish pipe mounted with an elevation of ±220-ft above grade level.
  Cables: One (1) EW63 cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antenna: One (1) Sinclair SD110-SFXPASNM dipole antenna mounted on one (1) 6-ft side arm with an elevation of ±216-ft above grade level.
  Coax Cable: One (1) 7/8” ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- VSC (Existing):
  Antenna: One (1) Telewave ANT450F10 Omni-directional whip antenna mounted on one (1) 6-ft side arm with an elevation of ±216-ft above grade level.
  Coax Cable: One (1) 7/8” ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Reserved):
  Antenna: One (1) 10-ft microwave dish pipe mounted with an elevation of ±205.5-ft above grade level.
  Cables: One (1) EW63 cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- CSP (Existing):
  Antenna: One (1) Sinclair SC479 Omni-directional whip antenna (inverted) mounted on one (1) 3-ft side arm with an elevation of ±204-ft above grade level.
  Coax Cable: One (1) 1-5/8" ∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (Existing):
  Antenna: Two (2) Sinclair SC479 Omni-directional whip antennas (one upright and one inverted) and one (1) 12"x16"x6" TMA mounted on one (1) 6-ft side arm with an elevation of ±200-ft above grade level.
  Coax Cable: Two (2) 1-5/8" ∅ and one (1) 1/2" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (Existing):
  Antenna: One (1) Telewvae ANT220F2 antenna mounted on one (1) 3-ft side arm with an elevation of ±200-ft above grade level.
  Coax Cable: One (1) 1-5/8" ∅ cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (Existing):
  Antenna: One (1) 6-ft microwave dish pipe mounted with an elevation of ±197-ft above grade level.
  Cables: One (1) EW63 cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (Existing):
  Antenna: One (1) 10-ft microwave dish pipe mounted with an elevation of ±195-ft above grade level.
  Cables: One (1) EW63 cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- Eversource (Existing):
  Antenna: One (1) Comprod 871F-70 antenna mounted on one (1) USF-4U mount with an elevation of ±177-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (Existing):
  Antenna: Two (2) Sinclair SC479 Omni-directional whip antennas (one upright and one inverted) mounted on one (1) 6-ft side arm with an elevation of ±175-ft above grade level.
  Coax Cable: Two (2) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (Existing):
  Antenna: One (1) Antel BCR-80010-90 Omni-directional whip antenna with reflector (upright), one (1) Antel BCD-80609 Omni-directional whip antenna (inverted) and one (1) 12"x16"x6" TMA mounted on one (1) 3-ft side arm with an elevation of ±175-ft above grade level.
  Coax Cable: Two (2) 1-5/8" ∅ and two (2) 1/2" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- Town of Haddam (Existing):
  Antenna: One (1) Telewave ANT450F6 Omni-directional whip antenna mounted on one (1) 3-ft side arm with an elevation of ±168-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (Existing):
  Antenna: One (1) 6-ft microwave dish pipe mounted with an elevation of ±163-ft above grade level.
  Cables: One (1) EW63 cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- VERIZON (Existing):
  Antennas: Six (6) Comscope NHH-65C-R2B panel antennas, three (3) Andrew HBXX-6517DS panel antennas, three (3) Andrew LNX-6515DS panel antennas, three (3) Samsung B2/B66 remote radio heads, three (3) Samsung B5/B13 remote radio heads and three (3) main distribution boxes mounted on three (3) 12-ft frames with a RAD center elevation of ±145-ft above grade level.
  Coax Cables: Three (3) 1-5/8" ∅ fiber cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- VSC (Existing):
  Antenna: One (1) Kathrein PR-950 paraflector mounted on one (1) 6-ft side arm with an elevation of ±126-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- VSC (Existing):
  Antenna: One (1) Kreco CO-36A Omni-directional whip antenna mounted on one (1) 6-ft side arm with an elevation of ±125-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- VSC (Existing):
  Antenna: One (1) Telewave ANT450F6 Omni-directional whip antenna mounted on one (1) 6-ft side arm with an elevation of ±124-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antenna: One (1) RFS SBX4-W60 microwave dish pipe mounted with an elevation of ±123-ft above grade level on leg "C".
  Cables: One (1) E60 cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- VSC (Existing):
  Antenna: One (1) grid dish mounted on one (1) 3-ft side arm with an elevation of ±117-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- VSC (Existing):
  Antenna: One (1) Browning BR6155 Omni-directional whip antenna mounted on one (1) 3-ft side arm with an elevation of ±116-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (Existing):
  Antenna: One (1) Telewave ANT400D dipole antenna mounted on the 3-ft side arm (above) with an elevation of ±116-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (Existing):
  Antenna: One (1) 6-ft microwave dish pipe mounted with an elevation of ±104-ft above grade level.
  Cables: One (1) EW63 cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- VSC (Existing):
  Antenna: One (1) Browning BR6155 Omni-directional whip antenna mounted on one (1) 3-ft side arm with an elevation of ±97-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- CSP (Existing):
  Antenna: One (1) 5-ft dipole antenna mounted on one (1) 3-ft side arm with an elevation of ±55-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- **Sprint (Existing to Remove):**
  Antenna: Three (3) RFS APXVTM14 panel antennas, three (3) NNVV-65B-R4 panel antennas, three (3) 1900MHz 4X45W RRHs, six (6) 800MHz 2X50W RRHs and three (3) TD-RRR8x20 RRHs mounted on three (3) 12-ft frames with a RAD center elevation of ±155-ft above grade level.
  Coax Cable: Four (4) fiber cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **T-MOBILE (Proposed Final Configuration):**
  Antennas: Three (3) Ericsson AIR6449 panel antennas, three (3) RFS APXVAALL24_43 panel antennas, three (3) Ericsson 4460 remote radio heads and three (3) Ericsson 4480 remote radio heads mounted on three (3) 12-ft frames with a RAD center elevation of ±155-ft above grade level.
  Coax Cables: Three (3) 6x24 ∅ fiber cable running on a face of the existing tower as specified in Section 3 of this report.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables should be routed as specified in section 3 of this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-H entitled "Structural Standard for Antenna Support Structures, Antennas and Small Wind Turbine Support Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-H Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-H, gravity loads of the tower structure and its components, and the application of 1.0" radial ice on the tower structure and its components.

Load Cases:	Load Case 1; 140 mph (Risk Cat III) wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-H]*

[1] The 2015 International Building Code as amended by the 2018 Connecticut State Building Code (CSBC).

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Design flexural strength was determined based on section 4.7 and Table 4-8 of the TIA-222-G.

- Calculated stresses **were found to be within allowable limits**.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T7)	140'-0"-160'-0"	70.7%	**PASS**
Diagonal (T8)	120'-0"-140'-0"	76.9%	**PASS**
Mid Girt (T3)	220'-0"-240'-0"	43.0%	**PASS**

Foundation and Anchors

The existing foundation consists of three (3) 5.5-ft ∅ x 4.25-ft long piers on a 49.5-ft square x 2.25-ft thick reinforced concrete mat. The base of the tower is connected to the foundation by means of (12) 1.25"∅, ASTM F1554-105 anchor bolts per leg embedded approximately 5-ft into the concrete foundation structure.

- The tower reactions developed from the governing Load Case were used in the verification of the foundation:

Reactions	Vector	Proposed Base Reactions
Base	Shear	**143 kips**
	Compression	**150 kips**
	Moment	**21,687 kip-ft**
Leg	Shear	**88 kips**
	Uplift	**558 kips**
	Compression	**676 kips**

- The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	49.2%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	TIA-222-H Section 9.4 FS(1)	Proposed Loading (FS)(1)	Result
Reinforced Concrete Piers (3) and Mat	OM(2)	1.0	1.89	**PASS**

Note 1: FS denotes Factor of Safety
Note 2: OM denotes Overturning Moment.

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration with the below recommendations.

The analysis is based, in part, on the information provided to this office by T-Mobile. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

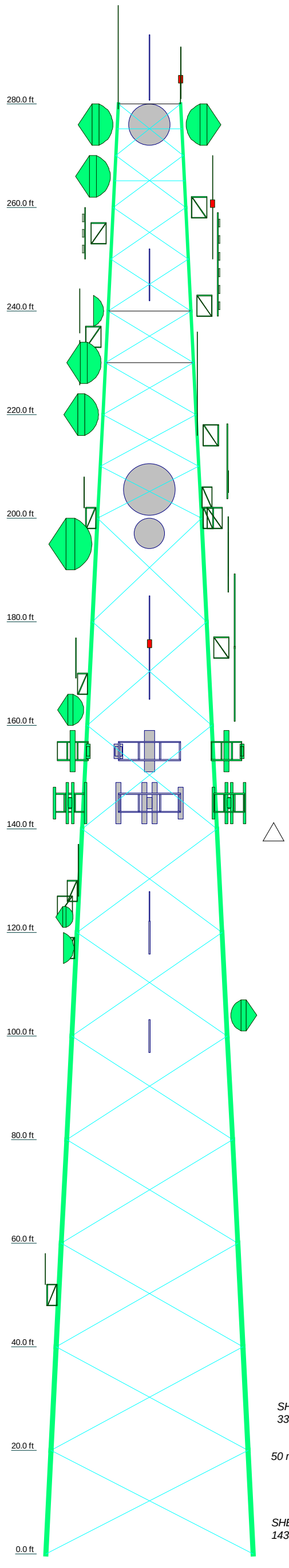
tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISATower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14
Legs	#12ZG - 1.25" - 1.00" conn. (Pirod 207628)			A	B	#12ZG -2.25" - 0.875" conn. (Pirod 208334)		C	D	E	F	#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)		
Leg Grade	A572-50													
Diagonals	L3x3x5/16		L4x4x1/4		2L3 1/2x3 1/2x1/4		2L4x4x1/4		2L4x4x3/8			2L5x5x5/16		
Diagonal Grade	A36													
Top Girts	L3 1/2x3 1/2x5/16	N.A.	L5x5x3/8		N.A.									
Mid Girts	N.A.		L3x3x3/16		N.A.									
Sec. Horizontals	L2 1/2x2 1/2x5/16						N.A.							
Face Width (ft)	12	14	16	18	20	22	24	26	28	30	32	34	36	38
# Panels @ (ft)	8 @ 10					10 @ 20								
Weight (K)	3.2	2.6	3.7	3.8	5.1	5.7	6.2	8.1	9.1	10.1	10.5	11.5	11.8	12.0

Total Weight (K): 103.4



ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 676 K
SHEAR: 88 K

UPLIFT: -558 K
SHEAR: 76 K

AXIAL 294 K
SHEAR 33 K
MOMENT 5087 kip-ft
TORQUE 62 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 150 K
SHEAR 143 K
MOMENT 21687 kip-ft
TORQUE 199 kip-ft
REACTIONS - 140 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Beacon Extender (4') 803062	280	APXVAALL24-43 (T-Mobile)	155
Beacon	280	AIR6449 (T-Mobile)	155
DB538 (Eversource)	279	APXVAALL24-43 (T-Mobile)	155
ANT150F6 -138-151 MHZ (Eversource)	279	4460 B25+B66 (T-Mobile)	155
1142-2C (VSC)	279	4460 B25+B66 (T-Mobile)	155
8' Solid w/ Radome (Eversource)	276	4460 B25+B66 (T-Mobile)	155
8' Solid w/ Radome (Eversource)	276	4480 B71+B85 (T-Mobile)	155
8' Solid w/ Radome (Eversource)	276	4480 B71+B85 (T-Mobile)	155
8' Solid w/ Radome (Eversource)	266	4480 B71+B85 (T-Mobile)	155
10' Dipole (VSC)	261	12' V-Frame (T-Mobile)	155
10' Dipole (VSC)	261	12' V-Frame (T-Mobile)	155
6' Pivot Side Arm (50" pipe) (VSC)	261	12' V-Frame (T-Mobile)	155
DB589-Y (Eversource)	260	B5/B13 RRH (Verizon)	145
DB589-Y (Eversource)	260	RC2DC-3315-PF-48 (Verizon)	145
TMA (12"x16"x6"") (Eversource)	260	LNX-6515DS (Verizon)	145
6' Pivot Side Arm (50" pipe) (Eversource)	260	NHH-65C-R2B (Verizon)	145
DB212-1-C (Eversource)	255	B2/B66A RRH (Verizon)	145
6' Pivot Side Arm (50" pipe) (Eversource)	255	B2/B66A RRH (Verizon)	145
SD110-SFXPASNM (Eversource)	241	SitePro SFS-V-L (Verizon)	145
6' Pivot Side Arm (50" pipe) (Eversource)	241	SitePro SFS-V-L (Verizon)	145
CO-41A (Eversource)	240	SitePro SFS-V-L (Verizon)	145
6' Pivot Side Arm (50" pipe) (Eversource)	240	NHH-65C-R2B (Verizon)	145
6' Dish (Eversource - Proposed)	240	SitePro VFA12-HD (Verizon)	145
TMA (12"x16"x6"") (CSP)	235	SitePro VFA12-HD (Verizon)	145
SE419-SF3P4LDF (CSP)	235	HBXX-6517DS (Verizon)	145
SE419-SF3P4LDF (CSP)	235	LNX-6515DS (Verizon)	145
6' Pivot Side Arm (50" pipe) (CSP)	235	B2/B66A RRH (Verizon)	145
531-70HD (Eversource)	230	B5/B13 RRH (Verizon)	145
3' Pivot Side Arm (50" pipe) (Eversource)	230	B5/B13 RRH (Verizon)	145
8' Solid w/ Radome (Eversource)	230	NHH-65C-R2B (Verizon)	145
8' Solid w/ Radome (Eversource)	220	NHH-65C-R2B (Verizon)	145
ANT450F10 (VSC)	216	RC2DC-3315-PF-48 (Verizon)	145
6' Pivot Side Arm (50" pipe) (VSC)	216	RC2DC-3315-PF-48 (Verizon)	145
SD110-SFXPASNM (Eversource)	216	HBXX-6517DS (Verizon)	145
6' Pivot Side Arm (50" pipe) (Eversource)	216	LNX-6515DS (Verizon)	145
10' Solid w/ Radome (Eversource)	205.5	NHH-65C-R2B (Verizon)	145
3' Pivot Side Arm (50" pipe) (CSP)	204	NHH-65C-R2B (Verizon)	145
SC479 (CSP)	204	HBXX-6517DS (Verizon)	145
SE419 (CSP)	200	SitePro VFA12-HD (Verizon)	145
TMA (12"x16"x6"") (CSP)	200	Beacon	140
3' Pivot Side Arm (50" pipe) (CSP)	200	Beacon	140
6' Pivot Side Arm (50" pipe) (CSP)	200	Beacon	140
SC479 (CSP)	200	3' Pivot Side Arm (50" pipe) (VSC)	128
ANT220F2 (CSP)	200	PR-950 (VSC)	126
ANT900D6-9 (CSP)	200	6' Pivot Side Arm (50" pipe) (VSC)	126
3' Pivot Side Arm (50" pipe) (CSP)	200	6' Pivot Side Arm (50" pipe) (VSC)	125
6' Solid w/ Radome (CSP)	197	KRECO CO-36A (VSC)	125
10' Solid w/ Radome (CSP)	195	ANT450F6 (VSC)	124
SitePro USF-4U (Eversource)	177	6' Pivot Side Arm (50" pipe) (VSC)	124
871F-70 (Eversource)	177	SBX4-W60 (Eversource)	123
SC479 (CSP)	175	3' Pivot Side Arm (50" pipe) (CSP)	117
BCR-80010-90 (CSP)	175	6' Grid Dish (VSC)	117
BCD-80609 (CSP)	175	3' Pivot Side Arm (50" pipe) (VSC/CSP)	116
TMA (12"x16"x6"") (CSP)	175	BR-6155 (VSC)	116
3' Pivot Side Arm (50" pipe) (CSP)	175	ANT400D (CSP)	116
SC479 (CSP)	175	6' Solid w/ Radome (Eversource)	104
6' Pivot Side Arm (50" pipe) (CSP)	175	BR-6155 (VSC)	97
ANT450F6 (Town of Haddam)	168	3' Pivot Side Arm (50" pipe) (VSC)	97
3' Pivot Side Arm (50" pipe) (Town of Haddam)	168	5-ft dipole (CSP)	55
6' Solid w/ Radome (CSP)	163	3' Pivot Side Arm (50" pipe) (CSP)	55
AIR6449 (T-Mobile)	155	ANT790F2 (CSP)	50
APXVAALL24-43 (T-Mobile)	155	3' Pivot Side Arm (50" pipe) (CSP)	50
AIR6449 (T-Mobile)	155		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	#12ZG - 1.75" - 1.00" conn. (Pirod 195557)	D	#12ZG -2.75"-0.875 -DB-0.625"-HP- (Pirod 238706)
B	#12ZG -2.00" - 0.875" conn.-Trans (Pirod 211843)	E	#12ZG -3.00"-0.875 -DB-0.625"-HP-Trans- (Pirod 238707)
C	#12ZG - 2.50" - 0.875" conn. (Pirod 208335)	F	#12ZG -3.00"-0.875 -DB-0.625"-HP- (Pirod 238708)

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

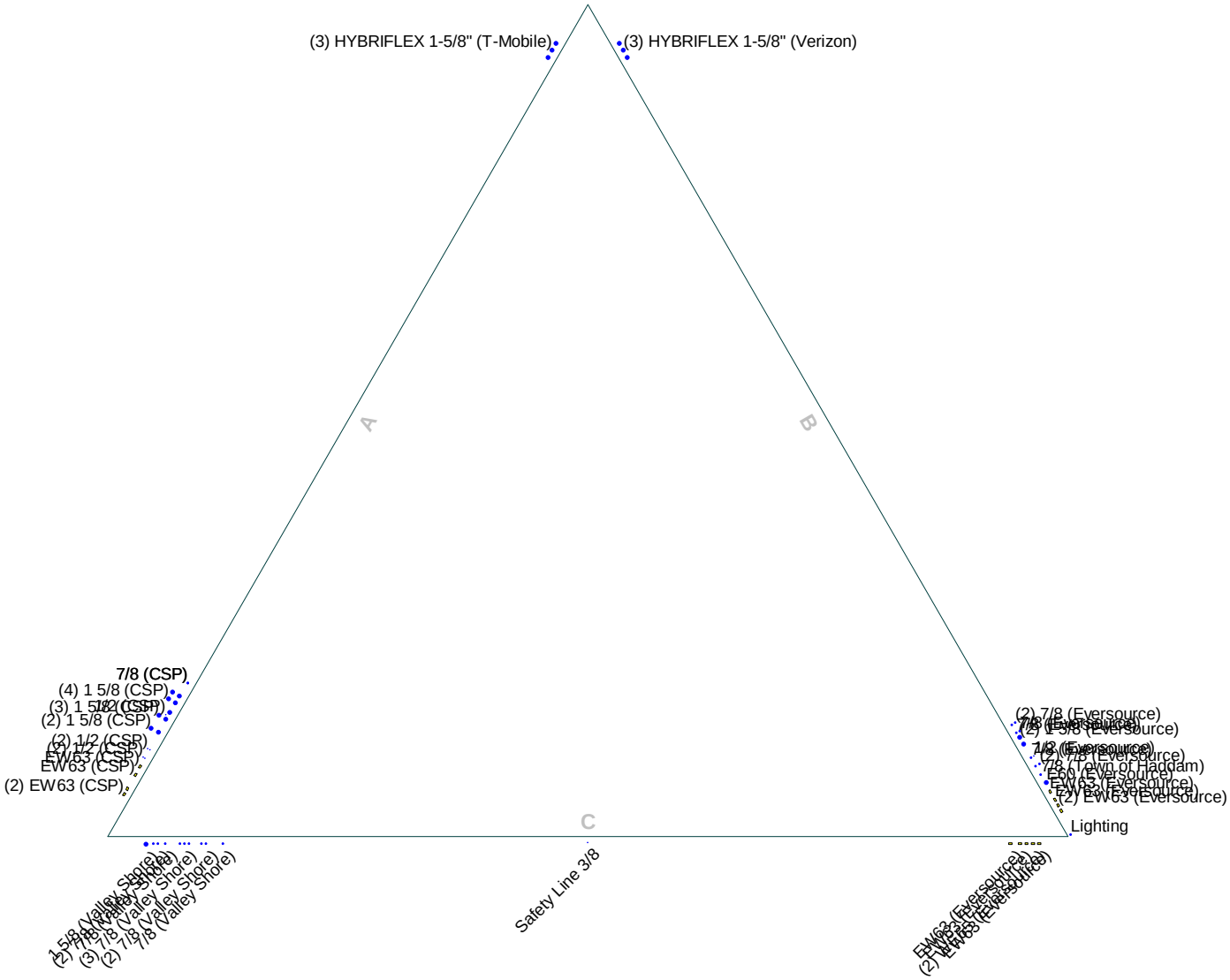
1. Tower designed for Exposure B to the TIA-222-H Standard.
2. Tower designed for a 140 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 76.9%

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **21005.19 - CTHA563A**		
Project: **280-ft Lattice Tower - Higganum, CT**		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-H	Date: 08/16/21	Scale: NTS
Path:		Dwg No. E-1

Feed Line Plan

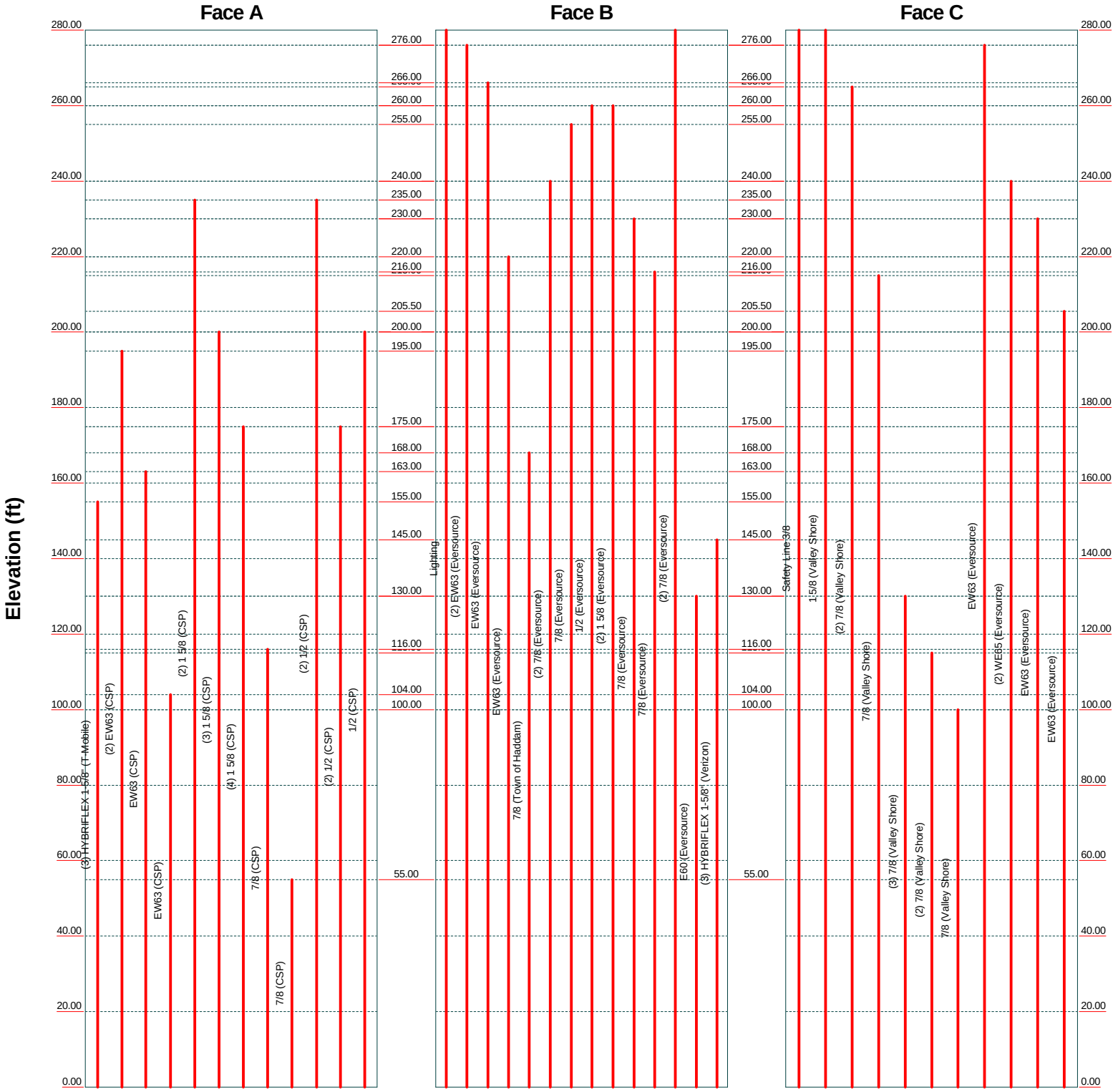
Round | Flat | App In Face | App Out Face | Truss-Leg



Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: ***21005.19 - CTHA563A***		
	Project: ***280-ft Lattice Tower - Higganum, CT***		
	Client: T-Mobile	Drawn by: TJL	App'd:
	Code: TIA-222-H	Date: 08/16/21	Scale: NTS
	Path:		Dwg No. E-7

Feed Line Distribution Chart
0' - 280'

Round | Flat | App In Face | App Out Face | Truss Leg



Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: ***21005.19 - CTHA563A***		
	Project: ***280-ft Lattice Tower - Higganum, CT***		
	Client: T-Mobile	Drawn by: TJL	App'd:
	Code: TIA-222-H	Date: 08/16/21	Scale: NTS
	Path:		Dwg No. E-7

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 280.00 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 12.00 ft at the top and 40.00 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower base elevation above sea level: 0.00 ft.
Basic wind speed of 140 mph.
Risk Category III.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.0000 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.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
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

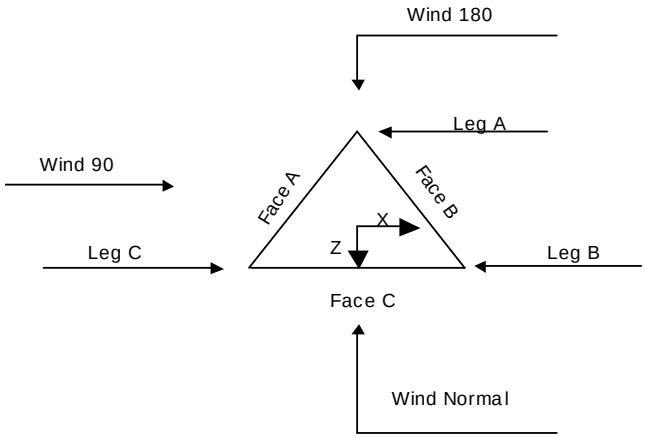
Consider Moments - Legs
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
√ Use Code Stress Ratios
√ Use Code Safety Factors - Guys
Escalate Ice
Always Use Max Kz
Use Special Wind Profile
√ Include Bolts In Member Capacity
Leg Bolts Are At Top Of Section
Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
SR Members Have Cut Ends
SR Members Are Concentric

Distribute Leg Loads As Uniform
Assume Legs Pinned
√ Assume Rigid Index Plate
√ Use Clear Spans For Wind Area
√ Use Clear Spans For KL/r
√ Retension Guys To Initial Tension
Bypass Mast Stability Checks
√ Use Azimuth Dish Coefficients
√ Project Wind Area of Appurt.
Autocalc Torque Arm Areas
Add IBC .6D+W Combination
√ Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing
√ Treat Feed Line Bundles As Cylinder
Ignore KL/ry For 60 Deg. Angle Legs

Use ASCE 10 X-Brace Ly Rules
√ Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
√ SR Leg Bolts Resist Compression
√ All Leg Panels Have Same Allowable
Offset Girt At Foundation
√ Consider Feed Line Torque
Include Angle Block Shear Check
Use TIA-222-H Bracing Resist. Exemption
Use TIA-222-H Tension Splice Exemption

Poles

Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets
Pole Without Linear Attachments
Pole With Shroud Or No Appurtenances
Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	280.00-260.00		PiRod 12BD Truss Leg	12.00	1	20.00
T2	260.00-240.00		PiRod 12BD Truss Leg	14.00	1	20.00
T3	240.00-220.00		PiRod 12BD Truss Leg	16.00	1	20.00
T4	220.00-200.00		PiRod 12BD Truss Leg	18.00	1	20.00
T5	200.00-180.00		PiRod 12BDH Truss Leg	20.00	1	20.00
T6	180.00-160.00		PiRod 12BDH Truss Leg	22.00	1	20.00
T7	160.00-140.00		PiRod 12BDH Truss Leg	24.00	1	20.00
T8	140.00-120.00		PiRod 12BDH Truss Leg	26.00	1	20.00
T9	120.00-100.00		PiRod 12BDH Truss Leg	28.00	1	20.00
T10	100.00-80.00		PiRod 12BDH Truss Leg	30.00	1	20.00
T11	80.00-60.00		PiRod 12BDH Truss Leg	32.00	1	20.00
T12	60.00-40.00		PiRod 12BDH Truss Leg	34.00	1	20.00
T13	40.00-20.00		PiRod 18BD Truss Leg	36.00	1	20.00
T14	20.00-0.00		PiRod 18BD Truss Leg	38.00	1	20.00

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	280.00-260.00	10.00	X Brace	No	Yes	0.0000	0.0000

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
T2	260.00-240.00	10.00	X Brace	No	No	0.0000	0.0000
T3	240.00-220.00	10.00	X Brace	No	No	0.0000	0.0000
T4	220.00-200.00	10.00	X Brace	No	Yes	0.0000	0.0000
T5	200.00-180.00	20.00	X Brace	No	No	0.0000	0.0000
T6	180.00-160.00	20.00	X Brace	No	No	0.0000	0.0000
T7	160.00-140.00	20.00	X Brace	No	No	0.0000	0.0000
T8	140.00-120.00	20.00	X Brace	No	No	0.0000	0.0000
T9	120.00-100.00	20.00	X Brace	No	No	0.0000	0.0000
T10	100.00-80.00	20.00	X Brace	No	No	0.0000	0.0000
T11	80.00-60.00	20.00	X Brace	No	No	0.0000	0.0000
T12	60.00-40.00	20.00	X Brace	No	No	0.0000	0.0000
T13	40.00-20.00	20.00	X Brace	No	No	0.0000	0.0000
T14	20.00-0.00	20.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 280.00-260.00	Truss Leg	#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T2 260.00-240.00	Truss Leg	#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T3 240.00-220.00	Truss Leg	#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)
T4 220.00-200.00	Truss Leg	#12ZG - 1.75" - 1.00" conn. (Pirod 195557)	A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)
T5 200.00-180.00	Truss Leg	#12ZG -2.00" - 0.875" conn.-Trans (Pirod 211843)	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x1/4	A36 (36 ksi)
T6 180.00-160.00	Truss Leg	#12ZG -2.25" - 0.875" conn. (Pirod 208334)	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x1/4	A36 (36 ksi)
T7 160.00-140.00	Truss Leg	#12ZG -2.25" - 0.875" conn. (Pirod 208334)	A572-50 (50 ksi)	Double Equal Angle	2L4x4x1/4	A36 (36 ksi)
T8 140.00-120.00	Truss Leg	#12ZG - 2.50" - 0.875" conn. (Pirod 208335)	A572-50 (50 ksi)	Double Equal Angle	2L4x4x3/8	A36 (36 ksi)
T9 120.00-100.00	Truss Leg	#12ZG -2.75"-0.875 -DB-0.625"-HP- (Pirod 238706)	A572-50 (50 ksi)	Double Equal Angle	2L4x4x3/8	A36 (36 ksi)
T10 100.00-80.00	Truss Leg	#12ZG -3.00"-0.875 -DB-0.625"-HP-Trans- (Pirod 238707)	A572-50 (50 ksi)	Double Equal Angle	2L4x4x3/8	A36 (36 ksi)
T11 80.00-60.00	Truss Leg	#12ZG -3.00"-0.875 -DB-0.625"-HP- (Pirod 238708)	A572-50 (50 ksi)	Double Equal Angle	2L5x5x5/16	A36 (36 ksi)
T12 60.00-40.00	Truss Leg	#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	A572-50 (50 ksi)	Double Equal Angle	2L5x5x5/16	A36 (36 ksi)
T13 40.00-20.00	Truss Leg	#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	A572-50 (50 ksi)	Double Equal Angle	2L5x5x5/16	A36 (36 ksi)
T14 20.00-0.00	Truss Leg	#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	A572-50 (50 ksi)	Double Equal Angle	2L5x5x5/16	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 280.00-260.00	Equal Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T3 240.00-220.00	Equal Angle	L5x5x3/8	A36 (36 ksi)	Solid Round		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
T3 240.00-220.00	1	Equal Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 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 280.00-260.00	Equal Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)	Solid Round		A36 (36 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
T1 280.00-260.00	0.00	0.5000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T2 260.00-240.00	0.00	0.5000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T3 240.00-220.00	0.00	0.5000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T4 220.00-200.00	0.00	0.5000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T5 200.00-180.00	0.00	0.6250	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T6 180.00-160.00	0.00	0.6250	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T7	0.00	0.6250	A36	1	1	1.05	36.0000	36.0000	36.0000

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
160.00-140.00			(36 ksi)						
T8	0.00	0.6250	A36	1	1	1.05	36.0000	36.0000	36.0000
140.00-120.00			(36 ksi)						
T9	0.00	0.6250	A36	1	1	1.05	36.0000	36.0000	36.0000
120.00-100.00			(36 ksi)						
T10	0.00	0.6250	A36	1	1	1.05	36.0000	36.0000	36.0000
100.00-80.00			(36 ksi)						
T11	0.00	0.6250	A36	1	1	1.05	36.0000	36.0000	36.0000
80.00-60.00			(36 ksi)						
T12	0.00	0.6250	A36	1	1	1.05	36.0000	36.0000	36.0000
60.00-40.00			(36 ksi)						
T13	0.00	0.6250	A36	1	1	1.05	36.0000	36.0000	36.0000
40.00-20.00			(36 ksi)						
T14 20.00-0.00	0.00	0.6250	A36	1	1	1.05	36.0000	36.0000	36.0000
			(36 ksi)						

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	Yes	1	1	1	1	1	1	1	1
280.00-260.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
260.00-240.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
240.00-220.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
220.00-200.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
200.00-180.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
180.00-160.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T9	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T10	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T11	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T12	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T13	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T14	Yes	Yes	1	1	1	1	1	1	1	1
20.00-0.00				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)*

	Truss-Leg K Factors					
	Truss-Legs Used As Leg Members			Truss-Legs Used As Inner Members		
Tower Elevation ft	Leg Panels	X Brace Diagonals	Z Brace Diagonals	Leg Panels	X Brace Diagonals	Z Brace Diagonals
T1 280.00-260.00	1	0.5	0.7	1	0.5	0.7
T2 260.00-240.00	1	0.5	0.7	1	0.5	0.7
T3 240.00-220.00	1	0.5	0.7	1	0.5	0.7
T4 220.00-200.00	1	0.5	0.7	1	0.5	0.7
T5 200.00-180.00	1	0.5	0.7	1	0.5	0.7
T6 180.00-160.00	1	0.5	0.7	1	0.5	0.7
T7 160.00-140.00	1	0.5	0.7	1	0.5	0.7
T8 140.00-120.00	1	0.5	0.7	1	0.5	0.7
T9 120.00-100.00	1	0.5	0.7	1	0.5	0.7
T10 100.00-80.00	1	0.5	0.7	1	0.5	0.7
T11 80.00-60.00	1	0.5	0.7	1	0.5	0.7
T12 60.00-40.00	1	0.5	0.7	1	0.5	0.7
T13 40.00-20.00	1	0.5	0.7	1	0.5	1
T14 20.00-0.00	1	0.5	0.7	1	0.5	1

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 280.00-260.00	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 260.00-240.00	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 240.00-220.00	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 220.00-200.00	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 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

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
T6 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
T7 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
T8 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
T9 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
T10 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
T11 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
T12 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
T13 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
T14 20.00-0.00	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 Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	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 280.00-260.00	0.0000	0.75	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 260.00-240.00	0.0000	0.75	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 240.00-220.00	0.0000	0.75	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 220.00-200.00	0.0000	0.75	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 200.00-180.00	0.0000	0.75	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 180.00-160.00	0.0000	0.75	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 160.00-140.00	0.0000	0.75	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 140.00-120.00	0.0000	0.75	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 120.00-100.00	0.0000	0.75	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 100.00-80.00	0.0000	0.75	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 80.00-60.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 60.00-40.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 40.00-20.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T14 20.00-0.00	0.0000	0.75	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	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 280.00-260.00	5.0000	10.7500	5.0000	10.7500	0.0000	0.0000	0.0000	0.0000
T2 260.00-240.00	5.0000	10.7500	5.0000	10.7500	0.0000	0.0000	0.0000	0.0000
T3 240.00-220.00	5.0000	10.7500	5.0000	10.7500	0.0000	0.0000	0.0000	0.0000
T4 220.00-200.00	5.0000	10.7500	5.0000	10.7500	0.0000	0.0000	0.0000	0.0000
T5 200.00-180.00	5.0000	11.5000	5.0000	11.5000	0.0000	0.0000	0.0000	0.0000
T6 180.00-160.00	5.0000	11.5000	5.0000	11.5000	0.0000	0.0000	0.0000	0.0000
T7 160.00-140.00	5.0000	11.5000	5.0000	11.5000	0.0000	0.0000	0.0000	0.0000
T8 140.00-120.00	5.0000	11.5000	5.0000	11.5000	0.0000	0.0000	0.0000	0.0000
T9 120.00-100.00	5.0000	11.5000	5.0000	11.5000	0.0000	0.0000	0.0000	0.0000
T10 100.00-80.00	5.0000	11.5000	5.0000	11.5000	0.0000	0.0000	0.0000	0.0000
T11 80.00-60.00	5.0000	11.5000	5.0000	11.5000	0.0000	0.0000	0.0000	0.0000
T12 60.00-40.00	5.0000	11.5000	5.0000	11.5000	0.0000	0.0000	0.0000	0.0000
T13 40.00-20.00	5.0000	11.5000	5.0000	11.5000	0.0000	0.0000	0.0000	0.0000
T14 20.00-0.00	5.0000	11.5000	5.0000	11.5000	0.0000	0.0000	0.0000	0.0000

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 280.00-260.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	1	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T2 260.00-240.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T3 240.00-220.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	1	1.0000 A325N	0	1.0000 A325N	1	1.0000 A325N	0	1.0000 A325N	0
T4 220.00-200.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T5 200.00-180.00	Flange	1.0000 A325N	12	0.8750 A325N	1	0.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T6 180.00-160.00	Flange	1.0000 A325N	12	0.8750 A325N	1	0.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T7 160.00-140.00	Flange	1.0000 A325N	12	0.8750 A325N	1	0.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T8 140.00-120.00	Flange	1.0000 A325N	12	0.8750 A325N	1	0.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T9 120.00-100.00	Flange	1.0000 A325N	12	0.8750 A325N	2	0.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T10 100.00-80.00	Flange	1.2500 A325N	12	0.8750 A325N	2	0.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T11 80.00-60.00	Flange	1.2500 A325N	12	0.8750 A325N	2	0.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T12 60.00-40.00	Flange	1.2500 A325N	12	0.8750 A325N	2	0.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T13 40.00-20.00	Flange	1.2500 A325N	12	0.8750 A325N	2	0.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T14 20.00-0.00	Flange	1.2500 F1554-105	12	0.8750 A325N	2	0.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	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	C	No	No	Ar (CaAa)	280.00 - 0.00	3.0000	0	1	1	0.3750	0.3750		0.22
Lighting	B	No	No	Ar (CaAa)	280.00 - 0.00	1.0000	0.5	1	1	0.8700	0.8700		0.15
HYBRIFLEX 1-5/8" (T-Mobile)	A	No	No	Ar (CaAa)	155.00 - 0.00	3.0000	0.44	3	3	1.9800	1.9800		1.90
EW63 (CSP)	A	No	No	Af (CaAa)	195.00 - 0.00	3.0000	-0.45	2	2	1.5742	1.5742		0.51
EW63 (CSP)	A	No	No	Af (CaAa)	163.00 - 0.00	3.0000	-0.43	1	1	1.5742	1.5742		0.51
EW63 (CSP)	A	No	No	Af (CaAa)	104.00 - 0.00	3.0000	-0.42	1	1	1.5742	1.5742		0.51
1 5/8 (CSP)	A	No	No	Ar (CaAa)	235.00 - 0.00	3.0000	-0.38	2	1	1.9800	1.9800		1.04
1 5/8 (CSP)	A	No	No	Ar (CaAa)	200.00 - 0.00	3.0000	-0.36	3	2	1.9800	1.9800		1.04
1 5/8 (CSP)	A	No	No	Ar (CaAa)	175.00 - 0.00	3.0000	-0.34	4	2	1.9800	1.9800		1.04
1 5/8 (Valley Shore)	C	No	No	Ar (CaAa)	280.00 - 0.00	3.0000	0.46	1	1	1.9800	1.9800		1.04
7/8 (Valley Shore)	C	No	No	Ar (CaAa)	265.00 - 0.00	3.0000	0.45	2	2	1.1100	1.1100		0.54
7/8 (Valley Shore)	C	No	No	Ar (CaAa)	215.00 - 0.00	3.0000	0.44	1	1	1.1100	1.1100		0.54
7/8 (Valley Shore)	C	No	No	Ar (CaAa)	130.00 - 0.00	3.0000	0.42	3	3	1.1100	1.1100		0.54
7/8 (Valley Shore)	C	No	No	Ar (CaAa)	115.00 - 0.00	3.0000	0.4	2	2	1.1100	1.1100		0.54
7/8 (Valley Shore)	C	No	No	Ar (CaAa)	100.00 - 0.00	3.0000	0.38	1	1	1.1100	1.1100		0.54

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
EW63 (Eversource)	B	No	No	Af (CaAa)	276.00 - 0.00	3.0000	0.47	2	2	1.5742	1.5742		0.51
EW63 (Eversource)	B	No	No	Af (CaAa)	266.00 - 0.00	3.0000	0.46	1	1	1.5742	1.5742		0.51
EW63 (Eversource)	B	No	No	Af (CaAa)	220.00 - 0.00	3.0000	0.45	1	1	1.5742	1.5742		0.51
7/8 (Town of Haddam)	B	No	No	Ar (CaAa)	168.00 - 0.00	3.0000	0.43	1	1	1.1100	1.1100		0.54
7/8 (Eversource)	B	No	No	Ar (CaAa)	240.00 - 0.00	3.0000	0.42	2	1	1.1100	1.1100		0.54
7/8 (Eversource)	B	No	No	Ar (CaAa)	255.00 - 0.00	3.0000	0.41	1	1	1.1100	1.1100		0.54
1/2 (Eversource)	B	No	No	Ar (CaAa)	260.00 - 0.00	5.0000	0.41	1	1	0.5800	0.5800		0.25
1 5/8 (Eversource)	B	No	No	Ar (CaAa)	260.00 - 0.00	3.0000	0.39	2	2	1.9800	1.9800		1.04
7/8 (Eversource)	B	No	No	Ar (CaAa)	230.00 - 0.00	3.0000	0.38	1	1	1.1100	1.1100		0.54
7/8 (Eversource)	B	No	No	Ar (CaAa)	216.00 - 0.00	5.0000	0.38	1	1	1.1100	1.1100		0.54
7/8 (Eversource)	B	No	No	Ar (CaAa)	280.00 - 0.00	3.0000	0.37	2	1	1.1100	1.1100		0.54
7/8 (CSP)	A	No	No	Ar (CaAa)	116.00 - 0.00	3.0000	-0.32	1	1	1.1100	1.1100		0.54
7/8 (CSP)	A	No	No	Ar (CaAa)	55.00 - 0.00	3.0000	-0.32	1	1	1.1100	1.1100		0.54
1/2 (CSP)	A	No	No	Ar (CaAa)	235.00 - 0.00	3.0000	-0.41	2	1	0.5800	0.5800		0.25
1/2 (CSP)	A	No	No	Ar (CaAa)	175.00 - 0.00	3.0000	-0.4	2	1	0.5800	0.5800		0.25
1/2 (CSP)	A	No	No	Ar (CaAa)	200.00 - 0.00	5.0000	-0.36	1	1	0.5800	0.5800		0.25
E60 (Eversource)	B	No	No	Ar (CaAa)	130.00 - 0.00	3.0000	0.44	1	1	2.2000	2.2000		0.68
EW63 (Eversource)	C	No	No	Af (CaAa)	276.00 - 0.00	3.0000	-0.47	1	1	1.5742	1.5742		0.51
WE65 (Eversource)	C	No	No	Af (CaAa)	240.00 - 0.00	3.0000	-0.46	2	2	1.5836	1.5836		0.53
EW63 (Eversource)	C	No	No	Af (CaAa)	230.00 - 0.00	3.0000	-0.45	1	1	1.5742	1.5742		0.51
EW63 (Eversource)	C	No	No	Af (CaAa)	205.50 - 0.00	3.0000	-0.44	1	1	1.5742	1.5742		0.51
HYBRIFLEX 1-5/8" (Verizon)	B	No	No	Ar (CaAa)	145.00 - 0.00	3.0000	-0.44	3	3	1.9800	1.9800		1.90

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 K
T1	280.00-260.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	16.150	0.000	0.04
		C	0.000	0.000	10.018	0.000	0.04
T2	260.00-240.00	A	0.000	0.000	0.000	0.000	0.00

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 K
		B	0.000	0.000	32.667	0.000	0.11
		C	0.000	0.000	14.397	0.000	0.06
T3	240.00-220.00	A	0.000	0.000	7.680	0.000	0.04
		B	0.000	0.000	38.772	0.000	0.14
		C	0.000	0.000	27.578	0.000	0.08
T4	220.00-200.00	A	0.000	0.000	10.240	0.000	0.05
		B	0.000	0.000	46.905	0.000	0.16
		C	0.000	0.000	33.310	0.000	0.10
T5	200.00-180.00	A	0.000	0.000	31.151	0.000	0.13
		B	0.000	0.000	47.349	0.000	0.17
		C	0.000	0.000	37.669	0.000	0.11
T6	180.00-160.00	A	0.000	0.000	48.182	0.000	0.21
		B	0.000	0.000	48.237	0.000	0.17
		C	0.000	0.000	37.669	0.000	0.11
T7	160.00-140.00	A	0.000	0.000	66.092	0.000	0.33
		B	0.000	0.000	52.539	0.000	0.21
		C	0.000	0.000	37.669	0.000	0.11
T8	140.00-120.00	A	0.000	0.000	69.062	0.000	0.36
		B	0.000	0.000	63.649	0.000	0.30
		C	0.000	0.000	40.999	0.000	0.13
T9	120.00-100.00	A	0.000	0.000	71.888	0.000	0.37
		B	0.000	0.000	65.849	0.000	0.30
		C	0.000	0.000	47.659	0.000	0.16
T10	100.00-80.00	A	0.000	0.000	76.529	0.000	0.38
		B	0.000	0.000	65.849	0.000	0.30
		C	0.000	0.000	50.989	0.000	0.17
T11	80.00-60.00	A	0.000	0.000	76.529	0.000	0.38
		B	0.000	0.000	65.849	0.000	0.30
		C	0.000	0.000	50.989	0.000	0.17
T12	60.00-40.00	A	0.000	0.000	78.194	0.000	0.39
		B	0.000	0.000	65.849	0.000	0.30
		C	0.000	0.000	50.989	0.000	0.17
T13	40.00-20.00	A	0.000	0.000	78.749	0.000	0.39
		B	0.000	0.000	65.849	0.000	0.30
		C	0.000	0.000	50.989	0.000	0.17
T14	20.00-0.00	A	0.000	0.000	78.749	0.000	0.39
		B	0.000	0.000	65.849	0.000	0.30
		C	0.000	0.000	50.989	0.000	0.17

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 K
T1	280.00-260.00	A	1.419	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	45.923	0.000	0.49
		C		0.000	0.000	29.378	0.000	0.35
T2	260.00-240.00	A	1.408	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	95.205	0.000	1.04
		C		0.000	0.000	45.088	0.000	0.50
T3	240.00-220.00	A	1.396	0.000	0.000	29.254	0.000	0.31
		B		0.000	0.000	118.798	0.000	1.30
		C		0.000	0.000	71.370	0.000	0.77
T4	220.00-200.00	A	1.384	0.000	0.000	38.831	0.000	0.41
		B		0.000	0.000	139.090	0.000	1.53
		C		0.000	0.000	85.194	0.000	0.92
T5	200.00-180.00	A	1.370	0.000	0.000	91.587	0.000	1.04
		B		0.000	0.000	139.879	0.000	1.53

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 K
		C		0.000	0.000	94.432	0.000	1.02
T6	180.00-160.00	A	1.355	0.000	0.000	131.226	0.000	1.60
		B		0.000	0.000	142.097	0.000	1.54
		C		0.000	0.000	93.862	0.000	1.01
T7	160.00-140.00	A	1.338	0.000	0.000	175.705	0.000	2.19
		B		0.000	0.000	154.063	0.000	1.69
		C		0.000	0.000	93.229	0.000	0.99
T8	140.00-120.00	A	1.319	0.000	0.000	183.022	0.000	2.28
		B		0.000	0.000	182.797	0.000	2.07
		C		0.000	0.000	103.770	0.000	1.09
T9	120.00-100.00	A	1.297	0.000	0.000	189.812	0.000	2.33
		B		0.000	0.000	186.113	0.000	2.09
		C		0.000	0.000	127.161	0.000	1.29
T10	100.00-80.00	A	1.271	0.000	0.000	197.994	0.000	2.39
		B		0.000	0.000	184.318	0.000	2.04
		C		0.000	0.000	137.518	0.000	1.38
T11	80.00-60.00	A	1.240	0.000	0.000	195.976	0.000	2.34
		B		0.000	0.000	182.122	0.000	1.99
		C		0.000	0.000	135.780	0.000	1.34
T12	60.00-40.00	A	1.199	0.000	0.000	198.616	0.000	2.32
		B		0.000	0.000	179.268	0.000	1.92
		C		0.000	0.000	133.523	0.000	1.29
T13	40.00-20.00	A	1.139	0.000	0.000	196.318	0.000	2.24
		B		0.000	0.000	175.118	0.000	1.81
		C		0.000	0.000	130.242	0.000	1.22
T14	20.00-0.00	A	1.021	0.000	0.000	188.287	0.000	2.03
		B		0.000	0.000	166.893	0.000	1.62
		C		0.000	0.000	123.737	0.000	1.08

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	280.00-260.00	6.2318	6.0812	8.9209	8.9311
T2	260.00-240.00	13.6029	11.6202	17.5310	15.9947
T3	240.00-220.00	13.7299	13.8136	17.6856	20.1133
T4	220.00-200.00	18.5875	18.7783	21.5803	25.6787
T5	200.00-180.00	13.9673	26.2190	13.6550	32.2409
T6	180.00-160.00	7.3081	28.9576	6.5112	35.5848
T7	160.00-140.00	3.8378	23.8602	3.1427	28.8770
T8	140.00-120.00	3.7653	19.5591	2.3755	23.2015
T9	120.00-100.00	1.2236	22.4420	-2.3481	27.4730
T10	100.00-80.00	-1.8057	24.7367	-6.3407	30.5108
T11	80.00-60.00	-1.7617	24.5576	-6.5096	31.1936
T12	60.00-40.00	-2.4344	25.4846	-7.8425	32.4782
T13	40.00-20.00	-2.7262	26.5593	-8.5502	33.5114
T14	20.00-0.00	-2.8116	27.5650	-8.9661	33.8545

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	260.00 - 280.00	0.6000	0.6000
T1	2	Lighting	260.00 - 280.00	0.6000	0.6000
T1	10	1 5/8	260.00 - 280.00	0.6000	0.6000
T1	11	7/8	260.00 - 265.00	0.6000	0.6000
T1	16	EW63	260.00 - 276.00	0.6000	0.6000
T1	17	EW63	260.00 - 266.00	0.6000	0.6000
T1	26	7/8	260.00 - 280.00	0.6000	0.6000
T1	34	EW63	260.00 - 276.00	0.6000	0.6000
T2	1	Safety Line 3/8	240.00 - 260.00	0.6000	0.6000
T2	2	Lighting	240.00 - 260.00	0.6000	0.6000
T2	10	1 5/8	240.00 - 260.00	0.6000	0.6000
T2	11	7/8	240.00 - 260.00	0.6000	0.6000
T2	16	EW63	240.00 - 260.00	0.6000	0.6000
T2	17	EW63	240.00 - 260.00	0.6000	0.6000
T2	21	7/8	240.00 - 255.00	0.6000	0.6000
T2	22	1/2	240.00 - 260.00	0.6000	0.6000
T2	23	1 5/8	240.00 - 260.00	0.6000	0.6000
T2	26	7/8	240.00 - 260.00	0.6000	0.6000
T2	34	EW63	240.00 - 260.00	0.6000	0.6000
T3	1	Safety Line 3/8	220.00 - 240.00	0.6000	0.6000
T3	2	Lighting	220.00 - 240.00	0.6000	0.6000
T3	7	1 5/8	220.00 - 235.00	0.6000	0.6000
T3	10	1 5/8	220.00 - 240.00	0.6000	0.6000
T3	11	7/8	220.00 - 240.00	0.6000	0.6000
T3	16	EW63	220.00 - 240.00	0.6000	0.6000
T3	17	EW63	220.00 - 240.00	0.6000	0.6000
T3	20	7/8	220.00 - 240.00	0.6000	0.6000
T3	21	7/8	220.00 - 240.00	0.6000	0.6000
T3	22	1/2	220.00 - 240.00	0.6000	0.6000
T3	23	1 5/8	220.00 - 240.00	0.6000	0.6000
T3	24	7/8	220.00 - 230.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	26	7/8	220.00 - 240.00	0.6000	0.6000
T3	29	1/2	220.00 - 235.00	0.6000	0.6000
T3	34	EW63	220.00 - 240.00	0.6000	0.6000
T3	35	WE65	220.00 - 240.00	0.6000	0.6000
T3	36	EW63	220.00 - 230.00	0.6000	0.6000
T4	1	Safety Line 3/8	200.00 - 220.00	0.6000	0.6000
T4	2	Lighting	200.00 - 220.00	0.6000	0.6000
T4	7	1 5/8	200.00 - 220.00	0.6000	0.6000
T4	10	1 5/8	200.00 - 220.00	0.6000	0.6000
T4	11	7/8	200.00 - 220.00	0.6000	0.6000
T4	12	7/8	200.00 - 215.00	0.6000	0.6000
T4	16	EW63	200.00 - 220.00	0.6000	0.6000
T4	17	EW63	200.00 - 220.00	0.6000	0.6000
T4	18	EW63	200.00 - 220.00	0.6000	0.6000
T4	20	7/8	200.00 - 220.00	0.6000	0.6000
T4	21	7/8	200.00 - 220.00	0.6000	0.6000
T4	22	1/2	200.00 - 220.00	0.6000	0.6000
T4	23	1 5/8	200.00 - 220.00	0.6000	0.6000
T4	24	7/8	200.00 - 220.00	0.6000	0.6000
T4	25	7/8	200.00 - 216.00	0.6000	0.6000
T4	26	7/8	200.00 - 220.00	0.6000	0.6000
T4	29	1/2	200.00 - 220.00	0.6000	0.6000
T4	34	EW63	200.00 - 220.00	0.6000	0.6000
T4	35	WE65	200.00 - 220.00	0.6000	0.6000
T4	36	EW63	200.00 - 220.00	0.6000	0.6000
T4	37	EW63	200.00 - 205.50	0.6000	0.6000
T5	1	Safety Line 3/8	180.00 - 200.00	0.6000	0.6000
T5	2	Lighting	180.00 - 200.00	0.6000	0.6000
T5	4	EW63	180.00 - 195.00	0.6000	0.6000
T5	7	1 5/8	180.00 - 200.00	0.6000	0.6000
T5	8	1 5/8	180.00 - 200.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	10	1 5/8	180.00 - 200.00	0.6000	0.6000
T5	11	7/8	180.00 - 200.00	0.6000	0.6000
T5	12	7/8	180.00 - 200.00	0.6000	0.6000
T5	16	EW63	180.00 - 200.00	0.6000	0.6000
T5	17	EW63	180.00 - 200.00	0.6000	0.6000
T5	18	EW63	180.00 - 200.00	0.6000	0.6000
T5	20	7/8	180.00 - 200.00	0.6000	0.6000
T5	21	7/8	180.00 - 200.00	0.6000	0.6000
T5	22	1/2	180.00 - 200.00	0.6000	0.6000
T5	23	1 5/8	180.00 - 200.00	0.6000	0.6000
T5	24	7/8	180.00 - 200.00	0.6000	0.6000
T5	25	7/8	180.00 - 200.00	0.6000	0.6000
T5	26	7/8	180.00 - 200.00	0.6000	0.6000
T5	29	1/2	180.00 - 200.00	0.6000	0.6000
T5	31	1/2	180.00 - 200.00	0.6000	0.6000
T5	34	EW63	180.00 - 200.00	0.6000	0.6000
T5	35	WE65	180.00 - 200.00	0.6000	0.6000
T5	36	EW63	180.00 - 200.00	0.6000	0.6000
T5	37	EW63	180.00 - 200.00	0.6000	0.6000
T6	1	Safety Line 3/8	160.00 - 180.00	0.6000	0.6000
T6	2	Lighting	160.00 - 180.00	0.6000	0.6000
T6	4	EW63	160.00 - 180.00	0.6000	0.6000
T6	5	EW63	160.00 - 163.00	0.6000	0.6000
T6	7	1 5/8	160.00 - 180.00	0.6000	0.6000
T6	8	1 5/8	160.00 - 180.00	0.6000	0.6000
T6	9	1 5/8	160.00 - 175.00	0.6000	0.6000
T6	10	1 5/8	160.00 - 180.00	0.6000	0.6000
T6	11	7/8	160.00 - 180.00	0.6000	0.6000
T6	12	7/8	160.00 - 180.00	0.6000	0.6000
T6	16	EW63	160.00 - 180.00	0.6000	0.6000
T6	17	EW63	160.00 - 180.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	18	EW63	160.00 - 180.00	0.6000	0.6000
T6	19	7/8	160.00 - 168.00	0.6000	0.6000
T6	20	7/8	160.00 - 180.00	0.6000	0.6000
T6	21	7/8	160.00 - 180.00	0.6000	0.6000
T6	22	1/2	160.00 - 180.00	0.6000	0.6000
T6	23	1 5/8	160.00 - 180.00	0.6000	0.6000
T6	24	7/8	160.00 - 180.00	0.6000	0.6000
T6	25	7/8	160.00 - 180.00	0.6000	0.6000
T6	26	7/8	160.00 - 180.00	0.6000	0.6000
T6	29	1/2	160.00 - 180.00	0.6000	0.6000
T6	30	1/2	160.00 - 175.00	0.6000	0.6000
T6	31	1/2	160.00 - 180.00	0.6000	0.6000
T6	34	EW63	160.00 - 180.00	0.6000	0.6000
T6	35	WE65	160.00 - 180.00	0.6000	0.6000
T6	36	EW63	160.00 - 180.00	0.6000	0.6000
T6	37	EW63	160.00 - 180.00	0.6000	0.6000
T7	1	Safety Line 3/8	140.00 - 160.00	0.6000	0.6000
T7	2	Lighting	140.00 - 160.00	0.6000	0.6000
T7	3	HYBRIFLEX 1-5/8"	140.00 - 155.00	0.6000	0.6000
T7	4	EW63	140.00 - 160.00	0.6000	0.6000
T7	5	EW63	140.00 - 160.00	0.6000	0.6000
T7	7	1 5/8	140.00 - 160.00	0.6000	0.6000
T7	8	1 5/8	140.00 - 160.00	0.6000	0.6000
T7	9	1 5/8	140.00 - 160.00	0.6000	0.6000
T7	10	1 5/8	140.00 - 160.00	0.6000	0.6000
T7	11	7/8	140.00 - 160.00	0.6000	0.6000
T7	12	7/8	140.00 - 160.00	0.6000	0.6000
T7	16	EW63	140.00 - 160.00	0.6000	0.6000
T7	17	EW63	140.00 - 160.00	0.6000	0.6000
T7	18	EW63	140.00 - 160.00	0.6000	0.6000
T7	19	7/8	140.00 - 160.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	20	7/8	140.00 - 160.00	0.6000	0.6000
T7	21	7/8	140.00 - 160.00	0.6000	0.6000
T7	22	1/2	140.00 - 160.00	0.6000	0.6000
T7	23	1 5/8	140.00 - 160.00	0.6000	0.6000
T7	24	7/8	140.00 - 160.00	0.6000	0.6000
T7	25	7/8	140.00 - 160.00	0.6000	0.6000
T7	26	7/8	140.00 - 160.00	0.6000	0.6000
T7	29	1/2	140.00 - 160.00	0.6000	0.6000
T7	30	1/2	140.00 - 160.00	0.6000	0.6000
T7	31	1/2	140.00 - 160.00	0.6000	0.6000
T7	34	EW63	140.00 - 160.00	0.6000	0.6000
T7	35	WE65	140.00 - 160.00	0.6000	0.6000
T7	36	EW63	140.00 - 160.00	0.6000	0.6000
T7	37	EW63	140.00 - 160.00	0.6000	0.6000
T7	38	HYBRIFLEX 1-5/8"	140.00 - 145.00	0.6000	0.6000
T8	1	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T8	2	Lighting	120.00 - 140.00	0.6000	0.6000
T8	3	HYBRIFLEX 1-5/8"	120.00 - 140.00	0.6000	0.6000
T8	4	EW63	120.00 - 140.00	0.6000	0.6000
T8	5	EW63	120.00 - 140.00	0.6000	0.6000
T8	7	1 5/8	120.00 - 140.00	0.6000	0.6000
T8	8	1 5/8	120.00 - 140.00	0.6000	0.6000
T8	9	1 5/8	120.00 - 140.00	0.6000	0.6000
T8	10	1 5/8	120.00 - 140.00	0.6000	0.6000
T8	11	7/8	120.00 - 140.00	0.6000	0.6000
T8	12	7/8	120.00 - 140.00	0.6000	0.6000
T8	13	7/8	120.00 - 130.00	0.6000	0.6000
T8	16	EW63	120.00 - 140.00	0.6000	0.6000
T8	17	EW63	120.00 - 140.00	0.6000	0.6000
T8	18	EW63	120.00 - 140.00	0.6000	0.6000
T8	19	7/8	120.00 - 140.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	20	7/8	120.00 - 140.00	0.6000	0.6000
T8	21	7/8	120.00 - 140.00	0.6000	0.6000
T8	22	1/2	120.00 - 140.00	0.6000	0.6000
T8	23	1 5/8	120.00 - 140.00	0.6000	0.6000
T8	24	7/8	120.00 - 140.00	0.6000	0.6000
T8	25	7/8	120.00 - 140.00	0.6000	0.6000
T8	26	7/8	120.00 - 140.00	0.6000	0.6000
T8	29	1/2	120.00 - 140.00	0.6000	0.6000
T8	30	1/2	120.00 - 140.00	0.6000	0.6000
T8	31	1/2	120.00 - 140.00	0.6000	0.6000
T8	32	E60	120.00 - 130.00	0.6000	0.6000
T8	34	EW63	120.00 - 140.00	0.6000	0.6000
T8	35	WE65	120.00 - 140.00	0.6000	0.6000
T8	36	EW63	120.00 - 140.00	0.6000	0.6000
T8	37	EW63	120.00 - 140.00	0.6000	0.6000
T8	38	HYBRIFLEX 1-5/8"	120.00 - 140.00	0.6000	0.6000
T9	1	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T9	2	Lighting	100.00 - 120.00	0.6000	0.6000
T9	3	HYBRIFLEX 1-5/8"	100.00 - 120.00	0.6000	0.6000
T9	4	EW63	100.00 - 120.00	0.6000	0.6000
T9	5	EW63	100.00 - 120.00	0.6000	0.6000
T9	6	EW63	100.00 - 104.00	0.6000	0.6000
T9	7	1 5/8	100.00 - 120.00	0.6000	0.6000
T9	8	1 5/8	100.00 - 120.00	0.6000	0.6000
T9	9	1 5/8	100.00 - 120.00	0.6000	0.6000
T9	10	1 5/8	100.00 - 120.00	0.6000	0.6000
T9	11	7/8	100.00 - 120.00	0.6000	0.6000
T9	12	7/8	100.00 - 120.00	0.6000	0.6000
T9	13	7/8	100.00 - 120.00	0.6000	0.6000
T9	14	7/8	100.00 - 115.00	0.6000	0.6000
T9	16	EW63	100.00 - 120.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	17	EW63	100.00 - 120.00	0.6000	0.6000
T9	18	EW63	100.00 - 120.00	0.6000	0.6000
T9	19	7/8	100.00 - 120.00	0.6000	0.6000
T9	20	7/8	100.00 - 120.00	0.6000	0.6000
T9	21	7/8	100.00 - 120.00	0.6000	0.6000
T9	22	1/2	100.00 - 120.00	0.6000	0.6000
T9	23	1 5/8	100.00 - 120.00	0.6000	0.6000
T9	24	7/8	100.00 - 120.00	0.6000	0.6000
T9	25	7/8	100.00 - 120.00	0.6000	0.6000
T9	26	7/8	100.00 - 120.00	0.6000	0.6000
T9	27	7/8	100.00 - 116.00	0.6000	0.6000
T9	29	1/2	100.00 - 120.00	0.6000	0.6000
T9	30	1/2	100.00 - 120.00	0.6000	0.6000
T9	31	1/2	100.00 - 120.00	0.6000	0.6000
T9	32	E60	100.00 - 120.00	0.6000	0.6000
T9	34	EW63	100.00 - 120.00	0.6000	0.6000
T9	35	WE65	100.00 - 120.00	0.6000	0.6000
T9	36	EW63	100.00 - 120.00	0.6000	0.6000
T9	37	EW63	100.00 - 120.00	0.6000	0.6000
T9	38	HYBRIFLEX 1-5/8"	100.00 - 120.00	0.6000	0.6000
T10	1	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T10	2	Lighting	80.00 - 100.00	0.6000	0.6000
T10	3	HYBRIFLEX 1-5/8"	80.00 - 100.00	0.6000	0.6000
T10	4	EW63	80.00 - 100.00	0.6000	0.6000
T10	5	EW63	80.00 - 100.00	0.6000	0.6000
T10	6	EW63	80.00 - 100.00	0.6000	0.6000
T10	7	1 5/8	80.00 - 100.00	0.6000	0.6000
T10	8	1 5/8	80.00 - 100.00	0.6000	0.6000
T10	9	1 5/8	80.00 - 100.00	0.6000	0.6000
T10	10	1 5/8	80.00 - 100.00	0.6000	0.6000
T10	11	7/8	80.00 - 100.00	0.6000	0.6000
T10	12	7/8	80.00 - 100.00	0.6000	0.6000
T10	13	7/8	80.00 - 100.00	0.6000	0.6000
T10	14	7/8	80.00 - 100.00	0.6000	0.6000
T10	15	7/8	80.00 - 100.00	0.6000	0.6000
T10	16	EW63	80.00 - 100.00	0.6000	0.6000
T10	17	EW63	80.00 - 100.00	0.6000	0.6000
T10	18	EW63	80.00 - 100.00	0.6000	0.6000
T10	19	7/8	80.00 - 100.00	0.6000	0.6000
T10	20	7/8	80.00 - 100.00	0.6000	0.6000
T10	21	7/8	80.00 - 100.00	0.6000	0.6000
T10	22	1/2	80.00 - 100.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T10	23	1 5/8	80.00 - 100.00	0.6000	0.6000
T10	24	7/8	80.00 - 100.00	0.6000	0.6000
T10	25	7/8	80.00 - 100.00	0.6000	0.6000
T10	26	7/8	80.00 - 100.00	0.6000	0.6000
T10	27	7/8	80.00 - 100.00	0.6000	0.6000
T10	29	1/2	80.00 - 100.00	0.6000	0.6000
T10	30	1/2	80.00 - 100.00	0.6000	0.6000
T10	31	1/2	80.00 - 100.00	0.6000	0.6000
T10	32	E60	80.00 - 100.00	0.6000	0.6000
T10	34	EW63	80.00 - 100.00	0.6000	0.6000
T10	35	WE65	80.00 - 100.00	0.6000	0.6000
T10	36	EW63	80.00 - 100.00	0.6000	0.6000
T10	37	EW63	80.00 - 100.00	0.6000	0.6000
T10	38	HYBRIFLEX 1-5/8"	80.00 - 100.00	0.6000	0.6000
T11	1	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T11	2	Lighting	60.00 - 80.00	0.6000	0.6000
T11	3	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.6000
T11	4	EW63	60.00 - 80.00	0.6000	0.6000
T11	5	EW63	60.00 - 80.00	0.6000	0.6000
T11	6	EW63	60.00 - 80.00	0.6000	0.6000
T11	7	1 5/8	60.00 - 80.00	0.6000	0.6000
T11	8	1 5/8	60.00 - 80.00	0.6000	0.6000
T11	9	1 5/8	60.00 - 80.00	0.6000	0.6000
T11	10	1 5/8	60.00 - 80.00	0.6000	0.6000
T11	11	7/8	60.00 - 80.00	0.6000	0.6000
T11	12	7/8	60.00 - 80.00	0.6000	0.6000
T11	13	7/8	60.00 - 80.00	0.6000	0.6000
T11	14	7/8	60.00 - 80.00	0.6000	0.6000
T11	15	7/8	60.00 - 80.00	0.6000	0.6000
T11	16	EW63	60.00 - 80.00	0.6000	0.6000
T11	17	EW63	60.00 - 80.00	0.6000	0.6000
T11	18	EW63	60.00 - 80.00	0.6000	0.6000
T11	19	7/8	60.00 - 80.00	0.6000	0.6000
T11	20	7/8	60.00 - 80.00	0.6000	0.6000
T11	21	7/8	60.00 - 80.00	0.6000	0.6000
T11	22	1/2	60.00 - 80.00	0.6000	0.6000
T11	23	1 5/8	60.00 - 80.00	0.6000	0.6000
T11	24	7/8	60.00 - 80.00	0.6000	0.6000
T11	25	7/8	60.00 - 80.00	0.6000	0.6000
T11	26	7/8	60.00 - 80.00	0.6000	0.6000
T11	27	7/8	60.00 - 80.00	0.6000	0.6000
T11	29	1/2	60.00 - 80.00	0.6000	0.6000
T11	30	1/2	60.00 - 80.00	0.6000	0.6000
T11	31	1/2	60.00 - 80.00	0.6000	0.6000
T11	32	E60	60.00 - 80.00	0.6000	0.6000
T11	34	EW63	60.00 - 80.00	0.6000	0.6000
T11	35	WE65	60.00 - 80.00	0.6000	0.6000
T11	36	EW63	60.00 - 80.00	0.6000	0.6000
T11	37	EW63	60.00 - 80.00	0.6000	0.6000
T11	38	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.6000
T12	1	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T12	2	Lighting	40.00 - 60.00	0.6000	0.6000
T12	3	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.6000
T12	4	EW63	40.00 - 60.00	0.6000	0.6000
T12	5	EW63	40.00 - 60.00	0.6000	0.6000
T12	6	EW63	40.00 - 60.00	0.6000	0.6000
T12	7	1 5/8	40.00 - 60.00	0.6000	0.6000
T12	8	1 5/8	40.00 - 60.00	0.6000	0.6000
T12	9	1 5/8	40.00 - 60.00	0.6000	0.6000
T12	10	1 5/8	40.00 - 60.00	0.6000	0.6000
T12	11	7/8	40.00 - 60.00	0.6000	0.6000
T12	12	7/8	40.00 - 60.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T12	13	7/8	40.00 - 60.00	0.6000	0.6000
T12	14	7/8	40.00 - 60.00	0.6000	0.6000
T12	15	7/8	40.00 - 60.00	0.6000	0.6000
T12	16	EW63	40.00 - 60.00	0.6000	0.6000
T12	17	EW63	40.00 - 60.00	0.6000	0.6000
T12	18	EW63	40.00 - 60.00	0.6000	0.6000
T12	19	7/8	40.00 - 60.00	0.6000	0.6000
T12	20	7/8	40.00 - 60.00	0.6000	0.6000
T12	21	7/8	40.00 - 60.00	0.6000	0.6000
T12	22	1/2	40.00 - 60.00	0.6000	0.6000
T12	23	1 5/8	40.00 - 60.00	0.6000	0.6000
T12	24	7/8	40.00 - 60.00	0.6000	0.6000
T12	25	7/8	40.00 - 60.00	0.6000	0.6000
T12	26	7/8	40.00 - 60.00	0.6000	0.6000
T12	27	7/8	40.00 - 60.00	0.6000	0.6000
T12	28	7/8	40.00 - 55.00	0.6000	0.6000
T12	29	1/2	40.00 - 60.00	0.6000	0.6000
T12	30	1/2	40.00 - 60.00	0.6000	0.6000
T12	31	1/2	40.00 - 60.00	0.6000	0.6000
T12	32	E60	40.00 - 60.00	0.6000	0.6000
T12	34	EW63	40.00 - 60.00	0.6000	0.6000
T12	35	WE65	40.00 - 60.00	0.6000	0.6000
T12	36	EW63	40.00 - 60.00	0.6000	0.6000
T12	37	EW63	40.00 - 60.00	0.6000	0.6000
T12	38	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.6000
T13	1	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T13	2	Lighting	20.00 - 40.00	0.6000	0.6000
T13	3	HYBRIFLEX 1-5/8"	20.00 - 40.00	0.6000	0.6000
T13	4	EW63	20.00 - 40.00	0.6000	0.6000
T13	5	EW63	20.00 - 40.00	0.6000	0.6000
T13	6	EW63	20.00 - 40.00	0.6000	0.6000
T13	7	1 5/8	20.00 - 40.00	0.6000	0.6000
T13	8	1 5/8	20.00 - 40.00	0.6000	0.6000
T13	9	1 5/8	20.00 - 40.00	0.6000	0.6000
T13	10	1 5/8	20.00 - 40.00	0.6000	0.6000
T13	11	7/8	20.00 - 40.00	0.6000	0.6000
T13	12	7/8	20.00 - 40.00	0.6000	0.6000
T13	13	7/8	20.00 - 40.00	0.6000	0.6000
T13	14	7/8	20.00 - 40.00	0.6000	0.6000
T13	15	7/8	20.00 - 40.00	0.6000	0.6000
T13	16	EW63	20.00 - 40.00	0.6000	0.6000
T13	17	EW63	20.00 - 40.00	0.6000	0.6000
T13	18	EW63	20.00 - 40.00	0.6000	0.6000
T13	19	7/8	20.00 - 40.00	0.6000	0.6000
T13	20	7/8	20.00 - 40.00	0.6000	0.6000
T13	21	7/8	20.00 - 40.00	0.6000	0.6000
T13	22	1/2	20.00 - 40.00	0.6000	0.6000
T13	23	1 5/8	20.00 - 40.00	0.6000	0.6000
T13	24	7/8	20.00 - 40.00	0.6000	0.6000
T13	25	7/8	20.00 - 40.00	0.6000	0.6000
T13	26	7/8	20.00 - 40.00	0.6000	0.6000
T13	27	7/8	20.00 - 40.00	0.6000	0.6000
T13	28	7/8	20.00 - 40.00	0.6000	0.6000
T13	29	1/2	20.00 - 40.00	0.6000	0.6000
T13	30	1/2	20.00 - 40.00	0.6000	0.6000
T13	31	1/2	20.00 - 40.00	0.6000	0.6000
T13	32	E60	20.00 - 40.00	0.6000	0.6000
T13	34	EW63	20.00 - 40.00	0.6000	0.6000
T13	35	WE65	20.00 - 40.00	0.6000	0.6000
T13	36	EW63	20.00 - 40.00	0.6000	0.6000
T13	37	EW63	20.00 - 40.00	0.6000	0.6000
T13	38	HYBRIFLEX 1-5/8"	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T14	1	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T14	2	Lighting	0.00 - 20.00	0.6000	0.6000
T14	3	HYBRIFLEX 1-5/8"	0.00 - 20.00	0.6000	0.6000
T14	4	EW63	0.00 - 20.00	0.6000	0.6000
T14	5	EW63	0.00 - 20.00	0.6000	0.6000
T14	6	EW63	0.00 - 20.00	0.6000	0.6000
T14	7	1 5/8	0.00 - 20.00	0.6000	0.6000
T14	8	1 5/8	0.00 - 20.00	0.6000	0.6000
T14	9	1 5/8	0.00 - 20.00	0.6000	0.6000
T14	10	1 5/8	0.00 - 20.00	0.6000	0.6000
T14	11	7/8	0.00 - 20.00	0.6000	0.6000
T14	12	7/8	0.00 - 20.00	0.6000	0.6000
T14	13	7/8	0.00 - 20.00	0.6000	0.6000
T14	14	7/8	0.00 - 20.00	0.6000	0.6000
T14	15	7/8	0.00 - 20.00	0.6000	0.6000
T14	16	EW63	0.00 - 20.00	0.6000	0.6000
T14	17	EW63	0.00 - 20.00	0.6000	0.6000
T14	18	EW63	0.00 - 20.00	0.6000	0.6000
T14	19	7/8	0.00 - 20.00	0.6000	0.6000
T14	20	7/8	0.00 - 20.00	0.6000	0.6000
T14	21	7/8	0.00 - 20.00	0.6000	0.6000
T14	22	1/2	0.00 - 20.00	0.6000	0.6000
T14	23	1 5/8	0.00 - 20.00	0.6000	0.6000
T14	24	7/8	0.00 - 20.00	0.6000	0.6000
T14	25	7/8	0.00 - 20.00	0.6000	0.6000
T14	26	7/8	0.00 - 20.00	0.6000	0.6000
T14	27	7/8	0.00 - 20.00	0.6000	0.6000
T14	28	7/8	0.00 - 20.00	0.6000	0.6000
T14	29	1/2	0.00 - 20.00	0.6000	0.6000
T14	30	1/2	0.00 - 20.00	0.6000	0.6000
T14	31	1/2	0.00 - 20.00	0.6000	0.6000
T14	32	E60	0.00 - 20.00	0.6000	0.6000
T14	34	EW63	0.00 - 20.00	0.6000	0.6000
T14	35	WE65	0.00 - 20.00	0.6000	0.6000
T14	36	EW63	0.00 - 20.00	0.6000	0.6000
T14	37	EW63	0.00 - 20.00	0.6000	0.6000
T14	38	HYBRIFLEX 1-5/8"	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Beacon Extender (4') 803062	B	From Leg	0.00	0.0000	280.00	No Ice	1.11	1.11	0.03
			0.00			1/2" Ice	1.32	1.32	0.04
			2.00			1" Ice	1.54	1.53	0.05
Beacon	B	From Leg	0.00	0.0000	280.00	No Ice	2.40	2.40	0.07
			0.00			1/2" Ice	2.67	2.67	0.10
			4.00			1" Ice	2.96	2.96	0.12
DB538	B	From Leg	0.00	0.0000	279.00	No Ice	2.25	2.25	0.01
(Eversource)			0.00			1/2" Ice	4.46	4.46	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			7.00			1" Ice	6.69	6.69	0.03
DB589-Y	B	From Leg	6.00	0.0000	260.00	No Ice	1.83	1.83	0.01
(Eversource)			0.00			1/2" Ice	2.75	2.75	0.03
			5.00			1" Ice	3.67	3.67	0.05
DB589-Y	B	From Leg	6.00	0.0000	260.00	No Ice	1.83	1.83	0.01
(Eversource)			0.00			1/2" Ice	2.75	2.75	0.03
			-5.00			1" Ice	3.67	3.67	0.05
TMA (12"x16"x6"")	B	From Leg	6.00	0.0000	260.00	No Ice	2.53	1.20	0.02
(Eversource)			0.00			1/2" Ice	2.71	1.33	0.04
			0.00			1" Ice	2.89	1.46	0.06
6' Pivot Side Arm (50" pipe)	B	From Leg	3.00	0.0000	260.00	No Ice	1.91	3.93	0.13
(Eversource)			0.00			1/2" Ice	2.67	4.99	0.17
			0.00			1" Ice	3.20	5.86	0.22
SD110-SFXPASNM	B	From Leg	6.00	0.0000	241.00	No Ice	2.43	2.43	0.03
(Eversource)			0.00			1/2" Ice	4.46	4.46	0.04
			8.00			1" Ice	6.51	6.51	0.05
6' Pivot Side Arm (50" pipe)	B	From Leg	3.00	0.0000	241.00	No Ice	1.91	3.93	0.13
(Eversource)			0.00			1/2" Ice	2.67	4.99	0.17
			0.00			1" Ice	3.20	5.86	0.22
ANT450F10	B	From Leg	0.00	0.0000	216.00	No Ice	5.59	5.59	0.04
(VSC)			0.00			1/2" Ice	7.63	7.63	0.08
			10.00			1" Ice	9.66	9.66	0.13
6' Pivot Side Arm (50" pipe)	B	From Leg	3.00	0.0000	216.00	No Ice	1.91	3.93	0.13
(VSC)			0.00			1/2" Ice	2.67	4.99	0.17
			0.00			1" Ice	3.20	5.86	0.22
TMA (12"x16"x6"")	B	From Leg	6.00	0.0000	200.00	No Ice	2.53	1.20	0.02
(CSP)			0.00			1/2" Ice	2.71	1.33	0.04
			0.00			1" Ice	2.89	1.46	0.06
ANT220F2	B	From Leg	6.00	0.0000	200.00	No Ice	1.03	1.03	0.02
(CSP)			0.00			1/2" Ice	1.29	1.29	0.02
			7.00			1" Ice	1.56	1.56	0.04
SE419	B	From Leg	6.00	0.0000	200.00	No Ice	4.15	9.55	0.02
(CSP)			0.00			1/2" Ice	5.14	10.19	0.07
			-7.00			1" Ice	6.10	10.83	0.12
6' Pivot Side Arm (50" pipe)	B	From Leg	3.00	0.0000	200.00	No Ice	1.91	3.93	0.13
(CSP)			0.00			1/2" Ice	2.67	4.99	0.17
			0.00			1" Ice	3.20	5.86	0.22
SC479	B	From Leg	6.00	0.0000	200.00	No Ice	4.40	4.40	0.03
(CSP)			0.00			1/2" Ice	6.54	6.54	0.07
			-7.00			1" Ice	8.04	8.04	0.11
3' Pivot Side Arm (50" pipe)	B	From Leg	1.50	0.0000	200.00	No Ice	1.91	2.49	0.11
(CSP)			0.00			1/2" Ice	2.70	3.30	0.13
			0.00			1" Ice	3.27	3.97	0.17
SC479	B	From Leg	6.00	0.0000	175.00	No Ice	4.49	4.49	0.03
(CSP)			0.00			1/2" Ice	6.54	6.54	0.07
			7.00			1" Ice	8.04	8.04	0.11
SC479	B	From Leg	6.00	0.0000	175.00	No Ice	4.49	4.49	0.03
(CSP)			0.00			1/2" Ice	6.54	6.54	0.07
			-7.00			1" Ice	8.04	8.04	0.11
6' Pivot Side Arm (50" pipe)	B	From Leg	3.00	0.0000	175.00	No Ice	1.91	3.93	0.13
(CSP)			0.00			1/2" Ice	2.67	4.99	0.17
			0.00			1" Ice	3.20	5.86	0.22
PR-950	A	From Leg	3.00	0.0000	126.00	No Ice	6.35	6.35	0.04
(VSC)			0.00			1/2" Ice	11.43	11.43	0.05
			0.00			1" Ice	16.51	16.51	0.06
6' Pivot Side Arm (50" pipe)	A	From Leg	3.00	0.0000	126.00	No Ice	1.91	3.93	0.13
(VSC)			0.00			1/2" Ice	2.67	4.99	0.17

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	3.20	5.86	0.22
ANT150F6 -138-151 MHZ	C	From Leg	0.00	0.0000	279.00	No Ice	5.87	5.87	0.03
(Eversource)			0.00			1/2" Ice	8.00	8.00	0.07
			10.00			1" Ice	10.13	10.13	0.13
DB212-1-C	C	From Leg	6.00	0.0000	255.00	No Ice	2.61	2.61	0.01
(Eversource)			0.00			1/2" Ice	5.38	5.38	0.03
			0.00			1" Ice	8.18	8.18	0.05
6' Pivot Side Arm (50" pipe)	C	From Leg	3.00	0.0000	255.00	No Ice	1.91	3.93	0.13
(Eversource)			0.00			1/2" Ice	2.67	4.99	0.17
			0.00			1" Ice	3.20	5.86	0.22
TMA (12"x16"x6"")	C	From Leg	6.00	0.0000	235.00	No Ice	2.53	1.20	0.02
(CSP)			0.00			1/2" Ice	2.71	1.33	0.04
			0.00			1" Ice	2.89	1.46	0.06
SE419-SF3P4LDF	C	From Leg	6.00	0.0000	235.00	No Ice	4.12	0.04	0.04
(CSP)			0.00			1/2" Ice	5.11	1.00	0.05
			5.00			1" Ice	6.08	1.97	0.07
SE419-SF3P4LDF	C	From Leg	6.00	0.0000	235.00	No Ice	4.12	0.04	0.04
(CSP)			0.00			1/2" Ice	5.11	1.00	0.05
			-5.00			1" Ice	6.08	1.97	0.07
6' Pivot Side Arm (50" pipe)	C	From Leg	3.00	0.0000	235.00	No Ice	1.91	3.93	0.13
(CSP)			0.00			1/2" Ice	2.67	4.99	0.17
			0.00			1" Ice	3.20	5.86	0.22
ANT900D6-9	C	From Leg	3.00	0.0000	200.00	No Ice	1.39	1.39	0.01
(CSP)			0.00			1/2" Ice	2.03	2.03	0.03
			5.00			1" Ice	2.69	2.69	0.05
3' Pivot Side Arm (50" pipe)	C	From Leg	1.50	0.0000	200.00	No Ice	1.91	2.49	0.11
(CSP)			0.00			1/2" Ice	2.70	3.30	0.13
			0.00			1" Ice	3.27	3.97	0.17
ANT450F6	C	From Leg	3.00	0.0000	168.00	No Ice	1.86	1.86	0.02
(Town of Haddam)			0.00			1/2" Ice	2.67	2.67	0.04
			5.00			1" Ice	3.30	3.30	0.05
3' Pivot Side Arm (50" pipe)	C	From Leg	1.50	0.0000	168.00	No Ice	1.91	2.49	0.11
(Town of Haddam)			0.00			1/2" Ice	2.70	3.30	0.13
			0.00			1" Ice	3.27	3.97	0.17
KRECO CO-36A	C	From Leg	0.00	0.0000	125.00	No Ice	5.87	5.87	0.03
(VSC)			0.00			1/2" Ice	8.00	8.00	0.07
			7.00			1" Ice	10.13	10.13	0.13
6' Pivot Side Arm (50" pipe)	C	From Leg	3.00	0.0000	125.00	No Ice	1.91	3.93	0.13
(VSC)			0.00			1/2" Ice	2.67	4.99	0.17
			0.00			1" Ice	3.20	5.86	0.22
3' Pivot Side Arm (50" pipe)	C	From Leg	1.50	0.0000	128.00	No Ice	1.91	2.49	0.11
(VSC)			0.00			1/2" Ice	2.70	3.30	0.13
			0.00			1" Ice	3.27	3.97	0.17
LNX-6515DS	A	From Leg	3.00	0.0000	145.00	No Ice	11.45	7.70	0.06
(Verizon)			-6.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
NHH-65C-R2B	A	From Leg	3.00	0.0000	145.00	No Ice	11.35	7.65	0.06
(Verizon)			-1.00			1/2" Ice	11.97	8.24	0.12
			0.00			1" Ice	12.59	8.84	0.19
NHH-65C-R2B	A	From Leg	3.00	0.0000	145.00	No Ice	11.35	7.65	0.06
(Verizon)			1.00			1/2" Ice	11.97	8.24	0.12
			0.00			1" Ice	12.59	8.84	0.19
HBXX-6517DS	A	From Leg	3.00	0.0000	145.00	No Ice	8.53	5.24	0.05
(Verizon)			6.00			1/2" Ice	9.00	5.71	0.10
			0.00			1" Ice	9.48	6.18	0.16
LNX-6515DS	B	From Leg	3.00	0.0000	145.00	No Ice	11.45	7.70	0.06
(Verizon)			-6.00			1/2" Ice	12.06	8.29	0.12

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	12.69	8.89	0.19
NHH-65C-R2B	B	From Leg	3.00	0.0000	145.00	No Ice	11.35	7.65	0.06
(Verizon)			-1.00			1/2" Ice	11.97	8.24	0.12
			0.00			1" Ice	12.59	8.84	0.19
NHH-65C-R2B	B	From Leg	3.00	0.0000	145.00	No Ice	11.35	7.65	0.06
(Verizon)			1.00			1/2" Ice	11.97	8.24	0.12
			0.00			1" Ice	12.59	8.84	0.19
HBXX-6517DS	B	From Leg	3.00	0.0000	145.00	No Ice	8.53	5.24	0.05
(Verizon)			6.00			1/2" Ice	9.00	5.71	0.10
			0.00			1" Ice	9.48	6.18	0.16
LNX-6515DS	C	From Leg	3.00	0.0000	145.00	No Ice	11.45	7.70	0.06
(Verizon)			-6.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
NHH-65C-R2B	C	From Leg	3.00	0.0000	145.00	No Ice	11.35	7.65	0.06
(Verizon)			-1.00			1/2" Ice	11.97	8.24	0.12
			0.00			1" Ice	12.59	8.84	0.19
NHH-65C-R2B	C	From Leg	3.00	0.0000	145.00	No Ice	11.35	7.65	0.06
(Verizon)			1.00			1/2" Ice	11.97	8.24	0.12
			0.00			1" Ice	12.59	8.84	0.19
HBXX-6517DS	C	From Leg	3.00	0.0000	145.00	No Ice	8.53	5.24	0.05
(Verizon)			6.00			1/2" Ice	9.00	5.71	0.10
			0.00			1" Ice	9.48	6.18	0.16
B2/B66A RRH	A	From Leg	3.00	0.0000	145.00	No Ice	2.54	1.61	0.06
(Verizon)			0.00			1/2" Ice	2.75	1.79	0.08
			0.00			1" Ice	2.97	1.98	0.10
B2/B66A RRH	B	From Leg	3.00	0.0000	145.00	No Ice	2.54	1.61	0.06
(Verizon)			0.00			1/2" Ice	2.75	1.79	0.08
			0.00			1" Ice	2.97	1.98	0.10
B2/B66A RRH	C	From Leg	3.00	0.0000	145.00	No Ice	2.54	1.61	0.06
(Verizon)			0.00			1/2" Ice	2.75	1.79	0.08
			0.00			1" Ice	2.97	1.98	0.10
B5/B13 RRH	A	From Leg	3.00	0.0000	145.00	No Ice	1.87	1.02	0.07
(Verizon)			0.00			1/2" Ice	2.03	1.15	0.09
			0.00			1" Ice	2.21	1.29	0.11
B5/B13 RRH	B	From Leg	3.00	0.0000	145.00	No Ice	1.87	1.02	0.07
(Verizon)			0.00			1/2" Ice	2.03	1.15	0.09
			0.00			1" Ice	2.21	1.29	0.11
B5/B13 RRH	C	From Leg	3.00	0.0000	145.00	No Ice	1.87	1.02	0.07
(Verizon)			0.00			1/2" Ice	2.03	1.15	0.09
			0.00			1" Ice	2.21	1.29	0.11
RC2DC-3315-PF-48	A	From Leg	3.00	0.0000	145.00	No Ice	3.01	1.96	0.03
(Verizon)			0.00			1/2" Ice	3.23	2.15	0.05
			0.00			1" Ice	3.46	2.35	0.08
RC2DC-3315-PF-48	B	From Leg	3.00	0.0000	145.00	No Ice	3.01	1.96	0.03
(Verizon)			0.00			1/2" Ice	3.23	2.15	0.05
			0.00			1" Ice	3.46	2.35	0.08
RC2DC-3315-PF-48	C	From Leg	3.00	0.0000	145.00	No Ice	3.01	1.96	0.03
(Verizon)			0.00			1/2" Ice	3.23	2.15	0.05
			0.00			1" Ice	3.46	2.35	0.08
SitePro VFA12-HD	A	From Leg	3.00	0.0000	145.00	No Ice	21.00	21.00	0.75
(Verizon)			0.00			1/2" Ice	25.00	25.00	0.90
			0.00			1" Ice	29.00	29.00	1.05
SitePro VFA12-HD	B	From Leg	3.00	0.0000	145.00	No Ice	21.00	21.00	0.75
(Verizon)			0.00			1/2" Ice	25.00	25.00	0.90
			0.00			1" Ice	29.00	29.00	1.05
SitePro VFA12-HD	C	From Leg	3.00	0.0000	145.00	No Ice	21.00	21.00	0.75
(Verizon)			0.00			1/2" Ice	25.00	25.00	0.90

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	29.00	29.00	1.05
SitePro SFS-V-L	A	From Leg	3.00	0.0000	145.00	No Ice	5.09	4.75	0.08
(Verizon)			0.00			1/2" Ice	5.74	5.35	0.10
			0.00			1" Ice	6.53	6.07	0.14
SitePro SFS-V-L	B	From Leg	3.00	0.0000	145.00	No Ice	5.09	4.75	0.08
(Verizon)			0.00			1/2" Ice	5.74	5.35	0.10
			0.00			1" Ice	6.53	6.07	0.14
SitePro SFS-V-L	C	From Leg	3.00	0.0000	145.00	No Ice	5.09	4.75	0.08
(Verizon)			0.00			1/2" Ice	5.74	5.35	0.10
			0.00			1" Ice	6.53	6.07	0.14
1142-2C	A	From Leg	0.00	0.0000	279.00	No Ice	2.09	2.09	0.02
(VSC)			0.00			1/2" Ice	3.37	3.37	0.04
			8.00			1" Ice	4.67	4.67	0.07
10' Dipole	A	From Leg	3.00	0.0000	261.00	No Ice	4.00	4.00	0.05
(VSC)			0.00			1/2" Ice	6.00	6.00	0.07
			5.00			1" Ice	8.00	8.00	0.10
10' Dipole	A	From Leg	3.00	0.0000	261.00	No Ice	4.00	4.00	0.05
(VSC)			0.00			1/2" Ice	6.00	6.00	0.07
			5.00			1" Ice	8.00	8.00	0.10
6' Pivot Side Arm (50" pipe)	A	From Leg	3.00	0.0000	261.00	No Ice	1.91	3.93	0.13
(VSC)			0.00			1/2" Ice	2.67	4.99	0.17
			0.00			1" Ice	3.20	5.86	0.22
CO-41A	A	From Leg	0.00	0.0000	240.00	No Ice	2.27	2.27	0.01
(Eversource)			0.00			1/2" Ice	3.71	3.71	0.03
			7.00			1" Ice	5.16	5.16	0.06
6' Pivot Side Arm (50" pipe)	A	From Leg	3.00	0.0000	240.00	No Ice	1.91	3.93	0.13
(Eversource)			0.00			1/2" Ice	2.67	4.99	0.17
			0.00			1" Ice	3.20	5.86	0.22
531-70HD	A	From Leg	6.00	0.0000	230.00	No Ice	6.00	6.00	0.04
(Eversource)			0.00			1/2" Ice	6.90	6.90	0.05
			0.00			1" Ice	7.80	7.80	0.06
3' Pivot Side Arm (50" pipe)	A	From Leg	1.50	0.0000	230.00	No Ice	1.91	2.49	0.11
(Eversource)			0.00			1/2" Ice	2.70	3.30	0.13
			0.00			1" Ice	3.27	3.97	0.17
SD110-SFXPASNM	A	From Leg	6.00	0.0000	216.00	No Ice	2.43	2.43	0.03
(Eversource)			0.00			1/2" Ice	4.46	4.46	0.04
			0.00			1" Ice	6.51	6.51	0.05
6' Pivot Side Arm (50" pipe)	A	From Leg	3.00	0.0000	216.00	No Ice	1.91	3.93	0.13
(Eversource)			0.00			1/2" Ice	2.67	4.99	0.17
			0.00			1" Ice	3.20	5.86	0.22
BCR-80010-90	A	From Leg	6.00	0.0000	175.00	No Ice	4.86	4.86	0.04
(CSP)			0.00			1/2" Ice	5.99	5.99	0.07
			5.00			1" Ice	6.66	6.66	0.11
BCD-80609	A	From Leg	6.00	0.0000	175.00	No Ice	2.95	2.95	0.03
(CSP)			0.00			1/2" Ice	4.08	4.08	0.05
			-5.00			1" Ice	5.21	5.21	0.08
TMA (12"x16"x6"")	A	From Leg	6.00	0.0000	175.00	No Ice	2.53	1.20	0.02
(CSP)			0.00			1/2" Ice	2.71	1.33	0.04
			0.00			1" Ice	2.89	1.46	0.06
3' Pivot Side Arm (50" pipe)	A	From Leg	1.50	0.0000	175.00	No Ice	1.91	2.49	0.11
(CSP)			0.00			1/2" Ice	2.70	3.30	0.13
			0.00			1" Ice	3.27	3.97	0.17
ANT450F6	A	From Leg	6.00	0.0000	124.00	No Ice	1.86	1.86	0.02
(VSC)			0.00			1/2" Ice	2.67	2.67	0.04
			0.00			1" Ice	3.30	3.30	0.05
6' Pivot Side Arm (50" pipe)	A	From Leg	3.00	0.0000	124.00	No Ice	1.91	3.93	0.13
(VSC)			0.00			1/2" Ice	2.67	4.99	0.17

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	3.20	5.86	0.22
BR-6155	A	From Leg	1.50	0.0000	116.00	No Ice	1.90	1.90	0.01
(VSC)			0.00			1/2" Ice	2.29	2.29	0.02
			3.00			1" Ice	2.68	2.68	0.04
ANT400D	A	From Leg	3.00	0.0000	116.00	No Ice	0.34	0.34	0.01
(CSP)			0.00			1/2" Ice	0.40	0.40	0.18
			-1.00			1" Ice	0.46	0.46	0.34
3' Pivot Side Arm (50" pipe)	A	From Leg	1.50	0.0000	116.00	No Ice	1.91	2.49	0.11
(VSC/CSP)			0.00			1/2" Ice	2.70	3.30	0.13
			0.00			1" Ice	3.27	3.97	0.17
BR-6155	A	From Leg	1.50	0.0000	97.00	No Ice	1.90	1.90	0.01
(VSC)			0.00			1/2" Ice	2.29	2.29	0.02
			3.00			1" Ice	2.68	2.68	0.04
3' Pivot Side Arm (50" pipe)	A	From Leg	1.50	0.0000	97.00	No Ice	1.91	2.49	0.11
(VSC)			0.00			1/2" Ice	2.70	3.30	0.13
			0.00			1" Ice	3.27	3.97	0.17
5-ft dipole	A	From Leg	3.00	0.0000	55.00	No Ice	2.70	2.70	0.01
(CSP)			0.00			1/2" Ice	4.50	4.50	0.03
			0.00			1" Ice	6.30	6.30	0.04
3' Pivot Side Arm (50" pipe)	A	From Leg	1.50	0.0000	55.00	No Ice	1.91	2.49	0.11
(CSP)			0.00			1/2" Ice	2.70	3.30	0.13
			0.00			1" Ice	3.27	3.97	0.17
ANT790F2	C	From Leg	3.00	0.0000	50.00	No Ice	0.69	0.69	0.01
(CSP)			0.00			1/2" Ice	0.89	0.89	0.01
			5.00			1" Ice	1.10	1.10	0.02
3' Pivot Side Arm (50" pipe)	C	From Leg	1.50	0.0000	50.00	No Ice	1.91	2.49	0.11
(CSP)			0.00			1/2" Ice	2.70	3.30	0.13
			0.00			1" Ice	3.27	3.97	0.17
3' Pivot Side Arm (50" pipe)	C	From Leg	1.50	0.0000	117.00	No Ice	1.91	2.49	0.11
(CSP)			0.00			1/2" Ice	2.70	3.30	0.13
			0.00			1" Ice	3.27	3.97	0.17
Beacon	A	None		0.0000	140.00	No Ice	0.17	0.17	0.01
						1/2" Ice	0.31	0.31	0.01
						1" Ice	0.39	0.39	0.02
Beacon	B	None		0.0000	140.00	No Ice	0.17	0.17	0.01
						1/2" Ice	0.31	0.31	0.01
						1" Ice	0.39	0.39	0.02
Beacon	C	None		0.0000	140.00	No Ice	0.17	0.17	0.01
						1/2" Ice	0.31	0.31	0.01
						1" Ice	0.39	0.39	0.02
3' Pivot Side Arm (50" pipe)	B	From Leg	1.50	0.0000	204.00	No Ice	1.91	2.49	0.11
(CSP)			0.00			1/2" Ice	2.70	3.30	0.13
			0.00			1" Ice	3.27	3.97	0.17
SC479	B	From Leg	6.00	0.0000	204.00	No Ice	4.39	4.39	0.03
(CSP)			0.00			1/2" Ice	6.54	6.54	0.07
			7.00			1" Ice	8.04	8.04	0.11
SitePro USF-4U	A	From Leg	2.00	0.0000	177.00	No Ice	5.75	5.75	0.16
(Eversource)			0.00			1/2" Ice	8.00	8.00	0.21
			0.00			1" Ice	10.25	10.25	0.26
871F-70	A	From Leg	3.00	0.0000	177.00	No Ice	2.40	2.40	0.01
(Eversource)			0.00			1/2" Ice	3.20	3.20	0.03
			3.00			1" Ice	4.00	4.00	0.04
AIR6449	A	From Leg	3.00	0.0000	155.00	No Ice	5.65	2.42	0.10
(T-Mobile)			-6.00			1/2" Ice	5.96	2.64	0.14
			0.00			1" Ice	6.26	2.87	0.18
APXVAALL24-43	A	From Leg	3.00	0.0000	155.00	No Ice	20.24	8.89	0.15
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	0.27

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	21.54	10.09	0.39
AIR6449	B	From Leg	3.00	0.0000	155.00	No Ice	5.65	2.42	0.10
(T-Mobile)			-6.00			1/2" Ice	5.96	2.64	0.14
			0.00			1" Ice	6.26	2.87	0.18
APXVAALL24-43	B	From Leg	3.00	0.0000	155.00	No Ice	20.24	8.89	0.15
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
AIR6449	C	From Leg	3.00	0.0000	155.00	No Ice	5.65	2.42	0.10
(T-Mobile)			-6.00			1/2" Ice	5.96	2.64	0.14
			0.00			1" Ice	6.26	2.87	0.18
APXVAALL24-43	C	From Leg	3.00	0.0000	155.00	No Ice	20.24	8.89	0.15
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
4460 B25+B66	A	From Leg	3.00	0.0000	155.00	No Ice	2.56	1.98	0.11
(T-Mobile)			-6.00			1/2" Ice	2.76	2.16	0.13
			0.00			1" Ice	2.97	2.34	0.16
4460 B25+B66	B	From Leg	3.00	0.0000	155.00	No Ice	2.56	1.98	0.11
(T-Mobile)			-6.00			1/2" Ice	2.76	2.16	0.13
			0.00			1" Ice	2.97	2.34	0.16
4460 B25+B66	C	From Leg	3.00	0.0000	155.00	No Ice	2.56	1.98	0.11
(T-Mobile)			-6.00			1/2" Ice	2.76	2.16	0.13
			0.00			1" Ice	2.97	2.34	0.16
4480 B71+B85	A	From Leg	3.00	0.0000	155.00	No Ice	2.85	1.38	0.08
(T-Mobile)			-6.00			1/2" Ice	3.06	1.54	0.11
			0.00			1" Ice	3.28	1.71	0.13
4480 B71+B85	B	From Leg	3.00	0.0000	155.00	No Ice	2.85	1.38	0.08
(T-Mobile)			-6.00			1/2" Ice	3.06	1.54	0.11
			0.00			1" Ice	3.28	1.71	0.13
4480 B71+B85	C	From Leg	3.00	0.0000	155.00	No Ice	2.85	1.38	0.08
(T-Mobile)			-6.00			1/2" Ice	3.06	1.54	0.11
			0.00			1" Ice	3.28	1.71	0.13
12' V-Frame	A	From Leg	3.00	0.0000	155.00	No Ice	9.22	12.97	0.30
(T-Mobile)			0.00			1/2" Ice	9.22	12.97	0.40
			0.00			1" Ice	9.22	12.97	0.50
12' V-Frame	B	From Leg	3.00	0.0000	155.00	No Ice	9.22	12.97	0.30
(T-Mobile)			0.00			1/2" Ice	9.22	12.97	0.40
			0.00			1" Ice	9.22	12.97	0.50
12' V-Frame	C	From Leg	3.00	0.0000	155.00	No Ice	9.22	12.97	0.30
(T-Mobile)			0.00			1/2" Ice	9.22	12.97	0.40
			0.00			1" Ice	9.22	12.97	0.50

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
8' Solid w/ Radome	C	Paraboloid	From	1.00	0.0000		276.00	8.00	No Ice	50.27	0.30
(Eversource)		w/Radome	Leg	0.00					1/2" Ice	51.32	0.62
				0.00					1" Ice	52.37	0.94

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
8' Solid w/ Radome (Eversource)	B	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		276.00	8.00	No Ice 1/2" Ice 1" Ice	50.27 51.32 52.37	0.30 0.62 0.94
8' Solid w/ Radome (Eversource)	A	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		276.00	8.00	No Ice 1/2" Ice 1" Ice	50.27 51.32 52.37	0.30 0.62 0.94
8' Solid w/ Radome (Eversource)	C	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		266.00	8.00	No Ice 1/2" Ice 1" Ice	50.27 51.32 52.37	0.30 0.62 0.94
6' Dish (Eversource - Proposed)	C	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	0.0000		240.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.07 29.87	0.08 0.10 0.12
8' Solid w/ Radome (Eversource)	C	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		230.00	8.00	No Ice 1/2" Ice 1" Ice	50.27 51.32 52.37	0.30 0.62 0.94
8' Solid w/ Radome (Eversource)	C	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		220.00	8.00	No Ice 1/2" Ice 1" Ice	50.27 51.32 52.37	0.30 0.62 0.94
10' Solid w/ Radome (Eversource)	A	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		205.50	10.00	No Ice 1/2" Ice 1" Ice	78.54 79.85 81.17	0.40 0.81 1.22
6' Solid w/ Radome (CSP)	A	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		197.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.07 32.82	0.16 0.32 0.49
10' Solid w/ Radome (CSP)	C	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		195.00	10.00	No Ice 1/2" Ice 1" Ice	78.54 79.85 81.17	0.40 0.81 1.22
6' Solid w/ Radome (CSP)	C	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		163.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.07 32.82	0.16 0.32 0.49
SBX4-W60 (Eversource)	C	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		123.00	4.00	No Ice 1/2" Ice 1" Ice	12.57 13.10 13.62	0.08 0.14 0.21
6' Solid w/ Radome (Eversource)	B	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		104.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.07 32.82	0.16 0.32 0.49
6' Grid Dish (VSC)	C	Grid	From Leg	0.50 0.00 0.00	0.0000		117.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.07 29.86	0.08 0.23 0.38

Truss-Leg Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in^2
#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	2175.9279	5918.6281	0.47	0.77	7.5553	20.5508	3.6816
#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	2175.9279	5910.8896	0.47	0.76	7.5553	20.5239	3.6816
#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	2175.9279	5902.5724	0.47	0.74	7.5553	20.4950	3.6816
#12ZG - 1.75" -	2421.2670	6037.5769	0.71	0.71	8.4072	20.9638	7.2158

Section Designation	Area in^2	Area Ice in^2	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in^2
1.00" conn. (Pirod 195557)							
#12ZG -2.00" - 0.875" conn.-Trans (Pirod 211843)	2550.9192	6099.7745	1.05	0.74	8.8574	21.1798	9.4248
#12ZG -2.25" - 0.875" conn. (Pirod 208334)	2686.5516	6160.9953	1.22	0.75	9.3283	21.3923	11.9282
#12ZG -2.25" - 0.875" conn. (Pirod 208334)	2686.5516	6149.0079	1.22	0.73	9.3283	21.3507	11.9282
#12ZG - 2.50" - 0.875" conn. (Pirod 208335)	2826.7749	6207.4851	1.42	0.74	9.8152	21.5538	14.7262
#12ZG -2.75"-0.875 -DB-0.625"-HP- (Pirod 238706)	3044.1575	6263.9416	1.69	0.76	10.5700	21.7498	17.8187
#12ZG -3.00"-0.875 -DB-0.625"-HP-Tran s- (Pirod 238707)	3198.8474	6317.6103	1.93	0.75	11.1071	21.9361	21.2058
#12ZG -3.00"-0.875 -DB-0.625"-HP- (Pirod 238708)	3198.8474	6295.1655	1.93	0.73	11.1071	21.8582	21.2058
#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	3360.5698	6337.9850	2.19	0.71	11.6686	22.0069	24.8873
#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	3360.5698	6295.5187	2.19	0.66	11.6686	21.8594	24.8873
#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	3360.5698	6211.2166	2.19	0.57	11.6686	21.5667	24.8873

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	270.00	1.313	56	282.111	A	22.686	25.226	25.226	52.65	0.000	0.000
280.00-260.00					B	22.686	25.226		52.65	16.150	0.000
					C	22.686	25.226		52.65	10.018	0.000
T2	250.00	1.284	55	322.111	A	16.082	25.226	25.226	61.07	0.000	0.000
260.00-240.00					B	16.082	25.226		61.07	32.667	0.000
					C	16.082	25.226		61.07	14.397	0.000
T3	230.00	1.254	53	362.111	A	33.932	25.226	25.226	42.64	7.680	0.000
240.00-220.00					B	33.932	25.226		42.64	38.772	0.000
					C	33.932	25.226		42.64	27.578	0.000
T4	210.00	1.222	52	402.945	A	26.001	28.071	28.071	51.91	10.240	0.000
220.00-200.00					B	26.001	28.071		51.91	46.905	0.000
					C	26.001	28.071		51.91	33.310	0.000
T5	190.00	1.187	51	443.362	A	15.781	29.574	29.574	65.21	31.151	0.000
200.00-180.00					B	15.781	29.574		65.21	47.349	0.000
					C	15.781	29.574		65.21	37.669	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T6	170.00	1.15	49	483.780	A	16.624	31.146	31.146	65.20	48.182	0.000
180.00-160.00					B	16.624	31.146		65.20	48.237	0.000
					C	16.624	31.146		65.20	37.669	0.000
T7	150.00	1.11	47	523.780	A	20.006	31.146	31.146	60.89	66.092	0.000
160.00-140.00					B	20.006	31.146		60.89	52.539	0.000
					C	20.006	31.146		60.89	37.669	0.000
T8	130.00	1.065	45	564.197	A	21.049	32.772	32.772	60.89	69.062	0.000
140.00-120.00					B	21.049	32.772		60.89	63.649	0.000
					C	21.049	32.772		60.89	40.999	0.000
T9	110.00	1.016	43	604.614	A	22.123	35.292	35.292	61.47	71.888	0.000
120.00-100.00					B	22.123	35.292		61.47	65.849	0.000
					C	22.123	35.292		61.47	47.659	0.000
T10	90.00	0.959	41	645.031	A	23.224	37.085	37.085	61.49	76.529	0.000
100.00-80.00					B	23.224	37.085		61.49	65.849	0.000
					C	23.224	37.085		61.49	50.989	0.000
T11	70.00	0.892	38	685.031	A	30.435	37.085	37.085	54.92	76.529	0.000
80.00-60.00					B	30.435	37.085		54.92	65.849	0.000
					C	30.435	37.085		54.92	50.989	0.000
T12	50.00	0.811	35	725.448	A	31.865	38.960	38.960	55.01	78.194	0.000
60.00-40.00					B	31.865	38.960		55.01	65.849	0.000
					C	31.865	38.960		55.01	50.989	0.000
T13	30.00	0.701	30	765.448	A	33.318	38.960	38.960	53.90	78.749	0.000
40.00-20.00					B	33.318	38.960		53.90	65.849	0.000
					C	33.318	38.960		53.90	50.989	0.000
T14 20.00-0.00	10.00	0.7	30	805.448	A	34.790	38.960	38.960	52.83	78.749	0.000
					B	34.790	38.960		52.83	65.849	0.000
					C	34.790	38.960		52.83	50.989	0.000

Tower Pressure - With Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	270.00	1.313	7	1.4190	286.847	A	22.686	90.588	68.617	60.58	0.000	0.000
280.00-260.00						B	22.686	90.588		60.58	45.923	0.000
						C	22.686	90.588		60.58	29.378	0.000
T2	250.00	1.284	7	1.4081	326.811	A	16.082	83.624	68.527	68.73	0.000	0.000
260.00-240.00						B	16.082	83.624		68.73	95.205	0.000
						C	16.082	83.624		68.73	45.088	0.000
T3	230.00	1.254	7	1.3964	366.772	A	33.932	92.180	68.431	54.26	29.254	0.000
240.00-220.00						B	33.932	92.180		54.26	118.798	0.000
						C	33.932	92.180		54.26	71.370	0.000
T4	210.00	1.222	7	1.3838	407.564	A	26.001	87.986	69.996	61.41	38.831	0.000
220.00-200.00						B	26.001	87.986		61.41	139.090	0.000
						C	26.001	87.986		61.41	85.194	0.000
T5	190.00	1.187	6	1.3700	447.935	A	15.781	83.071	70.717	71.54	91.587	0.000
200.00-180.00						B	15.781	83.071		71.54	139.879	0.000
						C	15.781	83.071		71.54	94.432	0.000
T6	170.00	1.15	6	1.3549	488.301	A	16.624	84.297	71.427	70.77	131.226	0.000
180.00-160.00						B	16.624	84.297		70.77	142.097	0.000
						C	16.624	84.297		70.77	93.862	0.000
T7	150.00	1.11	6	1.3380	528.245	A	20.006	84.671	71.288	68.10	175.705	0.000
160.00-140.00						B	20.006	84.671		68.10	154.063	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	20.006	84.671		68.10	93.229	0.000
T8	130.00	1.065	6	1.3190	568.599	A	21.049	85.847	71.966	67.32	183.022	0.000
140.00-120.00						B	21.049	85.847		67.32	182.797	0.000
						C	21.049	85.847		67.32	103.770	0.000
T9	110.00	1.016	6	1.2971	608.943	A	22.123	86.968	72.620	66.57	189.812	0.000
120.00-100.00						B	22.123	86.968		66.57	186.113	0.000
						C	22.123	86.968		66.57	127.161	0.000
T10	90.00	0.959	5	1.2714	649.274	A	23.224	88.005	73.242	65.85	197.994	0.000
100.00-80.00						B	23.224	88.005		65.85	184.318	0.000
						C	23.224	88.005		65.85	137.518	0.000
T11 80.00-60.00	70.00	0.892	5	1.2398	689.169	A	30.435	88.076	72.982	61.58	195.976	0.000
						B	30.435	88.076		61.58	182.122	0.000
						C	30.435	88.076		61.58	135.780	0.000
T12 60.00-40.00	50.00	0.811	4	1.1988	729.449	A	31.865	88.758	73.478	60.92	198.616	0.000
						B	31.865	88.758		60.92	179.268	0.000
						C	31.865	88.758		60.92	133.523	0.000
T13 40.00-20.00	30.00	0.701	4	1.1391	769.250	A	33.318	88.167	72.986	60.08	196.318	0.000
						B	33.318	88.167		60.08	175.118	0.000
						C	33.318	88.167		60.08	130.242	0.000
T14 20.00-0.00	10.00	0.7	4	1.0206	808.855	A	34.790	86.211	72.009	59.51	188.287	0.000
						B	34.790	86.211		59.51	166.893	0.000
						C	34.790	86.211		59.51	123.737	0.000

Tower Pressure - Service

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	270.00	1.313	10	282.111	A	22.686	25.226	25.226	52.65	0.000	0.000
280.00-260.00					B	22.686	25.226		52.65	16.150	0.000
					C	22.686	25.226		52.65	10.018	0.000
T2	250.00	1.284	10	322.111	A	16.082	25.226	25.226	61.07	0.000	0.000
260.00-240.00					B	16.082	25.226		61.07	32.667	0.000
					C	16.082	25.226		61.07	14.397	0.000
T3	230.00	1.254	10	362.111	A	33.932	25.226	25.226	42.64	7.680	0.000
240.00-220.00					B	33.932	25.226		42.64	38.772	0.000
					C	33.932	25.226		42.64	27.578	0.000
T4	210.00	1.222	10	402.945	A	26.001	28.071	28.071	51.91	10.240	0.000
220.00-200.00					B	26.001	28.071		51.91	46.905	0.000
					C	26.001	28.071		51.91	33.310	0.000
T5	190.00	1.187	9	443.362	A	15.781	29.574	29.574	65.21	31.151	0.000
200.00-180.00					B	15.781	29.574		65.21	47.349	0.000
					C	15.781	29.574		65.21	37.669	0.000
T6	170.00	1.15	9	483.780	A	16.624	31.146	31.146	65.20	48.182	0.000
180.00-160.00					B	16.624	31.146		65.20	48.237	0.000
					C	16.624	31.146		65.20	37.669	0.000
T7	150.00	1.11	9	523.780	A	20.006	31.146	31.146	60.89	66.092	0.000
160.00-140.00					B	20.006	31.146		60.89	52.539	0.000
					C	20.006	31.146		60.89	37.669	0.000
T8	130.00	1.065	8	564.197	A	21.049	32.772	32.772	60.89	69.062	0.000
140.00-120.00					B	21.049	32.772		60.89	63.649	0.000
					C	21.049	32.772		60.89	40.999	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T9	110.00	1.016	8	604.614	A	22.123	35.292	35.292	61.47	71.888	0.000
120.00-100.00					B	22.123	35.292		61.47	65.849	0.000
					C	22.123	35.292		61.47	47.659	0.000
T10	90.00	0.959	8	645.031	A	23.224	37.085	37.085	61.49	76.529	0.000
100.00-80.00					B	23.224	37.085		61.49	65.849	0.000
					C	23.224	37.085		61.49	50.989	0.000
T11	70.00	0.892	7	685.031	A	30.435	37.085	37.085	54.92	76.529	0.000
80.00-60.00					B	30.435	37.085		54.92	65.849	0.000
					C	30.435	37.085		54.92	50.989	0.000
T12	50.00	0.811	6	725.448	A	31.865	38.960	38.960	55.01	78.194	0.000
60.00-40.00					B	31.865	38.960		55.01	65.849	0.000
					C	31.865	38.960		55.01	50.989	0.000
T13	30.00	0.701	5	765.448	A	33.318	38.960	38.960	53.90	78.749	0.000
40.00-20.00					B	33.318	38.960		53.90	65.849	0.000
					C	33.318	38.960		53.90	50.989	0.000
T14 20.00-0.00	10.00	0.7	5	805.448	A	34.790	38.960	38.960	52.83	78.749	0.000
					B	34.790	38.960		52.83	65.849	0.000
					C	34.790	38.960		52.83	50.989	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.08	3.18	A	0.17	2.7	56	1	1	37.061	5.51	275.40	C
280.00-260.00			B	0.17	2.7		1	1	37.061			
			C	0.17	2.7		1	1	37.061			
T2	0.17	2.63	A	0.128	2.853	55	1	1	30.353	5.35	267.27	C
260.00-240.00			B	0.128	2.853		1	1	30.353			
			C	0.128	2.853		1	1	30.353			
T3	0.26	3.70	A	0.163	2.723	53	1	1	48.286	7.99	399.74	C
240.00-220.00			B	0.163	2.723		1	1	48.286			
			C	0.163	2.723		1	1	48.286			
T4	0.31	3.76	A	0.134	2.831	52	1	1	41.893	7.65	382.73	C
220.00-200.00			B	0.134	2.831		1	1	41.893			
			C	0.134	2.831		1	1	41.893			
T5	0.41	5.10	A	0.102	2.955	51	1	1	32.473	7.13	356.45	C
200.00-180.00			B	0.102	2.955		1	1	32.473			
			C	0.102	2.955		1	1	32.473			
T6	0.49	5.74	A	0.099	2.969	49	1	1	34.201	7.59	379.38	C
180.00-160.00			B	0.099	2.969		1	1	34.201			
			C	0.099	2.969		1	1	34.201			
T7	0.64	6.17	A	0.098	2.973	47	1	1	37.582	8.27	413.37	C
160.00-140.00			B	0.098	2.973		1	1	37.582			
			C	0.098	2.973		1	1	37.582			
T8	0.78	8.15	A	0.095	2.983	45	1	1	39.541	8.58	428.93	C
140.00-120.00			B	0.095	2.983		1	1	39.541			
			C	0.095	2.983		1	1	39.541			
T9	0.83	9.14	A	0.095	2.984	43	1	1	42.036	8.71	435.68	C
120.00-100.00			B	0.095	2.984		1	1	42.036			
			C	0.095	2.984		1	1	42.036			
T10	0.86	10.06	A	0.093	2.99	41	1	1	44.148	8.62	431.13	C
100.00-80.00			B	0.093	2.99		1	1	44.148			
			C	0.093	2.99		1	1	44.148			
T11	0.86	10.53	A	0.099	2.97	38	1	1	51.363	8.69	434.45	C
80.00-60.00			B	0.099	2.97		1	1	51.363			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.099	2.97		1	1	51.363			
T12	0.86	11.54	A	0.098	2.974	35	1	1	53.851	8.15	407.25	C
60.00-40.00			B	0.098	2.974		1	1	53.851			
			C	0.098	2.974		1	1	53.851			
T13	0.87	11.76	A	0.094	2.987	30	1	1	55.301	7.18	358.76	C
40.00-20.00			B	0.094	2.987		1	1	55.301			
			C	0.094	2.987		1	1	55.301			
T14	0.87	11.99	A	0.092	2.998	30	1	1	56.771	7.30	364.87	C
20.00-0.00			B	0.092	2.998		1	1	56.771			
			C	0.092	2.998		1	1	56.771			
Sum Weight:	8.29	103.45						OTM	14307.78 kip-ft	106.71		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.08	3.18	A	0.17	2.7	56	0.8	1	32.524	4.93	246.26	C
280.00-260.00			B	0.17	2.7		0.8	1	32.524			
			C	0.17	2.7		0.8	1	32.524			
T2	0.17	2.63	A	0.128	2.853	55	0.8	1	27.136	4.92	245.91	C
260.00-240.00			B	0.128	2.853		0.8	1	27.136			
			C	0.128	2.853		0.8	1	27.136			
T3	0.26	3.70	A	0.163	2.723	53	0.8	1	41.500	7.15	357.74	C
240.00-220.00			B	0.163	2.723		0.8	1	41.500			
			C	0.163	2.723		0.8	1	41.500			
T4	0.31	3.76	A	0.134	2.831	52	0.8	1	36.692	7.00	350.14	C
220.00-200.00			B	0.134	2.831		0.8	1	36.692			
			C	0.134	2.831		0.8	1	36.692			
T5	0.41	5.10	A	0.102	2.955	51	0.8	1	29.317	6.73	336.39	C
200.00-180.00			B	0.102	2.955		0.8	1	29.317			
			C	0.102	2.955		0.8	1	29.317			
T6	0.49	5.74	A	0.099	2.969	49	0.8	1	30.876	7.18	358.80	C
180.00-160.00			B	0.099	2.969		0.8	1	30.876			
			C	0.099	2.969		0.8	1	30.876			
T7	0.64	6.17	A	0.098	2.973	47	0.8	1	33.581	7.79	389.45	C
160.00-140.00			B	0.098	2.973		0.8	1	33.581			
			C	0.098	2.973		0.8	1	33.581			
T8	0.78	8.15	A	0.095	2.983	45	0.8	1	35.331	8.09	404.69	C
140.00-120.00			B	0.095	2.983		0.8	1	35.331			
			C	0.095	2.983		0.8	1	35.331			
T9	0.83	9.14	A	0.095	2.984	43	0.8	1	37.612	8.23	411.37	C
120.00-100.00			B	0.095	2.984		0.8	1	37.612			
			C	0.095	2.984		0.8	1	37.612			
T10	0.86	10.06	A	0.093	2.99	41	0.8	1	39.504	8.14	406.99	C
100.00-80.00			B	0.093	2.99		0.8	1	39.504			
			C	0.093	2.99		0.8	1	39.504			
T11	0.86	10.53	A	0.099	2.97	38	0.8	1	45.276	8.10	405.21	C
80.00-60.00			B	0.099	2.97		0.8	1	45.276			
			C	0.099	2.97		0.8	1	45.276			
T12	0.86	11.54	A	0.098	2.974	35	0.8	1	47.478	7.59	379.41	C
60.00-40.00			B	0.098	2.974		0.8	1	47.478			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.098	2.974		0.8	1	47.478			
T13	0.87	11.76	A	0.094	2.987	30	0.8	1	48.638	6.67	333.49	C
40.00-20.00			B	0.094	2.987		0.8	1	48.638			
			C	0.094	2.987		0.8	1	48.638			
T14	0.87	11.99	A	0.092	2.998	30	0.8	1	49.813	6.77	338.40	C
20.00-0.00			B	0.092	2.998		0.8	1	49.813			
			C	0.092	2.998		0.8	1	49.813			
Sum Weight:	8.29	103.45						OTM	13246.35 kip-ft	99.28		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.08	3.18	A	0.17	2.7	56	0.85	1	33.658	5.07	253.55	C
280.00-260.00			B	0.17	2.7		0.85	1	33.658			
			C	0.17	2.7		0.85	1	33.658			
T2	0.17	2.63	A	0.128	2.853	55	0.85	1	27.940	5.03	251.25	C
260.00-240.00			B	0.128	2.853		0.85	1	27.940			
			C	0.128	2.853		0.85	1	27.940			
T3	0.26	3.70	A	0.163	2.723	53	0.85	1	43.197	7.36	368.24	C
240.00-220.00			B	0.163	2.723		0.85	1	43.197			
			C	0.163	2.723		0.85	1	43.197			
T4	0.31	3.76	A	0.134	2.831	52	0.85	1	37.992	7.17	358.29	C
220.00-200.00			B	0.134	2.831		0.85	1	37.992			
			C	0.134	2.831		0.85	1	37.992			
T5	0.41	5.10	A	0.102	2.955	51	0.85	1	30.106	6.83	341.40	C
200.00-180.00			B	0.102	2.955		0.85	1	30.106			
			C	0.102	2.955		0.85	1	30.106			
T6	0.49	5.74	A	0.099	2.969	49	0.85	1	31.707	7.28	363.94	C
180.00-160.00			B	0.099	2.969		0.85	1	31.707			
			C	0.099	2.969		0.85	1	31.707			
T7	0.64	6.17	A	0.098	2.973	47	0.85	1	34.581	7.91	395.43	C
160.00-140.00			B	0.098	2.973		0.85	1	34.581			
			C	0.098	2.973		0.85	1	34.581			
T8	0.78	8.15	A	0.095	2.983	45	0.85	1	36.383	8.21	410.75	C
140.00-120.00			B	0.095	2.983		0.85	1	36.383			
			C	0.095	2.983		0.85	1	36.383			
T9	0.83	9.14	A	0.095	2.984	43	0.85	1	38.718	8.35	417.45	C
120.00-100.00			B	0.095	2.984		0.85	1	38.718			
			C	0.095	2.984		0.85	1	38.718			
T10	0.86	10.06	A	0.093	2.99	41	0.85	1	40.665	8.26	413.02	C
100.00-80.00			B	0.093	2.99		0.85	1	40.665			
			C	0.093	2.99		0.85	1	40.665			
T11	0.86	10.53	A	0.099	2.97	38	0.85	1	46.798	8.25	412.52	C
80.00-60.00			B	0.099	2.97		0.85	1	46.798			
			C	0.099	2.97		0.85	1	46.798			
T12	0.86	11.54	A	0.098	2.974	35	0.85	1	49.071	7.73	386.37	C
60.00-40.00			B	0.098	2.974		0.85	1	49.071			
			C	0.098	2.974		0.85	1	49.071			
T13	0.87	11.76	A	0.094	2.987	30	0.85	1	50.303	6.80	339.81	C
40.00-20.00			B	0.094	2.987		0.85	1	50.303			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.094	2.987		0.85	1	50.303			
T14	0.87	11.99	A	0.092	2.998	30	0.85	1	51.553	6.90	345.01	C
20.00-0.00			B	0.092	2.998		0.85	1	51.553			
			C	0.092	2.998		0.85	1	51.553			
Sum Weight:	8.29	103.45						OTM	13511.71 kip-ft	101.14		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.84	8.26	A	0.395	2.074	7	1	1	80.123	1.28	64.14	C
280.00-260.00			B	0.395	2.074		1	1	80.123			
			C	0.395	2.074		1	1	80.123			
T2	1.54	6.77	A	0.305	2.283	7	1	1	66.301	1.40	69.91	C
260.00-240.00			B	0.305	2.283		1	1	66.301			
			C	0.305	2.283		1	1	66.301			
T3	2.38	9.68	A	0.344	2.186	7	1	1	90.510	1.91	95.51	C
240.00-220.00			B	0.344	2.186		1	1	90.510			
			C	0.344	2.186		1	1	90.510			
T4	2.86	8.69	A	0.28	2.351	7	1	1	78.165	1.93	96.50	C
220.00-200.00			B	0.28	2.351		1	1	78.165			
			C	0.28	2.351		1	1	78.165			
T5	3.59	9.60	A	0.221	2.528	6	1	1	63.830	1.96	97.96	C
200.00-180.00			B	0.221	2.528		1	1	63.830			
			C	0.221	2.528		1	1	63.830			
T6	4.15	10.35	A	0.207	2.574	6	1	1	65.153	2.06	103.16	C
180.00-160.00			B	0.207	2.574		1	1	65.153			
			C	0.207	2.574		1	1	65.153			
T7	4.87	11.12	A	0.198	2.602	6	1	1	68.621	2.22	110.92	C
160.00-140.00			B	0.198	2.602		1	1	68.621			
			C	0.198	2.602		1	1	68.621			
T8	5.43	13.20	A	0.188	2.637	6	1	1	70.194	2.30	114.96	C
140.00-120.00			B	0.188	2.637		1	1	70.194			
			C	0.188	2.637		1	1	70.194			
T9	5.71	14.35	A	0.179	2.667	6	1	1	71.794	2.32	115.83	C
120.00-100.00			B	0.179	2.667		1	1	71.794			
			C	0.179	2.667		1	1	71.794			
T10	5.82	15.34	A	0.171	2.695	5	1	1	73.391	2.26	112.99	C
100.00-80.00			B	0.171	2.695		1	1	73.391			
			C	0.171	2.695		1	1	73.391			
T11	5.67	16.44	A	0.172	2.692	5	1	1	80.650	2.17	108.43	C
80.00-60.00			B	0.172	2.692		1	1	80.650			
			C	0.172	2.692		1	1	80.650			
T12	5.53	17.43	A	0.165	2.716	4	1	1	82.394	1.99	99.45	C
60.00-40.00			B	0.165	2.716		1	1	82.394			
			C	0.165	2.716		1	1	82.394			
T13	5.27	17.47	A	0.158	2.743	4	1	1	83.432	1.72	85.82	C
40.00-20.00			B	0.158	2.743		1	1	83.432			
			C	0.158	2.743		1	1	83.432			
T14	4.74	17.14	A	0.15	2.773	4	1	1	83.714	1.68	84.07	C
20.00-0.00			B	0.15	2.773		1	1	83.714			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.15	2.773		1	1	83.714			
Sum Weight:	58.41	175.84						OTM	3673.00 kip-ft	27.19		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.84	8.26	A	0.395	2.074	7	0.8	1	75.586	1.23	61.29	C
280.00-260.00			B	0.395	2.074		0.8	1	75.586			
			C	0.395	2.074		0.8	1	75.586			
T2	1.54	6.77	A	0.305	2.283	7	0.8	1	63.084	1.35	67.73	C
260.00-240.00			B	0.305	2.283		0.8	1	63.084			
			C	0.305	2.283		0.8	1	63.084			
T3	2.38	9.68	A	0.344	2.186	7	0.8	1	83.724	1.82	91.21	C
240.00-220.00			B	0.344	2.186		0.8	1	83.724			
			C	0.344	2.186		0.8	1	83.724			
T4	2.86	8.69	A	0.28	2.351	7	0.8	1	72.965	1.86	93.04	C
220.00-200.00			B	0.28	2.351		0.8	1	72.965			
			C	0.28	2.351		0.8	1	72.965			
T5	3.59	9.60	A	0.221	2.528	6	0.8	1	60.674	1.92	95.77	C
200.00-180.00			B	0.221	2.528		0.8	1	60.674			
			C	0.221	2.528		0.8	1	60.674			
T6	4.15	10.35	A	0.207	2.574	6	0.8	1	61.828	2.02	100.89	C
180.00-160.00			B	0.207	2.574		0.8	1	61.828			
			C	0.207	2.574		0.8	1	61.828			
T7	4.87	11.12	A	0.198	2.602	6	0.8	1	64.620	2.16	108.25	C
160.00-140.00			B	0.198	2.602		0.8	1	64.620			
			C	0.198	2.602		0.8	1	64.620			
T8	5.43	13.20	A	0.188	2.637	6	0.8	1	65.985	2.24	112.23	C
140.00-120.00			B	0.188	2.637		0.8	1	65.985			
			C	0.188	2.637		0.8	1	65.985			
T9	5.71	14.35	A	0.179	2.667	6	0.8	1	67.369	2.26	113.06	C
120.00-100.00			B	0.179	2.667		0.8	1	67.369			
			C	0.179	2.667		0.8	1	67.369			
T10	5.82	15.34	A	0.171	2.695	5	0.8	1	68.746	2.20	110.22	C
100.00-80.00			B	0.171	2.695		0.8	1	68.746			
			C	0.171	2.695		0.8	1	68.746			
T11	5.67	16.44	A	0.172	2.692	5	0.8	1	74.563	2.10	105.04	C
80.00-60.00			B	0.172	2.692		0.8	1	74.563			
			C	0.172	2.692		0.8	1	74.563			
T12	5.53	17.43	A	0.165	2.716	4	0.8	1	76.021	1.92	96.21	C
60.00-40.00			B	0.165	2.716		0.8	1	76.021			
			C	0.165	2.716		0.8	1	76.021			
T13	5.27	17.47	A	0.158	2.743	4	0.8	1	76.768	1.66	82.86	C
40.00-20.00			B	0.158	2.743		0.8	1	76.768			
			C	0.158	2.743		0.8	1	76.768			
T14	4.74	17.14	A	0.15	2.773	4	0.8	1	76.756	1.62	80.95	C
20.00-0.00			B	0.15	2.773		0.8	1	76.756			
			C	0.15	2.773		0.8	1	76.756			
Sum Weight:	58.41	175.84						OTM	3559.75 kip-ft	26.37		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.84	8.26	A	0.395	2.074	7	0.85	1	76.720	1.24	62.00	C
280.00-260.00			B	0.395	2.074		0.85	1	76.720			
			C	0.395	2.074		0.85	1	76.720			
T2	1.54	6.77	A	0.305	2.283	7	0.85	1	63.888	1.37	68.28	C
260.00-240.00			B	0.305	2.283		0.85	1	63.888			
			C	0.305	2.283		0.85	1	63.888			
T3	2.38	9.68	A	0.344	2.186	7	0.85	1	85.421	1.85	92.29	C
240.00-220.00			B	0.344	2.186		0.85	1	85.421			
			C	0.344	2.186		0.85	1	85.421			
T4	2.86	8.69	A	0.28	2.351	7	0.85	1	74.265	1.88	93.91	C
220.00-200.00			B	0.28	2.351		0.85	1	74.265			
			C	0.28	2.351		0.85	1	74.265			
T5	3.59	9.60	A	0.221	2.528	6	0.85	1	61.463	1.93	96.32	C
200.00-180.00			B	0.221	2.528		0.85	1	61.463			
			C	0.221	2.528		0.85	1	61.463			
T6	4.15	10.35	A	0.207	2.574	6	0.85	1	62.659	2.03	101.46	C
180.00-160.00			B	0.207	2.574		0.85	1	62.659			
			C	0.207	2.574		0.85	1	62.659			
T7	4.87	11.12	A	0.198	2.602	6	0.85	1	65.620	2.18	108.92	C
160.00-140.00			B	0.198	2.602		0.85	1	65.620			
			C	0.198	2.602		0.85	1	65.620			
T8	5.43	13.20	A	0.188	2.637	6	0.85	1	67.037	2.26	112.91	C
140.00-120.00			B	0.188	2.637		0.85	1	67.037			
			C	0.188	2.637		0.85	1	67.037			
T9	5.71	14.35	A	0.179	2.667	6	0.85	1	68.475	2.28	113.75	C
120.00-100.00			B	0.179	2.667		0.85	1	68.475			
			C	0.179	2.667		0.85	1	68.475			
T10	5.82	15.34	A	0.171	2.695	5	0.85	1	69.907	2.22	110.91	C
100.00-80.00			B	0.171	2.695		0.85	1	69.907			
			C	0.171	2.695		0.85	1	69.907			
T11	5.67	16.44	A	0.172	2.692	5	0.85	1	76.085	2.12	105.89	C
80.00-60.00			B	0.172	2.692		0.85	1	76.085			
			C	0.172	2.692		0.85	1	76.085			
T12	5.53	17.43	A	0.165	2.716	4	0.85	1	77.614	1.94	97.02	C
60.00-40.00			B	0.165	2.716		0.85	1	77.614			
			C	0.165	2.716		0.85	1	77.614			
T13	5.27	17.47	A	0.158	2.743	4	0.85	1	78.434	1.67	83.60	C
40.00-20.00			B	0.158	2.743		0.85	1	78.434			
			C	0.158	2.743		0.85	1	78.434			
T14	4.74	17.14	A	0.15	2.773	4	0.85	1	78.496	1.63	81.73	C
20.00-0.00			B	0.15	2.773		0.85	1	78.496			
			C	0.15	2.773		0.85	1	78.496			
Sum Weight:	58.41	175.84						OTM	3588.07 kip-ft	26.58		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.08	3.18	A	0.17	2.7	10	1	1	37.061	1.01	50.58	C
280.00-260.00			B	0.17	2.7		1	1	37.061			
			C	0.17	2.7		1	1	37.061			
T2	0.17	2.63	A	0.128	2.853	10	1	1	30.353	0.98	49.09	C
260.00-240.00			B	0.128	2.853		1	1	30.353			
			C	0.128	2.853		1	1	30.353			
T3	0.26	3.70	A	0.163	2.723	10	1	1	48.286	1.47	73.42	C
240.00-220.00			B	0.163	2.723		1	1	48.286			
			C	0.163	2.723		1	1	48.286			
T4	0.31	3.76	A	0.134	2.831	10	1	1	41.893	1.41	70.30	C
220.00-200.00			B	0.134	2.831		1	1	41.893			
			C	0.134	2.831		1	1	41.893			
T5	0.41	5.10	A	0.102	2.955	9	1	1	32.473	1.31	65.47	C
200.00-180.00			B	0.102	2.955		1	1	32.473			
			C	0.102	2.955		1	1	32.473			
T6	0.49	5.74	A	0.099	2.969	9	1	1	34.201	1.39	69.68	C
180.00-160.00			B	0.099	2.969		1	1	34.201			
			C	0.099	2.969		1	1	34.201			
T7	0.64	6.17	A	0.098	2.973	9	1	1	37.582	1.52	75.93	C
160.00-140.00			B	0.098	2.973		1	1	37.582			
			C	0.098	2.973		1	1	37.582			
T8	0.78	8.15	A	0.095	2.983	8	1	1	39.541	1.58	78.78	C
140.00-120.00			B	0.095	2.983		1	1	39.541			
			C	0.095	2.983		1	1	39.541			
T9	0.83	9.14	A	0.095	2.984	8	1	1	42.036	1.60	80.02	C
120.00-100.00			B	0.095	2.984		1	1	42.036			
			C	0.095	2.984		1	1	42.036			
T10	0.86	10.06	A	0.093	2.99	8	1	1	44.148	1.58	79.19	C
100.00-80.00			B	0.093	2.99		1	1	44.148			
			C	0.093	2.99		1	1	44.148			
T11	0.86	10.53	A	0.099	2.97	7	1	1	51.363	1.60	79.80	C
80.00-60.00			B	0.099	2.97		1	1	51.363			
			C	0.099	2.97		1	1	51.363			
T12	0.86	11.54	A	0.098	2.974	6	1	1	53.851	1.50	74.80	C
60.00-40.00			B	0.098	2.974		1	1	53.851			
			C	0.098	2.974		1	1	53.851			
T13	0.87	11.76	A	0.094	2.987	5	1	1	55.301	1.32	65.89	C
40.00-20.00			B	0.094	2.987		1	1	55.301			
			C	0.094	2.987		1	1	55.301			
T14	0.87	11.99	A	0.092	2.998	5	1	1	56.771	1.34	67.02	C
20.00-0.00			B	0.092	2.998		1	1	56.771			
			C	0.092	2.998		1	1	56.771			
Sum Weight:	8.29	103.45						OTM	2627.96 kip-ft	19.60		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.08	3.18	A	0.17	2.7	10	0.8	1	32.524	0.90	45.23	C
280.00-260.00			B	0.17	2.7		0.8	1	32.524			
			C	0.17	2.7		0.8	1	32.524			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T2	0.17	2.63	A	0.128	2.853	10	0.8	1	27.136	0.90	45.17	C
260.00-240.00			B	0.128	2.853		0.8	1	27.136			
			C	0.128	2.853		0.8	1	27.136			
T3	0.26	3.70	A	0.163	2.723	10	0.8	1	41.500	1.31	65.71	C
240.00-220.00			B	0.163	2.723		0.8	1	41.500			
			C	0.163	2.723		0.8	1	41.500			
T4	0.31	3.76	A	0.134	2.831	10	0.8	1	36.692	1.29	64.31	C
220.00-200.00			B	0.134	2.831		0.8	1	36.692			
			C	0.134	2.831		0.8	1	36.692			
T5	0.41	5.10	A	0.102	2.955	9	0.8	1	29.317	1.24	61.79	C
200.00-180.00			B	0.102	2.955		0.8	1	29.317			
			C	0.102	2.955		0.8	1	29.317			
T6	0.49	5.74	A	0.099	2.969	9	0.8	1	30.876	1.32	65.90	C
180.00-160.00			B	0.099	2.969		0.8	1	30.876			
			C	0.099	2.969		0.8	1	30.876			
T7	0.64	6.17	A	0.098	2.973	9	0.8	1	33.581	1.43	71.53	C
160.00-140.00			B	0.098	2.973		0.8	1	33.581			
			C	0.098	2.973		0.8	1	33.581			
T8	0.78	8.15	A	0.095	2.983	8	0.8	1	35.331	1.49	74.33	C
140.00-120.00			B	0.095	2.983		0.8	1	35.331			
			C	0.095	2.983		0.8	1	35.331			
T9	0.83	9.14	A	0.095	2.984	8	0.8	1	37.612	1.51	75.56	C
120.00-100.00			B	0.095	2.984		0.8	1	37.612			
			C	0.095	2.984		0.8	1	37.612			
T10	0.86	10.06	A	0.093	2.99	8	0.8	1	39.504	1.50	74.75	C
100.00-80.00			B	0.093	2.99		0.8	1	39.504			
			C	0.093	2.99		0.8	1	39.504			
T11	0.86	10.53	A	0.099	2.97	7	0.8	1	45.276	1.49	74.43	C
80.00-60.00			B	0.099	2.97		0.8	1	45.276			
			C	0.099	2.97		0.8	1	45.276			
T12	0.86	11.54	A	0.098	2.974	6	0.8	1	47.478	1.39	69.69	C
60.00-40.00			B	0.098	2.974		0.8	1	47.478			
			C	0.098	2.974		0.8	1	47.478			
T13	0.87	11.76	A	0.094	2.987	5	0.8	1	48.638	1.23	61.25	C
40.00-20.00			B	0.094	2.987		0.8	1	48.638			
			C	0.094	2.987		0.8	1	48.638			
T14	0.87	11.99	A	0.092	2.998	5	0.8	1	49.813	1.24	62.15	C
20.00-0.00			B	0.092	2.998		0.8	1	49.813			
			C	0.092	2.998		0.8	1	49.813			
Sum Weight:	8.29	103.45						OTM	2433.00 kip-ft	18.24		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.08	3.18	A	0.17	2.7	10	0.85	1	33.658	0.93	46.57	C
280.00-260.00			B	0.17	2.7		0.85	1	33.658			
			C	0.17	2.7		0.85	1	33.658			
T2	0.17	2.63	A	0.128	2.853	10	0.85	1	27.940	0.92	46.15	C
260.00-240.00			B	0.128	2.853		0.85	1	27.940			
			C	0.128	2.853		0.85	1	27.940			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T3	0.26	3.70	A	0.163	2.723	10	0.85	1	43.197	1.35	67.64	C
240.00-220.00			B	0.163	2.723		0.85	1	43.197			
			C	0.163	2.723		0.85	1	43.197			
T4	0.31	3.76	A	0.134	2.831	10	0.85	1	37.992	1.32	65.81	C
220.00-200.00			B	0.134	2.831		0.85	1	37.992			
			C	0.134	2.831		0.85	1	37.992			
T5	0.41	5.10	A	0.102	2.955	9	0.85	1	30.106	1.25	62.71	C
200.00-180.00			B	0.102	2.955		0.85	1	30.106			
			C	0.102	2.955		0.85	1	30.106			
T6	0.49	5.74	A	0.099	2.969	9	0.85	1	31.707	1.34	66.85	C
180.00-160.00			B	0.099	2.969		0.85	1	31.707			
			C	0.099	2.969		0.85	1	31.707			
T7	0.64	6.17	A	0.098	2.973	9	0.85	1	34.581	1.45	72.63	C
160.00-140.00			B	0.098	2.973		0.85	1	34.581			
			C	0.098	2.973		0.85	1	34.581			
T8	0.78	8.15	A	0.095	2.983	8	0.85	1	36.383	1.51	75.44	C
140.00-120.00			B	0.095	2.983		0.85	1	36.383			
			C	0.095	2.983		0.85	1	36.383			
T9	0.83	9.14	A	0.095	2.984	8	0.85	1	38.718	1.53	76.67	C
120.00-100.00			B	0.095	2.984		0.85	1	38.718			
			C	0.095	2.984		0.85	1	38.718			
T10	0.86	10.06	A	0.093	2.99	8	0.85	1	40.665	1.52	75.86	C
100.00-80.00			B	0.093	2.99		0.85	1	40.665			
			C	0.093	2.99		0.85	1	40.665			
T11	0.86	10.53	A	0.099	2.97	7	0.85	1	46.798	1.52	75.77	C
80.00-60.00			B	0.099	2.97		0.85	1	46.798			
			C	0.099	2.97		0.85	1	46.798			
T12	0.86	11.54	A	0.098	2.974	6	0.85	1	49.071	1.42	70.97	C
60.00-40.00			B	0.098	2.974		0.85	1	49.071			
			C	0.098	2.974		0.85	1	49.071			
T13	0.87	11.76	A	0.094	2.987	5	0.85	1	50.303	1.25	62.41	C
40.00-20.00			B	0.094	2.987		0.85	1	50.303			
			C	0.094	2.987		0.85	1	50.303			
T14	0.87	11.99	A	0.092	2.998	5	0.85	1	51.553	1.27	63.37	C
20.00-0.00			B	0.092	2.998		0.85	1	51.553			
			C	0.092	2.998		0.85	1	51.553			
Sum Weight:	8.29	103.45						OTM	2481.74 kip-ft	18.58		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	57.49					
Bracing Weight	45.95					
Total Member Self-Weight	103.45			6.41	26.31	
Total Weight	125.11			6.41	26.31	
Wind 0 deg - No Ice		3.28	-142.34	-21387.67	-733.13	-8.90
Wind 30 deg - No Ice		70.56	-120.09	-18183.15	-10766.01	73.70
Wind 60 deg - No Ice		118.06	-68.09	-10295.87	-17841.53	154.94
Wind 90 deg - No Ice		138.52	-0.72	-167.28	-20943.92	194.09
Wind 120 deg - No Ice		124.44	68.59	10106.89	-18767.71	163.52

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 150 deg - No Ice		68.06	114.52	16959.42	-10200.98	87.74
Wind 180 deg - No Ice		-0.26	131.01	19454.23	79.99	9.57
Wind 210 deg - No Ice		-69.16	117.86	17701.19	10486.35	-69.63
Wind 240 deg - No Ice		-123.94	72.10	10902.19	18678.96	-154.62
Wind 270 deg - No Ice		-134.87	1.61	366.71	20166.64	-198.49
Wind 300 deg - No Ice		-112.01	-64.30	-9444.65	16527.14	-164.51
Wind 330 deg - No Ice		-64.38	-115.46	-17158.98	9415.21	-87.40
Member Ice	72.39					
Total Weight Ice	269.24			206.59	59.01	
Wind 0 deg - Ice		0.62	-33.30	-4666.85	-64.67	1.61
Wind 30 deg - Ice		16.74	-28.49	-3982.87	-2414.23	29.95
Wind 60 deg - Ice		28.34	-16.35	-2194.10	-4102.93	51.83
Wind 90 deg - Ice		32.95	-0.21	170.37	-4781.91	59.75
Wind 120 deg - Ice		29.09	16.15	2544.56	-4208.43	50.18
Wind 150 deg - Ice		16.27	27.70	4225.52	-2321.69	26.97
Wind 180 deg - Ice		-0.04	31.89	4840.14	67.43	-0.78
Wind 210 deg - Ice		-16.42	28.19	4329.49	2472.24	-28.18
Wind 240 deg - Ice		-28.91	16.76	2668.26	4293.36	-51.79
Wind 270 deg - Ice		-32.39	0.21	255.13	4780.16	-61.57
Wind 300 deg - Ice		-27.43	-15.77	-2071.97	4026.27	-51.04
Wind 330 deg - Ice		-15.76	-27.84	-3841.36	2325.19	-26.92
Total Weight	125.11			6.41	26.31	
Wind 0 deg - Service		0.60	-26.17	-3938.83	-123.85	-1.33
Wind 30 deg - Service		12.97	-22.07	-3349.72	-1968.57	13.89
Wind 60 deg - Service		21.70	-12.52	-1899.62	-3269.58	28.76
Wind 90 deg - Service		25.46	-0.13	-37.32	-3839.93	35.83
Wind 120 deg - Service		22.87	12.61	1851.72	-3439.69	30.03
Wind 150 deg - Service		12.51	21.05	3111.77	-1864.79	15.94
Wind 180 deg - Service		-0.05	24.08	3570.52	25.49	1.45
Wind 210 deg - Service		-12.71	21.67	3248.01	1938.81	-13.14
Wind 240 deg - Service		-22.78	13.25	1997.79	3445.00	-28.70
Wind 270 deg - Service		-24.79	0.29	60.76	3718.77	-36.63
Wind 300 deg - Service		-20.59	-11.82	-1743.27	3049.77	-30.22
Wind 330 deg - Service		-11.84	-21.22	-3161.61	1742.07	-15.88

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice

Comb. No.	Description
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	280 - 260	Leg	Max Tension	7	6.23	0.09	0.02
			Max. Compression	18	-10.16	2.47	0.04
			Max. Mx	10	-9.87	2.48	-0.28
			Max. My	4	-1.01	-0.01	1.63
			Max. Vy	29	-0.82	-2.21	-0.02
			Max. Vx	24	0.59	-0.05	-0.20
		Diagonal	Max Tension	9	4.50	-0.01	0.01
			Max. Compression	8	-4.69	0.00	0.00
			Max. Mx	34	0.44	0.11	0.02
			Max. My	35	-0.08	0.10	0.02
			Max. Vy	30	0.07	0.11	-0.01
			Max. Vx	35	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	14	1.01	-0.04	0.00
			Max. Compression	3	-1.30	0.10	0.00
			Max. Mx	4	-1.04	0.12	0.01
			Max. My	20	-0.99	0.08	0.02
			Max. Vy	34	0.07	0.11	0.01
			Max. Vx	20	0.00	0.00	0.00
		Top Girt	Max Tension	35	0.38	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	22	-0.31	0.00	0.00
			Max. Mx	26	0.32	-0.36	0.00
			Max. My	35	0.28	0.00	0.01
			Max. Vy	26	0.12	0.00	0.00
			Max. Vx	35	0.00	0.00	0.00
T2	260 - 240	Leg	Max Tension	7	24.50	0.56	-0.07
			Max. Compression	10	-32.26	2.57	-0.12
			Max. Mx	18	-32.26	2.65	0.21
			Max. My	4	-2.02	-0.07	-1.98
			Max. Vy	18	-0.61	2.65	0.21
			Max. Vx	16	-0.52	-0.04	1.34
		Diagonal	Max Tension	8	6.37	0.00	0.00
			Max. Compression	8	-6.49	0.00	0.00
			Max. Mx	31	0.92	0.14	0.02
			Max. My	30	0.47	0.13	-0.02
			Max. Vy	34	0.08	0.14	0.02
			Max. Vx	30	0.00	0.00	0.00
T3	240 - 220	Leg	Max Tension	7	49.34	0.10	-0.10
			Max. Compression	18	-61.96	2.08	0.23
			Max. Mx	18	-45.39	2.79	0.22
			Max. My	5	-3.85	-0.05	-2.50
			Max. Vy	6	-0.82	-0.01	-0.08
			Max. Vx	2	0.89	0.03	0.52
		Diagonal	Max Tension	8	10.13	0.00	0.00
			Max. Compression	8	-10.28	0.00	0.00
			Max. Mx	35	1.18	0.19	0.02
			Max. My	35	-0.02	0.17	0.03
			Max. Vy	33	0.10	0.18	-0.02
			Max. Vx	35	-0.01	0.00	0.00
		Top Girt	Max Tension	33	2.05	0.00	0.00
			Max. Compression	11	-1.17	0.00	0.00
			Max. Mx	26	1.81	-0.96	0.00
			Max. My	35	1.84	0.00	0.03
			Max. Vy	26	-0.24	0.00	0.00
			Max. Vx	35	0.01	0.00	0.00
		Mid Girt	Max Tension	33	2.00	0.00	0.00
			Max. Compression	19	-1.35	0.00	0.00
			Max. Mx	26	1.71	-0.52	0.00
			Max. My	35	1.78	0.00	0.01
			Max. Vy	26	-0.12	0.00	0.00
			Max. Vx	35	-0.00	0.00	0.00
T4	220 - 200	Leg	Max Tension	7	83.11	-0.46	0.25
			Max. Compression	18	-100.45	7.29	0.09
			Max. Mx	6	81.20	-7.62	-0.33
			Max. My	12	-4.10	-0.63	-6.12
			Max. Vy	14	1.31	-6.79	-0.67
			Max. Vx	16	-1.24	-0.29	5.24
		Diagonal	Max Tension	8	12.31	0.00	0.00
			Max. Compression	8	-12.39	0.00	0.00
			Max. Mx	35	2.45	0.23	-0.02
			Max. My	20	-11.75	0.05	0.04
			Max. Vy	32	0.11	0.22	0.03
			Max. Vx	29	0.01	0.00	0.00
T5	200 - 180	Leg	Max Tension	7	111.06	2.28	0.22
			Max. Compression	18	-132.27	13.31	0.96
			Max. Mx	18	-132.27	13.31	0.96
			Max. My	4	-11.43	0.37	-8.44
			Max. Vy	19	-1.47	13.27	0.96
			Max. Vx	4	-1.58	-0.43	-0.70
		Diagonal	Max Tension	8	19.27	0.00	0.00
			Max. Compression	8	-19.81	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	33	2.29	-0.51	-0.08
			Max. My	8	-19.66	-0.19	0.10
			Max. Vy	33	-0.18	-0.51	-0.08
			Max. Vx	29	-0.01	0.00	0.00
T6	180 - 160	Leg	Max Tension	7	153.54	7.22	-0.05
			Max. Compression	18	-182.69	17.95	1.10
			Max. Mx	19	-179.32	17.95	1.09
			Max. My	4	-15.51	0.18	-11.13
			Max. Vy	6	2.12	-17.41	-1.17
			Max. Vx	10	1.39	-9.43	-9.91
		Diagonal	Max Tension	8	20.95	0.00	0.00
			Max. Compression	8	-21.02	0.00	0.00
			Max. Mx	33	3.44	-0.58	-0.09
			Max. My	35	-0.29	-0.57	-0.09
			Max. Vy	33	-0.19	-0.58	-0.09
			Max. Vx	35	-0.01	0.00	0.00
T7	160 - 140	Leg	Max Tension	7	195.69	0.59	-0.06
			Max. Compression	18	-233.34	18.60	0.85
			Max. Mx	19	-228.77	18.61	0.85
			Max. My	4	-20.80	0.09	-13.07
			Max. Vy	6	3.31	-18.18	-0.98
			Max. Vx	4	2.88	0.09	-13.07
		Diagonal	Max Tension	8	24.39	0.00	0.00
			Max. Compression	8	-25.11	0.00	0.00
			Max. Mx	33	3.50	-0.76	0.11
			Max. My	29	-6.02	-0.72	0.12
			Max. Vy	33	-0.24	-0.76	0.11
			Max. Vx	35	-0.01	0.00	0.00
T8	140 - 120	Leg	Max Tension	7	243.94	0.99	0.09
			Max. Compression	18	-291.52	14.18	0.59
			Max. Mx	18	-291.52	14.18	0.59
			Max. My	12	-14.21	0.01	-7.39
			Max. Vy	10	-1.57	14.02	-1.04
			Max. Vx	24	-0.92	0.03	7.38
		Diagonal	Max Tension	8	28.43	0.00	0.00
			Max. Compression	8	-29.04	0.00	0.00
			Max. Mx	33	4.67	-1.04	-0.14
			Max. My	35	-0.40	-1.02	-0.15
			Max. Vy	33	-0.32	-1.04	-0.14
			Max. Vx	35	-0.02	0.00	0.00
T9	120 - 100	Leg	Max Tension	7	294.50	4.52	0.34
			Max. Compression	18	-351.62	14.19	1.04
			Max. Mx	18	-351.62	14.19	1.04
			Max. My	4	-29.70	0.09	-8.56
			Max. Vy	19	-1.63	14.17	1.04
			Max. Vx	18	-1.23	-7.02	8.17
		Diagonal	Max Tension	8	29.97	0.00	0.00
			Max. Compression	8	-30.32	0.00	0.00
			Max. Mx	33	4.05	-1.21	0.16
			Max. My	35	-0.82	-1.06	-0.17
			Max. Vy	33	-0.35	-1.21	0.16
			Max. Vx	35	-0.02	0.00	0.00
T10	100 - 80	Leg	Max Tension	7	344.90	2.27	-0.20
			Max. Compression	18	-411.69	13.85	0.68
			Max. Mx	18	-411.69	13.85	0.68
			Max. My	4	-34.36	0.68	-7.17
			Max. Vy	19	-1.28	13.72	0.68
			Max. Vx	10	0.79	-6.40	-6.90
		Diagonal	Max Tension	8	31.39	0.00	0.00
			Max. Compression	8	-32.01	0.00	0.00
			Max. Mx	33	5.96	-1.28	-0.17

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	35	0.05	-1.27	-0.17
			Max. Vy	33	-0.36	-1.28	-0.17
			Max. Vx	35	-0.02	0.00	0.00
T11	80 - 60	Leg	Max Tension	7	394.56	0.96	0.02
			Max. Compression	18	-471.95	10.59	0.57
			Max. Mx	27	-160.07	11.06	0.06
			Max. My	4	-39.38	-0.26	-9.92
			Max. Vy	6	1.04	-10.54	-0.64
			Max. Vx	18	-0.87	-5.73	9.12
		Diagonal	Max Tension	8	32.57	0.00	0.00
			Max. Compression	8	-33.05	0.00	0.00
			Max. Mx	33	3.21	-1.71	0.22
			Max. My	29	-9.62	-1.64	0.23
			Max. Vy	33	-0.43	-1.71	0.22
			Max. Vx	29	0.02	0.00	0.00
T12	60 - 40	Leg	Max Tension	7	442.91	0.61	-0.01
			Max. Compression	18	-531.21	13.31	0.51
			Max. Mx	29	22.96	-13.62	-0.16
			Max. My	4	-41.85	-1.18	-5.50
			Max. Vy	29	1.21	-13.62	-0.16
			Max. Vx	12	-0.65	-1.18	-5.15
		Diagonal	Max Tension	8	33.71	0.00	0.00
			Max. Compression	8	-34.45	0.00	0.00
			Max. Mx	33	7.94	-1.66	-0.21
			Max. My	36	4.95	-1.65	-0.22
			Max. Vy	33	-0.44	-1.66	-0.21
			Max. Vx	36	-0.02	0.00	0.00
T13	40 - 20	Leg	Max Tension	7	491.29	-1.94	0.00
			Max. Compression	18	-591.70	8.58	0.49
			Max. Mx	27	-200.73	14.24	0.07
			Max. My	4	-50.06	-0.56	-13.76
			Max. Vy	34	-1.28	-10.76	0.06
			Max. Vx	4	1.12	-0.56	-13.76
		Diagonal	Max Tension	8	34.41	0.00	0.00
			Max. Compression	8	-34.69	0.00	0.00
			Max. Mx	33	1.20	-2.08	0.27
			Max. My	36	-13.18	-2.00	-0.29
			Max. Vy	33	-0.47	-2.08	0.27
			Max. Vx	36	-0.03	0.00	0.00
T14	20 - 0	Leg	Max Tension	7	535.98	-2.38	-0.17
			Max. Compression	18	-647.31	4.23	0.18
			Max. Mx	31	-232.89	9.81	0.00
			Max. My	4	-52.50	-1.43	-10.70
			Max. Vy	29	0.67	-0.70	-0.05
			Max. Vx	4	-0.88	-1.43	-10.70
		Diagonal	Max Tension	8	35.43	0.00	0.00
			Max. Compression	8	-36.63	0.00	0.00
			Max. Mx	34	10.58	-1.81	-0.23
			Max. My	35	8.93	-1.80	-0.24
			Max. Vy	34	-0.46	-1.81	-0.23
			Max. Vx	35	-0.02	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	676.10	76.87	-41.87
	Max. H_x	18	676.10	76.87	-41.87
	Max. H_z	5	-495.15	-55.66	37.80
	Min. Vert	7	-558.30	-66.81	35.95
	Min. H_x	7	-558.30	-66.81	35.95
	Min. H_z	18	676.10	76.87	-41.87
Leg B	Max. Vert	10	666.55	-76.30	-41.20
	Max. H_x	23	-512.93	63.06	33.62
	Max. H_z	25	-446.36	51.67	35.21
	Min. Vert	23	-512.93	63.06	33.62
	Min. H_x	10	666.55	-76.30	-41.20
	Min. H_z	10	666.55	-76.30	-41.20
Leg A	Max. Vert	2	668.96	-0.29	86.86
	Max. H_x	21	26.93	8.92	2.31
	Max. H_z	2	668.96	-0.29	86.86
	Min. Vert	15	-525.09	0.14	-72.57
	Min. H_x	8	54.84	-9.18	4.88
	Min. H_z	15	-525.09	0.14	-72.57

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	125.11	0.00	-0.00	6.39	26.28	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	150.14	3.28	-142.34	-21439.93	-730.03	-9.03
0.9 Dead+1.0 Wind 0 deg - No Ice	112.60	3.28	-142.34	-21428.35	-737.40	-9.00
1.2 Dead+1.0 Wind 30 deg - No Ice	150.14	70.56	-120.09	-18227.39	-10788.09	73.68
0.9 Dead+1.0 Wind 30 deg - No Ice	112.60	70.56	-120.09	-18217.81	-10789.14	73.65
1.2 Dead+1.0 Wind 60 deg - No Ice	150.14	118.06	-68.09	-10320.10	-17881.16	154.94
0.9 Dead+1.0 Wind 60 deg - No Ice	112.60	118.06	-68.09	-10315.52	-17877.78	154.93
1.2 Dead+1.0 Wind 90 deg - No Ice	150.14	138.52	-0.72	-166.12	-20991.27	194.12
0.9 Dead+1.0 Wind 90 deg - No Ice	112.60	138.52	-0.72	-167.92	-20985.91	194.13
1.2 Dead+1.0 Wind 120 deg - No Ice	150.14	124.44	68.59	10133.52	-18809.47	163.59
0.9 Dead+1.0 Wind 120 deg - No Ice	112.60	124.44	68.59	10125.29	-18805.44	163.61
1.2 Dead+1.0 Wind 150 deg - No Ice	150.14	68.06	114.51	17002.95	-10221.11	87.90
0.9 Dead+1.0 Wind 150 deg - No Ice	112.60	68.06	114.51	16990.40	-10222.58	87.83
1.2 Dead+1.0 Wind 180 deg - No Ice	150.14	-0.26	131.01	19503.85	85.49	9.67
0.9 Dead+1.0 Wind 180 deg - No Ice	112.60	-0.26	131.01	19489.73	77.53	9.65
1.2 Dead+1.0 Wind 210 deg - No Ice	150.14	-69.16	117.86	17746.83	10517.80	-69.61
0.9 Dead+1.0 Wind 210 deg - No Ice	112.60	-69.16	117.86	17733.74	10503.26	-69.59

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 240 deg - No Ice	150.14	-123.94	72.10	10931.13	18730.92	-154.57
0.9 Dead+1.0 Wind 240 deg - No Ice	112.60	-123.94	72.10	10922.31	18711.15	-154.62
1.2 Dead+1.0 Wind 270 deg - No Ice	150.14	-134.87	1.61	369.42	20222.26	-198.50
0.9 Dead+1.0 Wind 270 deg - No Ice	112.60	-134.87	1.61	367.23	20201.66	-198.52
1.2 Dead+1.0 Wind 300 deg - No Ice	150.14	-112.01	-64.30	-9466.47	16573.51	-164.61
0.9 Dead+1.0 Wind 300 deg - No Ice	112.60	-112.01	-64.30	-9462.51	16555.28	-164.57
1.2 Dead+1.0 Wind 330 deg - No Ice	150.14	-64.39	-115.46	-17200.35	9443.87	-87.58
0.9 Dead+1.0 Wind 330 deg - No Ice	112.60	-64.38	-115.46	-17191.52	9430.11	-87.51
1.2 Dead+1.0 Ice+1.0 Temp	294.27	0.00	-0.00	208.88	64.38	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	294.27	0.62	-33.30	-4690.44	-59.99	1.59
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	294.27	16.74	-28.49	-4002.80	-2422.18	30.01
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	294.27	28.34	-16.35	-2204.33	-4119.90	51.98
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	294.27	32.95	-0.21	172.82	-4802.58	59.94
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	294.27	29.09	16.15	2559.71	-4225.99	50.36
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	294.27	16.27	27.70	4249.64	-2329.04	27.08
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	294.27	-0.04	31.89	4867.48	72.94	-0.77
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	294.27	-16.42	28.18	4354.27	2490.70	-28.25
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	294.27	-28.91	16.76	2684.17	4321.63	-51.94
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	294.27	-32.39	0.21	258.09	4810.97	-61.75
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	294.27	-27.43	-15.77	-2081.45	4052.89	-51.21
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	294.27	-15.76	-27.84	-3860.41	2342.71	-27.02
Dead+Wind 0 deg - Service	125.11	0.60	-26.17	-3935.27	-113.47	-1.35
Dead+Wind 30 deg - Service	125.11	12.97	-22.07	-3344.89	-1962.03	13.88
Dead+Wind 60 deg - Service	125.11	21.70	-12.52	-1891.72	-3265.74	28.76
Dead+Wind 90 deg - Service	125.11	25.46	-0.13	-25.51	-3837.23	35.83
Dead+Wind 120 deg - Service	125.11	22.87	12.61	1867.44	-3436.24	30.05
Dead+Wind 150 deg - Service	125.11	12.51	21.05	3130.02	-1857.97	15.97
Dead+Wind 180 deg - Service	125.11	-0.05	24.08	3589.79	36.24	1.47
Dead+Wind 210 deg - Service	125.11	-12.71	21.67	3266.59	1953.55	-13.14
Dead+Wind 240 deg - Service	125.11	-22.78	13.25	2013.87	3462.93	-28.71
Dead+Wind 270 deg - Service	125.11	-24.79	0.29	72.80	3737.16	-36.64
Dead+Wind 300 deg - Service	125.11	-20.59	-11.82	-1735.00	3066.78	-30.23
Dead+Wind 330 deg - Service	125.11	-11.84	-21.22	-3156.27	1756.31	-15.91

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-125.11	0.00	-0.00	125.11	0.00	0.000%
2	3.28	-150.14	-142.34	-3.28	150.14	142.34	0.000%
3	3.28	-112.60	-142.34	-3.28	112.60	142.34	0.000%
4	70.56	-150.14	-120.09	-70.56	150.14	120.09	0.000%
5	70.56	-112.60	-120.09	-70.56	112.60	120.09	0.001%
6	118.06	-150.14	-68.09	-118.06	150.14	68.09	0.000%
7	118.06	-112.60	-68.09	-118.06	112.60	68.09	0.000%
8	138.52	-150.14	-0.72	-138.52	150.14	0.72	0.000%
9	138.52	-112.60	-0.72	-138.52	112.60	0.72	0.000%
10	124.44	-150.14	68.59	-124.44	150.14	-68.59	0.000%
11	124.44	-112.60	68.59	-124.44	112.60	-68.59	0.000%
12	68.06	-150.14	114.52	-68.06	150.14	-114.51	0.000%
13	68.06	-112.60	114.52	-68.06	112.60	-114.51	0.000%
14	-0.26	-150.14	131.01	0.26	150.14	-131.01	0.000%
15	-0.26	-112.60	131.01	0.26	112.60	-131.01	0.000%
16	-69.16	-150.14	117.86	69.16	150.14	-117.86	0.000%
17	-69.16	-112.60	117.86	69.16	112.60	-117.86	0.000%
18	-123.94	-150.14	72.10	123.94	150.14	-72.10	0.000%
19	-123.94	-112.60	72.10	123.94	112.60	-72.10	0.000%
20	-134.87	-150.14	1.61	134.87	150.14	-1.61	0.000%
21	-134.87	-112.60	1.61	134.87	112.60	-1.61	0.000%
22	-112.01	-150.14	-64.30	112.01	150.14	64.30	0.000%
23	-112.01	-112.60	-64.30	112.01	112.60	64.30	0.000%
24	-64.38	-150.14	-115.46	64.39	150.14	115.46	0.001%
25	-64.38	-112.60	-115.46	64.38	112.60	115.46	0.000%
26	0.00	-294.27	0.00	-0.00	294.27	0.00	0.000%
27	0.62	-294.27	-33.30	-0.62	294.27	33.30	0.000%
28	16.74	-294.27	-28.49	-16.74	294.27	28.49	0.000%
29	28.34	-294.27	-16.35	-28.34	294.27	16.35	0.000%
30	32.95	-294.27	-0.21	-32.95	294.27	0.21	0.000%
31	29.09	-294.27	16.15	-29.09	294.27	-16.15	0.000%
32	16.27	-294.27	27.70	-16.27	294.27	-27.70	0.000%
33	-0.04	-294.27	31.89	0.04	294.27	-31.89	0.000%
34	-16.42	-294.27	28.19	16.42	294.27	-28.18	0.000%
35	-28.91	-294.27	16.76	28.91	294.27	-16.76	0.000%
36	-32.39	-294.27	0.21	32.39	294.27	-0.21	0.000%
37	-27.43	-294.27	-15.77	27.43	294.27	15.77	0.000%
38	-15.76	-294.27	-27.84	15.76	294.27	27.84	0.000%
39	0.60	-125.11	-26.17	-0.60	125.11	26.17	0.000%
40	12.97	-125.11	-22.07	-12.97	125.11	22.07	0.000%
41	21.70	-125.11	-12.52	-21.70	125.11	12.52	0.000%
42	25.46	-125.11	-0.13	-25.46	125.11	0.13	0.000%
43	22.87	-125.11	12.61	-22.87	125.11	-12.61	0.000%
44	12.51	-125.11	21.05	-12.51	125.11	-21.05	0.000%
45	-0.05	-125.11	24.08	0.05	125.11	-24.08	0.000%
46	-12.71	-125.11	21.67	12.71	125.11	-21.67	0.000%
47	-22.78	-125.11	13.25	22.78	125.11	-13.25	0.000%
48	-24.79	-125.11	0.29	24.79	125.11	-0.29	0.000%
49	-20.59	-125.11	-11.82	20.59	125.11	11.82	0.000%
50	-11.84	-125.11	-21.22	11.84	125.11	21.22	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00005974

2	Yes	9	0.00000001	0.00004883
3	Yes	9	0.00000001	0.00004680
4	Yes	9	0.00000001	0.00005035
5	Yes	9	0.00000001	0.00004829
6	Yes	9	0.00000001	0.00005150
7	Yes	9	0.00000001	0.00004942
8	Yes	9	0.00000001	0.00005036
9	Yes	9	0.00000001	0.00004830
10	Yes	9	0.00000001	0.00004888
11	Yes	9	0.00000001	0.00004684
12	Yes	9	0.00000001	0.00004985
13	Yes	9	0.00000001	0.00004779
14	Yes	9	0.00000001	0.00005098
15	Yes	9	0.00000001	0.00004893
16	Yes	9	0.00000001	0.00005006
17	Yes	9	0.00000001	0.00004800
18	Yes	9	0.00000001	0.00004889
19	Yes	9	0.00000001	0.00004684
20	Yes	9	0.00000001	0.00005003
21	Yes	9	0.00000001	0.00004798
22	Yes	9	0.00000001	0.00005092
23	Yes	9	0.00000001	0.00004888
24	Yes	9	0.00000001	0.00004978
25	Yes	9	0.00000001	0.00004775
26	Yes	7	0.00000001	0.00008610
27	Yes	9	0.00000001	0.00004196
28	Yes	9	0.00000001	0.00004252
29	Yes	9	0.00000001	0.00004303
30	Yes	9	0.00000001	0.00004397
31	Yes	9	0.00000001	0.00004464
32	Yes	9	0.00000001	0.00004445
33	Yes	9	0.00000001	0.00004467
34	Yes	9	0.00000001	0.00004512
35	Yes	9	0.00000001	0.00004493
36	Yes	9	0.00000001	0.00004334
37	Yes	9	0.00000001	0.00004158
38	Yes	9	0.00000001	0.00004101
39	Yes	9	0.00000001	0.00004376
40	Yes	9	0.00000001	0.00004395
41	Yes	9	0.00000001	0.00004380
42	Yes	9	0.00000001	0.00004392
43	Yes	9	0.00000001	0.00004386
44	Yes	9	0.00000001	0.00004315
45	Yes	9	0.00000001	0.00004312
46	Yes	9	0.00000001	0.00004380
47	Yes	9	0.00000001	0.00004417
48	Yes	9	0.00000001	0.00004355
49	Yes	9	0.00000001	0.00004277
50	Yes	9	0.00000001	0.00004288

Maximum Tower Deflections - Service Wind

Section No.	*Elevation* *ft*	*Horz. Deflection* *in*	*Gov. Load Comb.*	*Tilt* °	*Twist* °
T1	280 - 260	3.406	47	0.0976	0.0142
T2	260 - 240	2.965	47	0.0974	0.0138
T3	240 - 220	2.540	47	0.0927	0.0128
T4	220 - 200	2.147	47	0.0833	0.0112
T5	200 - 180	1.789	47	0.0759	0.0093

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T6	180 - 160	1.452	47	0.0687	0.0081
T7	160 - 140	1.152	47	0.0614	0.0068
T8	140 - 120	0.887	47	0.0527	0.0056
T9	120 - 100	0.664	47	0.0443	0.0048
T10	100 - 80	0.476	47	0.0366	0.0040
T11	80 - 60	0.318	47	0.0295	0.0032
T12	60 - 40	0.193	47	0.0218	0.0024
T13	40 - 20	0.099	47	0.0149	0.0016
T14	20 - 0	0.031	47	0.0075	0.0008

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
280.00	Beacon Extender (4') 803062	47	3.406	0.0976	0.0142	Inf
279.00	DB538	47	3.384	0.0976	0.0141	Inf
276.00	8' Solid w/ Radome	47	3.317	0.0977	0.0141	Inf
266.00	8' Solid w/ Radome	47	3.097	0.0978	0.0139	473758
261.00	10' Dipole	47	2.987	0.0975	0.0138	346700
260.00	DB589-Y	47	2.965	0.0974	0.0138	327453
255.00	DB212-1-C	47	2.857	0.0968	0.0136	249999
241.00	SD110-SFXPASNM	47	2.561	0.0931	0.0129	148960
240.00	6' Dish	47	2.540	0.0927	0.0128	145594
235.00	TMA (12"x16"x6"")	47	2.438	0.0906	0.0125	134662
230.00	8' Solid w/ Radome	47	2.339	0.0881	0.0121	126611
220.00	8' Solid w/ Radome	47	2.147	0.0833	0.0112	117889
216.00	ANT450F10	47	2.073	0.0816	0.0109	133527
205.50	10' Solid w/ Radome	47	1.885	0.0778	0.0098	253380
204.00	3' Pivot Side Arm (50" pipe)	47	1.859	0.0773	0.0097	290292
200.00	TMA (12"x16"x6"")	47	1.789	0.0759	0.0093	365107
197.00	6' Solid w/ Radome	47	1.737	0.0749	0.0091	307725
195.00	10' Solid w/ Radome	47	1.703	0.0742	0.0090	257235
177.00	SitePro USF-4U	47	1.405	0.0676	0.0079	113798
175.00	SC479	47	1.374	0.0669	0.0078	117591
168.00	ANT450F6	47	1.268	0.0644	0.0074	134847
163.00	6' Solid w/ Radome	47	1.195	0.0626	0.0070	150223
155.00	AIR6449	47	1.082	0.0593	0.0065	140712
145.00	LNX-6515DS	47	0.949	0.0549	0.0059	111409
140.00	Beacon	47	0.887	0.0527	0.0056	103837
128.00	3' Pivot Side Arm (50" pipe)	47	0.748	0.0476	0.0051	123151
126.00	PR-950	47	0.726	0.0468	0.0050	127849
125.00	KRECO CO-36A	47	0.716	0.0464	0.0050	130335
124.00	ANT450F6	47	0.705	0.0459	0.0050	132907
123.00	SBX4-W60	47	0.695	0.0455	0.0049	135498
117.00	6' Grid Dish	47	0.633	0.0431	0.0047	146487
116.00	BR-6155	47	0.623	0.0427	0.0047	147365
104.00	6' Solid w/ Radome	47	0.511	0.0381	0.0042	157201
97.00	BR-6155	47	0.450	0.0355	0.0039	159681
55.00	5-ft dipole	47	0.167	0.0200	0.0022	153859
50.00	ANT790F2	47	0.143	0.0183	0.0020	182377

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	280 - 260	18.392	18	0.5254	0.0767
T2	260 - 240	16.021	18	0.5246	0.0745
T3	240 - 220	13.731	18	0.4995	0.0694
T4	220 - 200	11.610	18	0.4490	0.0608
T5	200 - 180	9.677	18	0.4101	0.0504
T6	180 - 160	7.858	18	0.3710	0.0437
T7	160 - 140	6.234	18	0.3318	0.0370
T8	140 - 120	4.800	18	0.2845	0.0304
T9	120 - 100	3.594	18	0.2397	0.0261
T10	100 - 80	2.577	18	0.1980	0.0218
T11	80 - 60	1.725	18	0.1596	0.0172
T12	60 - 40	1.045	18	0.1179	0.0129
T13	40 - 20	0.537	18	0.0805	0.0086
T14	20 - 0	0.169	18	0.0408	0.0043

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
280.00	Beacon Extender (4') 803062	18	18.392	0.5254	0.0767	253989
279.00	DB538	18	18.272	0.5256	0.0766	253989
276.00	8' Solid w/ Radome	18	17.915	0.5261	0.0764	253989
266.00	8' Solid w/ Radome	18	16.728	0.5265	0.0753	90710
261.00	10' Dipole	18	16.138	0.5251	0.0746	66276
260.00	DB589-Y	18	16.021	0.5246	0.0745	62513
255.00	DB212-1-C	18	15.437	0.5214	0.0735	47227
241.00	SD110-SFXPASNM	18	13.842	0.5016	0.0697	27707
240.00	6' Dish	18	13.731	0.4995	0.0694	27087
235.00	TMA (12"x16"x6"")	18	13.182	0.4879	0.0676	25203
230.00	8' Solid w/ Radome	18	12.645	0.4749	0.0655	23863
220.00	8' Solid w/ Radome	18	11.610	0.4490	0.0608	22452
216.00	ANT450F10	18	11.211	0.4401	0.0587	25387
205.50	10' Solid w/ Radome	18	10.196	0.4201	0.0530	47292
204.00	3' Pivot Side Arm (50" pipe)	18	10.054	0.4174	0.0522	53876
200.00	TMA (12"x16"x6"")	18	9.677	0.4101	0.0504	66894
197.00	6' Solid w/ Radome	18	9.396	0.4045	0.0491	56431
195.00	10' Solid w/ Radome	18	9.210	0.4006	0.0484	47250
177.00	SitePro USF-4U	18	7.601	0.3653	0.0428	21179
175.00	SC479	18	7.433	0.3615	0.0421	21868
168.00	ANT450F6	18	6.860	0.3481	0.0398	24988
163.00	6' Solid w/ Radome	18	6.466	0.3381	0.0380	27750
155.00	AIR6449	18	5.857	0.3205	0.0352	26008
145.00	LNX-6515DS	18	5.139	0.2966	0.0319	20676
140.00	Beacon	18	4.800	0.2845	0.0304	19291
128.00	3' Pivot Side Arm (50" pipe)	18	4.051	0.2571	0.0276	22810
126.00	PR-950	18	3.934	0.2527	0.0272	23663
125.00	KRECO CO-36A	18	3.876	0.2505	0.0270	24113
124.00	ANT450F6	18	3.818	0.2484	0.0268	24580
123.00	SBX4-W60	18	3.762	0.2462	0.0266	25049
117.00	6' Grid Dish	18	3.430	0.2332	0.0254	27080
116.00	BR-6155	18	3.377	0.2310	0.0252	27253
104.00	6' Solid w/ Radome	18	2.767	0.2059	0.0227	29240
97.00	BR-6155	18	2.439	0.1922	0.0211	29694
55.00	5-ft dipole	18	0.904	0.1083	0.0119	28577
50.00	ANT790F2	18	0.773	0.0990	0.0108	33688

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	280	Leg	A325N	1.0000	6	1.04	54.52	0.019 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	4.50	26.38	0.171 ✓	1	Member Bearing
		Top Girt	A325N	1.0000	1	0.38	26.38	0.014 ✓	1	Member Bearing
T2	260	Leg	A325N	1.0000	6	4.08	54.52	0.075 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	6.37	26.38	0.241 ✓	1	Member Bearing
T3	240	Leg	A325N	1.0000	6	8.19	54.52	0.150 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	10.13	21.11	0.480 ✓	1	Member Bearing
		Top Girt	A325N	1.0000	1	2.05	31.66	0.065 ✓	1	Member Bearing
		Mid Girt	A325N	1.0000	1	2.00	12.72	0.157 ✓	1	Member Bearing
T4	220	Leg	A325N	1.0000	6	13.85	54.52	0.254 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	12.31	21.11	0.583 ✓	1	Member Bearing
T5	200	Leg	A325N	1.0000	12	9.25	54.52	0.170 ✓	1	Bolt Tension
		Diagonal	A325N	0.8750	1	19.27	36.98	0.521 ✓	1	Gusset Bearing
T6	180	Leg	A325N	1.0000	12	12.79	54.52	0.235 ✓	1	Bolt Tension
		Diagonal	A325N	0.8750	1	20.95	36.98	0.567 ✓	1	Gusset Bearing
T7	160	Leg	A325N	1.0000	12	16.31	54.52	0.299 ✓	1	Bolt Tension
		Diagonal	A325N	0.8750	1	24.39	36.98	0.660 ✓	1	Gusset Bearing
T8	140	Leg	A325N	1.0000	12	20.33	54.52	0.373 ✓	1	Bolt Tension
		Diagonal	A325N	0.8750	1	28.43	36.98	0.769 ✓	1	Gusset Bearing
T9	120	Leg	A325N	1.0000	12	24.54	54.52	0.450 ✓	1	Bolt Tension
		Diagonal	A325N	0.8750	2	14.98	48.94	0.306 ✓	1	Gusset Bearing
T10	100	Leg	A325N	1.2500	12	28.74	87.22	0.330 ✓	1	Bolt Tension
		Diagonal	A325N	0.8750	2	15.70	48.94	0.321 ✓	1	Gusset Bearing
T11	80	Leg	A325N	1.2500	12	32.88	87.22	0.377 ✓	1	Bolt Tension
		Diagonal	A325N	0.8750	2	16.28	48.94	0.333 ✓	1	Gusset Bearing
T12	60	Leg	A325N	1.2500	12	36.91	87.22	0.423 ✓	1	Bolt Tension
		Diagonal	A325N	0.8750	2	16.86	48.94	0.344 ✓	1	Gusset Bearing
T13	40	Leg	A325N	1.2500	12	40.94	87.22	0.469 ✓	1	Bolt Tension
		Diagonal	A325N	0.8750	2	17.21	48.94	0.352 ✓	1	Gusset Bearing
T14	20	Leg	F1554-105	1.2500	12	44.67	90.85	0.492 ✓	1	Bolt Tension
		Diagonal	A325N	0.8750	2	17.71	48.94	0.362 ✓	1	Gusset Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	280 - 260	#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	20.03	10.02	45.0 K=1.00	3.6816	-10.16	142.87	0.071 [1] ✔
T2	260 - 240	#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	20.03	10.02	45.0 K=1.00	3.6816	-32.26	142.87	0.226 [1] ✔
T3	240 - 220	#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	20.03	10.02	45.0 K=1.00	3.6816	-61.96	142.87	0.434 [1] ✔
T4	220 - 200	#12ZG - 1.75" - 1.00" conn. (Pirod 195557)	20.03	10.02	31.9 K=1.00	7.2158	-100.45	301.49	0.333 [1] ✔
T5	200 - 180	#12ZG -2.00" - 0.875" conn.-Trans (Pirod 211843)	20.03	20.03	48.8 K=1.00	9.4248	-132.27	356.29	0.371 [1] ✔
T6	180 - 160	#12ZG -2.25" - 0.875" conn. (Pirod 208334)	20.03	20.03	48.8 K=1.00	11.9282	-182.69	451.15	0.405 [1] ✔
T7	160 - 140	#12ZG -2.25" - 0.875" conn. (Pirod 208334)	20.03	20.03	48.8 K=1.00	11.9282	-233.34	451.15	0.517 [1] ✔
T8	140 - 120	#12ZG - 2.50" - 0.875" conn. (Pirod 208335)	20.03	20.03	48.7 K=1.00	14.7262	-291.52	557.27	0.523 [1] ✔
T9	120 - 100	#12ZG -2.75"-0.875 -DB-0.625"-HP- (Pirod 238706)	20.03	20.03	48.6 K=1.00	17.8187	-351.62	674.68	0.521 [1] ✔
T10	100 - 80	#12ZG -3.00"-0.875 -DB-0.625"-HP-Trans- (Pirod 238707)	20.03	20.03	48.5 K=1.00	21.2057	-411.69	803.44	0.512 [1] ✔
T11	80 - 60	#12ZG -3.00"-0.875 -DB-0.625"-HP- (Pirod 238708)	20.03	20.03	48.5 K=1.00	21.2057	-471.95	803.44	0.587 [1] ✔
T12	60 - 40	#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	20.03	20.03	48.4 K=1.00	24.8873	-531.21	943.57	0.563 [1] ✔
T13	40 - 20	#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	20.03	20.03	48.4 K=1.00	24.8873	-591.70	943.57	0.627 [1] ✔
T14	20 - 0	#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	20.03	20.03	48.4 K=1.00	24.8873	-647.31	943.57	0.686 [1] ✔

[1] P_u / ϕP_n controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T1	280 - 260	0.5	1.48	99.1	165.67	0.1963	0.82	4.85	0.170 ✔
T2	260 - 240	0.5	1.48	99.1	165.67	0.1963	0.64	4.85	0.132 ✔
T3	240 - 220	0.5	1.48	99.1	165.67	0.1963	0.92	4.85	0.191

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T4	220 - 200	0.5	1.44	96.9	324.71	0.1963	1.40	4.39	0.321 ✔
T5	200 - 180	0.5	1.39	93.2	424.12	0.1963	1.74	4.67	0.375 ✔
T6	180 - 160	0.5	1.38	92.4	536.77	0.1963	2.14	4.71	0.454 ✔
T7	160 - 140	0.5	1.38	92.4	536.77	0.1963	3.32	4.71	0.707 ✔
T8	140 - 120	0.5	1.36	91.6	662.68	0.1963	1.58	4.75	0.334 ✔
T9	120 - 100	0.625	1.35	72.6	801.84	0.3068	1.68	8.74	0.195 ✔
T10	100 - 80	0.625	1.34	72.0	954.26	0.3068	1.28	8.78	0.147 ✔
T11	80 - 60	0.625	1.34	72.0	954.26	0.3068	1.09	8.78	0.128 ✔
T12	60 - 40	0.625	1.33	71.4	1119.93	0.3068	1.21	8.82	0.137 ✔
T13	40 - 20	0.625	1.33	71.4	1119.93	0.3068	1.29	8.82	0.147 ✔
T14	20 - 0	0.625	1.33	71.4	1119.93	0.3068	0.90	8.82	0.108 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	280 - 260	L3x3x5/16	14.87	7.52	153.2 K=1.00	1.7800	-4.69	21.70	0.216 [1] ✔
T2	260 - 240	L3x3x5/16	16.49	8.32	169.5 K=1.00	1.7800	-6.49	17.73	0.366 [1] ✔
T3	240 - 220	L4x4x1/4	18.19	9.16	138.3 K=1.00	1.9400	-10.28	29.03	0.354 [1] ✔
T4	220 - 200	L4x4x1/4	19.94	10.04	151.5 K=1.00	1.9400	-12.31	24.20	0.509 [1] ✔
T5	200 - 180	2L3 1/2x3 1/2x1/4	27.05	13.98	153.9 K=1.00	3.3800	-19.81	40.82	0.485 [1] ✔
T6	180 - 160	2L3 1/2x3 1/2x1/4	28.50	14.68	161.6 K=1.00	3.3800	-21.02	37.03	0.568 [1] ✔
T7	160 - 140	2L4x4x1/4	30.01	15.42	148.0 K=1.00	3.8800	-25.11	50.70	0.495 [1] ✔
T8	140 - 120	2L4x4x3/8	31.57	16.18	157.9 K=1.00	5.7200	-29.04	65.67	0.442 [1] ✔
T9	120 - 100	2L4x4x3/8	33.18	16.87	154.0 K=0.94	5.7200	-30.32	69.04	0.439 [1] ✔
T10	100 - 80	2L4x4x3/8	34.84	17.68	160.1 K=0.93	5.7200	-32.01	63.91	0.501 [1] ✔
T11	80 - 60	2L5x5x5/16	36.52	18.52	136.4 K=0.96	6.0500	-33.05	93.01	0.355 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T12	60 - 40	2L5x5x5/16	38.24	19.37	141.4 K=0.96	6.0500	-34.45	86.60	0.398 [1]
T13	40 - 20	2L5x5x5/16	39.98	20.23	146.4 K=0.95	6.0500	-34.69	80.74	0.430 [1]
T14	20 - 0	2L5x5x5/16	41.75	21.11	151.6 K=0.94	6.0500	-36.63	75.38	0.486 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	280 - 260	L2 1/2x2 1/2x5/16	12.48	11.48	181.0 K=1.00	1.4600	-1.30	12.75	0.102 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	280 - 260	L3 1/2x3 1/2x5/16	12.00	10.62	184.6 K=1.00	2.0900	-0.31	17.55	0.018 [1]
T3	240 - 220	L5x5x3/8	16.00	14.62	177.2 K=1.00	3.6100	-1.17	32.91	0.035 [1]

[1] P_u / ϕP_n controls

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T3	240 - 220	L3x3x3/16	17.00	15.67	315.4 K=1.00	1.0900	-1.35	3.14	0.430 [1]
		KL/R > 200 (C) - 47							

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	280 - 260	#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	20.03	10.02	45.0	3.6816	6.23	165.67	0.038 [1] ✔
T2	260 - 240	#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	20.03	10.02	45.0	3.6816	24.50	165.67	0.148 [1] ✔
T3	240 - 220	#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	20.03	10.02	45.0	3.6816	49.12	165.67	0.296 [1] ✔
T4	220 - 200	#12ZG - 1.75" - 1.00" conn. (Pirod 195557)	20.03	10.02	31.9	7.2158	83.11	324.71	0.256 [1] ✔
T5	200 - 180	#12ZG -2.00" - 0.875" conn.-Trans (Pirod 211843)	20.03	20.03	48.8	9.4248	111.06	424.12	0.262 [1] ✔
T6	180 - 160	#12ZG -2.25" - 0.875" conn. (Pirod 208334)	20.03	20.03	48.8	11.9282	153.54	536.77	0.286 [1] ✔
T7	160 - 140	#12ZG -2.25" - 0.875" conn. (Pirod 208334)	20.03	20.03	48.8	11.9282	195.69	536.77	0.365 [1] ✔
T8	140 - 120	#12ZG - 2.50" - 0.875" conn. (Pirod 208335)	20.03	20.03	48.7	14.7262	243.94	662.68	0.368 [1] ✔
T9	120 - 100	#12ZG -2.75"-0.875 -DB-0.625"-HP- (Pirod 238706)	20.03	20.03	48.6	17.8187	294.51	801.84	0.367 [1] ✔
T10	100 - 80	#12ZG -3.00"-0.875 -DB-0.625"-HP-Trans- (Pirod 238707)	20.03	20.03	48.5	21.2057	344.90	954.26	0.361 [1] ✔
T11	80 - 60	#12ZG -3.00"-0.875 -DB-0.625"-HP- (Pirod 238708)	20.03	20.03	48.5	21.2057	394.56	954.26	0.413 [1] ✔
T12	60 - 40	#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	20.03	20.03	48.4	24.8873	442.91	1119.93	0.395 [1] ✔
T13	40 - 20	#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	20.03	20.03	48.4	24.8873	491.29	1119.93	0.439 [1] ✔
T14	20 - 0	#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	20.03	20.03	48.4	24.8873	535.98	1119.93	0.479 [1] ✔

[1] P_u / ϕP_n controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T1	280 - 260	0.5	1.48	99.1	165.67	0.1963	0.82	4.85	0.170 ✔
T2	260 - 240	0.5	1.48	99.1	165.67	0.1963	0.64	4.85	0.132

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T3	240 - 220	0.5	1.48	99.1	165.67	0.1963	0.92	4.85	0.191 ✔
T4	220 - 200	0.5	1.44	96.9	324.71	0.1963	1.40	4.39	0.321 ✔
T5	200 - 180	0.5	1.39	93.2	424.12	0.1963	1.74	4.67	0.375 ✔
T6	180 - 160	0.5	1.38	92.4	536.77	0.1963	2.14	4.71	0.454 ✔
T7	160 - 140	0.5	1.38	92.4	536.77	0.1963	3.32	4.71	0.707 ✔
T8	140 - 120	0.5	1.36	91.6	662.68	0.1963	1.58	4.75	0.334 ✔
T9	120 - 100	0.625	1.35	72.6	801.84	0.3068	1.68	8.74	0.195 ✔
T10	100 - 80	0.625	1.34	72.0	954.26	0.3068	1.28	8.78	0.147 ✔
T11	80 - 60	0.625	1.34	72.0	954.26	0.3068	1.09	8.78	0.128 ✔
T12	60 - 40	0.625	1.33	71.4	1119.93	0.3068	1.21	8.82	0.137 ✔
T13	40 - 20	0.625	1.33	71.4	1119.93	0.3068	1.29	8.82	0.147 ✔
T14	20 - 0	0.625	1.33	71.4	1119.93	0.3068	0.90	8.82	0.108 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	280 - 260	L3x3x5/16	14.87	7.52	100.4	1.0713	4.50	46.60	0.097 [1] ✔
T2	260 - 240	L3x3x5/16	16.49	8.32	110.8	1.0713	6.37	46.60	0.137 [1] ✔
T3	240 - 220	L4x4x1/4	18.19	9.16	89.8	1.2441	10.13	54.12	0.187 [1] ✔
T4	220 - 200	L4x4x1/4	19.06	9.60	94.0	1.2441	12.31	54.12	0.227 [1] ✔
T5	200 - 180	2L3 1/2x3 1/2x1/4	27.05	13.98	156.0	2.1600	19.27	93.96	0.205 [1] ✔
T6	180 - 160	2L3 1/2x3 1/2x1/4	28.50	14.68	163.7	2.1600	20.95	93.96	0.223 [1] ✔
T7	160 - 140	2L4x4x1/4	30.01	15.42	149.8	2.5350	24.39	110.27	0.221 [1] ✔
T8	140 - 120	2L4x4x3/8	31.57	16.18	159.7	3.7275	28.43	162.15	0.175 [1] ✔
T9	120 - 100	2L4x4x3/8	33.18	16.87	167.5	3.7275	29.97	162.15	0.185 [1] ✔
T10	100 - 80	2L4x4x3/8	34.84	17.68	175.4	3.7275	31.39	162.15	0.194 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T11	80 - 60	2L5x5x5/16	36.52	18.52	143.8	4.0687	32.57	176.99	0.184 [1]
T12	60 - 40	2L5x5x5/16	38.24	19.37	150.3	4.0687	33.71	176.99	0.190 [1]
T13	40 - 20	2L5x5x5/16	39.98	20.23	156.9	4.0687	34.41	176.99	0.194 [1]
T14	20 - 0	2L5x5x5/16	41.75	21.11	163.6	4.0687	35.43	176.99	0.200 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	280 - 260	L2 1/2x2 1/2x5/16	12.48	11.48	181.0	1.4600	1.01	47.30	0.021 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	280 - 260	L3 1/2x3 1/2x5/16	12.00	10.62	122.2	1.3038	0.38	56.72	0.007 [1]
T3	240 - 220	L5x5x3/8	16.00	14.62	115.4	2.3911	2.05	104.01	0.020 [1]

[1] P_u / ϕP_n controls

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T3	240 - 220	L3x3x3/16	17.00	15.67	204.5	0.6593	2.00	28.68	0.070 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	280 - 260	Leg	#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	1	-10.16	142.87	17.0	Pass
T2	260 - 240	Leg	#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	26	-32.26	142.87	22.6	Pass
T3	240 - 220	Leg	#12ZG - 1.25" - 1.00" conn. (Pirod 207628)	40	-61.96	142.87	43.4	Pass
T4	220 - 200	Leg	#12ZG - 1.75" - 1.00" conn. (Pirod 195557)	61	-100.45	301.49	33.3	Pass
T5	200 - 180	Leg	#12ZG -2.00" - 0.875" conn.-Trans (Pirod 211843)	76	-132.27	356.29	37.5	Pass
T6	180 - 160	Leg	#12ZG -2.25" - 0.875" conn. (Pirod 208334)	85	-182.69	451.15	45.4	Pass
T7	160 - 140	Leg	#12ZG -2.25" - 0.875" conn. (Pirod 208334)	94	-233.34	451.15	70.7	Pass
T8	140 - 120	Leg	#12ZG - 2.50" - 0.875" conn. (Pirod 208335)	103	-291.52	557.27	52.3	Pass
T9	120 - 100	Leg	#12ZG -2.75"-0.875 -DB-0.625"-HP- (Pirod 238706)	112	-351.62	674.68	52.1	Pass
T10	100 - 80	Leg	#12ZG -3.00"-0.875 -DB-0.625"-HP-Trans- (Pirod 238707)	121	-411.69	803.44	51.2	Pass
T11	80 - 60	Leg	#12ZG -3.00"-0.875 -DB-0.625"-HP- (Pirod 238708)	130	-471.95	803.44	58.7	Pass
T12	60 - 40	Leg	#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	139	-531.21	943.57	56.3	Pass
T13	40 - 20	Leg	#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	148	-591.70	943.57	62.7	Pass
T14	20 - 0	Leg	#12ZG -3.25"-0.875 -DB-0.625"-HP- (Pirod 238709)	157	-647.31	943.57	68.6	Pass
T1	280 - 260	Diagonal	L3x3x5/16	8	-4.69	21.70	21.6	Pass
T2	260 - 240	Diagonal	L3x3x5/16	29	-6.49	17.73	36.6	Pass
T3	240 - 220	Diagonal	L4x4x1/4	50	-10.28	29.03	35.4 48.0 (b)	Pass
T4	220 - 200	Diagonal	L4x4x1/4	65	-12.31	24.20	50.9 58.3 (b)	Pass
T5	200 - 180	Diagonal	2L3 1/2x3 1/2x1/4	80	-19.81	40.82	48.5 52.1 (b)	Pass
T6	180 - 160	Diagonal	2L3 1/2x3 1/2x1/4	89	-21.02	37.03	56.8	Pass
T7	160 - 140	Diagonal	2L4x4x1/4	98	-25.11	50.70	49.5 66.0 (b)	Pass
T8	140 - 120	Diagonal	2L4x4x3/8	107	-29.04	65.67	44.2 76.9 (b)	Pass
T9	120 - 100	Diagonal	2L4x4x3/8	116	-30.32	69.04	43.9	Pass
T10	100 - 80	Diagonal	2L4x4x3/8	125	-32.01	63.91	50.1	Pass
T11	80 - 60	Diagonal	2L5x5x5/16	134	-33.05	93.01	35.5	Pass
T12	60 - 40	Diagonal	2L5x5x5/16	143	-34.45	86.60	39.8	Pass
T13	40 - 20	Diagonal	2L5x5x5/16	152	-34.69	80.74	43.0	Pass
T14	20 - 0	Diagonal	2L5x5x5/16	161	-36.63	75.38	48.6	Pass
T1	280 - 260	Secondary Horizontal	L2 1/2x2 1/2x5/16	23	-1.30	12.75	10.2	Pass
T1	280 - 260	Top Girt	L3 1/2x3 1/2x5/16	6	-0.31	17.55	1.8	Pass
T3	240 - 220	Top Girt	L5x5x3/8	45	-1.17	32.91	3.5 6.5 (b)	Pass
T3	240 - 220	Mid Girt	L3x3x3/16	47	-1.35	3.14	43.0	Pass
							Summary	
						Leg (T7)	70.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$øP_{allow}$ K	% Capacity	Pass Fail
						Diagonal (T8)	76.9	Pass
						Secondary Horizontal (T1)	10.2	Pass
						Top Girt (T3)	6.5	Pass
						Mid Girt (T3)	43.0	Pass
						Bolt Checks	76.9	Pass
						RATING =	**76.9**	**Pass**

Pier and Mat Foundation Analysis:

Input Data:

Tower Data

Overturning Moment =	$OM := 21687 \cdot ft \cdot kips$	(User Input from tnxTower)	
Shear Force =	$S_t := 143 \cdot kip$	(User Input from tnxTower)	
Axial Force =	$WT_t := 150 \cdot kip$	(User Input from tnxTower)	
Max Compression Force =	$C_t := 676 \cdot kip$	(User Input from tnxTower)	
Max Uplift Force =	$U_t := 558 \cdot kip$	(User Input from tnxTower)	
Tower Height =	$H_t := 280 \cdot ft$	(User Input)	
Tower Width =	$W_t := 40 \cdot ft$	(User Input)	
Tower Position on Foundation (1=offset, 2=centered) =	$Pos_t := 1$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 6.0 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 4.25 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Diameter of Pier =	$d_p := 5.5 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 2.25 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 49.5 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 4000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 34 \cdot deg$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 6000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 125 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Pier Reinforcement:

Bar Size =	$BS_{pier} := 9$	(User Input)	
Bar Diameter =	$d_{bpier} := 1.128 \cdot in$	(User Input)	
Number of Bars =	$NB_{pier} := 26$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{pier} := 3 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{Tie} := 4 \cdot in$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 11$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 1.41 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 91$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 11$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 1.41 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 91$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area = $A_{bpier} := \frac{\pi \cdot d_{bpier}^2}{4} = 0.999 \cdot in^2$

Pad Top Reinforcement Bar Area = $A_{btop} := \frac{\pi \cdot d_{btop}^2}{4} = 1.561 \cdot in^2$

Pad Bottom Reinforcement Bar Area = $A_{bbot} := \frac{\pi \cdot d_{bbot}^2}{4} = 1.561 \cdot in^2$

Coefficient of Lateral Soil Pressure = $K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3.537$

Load Factor = $LF := 1$

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{conc} - 62.4\text{pcf}, \gamma_{conc}) = 150 \cdot \text{pcf}$

Adjusted Soil Unit Weight = $\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{soil} - 62.4\text{pcf}, \gamma_{soil}) = 125 \cdot \text{pcf}$

Passive Pressure = $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot \text{ksf}$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 1.658 \cdot \text{ksf}$

$P_{top} := \text{if}[n < (D_f - T_f), P_{pt}, P_{pn}] = 1.658 \cdot \text{ksf}$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 2.653 \cdot \text{ksf}$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 2.155 \cdot \text{ksf}$

$T_p := \text{if}[n < (D_f - T_f), T_f, (D_f - n)] = 2.25 \cdot \text{ft}$

$A_p := W_f \cdot T_p = 111.375 \cdot \text{ft}^2$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 240.062 \cdot \text{kip}$

Weight of Concrete = $WT_c := \left[\left(W_f^2 \cdot T_f\right) + (3) \cdot \left(\frac{d_p^2 \cdot \pi}{4} L_p\right)\right] \cdot \gamma_c = 872.397 \cdot \text{kip}$

Weight of Soil Above Footing = $WT_{s1} := \left[\left[W_f^2 - (3) \cdot \left(\frac{d_p^2 \cdot \pi}{4}\right)\right] \cdot \left(\left|L_p - L_{pag} - n\right|\right)\right] \cdot \gamma_s = 1.12 \times 10^3 \cdot \text{kip}$

Tower Offset = $X_{t1} := \left[\frac{W_f}{2} - \frac{(W_t \cdot \cos(30 \cdot \text{deg}))}{2}\right]$ $\quad X_{t2} := \frac{W_f}{2} - \frac{(W_t \cdot \cos(30 \cdot \text{deg}))}{3}$

$X_t := \text{if}(Pos_t = 1, X_{t1}, X_{t2}) = 7.429$

$X_{off1} := \frac{W_f}{2} - \left[\frac{(W_t \cdot \cos(30 \cdot \text{deg}))}{3} + X_t\right] = 5.774$ $\quad X_{off2} := 0$

$X_{off} := \text{if}(Pos_t = 1, X_{off1}, X_{off2})$ $\quad X_{off} = 5.774 \cdot \text{ft}$

Total Weight = $WT_{tot} := 0.9WT_c + 0.75WT_{s1} = 1621.5 \cdot \text{kip}$

Resisting Moment = $M_r := (WT_{tot}) \cdot \frac{W_f}{2} + 0.9WT_t \cdot \left(\frac{W_f}{2} - X_{off}\right) + 0.75\left(S_u \cdot \frac{T_p}{3}\right) = 42829 \cdot \text{kip} \cdot \text{ft}$

Overturning Moment = $M_{ot} := OM + S_t \cdot (L_p + T_f) = 22616.5 \cdot \text{kip} \cdot \text{ft}$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 1.89$

Factor of Safety Required = $FS_{req} := 1$ $\quad$ OverTurning_Moment_Check := if(FS ≥ FS_{req}, "Okay", "No Good")

OverTurning_Moment_Check = "Okay"

Shear Capacity in Pier:

Shear Resistance of Pier = $S_p := \frac{P_{ave} \cdot A_p + \mu \cdot WT_{tot}}{FS_{req}} = 969.744 \cdot kips$

$Shear\_Check := if(S_p > S_t, "Okay", "No Good")$

$Shear\_Check = "Okay"$

Bearing Pressure Caused by Footing:

Total Load = $Load_{tot} := WT_c + WT_{s1} + WT_t = 2138 \cdot kip$

Area of the Mat = $A_{mat} := W_f^2 = 2.45 \times 10^3$

Section Modulus of Mat = $S := \frac{W_f^3}{6} = 2.02 \times 10^4 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{Load_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 1.991 \cdot ksf$

$Max\_Pressure\_Check := if(P_{max} < 0.75q_s, "Okay", "No Good")$

$Max\_Pressure\_Check = "Okay"$

Minimum Pressure in Mat = $P_{min} := \frac{Load_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.246 \cdot ksf$

$Min\_Pressure\_Check := if[(P_{min} \geq 0) \cdot (P_{min} < 0.75q_s), "Okay", "No Good"]$

$Min\_Pressure\_Check = "No Good"$

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 14.683$

Distance to Kern = $X_k := \frac{W_f}{6} = 8.25$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity = $e := \frac{M_{ot}}{Load_{tot}} = 10.581$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot Load_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 2.032 \cdot ksf$

$q_{adj} := if(P_{min} < 0, P_a, P_{max}) = 2.032 \cdot ksf$

$Pressure\_Check := if(q_{adj} < 0.75q_s, "Okay", "No Good")$

$Pressure\_Check = "Okay"$

Concrete Bearing Capacity:

Strength Reduction Factor = $\Phi_c := 0.65$ (ACI-2008 9.3.2.2)

Bearing Strength Between Pier and Pad = $P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot \frac{\pi \cdot d_p^2}{4} = 7.561 \times 10^3 \cdot kips$ (ACI-2008 10.14)

$Bearing\_Check := if(P_b > LF \cdot C_t, "Okay", "No Good")$

Bearing_Check = "Okay"

Shear Strength of Concrete:

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := 0.85$ (ACI 9.3.2.5)

$d := T_f - Cvr_{pad} - d_{bbot} = 22.59 \cdot in$

$FL := LF \cdot \frac{C_t}{W_f^2} = 0.276 \cdot ksf$

$V_{req} := FL \cdot (X_t - .5 \cdot d_p - d) \cdot W_f = 38.197 \cdot kips$

$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot psi} \cdot W_f \cdot d = 1443 \cdot kip$ (ACI-2008 11.2.1.1)

$Beam\_Shear\_Check := if(V_{req} < V_{Avail}, "Okay", "No Good")$

Beam_Shear_Check = "Okay"

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear = $b_o := (d_p + d) \cdot \pi = 23.2$

Area Included Inside Perimeter = $A_{bo} := \frac{\pi \cdot (d_p + d)^2}{4} = 42.8$

Required Shear Strength = $V_{req} := FL \cdot (W_f^2 - A_{bo}) = 664 \cdot kips$

Available Shear Strength = $V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot psi} \cdot b_o \cdot d = 1351.9 \cdot kip$ (ACI-2008 11.11.2.1)

$Punching\_Shear\_Check := if(V_{req} < V_{Avail}, "Okay", "No Good")$

Punching_Shear_Check = "Okay"

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

Maximum Moment in Pad = $M_{max} := 1300 \cdot kip \cdot ft$ (User Input)

Design Moment = $M_n := \frac{LF \cdot M_{max}}{\phi_m} = 1.444 \times 10^3 \cdot kips \cdot ft$

$$\beta := \begin{cases} 0.85 & \text{if } 2500 \cdot psi \le f_c \le 4000 \cdot psi \\ 0.65 & \text{if } f_c > 8000 \cdot psi \\ \left[0.85 - \left[\frac{\left(\frac{f_c}{psi} - 4000\right)}{1000}\right] \cdot 0.5\right] & \text{otherwise} \end{cases} = 0.85$$

(ACI-200810.2.7.3)

$b_{eff} := W_t \cdot \cos(30 \cdot deg) + d_p = 481.692 \cdot in$

$A_s := \frac{M_n}{(f_y \cdot d)} = 12.788 \cdot in^2$

$a := \frac{A_s \cdot f_y}{\beta \cdot f_c \cdot b_{eff}} = 0.469 \cdot in$

$A_s := \frac{M_n}{f_y \cdot \left(d - \frac{a}{2}\right)} = 12.922 \cdot in^2$

$\rho := \frac{A_s}{b_{eff} d} = 0.01425 \cdot in$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \cdot psi \\ .0020 & \text{otherwise} \end{cases} = 0.0018$$

(ACI -2008 7.12.2.1)

Check Bottom Bars:

$$As := if\left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d\right) = 9.8 \cdot in^2$$

$$As_{prov} := A_{bbot} \cdot NB_{bot} = 142.1 \cdot in^2$$

$$Pad\_Reinforcement\_Bot := if\left(As_{prov} > As, \text{"Okay"}, \text{"No Good"}\right)$$

Pad_Reinforcement_Bot = "Okay"

Check top Bars:

$$As := if\left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d\right) = 9.8 \cdot in^2$$

$$As_{prov} := A_{btop} \cdot NB_{top} = 142.1 \cdot in^2$$

$$Pad\_Reinforcement\_Top := if\left(As_{prov} > As, \text{"Okay"}, \text{"No Good"}\right)$$

Pad_Reinforcement_Top = "Okay"

Steel Reinforcement in Pier:

Area of Pier = $A_p := \frac{\pi \cdot d_p^2}{4} = 3421.19 \cdot in^2$

$A_{smin} := 0.01 \cdot 0.5 \cdot A_p = 17.11 \cdot in^2$ (ACI-2008 10.8.4 & 10.9.1)

$A_{sprov} := NB_{pier} \cdot A_{bpier} = 25.98 \cdot in^2$

Steel_Area_Check := if($A_{sprov} > A_{smin}$, "Okay", "No Good")

Steel_Area_Check = "Okay"

Bar Spacing In Pier = $B_{sPier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier} = 6.847 \cdot in$

Diameter of Reinforcement Cage = $Diam_{cage} := d_p - 2 \cdot Cvr_{pier} = 60 \cdot in$

Maximum Moment in Pier = $M_p := S_t \cdot (L_p) \cdot LF = 7293 \cdot in \cdot kips$

Pier Check evaluated from outside program and results are listed below;

$$\begin{pmatrix} D & N & n & P_u & M_{xu} \end{pmatrix} := \begin{pmatrix} d_p \cdot 12 & NB_{pier} & BS_{pier} & \frac{C_t \cdot 1.333}{kips} & \frac{M_p}{in \cdot kips} \end{pmatrix}$$

$$\begin{pmatrix} D & N & n & P_u & M_{xu} \end{pmatrix} = \begin{pmatrix} 66 & 26 & 9 & 901.108 & 7.293 \times 10^3 \end{pmatrix}$$

$$\begin{pmatrix} \phi P_n & \phi M_{xn} & f_{sp} & \rho \end{pmatrix} := \begin{pmatrix} 0 & 0 & 0 & 0 \end{pmatrix}$$

$$\begin{pmatrix} \phi P_n & \phi M_{xn} & f_{sp} & \rho \end{pmatrix} := \phi P'_n(D, N, n, P_u, M_{xu})^T$$

$$\begin{pmatrix} \phi P_n & \phi M_{xn} & f_{sp} & \rho \end{pmatrix} = \begin{pmatrix} 5.173 \times 10^3 & 4.187 \times 10^4 & -25.398 & 7.6 \times 10^{-3} \end{pmatrix}$$

Axial_Load_Check := if($\phi P_n \geq P_u$, "Okay", "No Good")

Axial_Load_Check = "Okay"

Bending_Check := if($\phi M_{xn} \geq M_{xu}$, "Okay", "No Good")

Bending_Check = "Okay"

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP

CTHA563A_Sprint Retain_1_draft

Print Name: Standard
PORs: New Build_Sprint Keep

Section 1 - Site Information

Site ID: CTHA563A
Status: Draft
Version: 1
Project Type: Sprint Retain
Approved: Not Approved
Approved By: Not Approved
Last Modified: 7/9/2021 2:52:29 PM
Last Modified By: ANKIT.JAISWAL20@T-Mobile.com

Site Name: CTHA563A
Site Class: Guyed Tower
Site Type: Structure Non Building
Plan Year: 2021
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Not Specified

Latitude: 41.44360277
Longitude: -72.56638611
Address: 330 Pokorny Rd
City, State: Higganum, CT
Region: NORTHEAST

RAN Template: 67E5A998E 6160			AL Template: 67E5998E_1xAIR+1OP	
Sector Count: 3	**Antenna Count:** 6	**Coax Line Count:** 0	**TMA Count:** 0	**RRU Count:** 6

Section 2 - Existing Template Images

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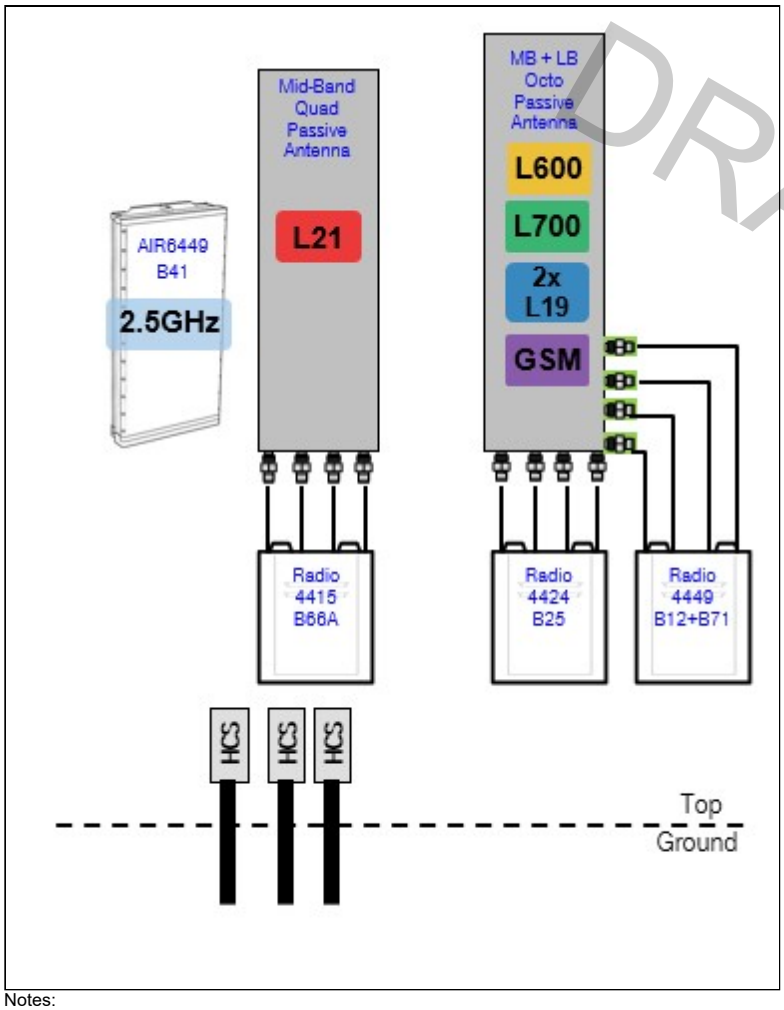
Section 3 - Proposed Template Images

67D5A998C_1xAIR+1xQP+1xOP.jpg



Notes:

Section 4 - Siteplan Images

----- This section is intentionally blank. -----

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP

CTHA563A_Sprint Retain_1_draft

Print Name: Standard
PORs: New Build_Sprint Keep

Section 5 - RAN Equipment

Existing RAN Equipment

----- This section is intentionally blank. -----

Proposed RAN Equipment

Template: 67E5A998E 6160

Enclosure	1	2	3	4
Enclosure Type	Ancillary Equipment (Ericsson)	Enclosure 6160	B160	RBS 6601
Baseband		BB 6648 L2500 N2500 BB 6648 L1900 L2100 BB 6648 L700 L600 N600		DUG20 G1900
Hybrid Cable System	PSU 4813 Ericsson Hybrid Trunk 6/24 4AWG 100m **(x 3)**			
Transport System		CSR IXRe V2 (Gen2)		
Functionality Groups		Cell Site Router		

RAN Scope of Work:

current 200 amp
add Generator

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP

CTHA563A_Sprint Retain_1_draft

Print Name: Standard
PORs: New Build_Sprint Keep

Section 6 - A&L Equipment

Existing Template: Custom
Proposed Template: 67E5998E_1xAIR+1OP

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1				2	
Antenna Model	RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	30				30	
M. Tilt						
Height	155				155	
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L700 L600 N600	L700 L600 N600	L2100 L1900 G1900	L2100 L1900 G1900	L2500 N2500	L2500 N2500
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2	2	2	2	2	2
Cables	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs						
Diplexers / Combiners						
Radio	Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)		
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP

CTHA563A_Sprint Retain_1_draft

Print Name: Standard
PORs: New Build_Sprint Keep

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1				2	
Antenna Model	RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	150				150	
M. Tilt						
Height	155				155	
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L700 L600 N600	L700 L600 N600	L2100 L1900 G1900	L2100 L1900 G1900	L2500 N2500	L2500 N2500
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2	2	2	2	2	2
Cables	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs						
Diplexers / Combiners						
Radio	Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)		
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP

CTHA563A_Sprint Retain_1_draft

Print Name: Standard
PORs: New Build_Sprint Keep

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1				2	
Antenna Model	RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	270				270	
M. Tilt						
Height	155				155	
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L700 L600 N600	L700 L600 N600	L2100 L1900 G1900	L2100 L1900 G1900	L2500 N2500	L2500 N2500
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt	2	2	2	2	2	2
Cables	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs						
Diplexers / Combiners						
Radio	Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)	Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)		
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP

CTHA563A_Sprint Retain_1_draft

Print Name: Standard
PORs: New Build_Sprint Keep

Section 7 - Power Systems Equipment

Existing Power Systems Equipment
----- This section is intentionally blank. -----

	Proposed Power Systems Equipment
Enclosure	**1**
Enclosure Type	Enclosure 6160

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: CTHA563A

330 Pokorny Road
Higganum, Connecticut 06441

September 19, 2021

EBI Project Number: 6221005368

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**16.95%**

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

September 19, 2021

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

Emissions Analysis for Site: CTHA563A -

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **330 Pokorny Road** in **Higganum, Connecticut** 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 ($\mu W/cm^2$). 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), 2100 MHz (AWS) and 11 GHz 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 330 Pokorny Road in Higganum, Connecticut 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 manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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 power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

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

1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.

3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

5) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) 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.

7) 1 LTE Traffic channel (LTE 1C and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 60 Watts.

8) 1 LTE Broadcast channel (LTE 1C and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 20 Watts.

9) 1 NR Traffic channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.

10) 1 NR Broadcast channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 40 Watts.

11) 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.

12) 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 manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

13) The antennas used in this modeling are the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector A, the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector B, the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector C. 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 manufacturer's supplied

specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

14) The antenna mounting height centerline of the proposed antennas is 155 feet above ground level (AGL).

15) 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.

16) 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:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd / 16.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd / 16.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd / 16.45 dBd
Height (AGL):	155 feet	Height (AGL):	155 feet	Height (AGL):	155 feet
Channel Count:	13	Channel Count:	13	Channel Count:	13
Total TX Power (W):	560 Watts	Total TX Power (W):	560 Watts	Total TX Power (W):	560 Watts
ERP (W):	17,868.72	ERP (W):	17,868.72	ERP (W):	17,868.72
Antenna A1 MPE %:	**3.82%**	Antenna B1 MPE %:	**3.82%**	Antenna C1 MPE %:	**3.82%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz
Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd
Height (AGL):	155 feet	Height (AGL):	155 feet	Height (AGL):	155 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	36,356.09	ERP (W):	36,356.09	ERP (W):	36,356.09
Antenna A2 MPE %:	**5.89%**	Antenna B2 MPE %:	**5.89%**	Antenna C2 MPE %:	**5.89%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	9.71%
Verizon	4.44%
Eversource Energy	0.72%
Various Others	2.08%
Site Total MPE % :	16.95%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	9.71%
T-Mobile Sector B Total:	9.71%
T-Mobile Sector C Total:	9.71%
Site Total MPE % :	16.95%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 600 MHz LTE	2	591.73	155.0	1.92	600 MHz LTE	400	0.48%
T-Mobile 600 MHz NR	1	1577.94	155.0	2.56	600 MHz NR	400	0.64%
T-Mobile 700 MHz LTE	2	695.22	155.0	2.25	700 MHz LTE	467	0.48%
T-Mobile 1900 MHz GSM	4	1052.26	155.0	6.82	1900 MHz GSM	1000	0.68%
T-Mobile 1900 MHz LTE	2	2104.51	155.0	6.82	1900 MHz LTE	1000	0.68%
T-Mobile 2100 MHz LTE	2	2649.42	155.0	8.58	2100 MHz LTE	1000	0.86%
T-Mobile 2500 MHz LTE 1C & 2C Traffic	1	11044.63	155.0	17.89	2500 MHz LTE 1C & 2C Traffic	1000	1.79%
T-Mobile 2500 MHz LTE 1C & 2C Broadcast	1	1074.06	155.0	1.74	2500 MHz LTE 1C & 2C Broadcast	1000	0.17%
T-Mobile 2500 MHz NR Traffic	1	22089.26	155.0	35.77	2500 MHz NR Traffic	1000	3.58%
T-Mobile 2500 MHz NR Broadcast	1	2148.13	155.0	3.48	2500 MHz NR Broadcast	1000	0.35%
						Total:	**9.71%**

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

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:	9.71%
Sector B:	9.71%
Sector C:	9.71%
T-Mobile Maximum MPE % (Sector A):	9.71%
Site Total:	16.95%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **16.95%** 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.