10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

Transcend Wireless

October 22, 2021

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

RE: Notice of Exempt Modification
157/169 Hampden Road, Stafford Springs, CT 06076
Latitude: 41.595861
Longitude: -72.212016
T-Mobile Site#: CTHA830A - Sprint Keep Project

Dear Ms. Bachman:

T-Mobile/Sprint currently maintains six (6) antennas at the 171-foot level of the existing 180-foot Guyed Tower at 169 Hampden Road, Stafford Springs, Connecticut. The 180-foot Guyed Tower is owned and operated by Cordless Data Transfer. The ground space is owned by Michael Angelo. T-Mobile 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 171-foot level. The new antennas support 5G services.

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

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

Ground:
Install New:

(1) B160s
(1) Enclosure 6160
(1) 10’ x 4’ Concrete Pad
(1) 25 KW Diesel Fueled Back-up Generator

To Be Removed:
All Sprint Ground Equipment

The earliest Siting Council submission was from May 31, 2011. The original building permit for the tower construction was unavailable but attached is a permit application from June 24, 2011

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 - Mary Mitta, Elected Official, and David Perkins, Zoning Enforcement Officer, 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: Mary Mitta - as First Selectman of Stafford
David Perkins - Zoning Enforcement Officer
Cordless Data Transfer - Tower Owner
Michael Angelo - Land Owner

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
MARY MITTA
1 MAIN STREET
STAFFORD CT 06076

CT 061 9-99

UPS GROUND
TRACKING #: 1Z V25 742 03 9886 6081

BILLING: P/P

Reference #1: CTHA830A

XOL 21.10.03 NV45 43.0A 10/2021*

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
DAVID PERKINS
1 MAIN STREET
STAFFORD CT 06076

CT 061 9-99

UPS GROUND
TRACKING #: 1Z V25 742 03 9008 9024

BILLING: P/P

Reference #1: CTHA830A

XOL 21.10.03 NV45 43.0A 10/2021*

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
MICHAEL ANGELO
60 SUNSET RIDGE ROAD
STAFFORD CT 06076

CT 061 9-99

UPS GROUND

TRACKING #: 1Z V25 742 03 9192 1041

BILLING: P/P

Reference #1: CTHA830A

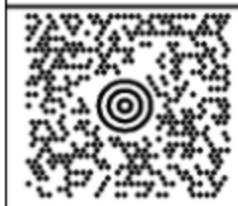
XOL 21.10.03 NV45 43.0A 10/2021*

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS

1 OF 1

SHIP TO:
CORDLESS DATA TRANSFER
600 OLD HARTFORD ROAD
COLCHESTER CT 06415



CT 063 0-01

UPS GROUND

TRACKING #: 1Z V25 742 03 9070 3038

BILLING: P/P

Reference #1: CTHA830A

XOL 21.10.03 NV45 43.0A 10/2021*

Hello, your package has been delivered.

Delivery Date: Wednesday, 10/20/2021

Delivery Time: 10:36 AM

Left At: OFFICE

Signed by: DADAULT

TRANSCEND WIRELESS

Tracking Number:	1ZV257420390089024
Ship To:	DAVID PERKINS 1 MAIN STREET STAFFORD, CT 06076 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTHA830A

Hello, your package has been delivered.

Delivery Date: Wednesday, 10/20/2021

Delivery Time: 1:22 PM

Left At: MET CUST MAN

TRANSCEND WIRELESS

Tracking Number:	1ZV257420391921041
Ship To:	MICHAEL ANGELO 60 SUNSET RIDGE ROAD STAFFORD, CT 06076 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTHA830A

Hello, your package has been delivered.

Delivery Date: Wednesday, 10/20/2021

Delivery Time: 10:36 AM

Left At: OFFICE

Signed by: DADAULT

TRANSCEND WIRELESS

Tracking Number:	1ZV257420398866081
Ship To:	MARY MITTA 1 MAIN STREET STAFFORD, CT 06076 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTHA830A

Hello, your package has been delivered.

Delivery Date: Wednesday, 10/20/2021

Delivery Time: 11:31 AM

Left At: OTHER-RELEAS

TRANSCEND WIRELESS

Tracking Number:	1ZV257420390703038
Ship To:	CORDLESS DATA TRANSFER 600 OLD HARTFORD ROAD COLCHESTER, CT 06415 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTHA830A

169 HAMPDEN RD

Sales | Print | Map It

Location	169 HAMPDEN RD	**Mblu**	23/ / 60/ /
Acct#	00109700	**Owner**	ANGELO MICHAEL+SHELLY M
Assessment	$260,140	**Appraisal**	$473,800
PID	1227	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$115,700	$358,100	$473,800
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$80,990	$179,150	$260,140

Owner of Record

Owner	ANGELO MICHAEL+SHELLY M	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	60 SUNSET RIDGE STAFFORD SPRINGS, CT 06076	**Book & Page**	0595/0005
		Sale Date	09/24/2012
		Instrument	01

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
ANGELO MICHAEL+SHELLY M	$0		0595/0005	01	09/24/2012
ANGELO MICHAEL	$0		0595/0002	01	09/24/2012
ANGELO MICHAEL J	$0	1	0326/0545		03/31/1995

Building Information

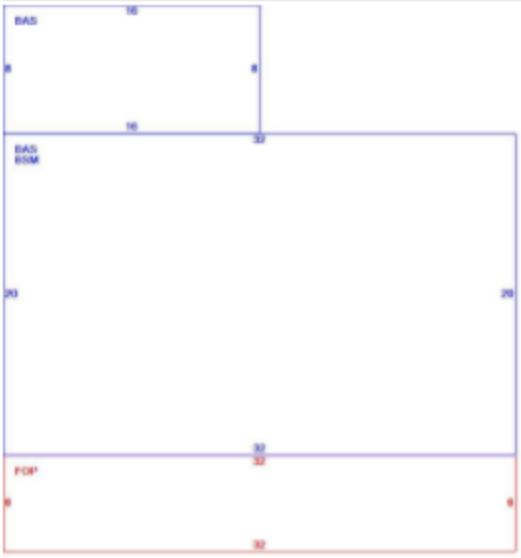
Building 1 : Section 1

Year Built:	1999
Living Area:	768
Replacement Cost:	$91,353
Building Percent Good:	87
Replacement Cost Less Depreciation:	$79,500

Building Attributes	
Field	**Description**
STYLE	Single Family
MODEL	Comm/Ind
Grade	C
Stories:	1
Occupancy	1.00
Exterior Wall 1	Logs
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asph/F Gls/Cmp
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Floor 1	Average
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Forced Hot Air
AC Type	None
Struct Class	
Bldg Use	SFD - Comm
Total Bedrooms	2
Total Baths	1

Building Photo

Building Layout



1st Floor Use:	
Heat/AC	None
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Wall	Ceil & Wall
Rooms/Prtns	Average
Wall Height	8.00
Num Fixtures	

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	768	768
BSM	Basement	640	0
FOP	Open Porch	192	0
		1,600	768

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
FPL	Com Fireplace	1.00 UNITS	$1,700	1

Land

Land Use

Use Code	101C
Description	SFD - Comm
Zone	
Neighborhood	502
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	43.54
Frontage	
Depth	
Assessed Value	$179,150
Appraised Value	$358,100

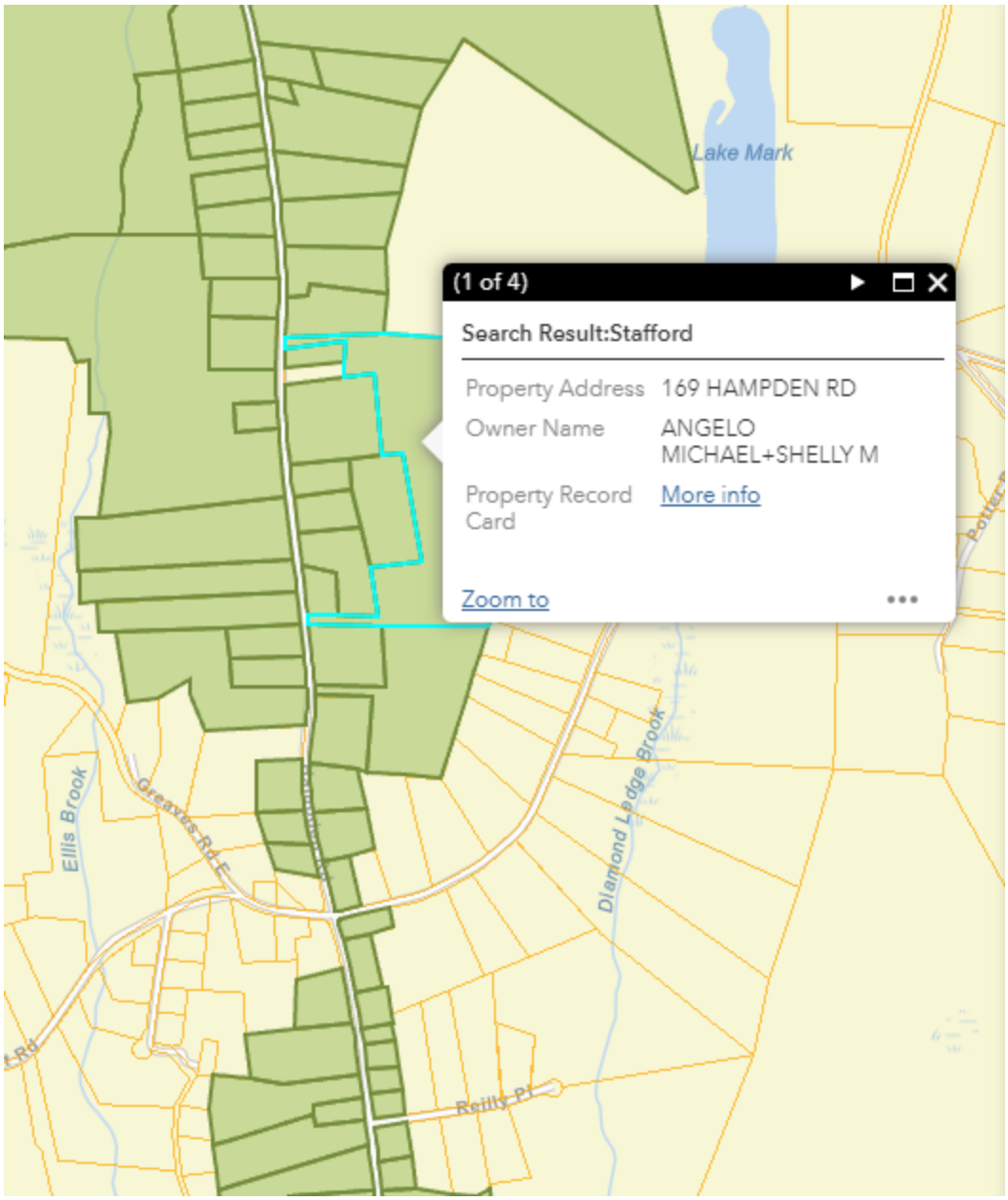
Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
FGR2	Garage w/ Loft			1024.00 S.F.	$18,600	1
FGR2	Garage w/ Loft			676.00 S.F.	$12,300	1
FN3	FENCE-6' CHAIN			150.00 L.F.	$900	1
FCP	Carport			384.00 S.F.	$2,700	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2019	$99,100	$376,400	$475,500
2018	$99,100	$376,400	$475,500
2017	$99,100	$376,400	$475,500

Assessment			
Valuation Year	Improvements	Land	Total
2019	$69,370	$176,000	$245,370
2018	$69,370	$176,000	$245,370
2017	$69,370	$176,000	$245,370


Lake Mark
(1 of 4)
Search Result:Stafford
Property Address 169 HAMPDEN RD
Owner Name ANGELO MICHAEL+SHELLY M
Property Record Card More info
Zoom to
Ellis Brook
Greaves Rd E
Diamond Ledge Brook
Reilly Pl

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

May 31, 2011

Mark Hulshart, Principal
Hulshart & Associates, LLC
3009 Federal Hill Drive
Falls Church, VA 22044

RE: **EM-SPRINT-134-110505** – Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 169 Hampden Road, Stafford, Connecticut.

Dear Mr. Hulshart:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated April 29, 2011. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Michael P. Krol, First Selectman, Town of Stafford
Wendell Avery, Zoning Enforcement Officer, Town of Stafford
Michael Angelo

CSC
CONNECTICUT SITING COUNCIL

CT33XC553

Town of Stafford
BUILDING PERMIT

Building Official
1 Main Street - Town Hall
Stafford Springs, CT 06076
Tel. (860) 684-1775 • Fax: (860) 684-1768

"A certificate of Use or Occupancy is required upon completion of new work, alteration or change of use." Separate permits are required for plumbing, heating and electrical

Date: _____ License: _____ Expiration Date: _____

Estimated Cost: $14,000 Fee: 196.10 Map: 23 /060 Lot: _____ Permit #: 15406

Location of Construction: 169 Hampden Road, Stafford CT 06075

Owner's Name & Address: Sprint c/o Black & Veatch Corporation
30150 Telegraph Road, Suite 420, Bingham Farms, MI 48025

Contractor's Name & Address: Overland Contracting Inc.
8400 Ward Parkway, Kansas City MO 64114

Signature of Applicant, Homeowner, ~~Agent~~	Telephone Number	Building Official Signature	Date
Kristen M Karnes KRISTEN M. KARNES	(248) 594-9330 (248) 613-3973 (cell)	DC Malanowich	6-7-11

Describe Nature of Work: Add fuel cell & storage cabinets on 6' x 9' concrete pad inside existing lease area.

TYPE		FOUNDATIONS		ROOF TYPE		FOOTING		FRAMING	SIZE	SPAN
Single Family		Thickness		Gable		Size		Joist		
Two Family		Concrete slab	X	Hip		Stone		2nd Floor		
Apt House		Concrete Blocks		Gambrel		Concrete		Rafter		
Agricultural		Piers		Truss		Drains		Girder		
Accessory		Stone		Flat		Depth		Column		
Office				Roof Pitch				Sill		
Factory		CONSTRUCTION				CHIMNEYS		Post		
Gas Station		Frame		ROOFING	N/A	Size / Flues		Plate		
Commercial	X	Masonry		Asphalt Shingle		Stone		Stud		
Demolition		I.C.F.		Wood Shingle		Brick				
Other:		Other:		Built-up		Block		Species & Grade		
				Other:		Factory Built				
Number of Rooms		EXTERIOR				Fire Place				
Number of Bathrooms		Clapboard or Wood Shingle		Cellar N/A						
Number of Bedrooms		Vinyl		Whole		Built to Conform to:				
Insulation		Masonry		Part		Residential Code (IRC)				
Ceiling		Other		None		Commercial Code (IBC)				
Walls				Slab						
Floors				Other		F.M. Approval				

SWIMMING POOL: Above Ground ☐ In Ground ☐ Fence ☐ N/A

Building Official Comments / Special Conditions

Work shall not proceed until the inspector has inspected and approved the various stages of construction. Final inspection is required upon completion of work. Permit will become null and void if construction work is not started within six months of the date the permit is issued. Permit grants the right to entry to any official from the building, health, or zoning departments during normal business hours for the purpose of inspection. If signed by other than the owner, applicant attests compliance with CGS20-388B and has authorization by owner to apply for this permit.

SBP 708 DD Printing

SPRINT ID: CT33XC553
SITE ID: CTHA830A
157 HAMPDEN RD
STAFFORD SPRINGS, CT 06076

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 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

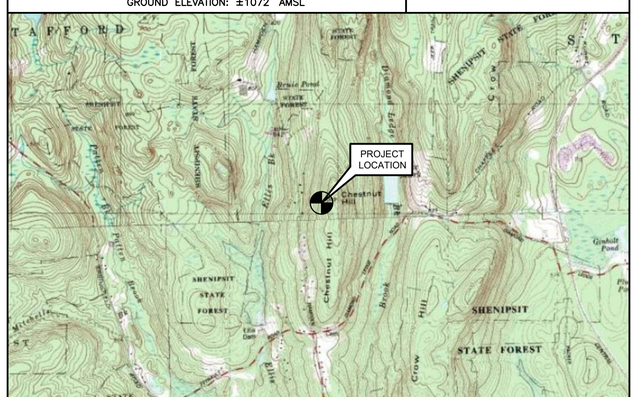
FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

TO: 157 HAMPDEN RD
STAFFORD SPRINGS, CT 06076

1.	GET ON I-91 S IN WINDSOR FROM DAY HILL RD.	4.30 MI.
2.	MERGE ONTO I-91 S.	3.60 MI.
3.	TAKE EXIT 35A FOR I-291 TOWARD MANCHESTER.	0.60 MI.
4.	CONTINUE ONTO I-291 E.	5.60 MI.
5.	USE THE LEFT LANE TO MERGE ONTO I-84 E TOWARD BOSTON.	8.50 MI.
6.	TAKE EXIT 67 FOR CT-31.	0.30 MI.
7.	TURN RIGHT ONTO CT-31 S.	0.20 MI.
8.	TURN LEFT ONTO LOEHR RD.	1.00 MI.
9.	TURN LEFT ONTO MOUNTAIN SPRING RD/ REED RD.	0.70 MI.
10.	TURN LEFT ONTO OLD POST RD. DESTINATION WILL BE ON THE LEFT.	0.07 MI.

SITE COORDINATES: LATITUDE: 41° 59' 58" N
LONGITUDE: 72° 21' 20" W
GROUND ELEVATION: ±1072' 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) ERICSSON AIR6449 B41 ANTENNA PER SECTOR TOTAL (3)
4. INSTALL (1) RADIO 4480 B71+B85 PER SECTOR. TOTAL OF (3)
5. INSTALL (1) RADIO 4460 B25+B66 PER SECTOR. TOTAL OF (3)
6. INSTALL 150A CIRCUIT 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 AUTOMATIC TRANSFER SWITCH
12. INSTALL 10' x 4' CONCRETE PAD
13. RELOCATE EXISTING ANTENNA MOUNTS TO NEW ANTENNA FRAMES.
14. INSTALL (1) 9' MAST PER SECTOR FOR POS. 1 ANTENNA, TOTAL OF (3)
15. INSTALL (3) NEW ANTENNA FRAMES

PROJECT SUMMARY (STRUCTURAL)

FOR REQUIRED STRUCTURAL MODIFICATIONS, SEE SHEET(S) S-1 FOR ADDITIONAL DETAILS. NEW ANTENNA MOUNTS/FRAMES TO BE INSTALLED

PROJECT INFORMATION

SPRINT ID:	CT33XC553
SITE ID:	CTHA830A
SITE ADDRESS:	157 HAMPDEN RD STAFFORD SPRINGS, CT 06076
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	KYLE RICHERS TRANSCEND WIRELESS, (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°-59'-58" N LONGITUDE: 72°-21'-20" W GROUND ELEVATION: 1072'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	08/30/21	RTS	TJR	CONSTRUCTION DRAWINGS - REVISED PER NEW RFDS

PROFESSIONAL ENGINEER SEAL

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T-MOBILE NORTHEAST LLC

SPRINT ID: CT33XC553
SITE ID: CTHA830A
157 HAMPDEN RD
STAFFORD SPRINGS, CT 06076

DATE:	04/22/21
SCALE:	AS NOTED
JOB NO.	21005.22

TITLE SHEET

T-1

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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): 123 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

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 IT'S 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 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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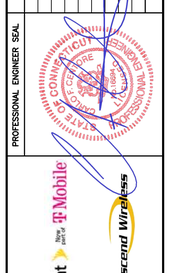

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T-MOBILE NORTHEAST LLC

SPRINT ID: CT33XC553
SITE ID: CTHA830A
157 HAMPDEN RD
STAFFORD SPRINGS, CT 06076

DATE: 04/22/21
SCALE: AS NOTED
JOB NO. 21005.22

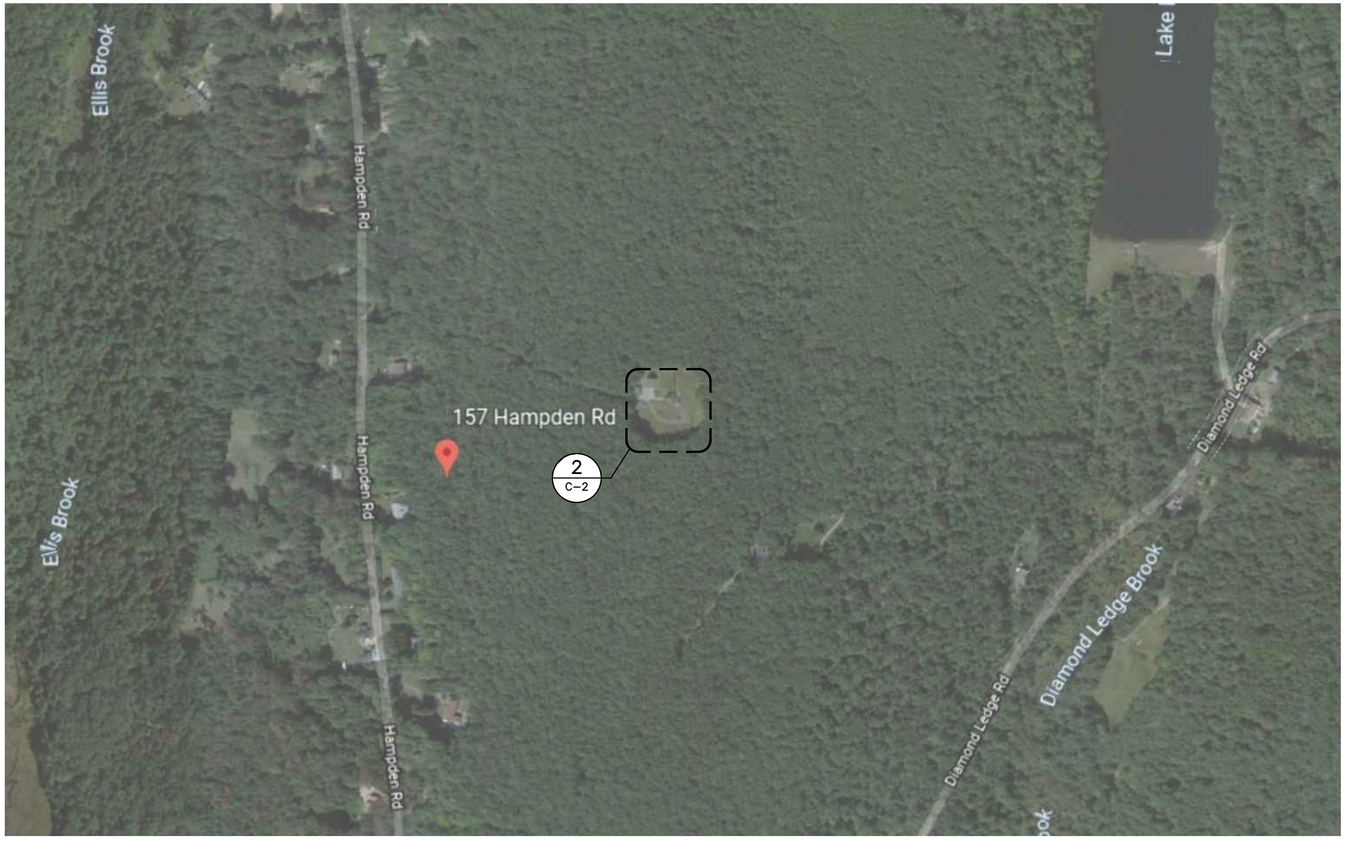
GENERAL NOTES AND SPECIFICATIONS

N-1

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 (LENGTH)
A1	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	171'	0°	(P) RADIO 4480 B71+B85 (1), (P) RADIO 4460 B25+B66 (1)		(1) 6/24 4AWG HYBRID CABLE (±210')
A2	PROPOSED	ERICSSON–AIR6449 B41	33.1 x 20.6 x 8.6	171'	0°			
B1	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	171'	120°	(P) RADIO 4480 B71+B85 (1), (P) RADIO 4460 B25+B66 (1)		(1) 6/24 4AWG HYBRID CABLE (±210')
B2	PROPOSED	ERICSSON–AIR6449 B41	33.1 x 20.6 x 8.6	171'	120°			
C1	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	171'	240°	(P) RADIO 4480 B71+B85 (1), (P) RADIO 4460 B25+B66 (1)		(1) 6/24 4AWG HYBRID CABLE (±210')
C2	PROPOSED	ERICSSON–AIR6449 B41	33.1 x 20.6 x 8.6	171'	240°			



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

TRUE NORTH

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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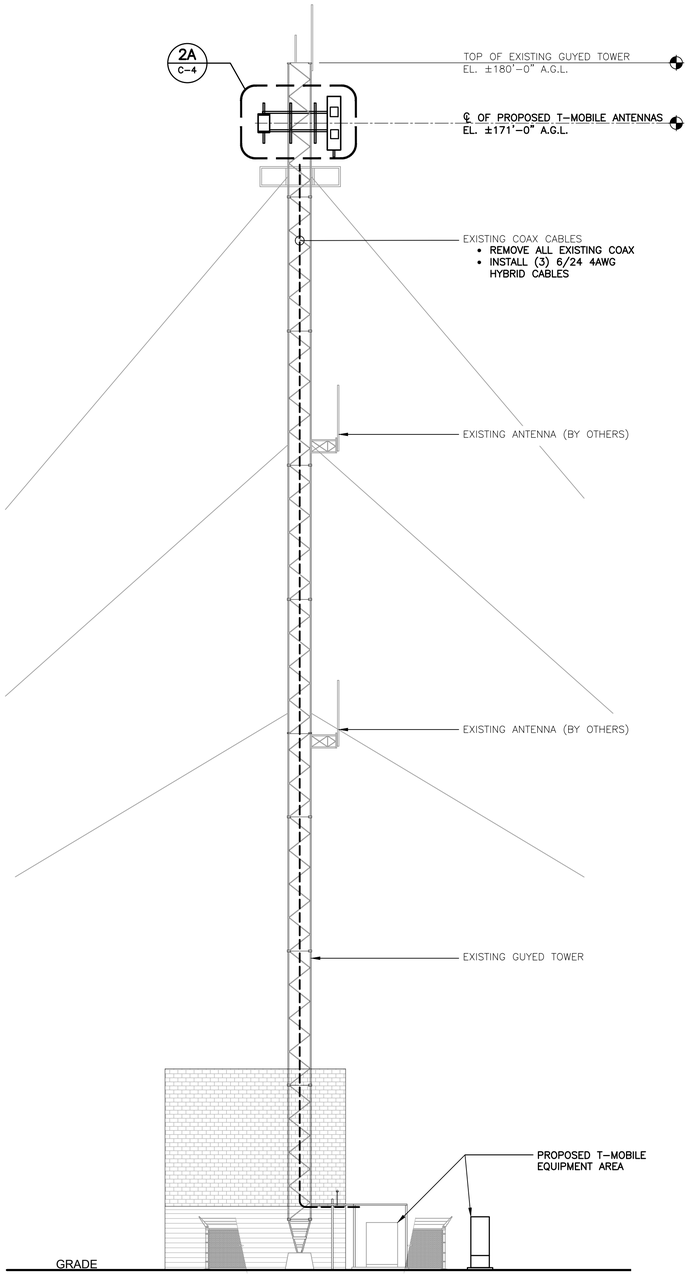
SITE LOCATION PLAN

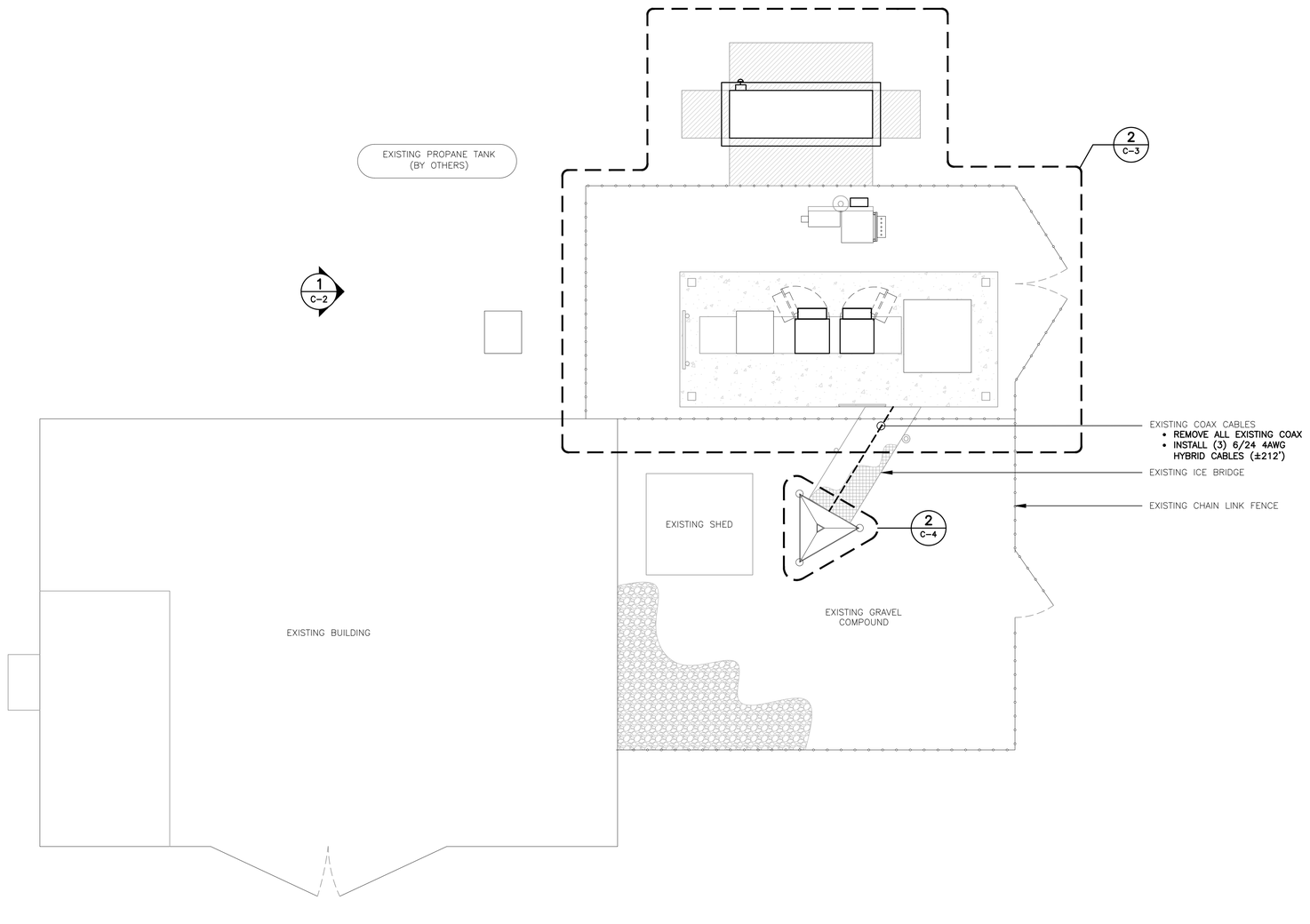
C–1

Sheet No. 3 of 12

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 DEFICIENT AND WARRANTING MODIFICATION PRIOR TO INSTALLATION OF THE PROPOSED EQUIPMENT. FOR REQUIRED STRUCTURAL MODIFICATIONS, SEE SHEET(S) S-1 FOR ADDITIONAL DETAILS. REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 21005.22) DATED 08/11/21 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.



1 C-2 **EAST ELEVATION - PROPOSED**
SCALE: 3/32" = 1'



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

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COMPOUND PLAN AND ELEVATION

C-2

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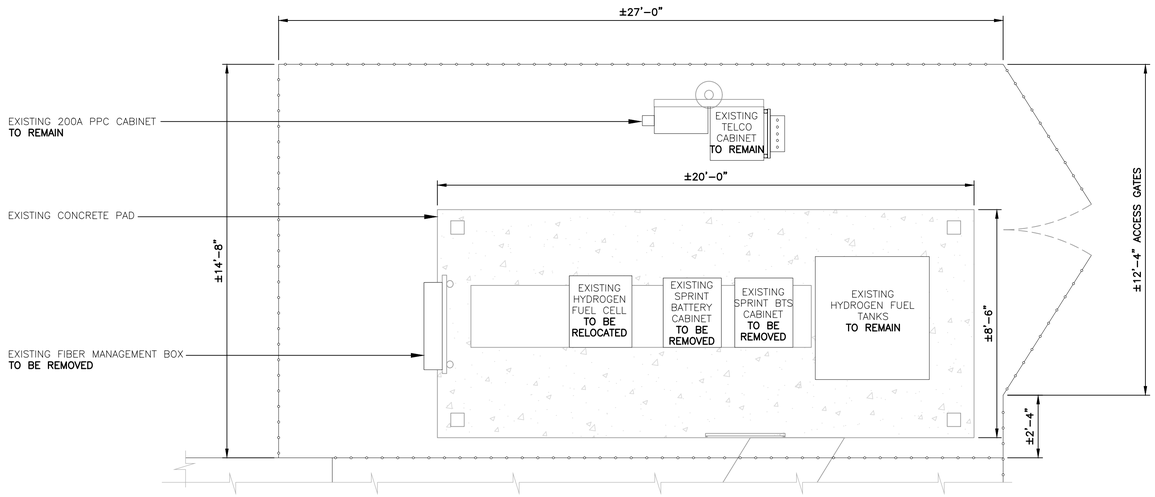
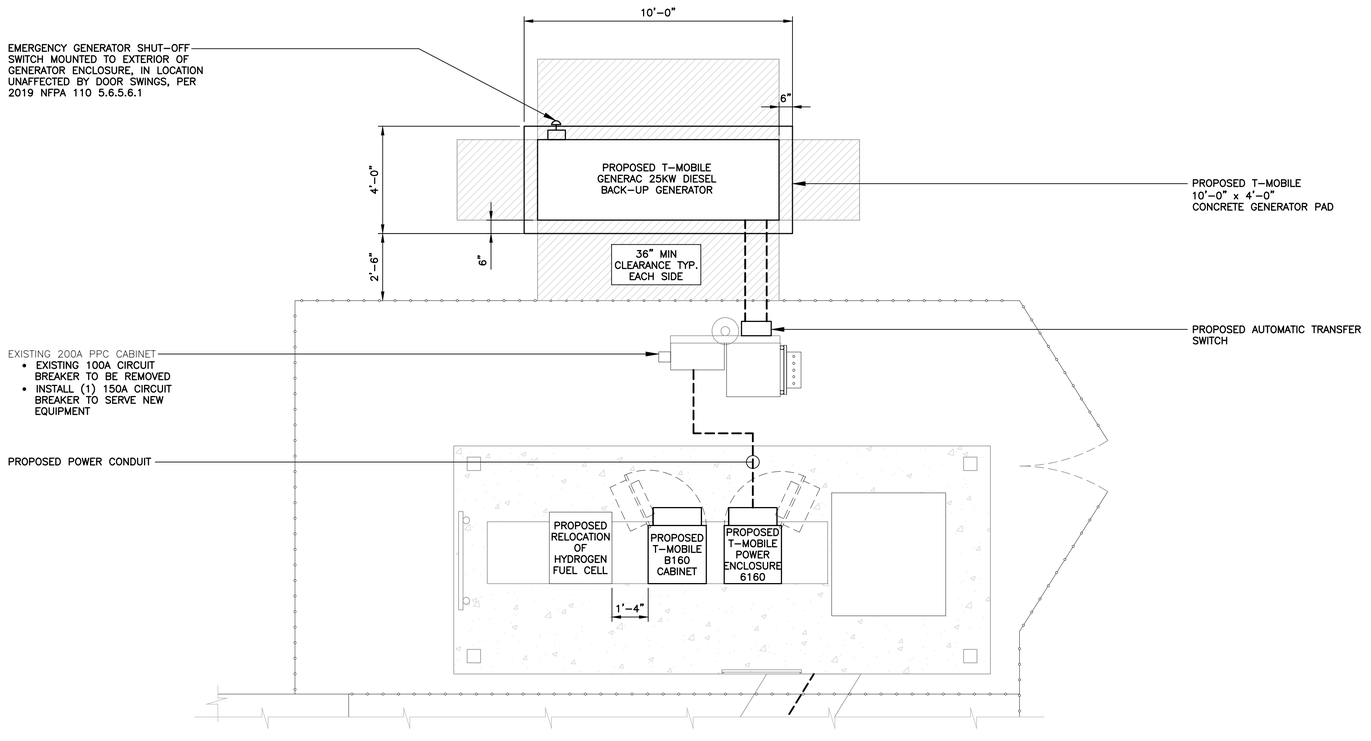


1 C-3 **EXISTING EQUIPMENT PLAN**
SCALE: 1/2" = 1'

TRUE NORTH



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

TRUE NORTH

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EQUIPMENT PLANS

C-3

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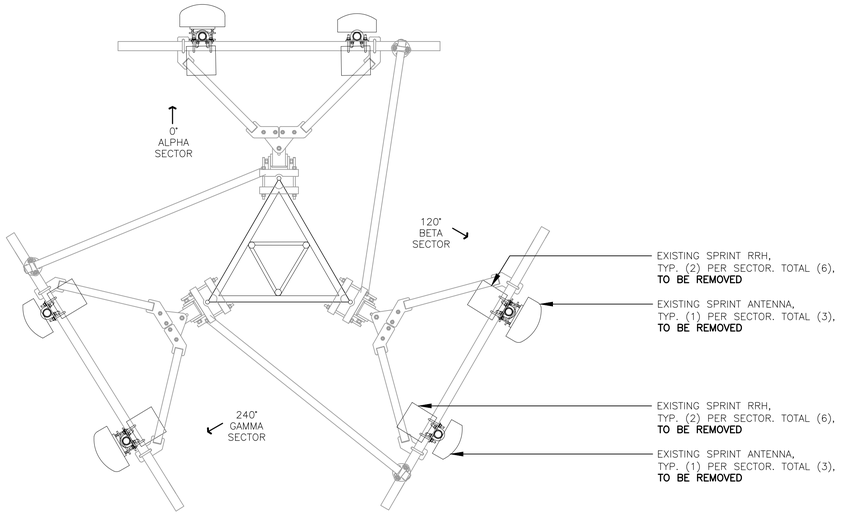
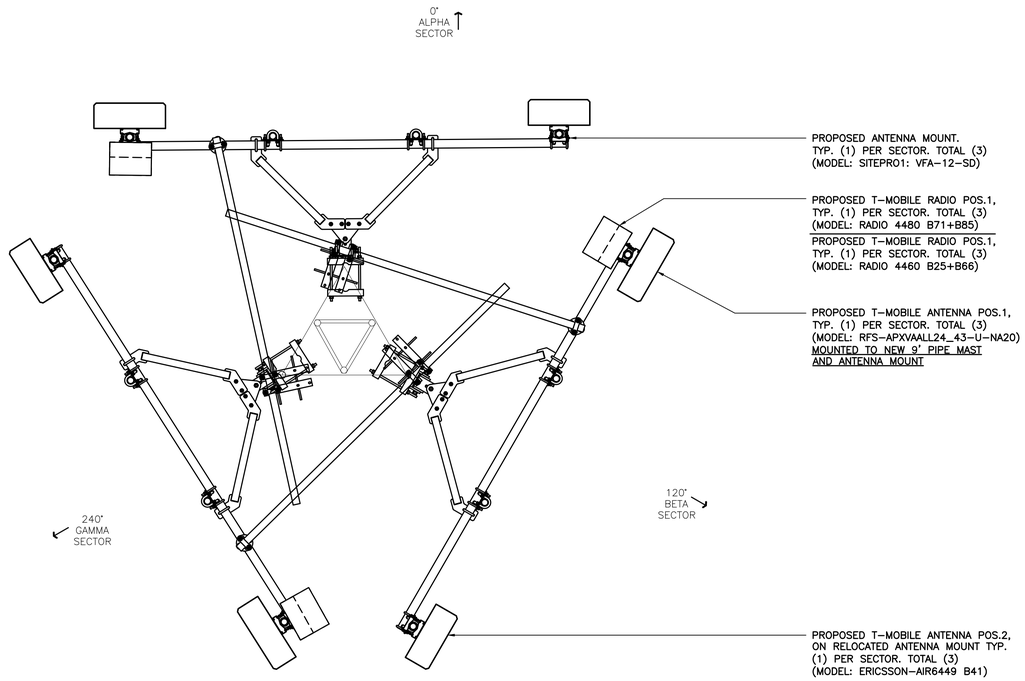


1 C-4 **ANTENNA PLAN - EXISTING**

SCALE: 1/2" = 1'

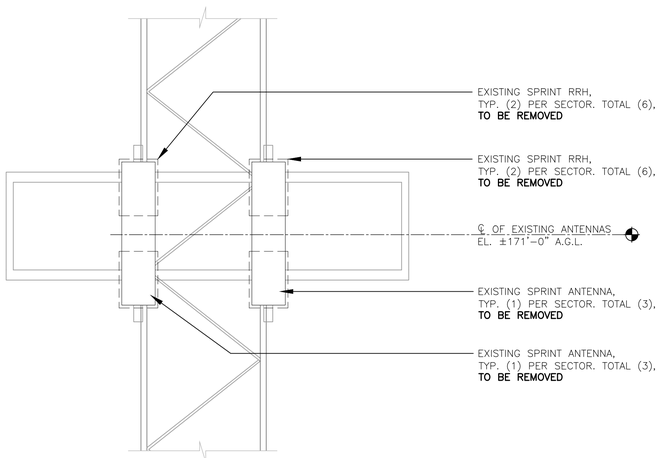
TRUE NORTH



2 C-4 **ANTENNA PLAN - PROPOSED**

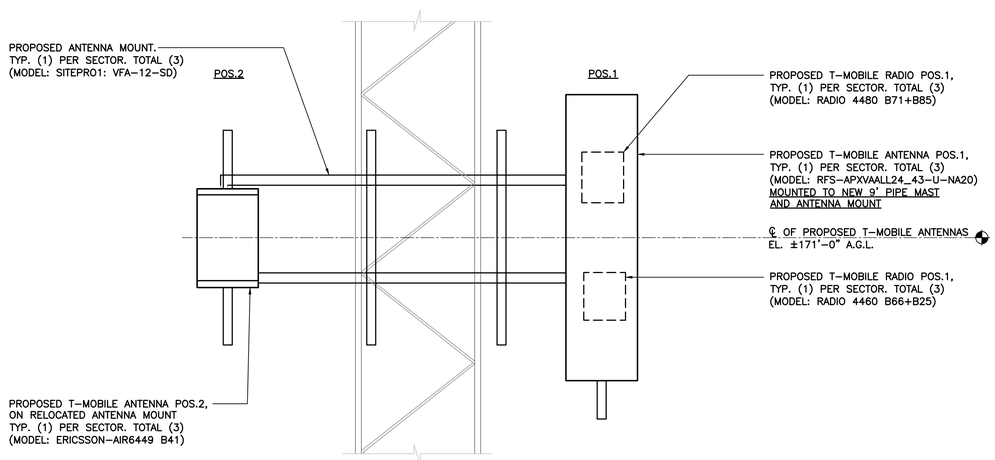
SCALE: 1/2" = 1'

TRUE NORTH



1A C-4 **ANTENNA ELEVATION - EXISTING**

SCALE: 1/2" = 1'



2A C-4 **ANTENNA ELEVATION - PROPOSED**

SCALE: 1/2" = 1'

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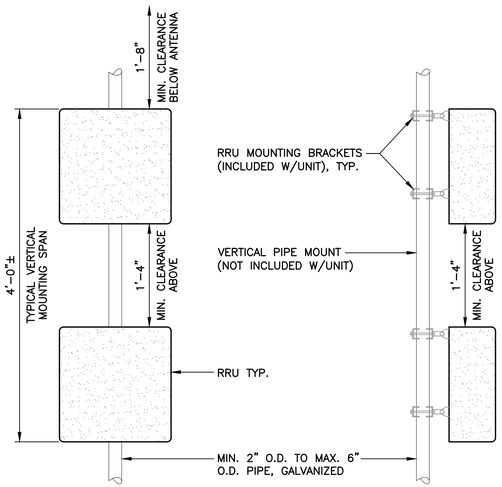
ANTENNA PLANS AND ELEVATIONS

C-4

Sheet No. 6 of 12



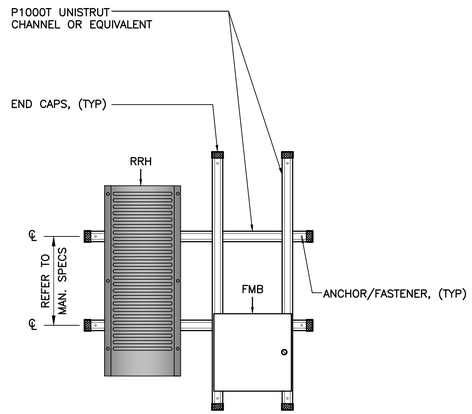
FRONT ELEVATION SIDE ELEVATION

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.

1 C–5 TYPICAL RRU MOUNTING DETAIL

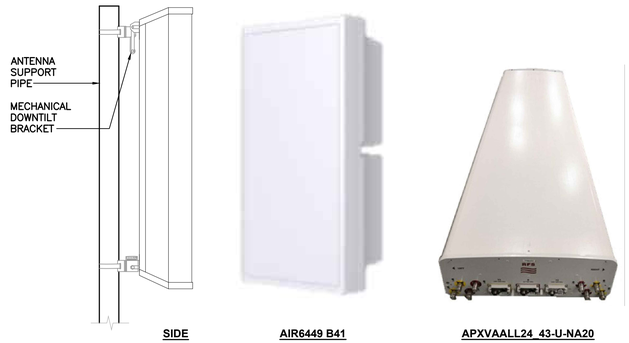
SCALE: NOT TO SCALE



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.

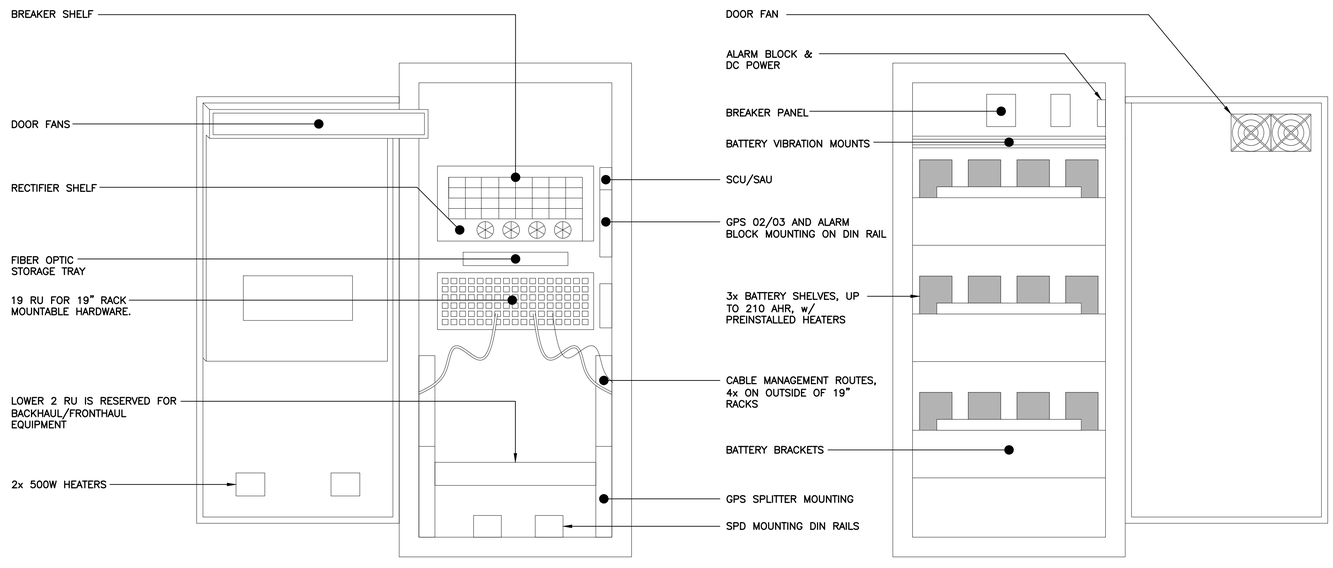


SIDE AIR6449 B41 APXVAALL24_43-U-NA20

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

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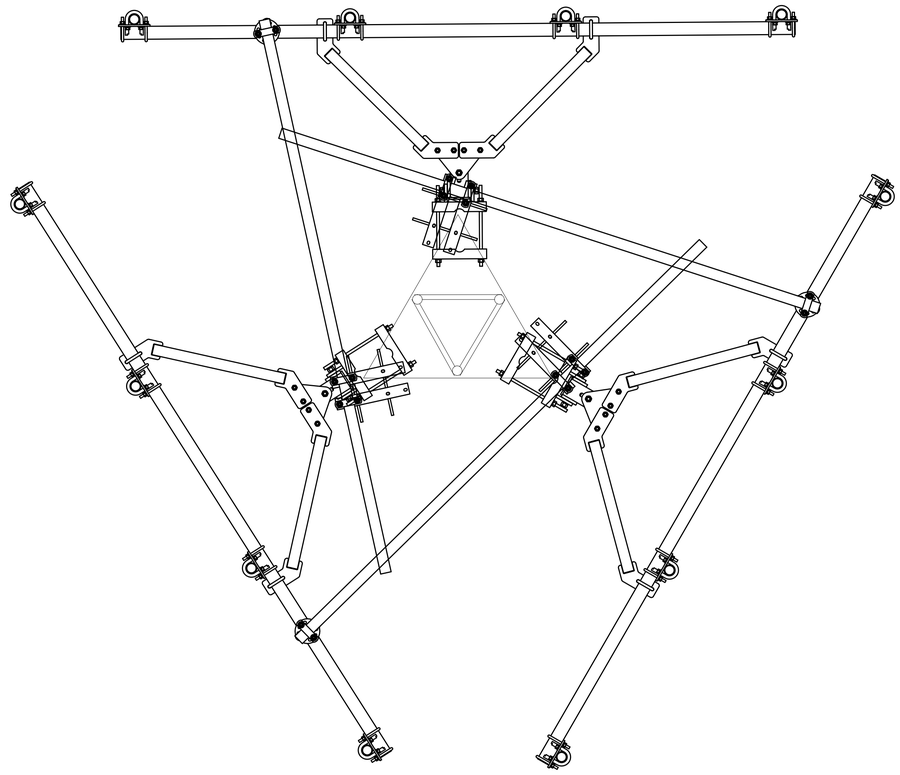

SITEPRO1: VFA-12-SD

1 / S-1 **TYPICAL ANTENNA MOUNT DETAIL**

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STRUCTURAL DETAILS

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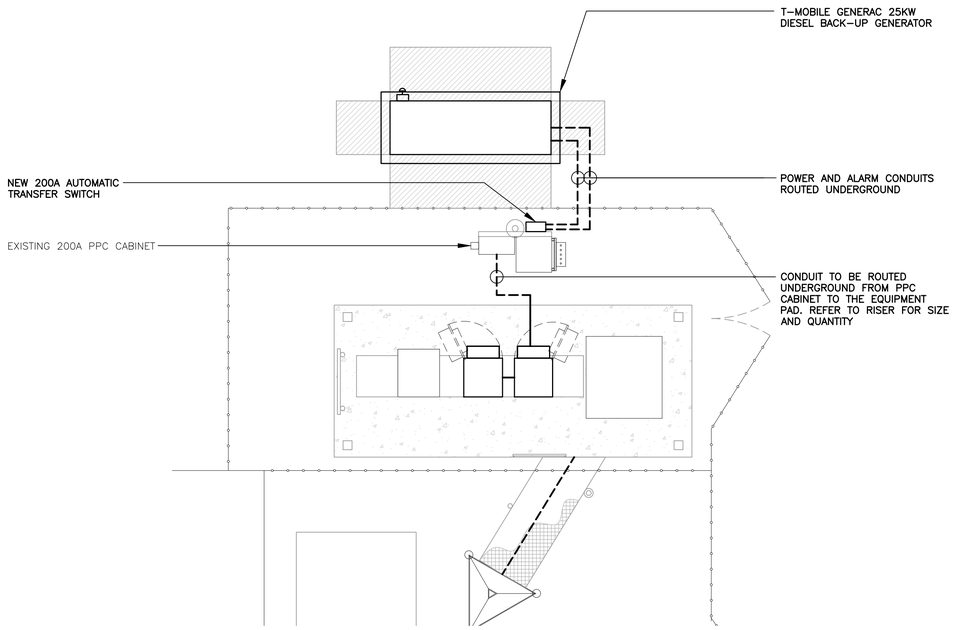


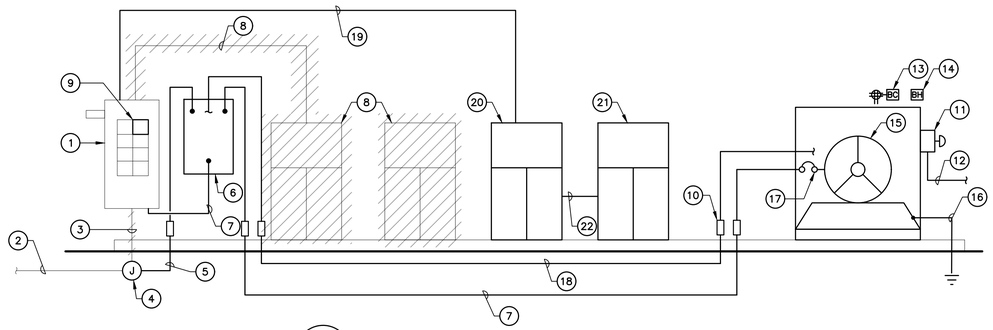
1 E-1 **ELECTRICAL CONDUIT ROUTING PLAN**
SCALE: 1/4" = 1'

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

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ELECTRICAL RISER DIAGRAM AND CONDUIT ROUTING

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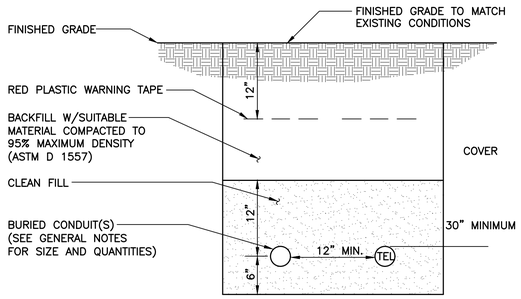
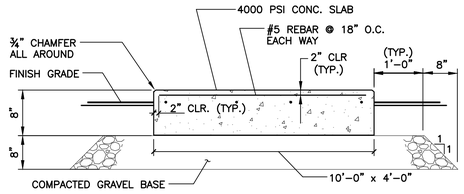


NOTES:

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.

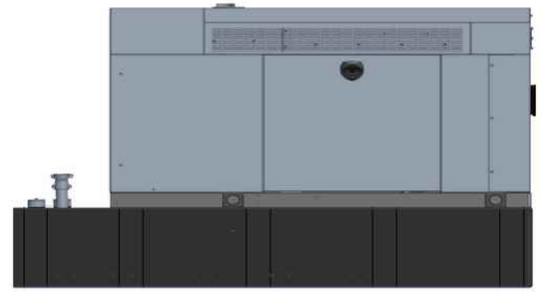
1 E-2 TYPICAL ELECTRICAL/TEL TRENCH DETAIL

SCALE: NOT TO SCALE



2 E-2 TYPICAL CONCRETE PAD DETAIL

SCALE: NOT TO SCALE



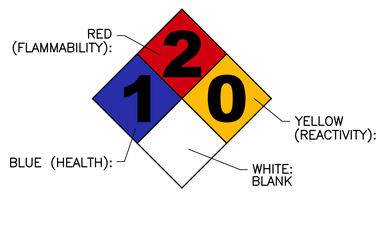
BACKUP POWER GENERATOR						
EQUIPMENT	POWER GENERATED	FUEL	MODEL NUMBER	FUEL TANK SIZE (GAL)	DIMENSIONS	WEIGHT
MAKE: GENERAC MODEL: RD025	25 KW, AC	DIESEL	7192-0	229	103.4"L x 35.0"W x 91.7"H	2123 LBS.

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



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.

4 E-2 NFPA 704 DIAMOND SIGNAGE 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

5 E-2 AUTOMATIC TRANSFER SWITCH DETAIL

SCALE: NOT TO SCALE

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TYPICAL ELECTRICAL DETAILS

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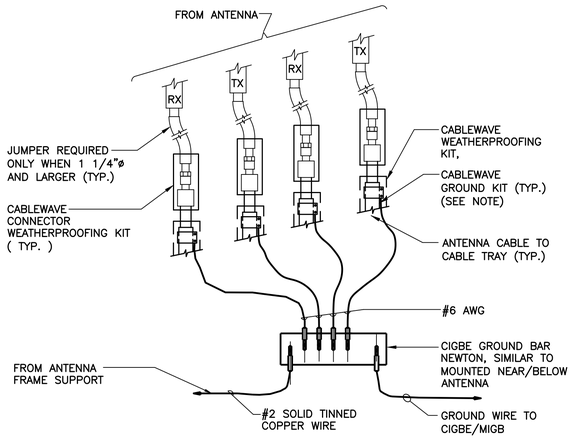
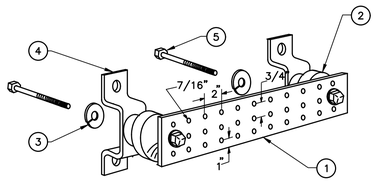


NOTES:

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

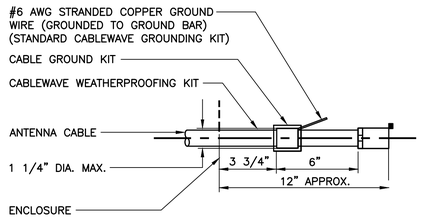


NOTES

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

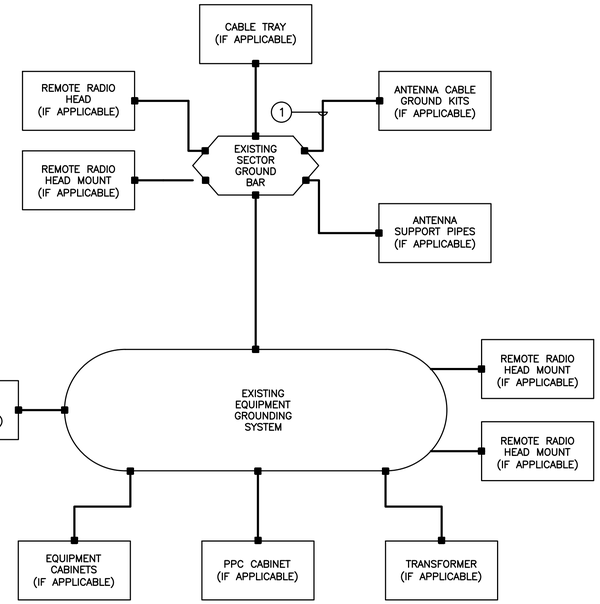


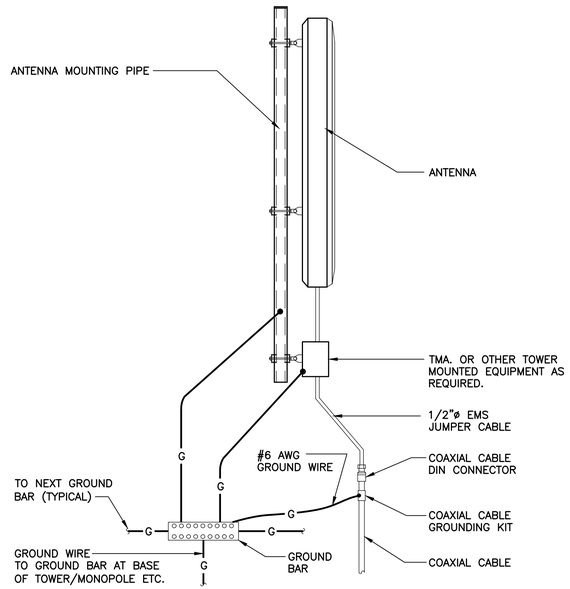
NOTES:

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

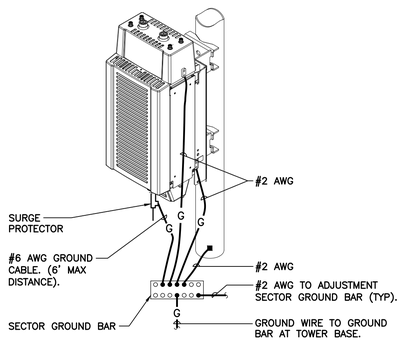




4 E-3 TYPICAL ANTENNA GROUNDING DETAIL

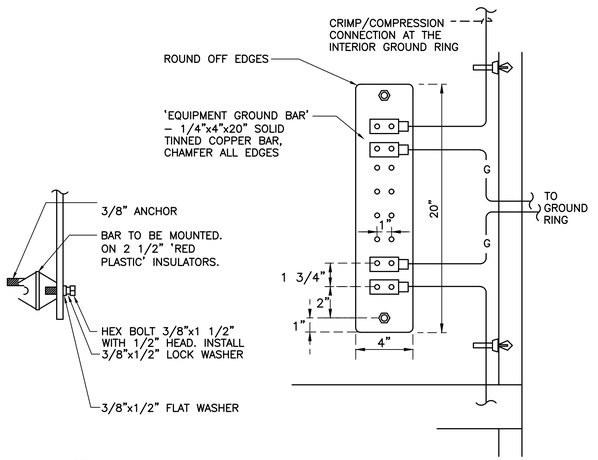
SCALE: NOT TO SCALE

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

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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	08/30/21	RTS	TJR	CONSTRUCTION DRAWINGS - REVISED PER NEW RFDS

PROFESSIONAL ENGINEER SEAL

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: CT33XC553
SITE ID: CTHA830A
157 HAMPDEN RD
STAFFORD SPRINGS, CT 06076

DATE: 04/22/21
SCALE: AS NOTED
JOB NO. 21005.22

ELECTRICAL SPECIFICATION

E-4

Sheet No. 12 of 12

FRED A. NUDD CORPORATION

1743 ROUTE 104, BOX 577
ONTARIO, NY 14519
(315) 524-2531 FAX (315) 524-4249

www.nuddtowers.com

Mark LeGault
Cordless Data Transfer, Inc.
600 Old Hartford Road
Colchester, CT 06415
September 6, 2021

Fred A. Nudd Job Number: 121-23082

Location: 169 Hampden Road, Stafford Springs, CT 06076, Tolland County

Subject: Structural Analysis of a 180 ft Guyed Tower

Fred A. Nudd Corporation has completed a structural analysis of an existing 180 ft guyed tower. The tower was originally designed by Rohn Industries, to #80 specifications. The tower analysis was completed considering TIA-222-G design standards, which is the enforced design standard of the 2015 International Building Code, including 2018 Connecticut State Building Code. Tower dimensions have been taken from drawings by Rohn Industries, File Number 32343PH, dated April 17, 1995. Design criteria per each analysis are noted on the following page. The tower is assumed to be in good, undamaged and equivalent to as new condition and has been maintained / inspected per criteria by TIA-222.

The purpose of this analysis is to determine the structure's ability to support new Sprint equipment installed at a rad center of 171 ft above ground level (AGL). The new equipment to be installed, which included antennas, coax, mounts and associated hardware are listed on the following page in the appurtenance loading table.

Results of the analysis indicate the tower will be able to the support the design loads noted in the appurtenance loading table on the following pages when considering the existing and proposed loading. Specific section design loads, capacities and stress ratios are provided on the following pages. Maximum member usage was found to be 93%.

The tower base foundation was analyzed based on dimensions provided by CDT and assumed geotechnical values. The anchors were analyzed by comparing the reactions from this analysis to the original design loads. Based on comparison to the calculated results and comparison to the original design reaction, it is reasonable to expect to expect the foundations have adequate capacity to support the existing and proposed loading noted above.

In conclusion, the tower superstructure can support the existing and proposed equipment noted above. The tower substructure is expected to be able to support this loading as well.

We trust this report satisfies your needs. Please contact us with any questions or concerns regarding this report.

Best Regards,

Fred. A. Nudd Corporation

Code Design Criteria

ANSI/TIA-222-G
Windspeed = 97 mph, 3-Second Gust, V_{asd} / 123 mph, 3-Second Gust, V_{ult}
Structure Class = II
Topographic Category = 1
Exposure = B
Radial Ice = 1.0 inch
Ice Windspeed = 50 mph, 3-Second Gust
S_s < 1.0, thus seismic loading does not need to be considered

Appurtenance Loading – Existing and To Remain on Tower

Height (ft)	Appurtenance	Mount	Coax (in)
180	(1) Station Master Antenna	Leg	(2) 7/8 (1) 1-1/4
179	(1) Decibel DB809	Side Arm	(1) 1-1/4
177	(1) Decibel DB809	Boom	(1) 7/8
163	(1) Celwave PD201	Pipe	(1) 7/8
150	--	Frame / Boom	--
127	(1) Decibel DB420	Side Arm	(1) 7/8
83	(1) Celwave PD201	Pipe	(1) 1/2

- *Height measurement taken as distance from top of base foundation to center of appurtenance.*

Appurtenance Loading – Final Equipment Configuration For Sprint

Height (ft)	Carrier	Appurtenance	Mount	Coax (in)
171	Sprint	(3) RFS APXVAALL24_43-U-NA20 (3) Ericsson AIR6449 B41 (3) Ericsson Radio 4460 B25+B86 (3) Ericsson Radio 4480 B71 B85	(3) V-Frame	(3) 6/24 4AWG Hybrid

- *Height measurement taken as distance from top of base foundation to center of appurtenance.*
- *The proposed coax can be installed on any tower face.*

Maximum Member Usage

Member	Percentage
Leg	78
Diagonal	35
Horizontal	93
Guys	50
Splice/Connection Bolts	93

- *Percentage equal to or less than 100% denote member stress levels are satisfactory for loading.*
- *Percentage greater than 100% indicates member strengthening is required.*

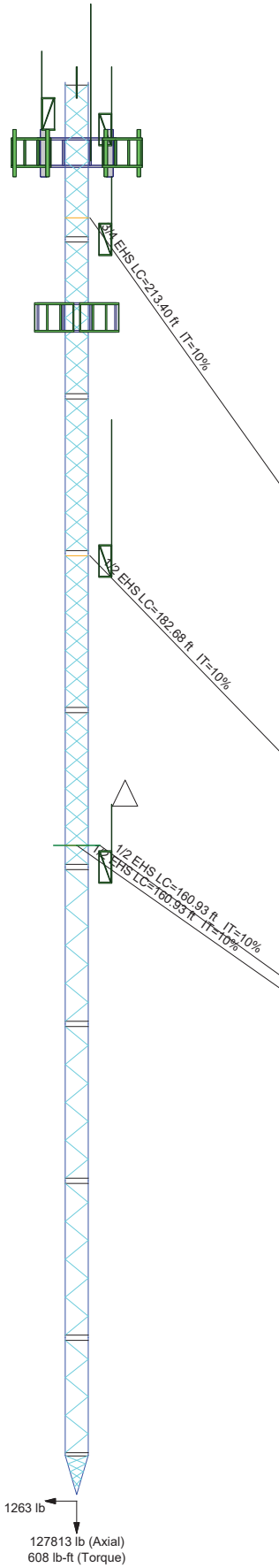
Foundation Usage

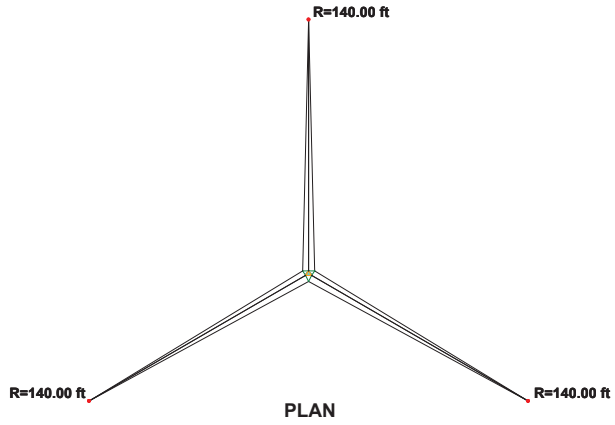
Design Load	Original Design or Calculated Capacity (kips)	Analysis (kips)	Percentage
Base Axial	150.0 (Calculated)	127.8	88
Anchor Uplift	26.8 (Original Design)	19.4	54
Anchor Shear	32.4 (Original Design)	26.6	61

- *The anchor percentages are divided by 1.35 to account for unfactored to factored load comparison*
- *Percentage less than 100% denote foundation is satisfactory for loading*
- *Percentage greater than 100% indicates foundation analysis is required*

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Legs		P2x.218			P2.5x.276		P2.5x.203		P2.5x.276	
Leg Grade					A500-50					
Diagonals					ROHN TS1.5x16 ga					
Diagonal Grade					A36M-45					
Top Girts		ROHN TS1.5x16 ga		N.A.			ROHN TS1.5x16 ga			
Bottom Girts					ROHN TS1.5x16 ga					N.A.
Top Guy Pull-Offs	3x1/2	N.A.		3x1/2	L1 1/2x1 1/2x3/16		N.A.			
Face Width (ft)	3.42					64 @ 2.41667				
# Panels @ (ft)									6 @ 2.38889	A
Weight (lb)	552.0	499.7	499.7	542.9	997.5	568.3	456.1	456.1	430.6	181.6

5184.5





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4'	180	Ericsson AIR6449 B41	171
Station Master Antenna	180	Ericsson Radio 4460 B25+B66	171
Decibel DB809	179	Ericsson Radio 4480 B71+B85A	171
Side Arm	179	RFS APXVAALL24_43-U-NA20	171
Decibel DB809	177	Ericsson AIR6449 B41	171
Side Arm	177	Ericsson Radio 4460 B25+B66	171
12 ft Boom / Frame (Sprint)	171	Ericsson Radio 4480 B71+B85A	171
12 ft Boom / Frame (Sprint)	171	Celwave PD201	163
12 ft Boom / Frame (Sprint)	171	12 ft Boom / Frame	150
RFS APXVAALL24_43-U-NA20	171	12 ft Boom / Frame	150
Ericsson AIR6449 B41	171	12 ft Boom / Frame	150
Ericsson Radio 4460 B25+B66	171	Decibel DB420	127
Ericsson Radio 4480 B71+B85A	171	Side Arm	127
RFS APXVAALL24_43-U-NA20	171	Celwave PD201	83

SYMBOL LIST

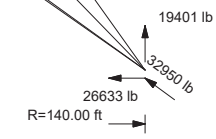
MARK	SIZE	MARK	SIZE
A	5 @ 0.983333		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A36M-45	45 ksi	60 ksi

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft.
8. TOWER RATING: 93.1%



ALL REACTIONS ARE FACTORED

Phone: FAX:	Job: 121-23082		
	Project: 180 ft Rohn #80 - Stafford Springs CT		
	Client: CDT	Drawn by:	App'd:
	Code: TIA-222-G	Date: 09/06/21	Scale: NTS
	Path:		Dwg No. E-1

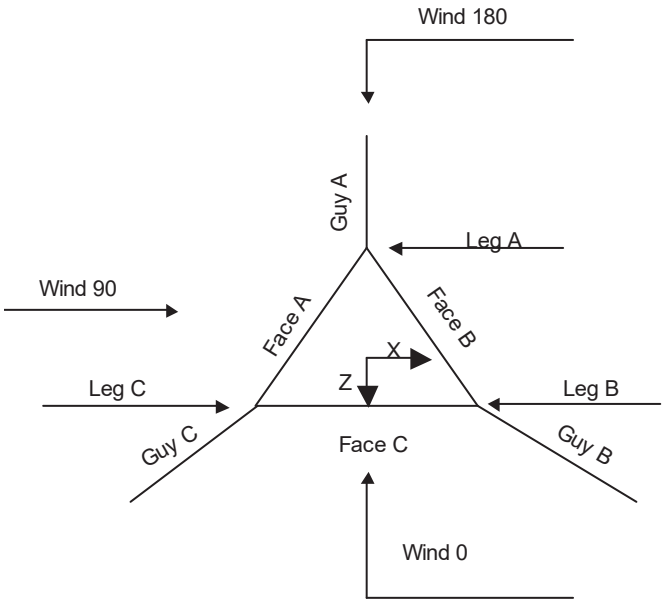
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 3.42 ft at the top and tapered at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

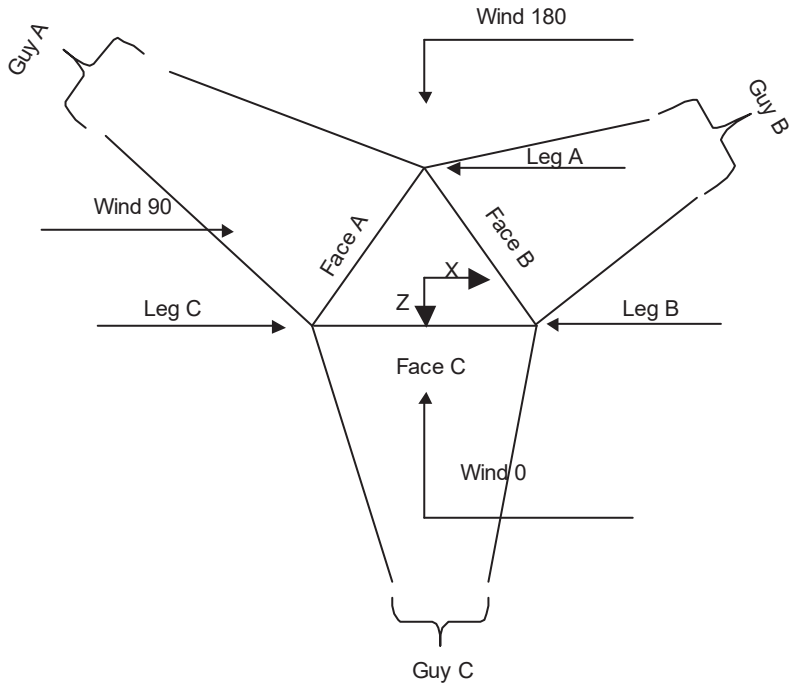
Tower is located in Tolland County, Connecticut.
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Safety factor used in guy design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r	√	All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys	√	Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice		Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity	√	Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
√	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)	√	Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



Corner & Starmount Guyed Tower



Face Guyed

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	180.00-160.00			3.42	1	20.00
T2	160.00-140.00			3.42	1	20.00
T3	140.00-120.00			3.42	1	20.00
T4	120.00-100.00			3.42	1	20.00
T5	100.00-80.00			3.42	1	20.00
T6	80.00-60.00			3.42	1	20.00
T7	60.00-40.00			3.42	1	20.00
T8	40.00-20.00			3.42	1	20.00
T9	20.00-5.00			3.42	1	15.00
T10	5.00-0.00			3.42	1	5.00

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	180.00-160.00	2.42	CX Brace	No	Yes	4.0000	4.0000
T2	160.00-140.00	2.42	CX Brace	No	Yes	4.0000	4.0000
T3	140.00-120.00	2.42	CX Brace	No	Yes	4.0000	4.0000
T4	120.00-100.00	2.42	CX Brace	No	Yes	4.0000	4.0000
T5	100.00-80.00	2.42	CX Brace	No	Yes	4.0000	4.0000
T6	80.00-60.00	2.42	K Brace Left	No	Yes	4.0000	4.0000
T7	60.00-40.00	2.42	K Brace Left	No	Yes	4.0000	4.0000
T8	40.00-20.00	2.42	K Brace Left	No	Yes	4.0000	4.0000
T9	20.00-5.00	2.39	K Brace Left	No	Yes	4.0000	4.0000
T10	5.00-0.00	0.98	X Brace	No	Yes	1.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-160.00	Pipe	P2x.218	A500-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)
T2 160.00-140.00	Pipe	P2x.218	A500-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)
T3 140.00-120.00	Pipe	P2x.218	A500-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)
T4 120.00-100.00	Pipe	P2x.218	A500-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)
T5 100.00-80.00	Pipe	P2.5x.276	A500-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)
T6 80.00-60.00	Pipe	P2.5x.276	A500-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)
T7 60.00-40.00	Pipe	P2.5x.203	A500-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)
T8 40.00-20.00	Pipe	P2.5x.203	A500-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)
T9 20.00-5.00	Pipe	P2.5x.276	A500-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)
T10 5.00-0.00	Pipe	P2.5x.276	A500-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 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 180.00-160.00	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)
T2 160.00-140.00	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)
T3 140.00-120.00	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)
T4 120.00-100.00	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)	Pipe	ROHN TS1.5x16 ga	A36M-45 (45 ksi)
T5 100.00-80.00	Pipe	ROHN TS1.5x16 ga	A36M-45	Pipe	ROHN TS1.5x16 ga	A36M-45

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T6 80.00-60.00	Pipe	ROHN TS1.5x16 ga	(45 ksi) A36M-45 (45 ksi)	Pipe	ROHN TS1.5x16 ga	(45 ksi) A36M-45 (45 ksi)
T7 60.00-40.00	Pipe	ROHN TS1.5x16 ga	(45 ksi) A36M-45 (45 ksi)	Pipe	ROHN TS1.5x16 ga	(45 ksi) A36M-45 (45 ksi)
T8 40.00-20.00	Pipe	ROHN TS1.5x16 ga	(45 ksi) A36M-45 (45 ksi)	Pipe	ROHN TS1.5x16 ga	(45 ksi) A36M-45 (45 ksi)
T9 20.00-5.00	Pipe	ROHN TS1.5x16 ga	(45 ksi) A36M-45 (45 ksi)	Pipe	ROHN TS1.5x16 ga	(45 ksi) A36M-45 (45 ksi)
T10 5.00-0.00	Pipe	ROHN TS1.5x16 ga	(45 ksi) A36M-45 (45 ksi)	Pipe	ROHN TS1.5x16 ga	(45 ksi) A36M-45 (45 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 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 20.00-5.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T10 5.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180.00-160.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 160.00-140.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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
T3	No	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T4	No	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T5	No	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T6	No	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T7	No	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T8	No	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T9 20.00-5.00	No	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T10 5.00-0.00	No	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
180.00-160.00														
T2	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
160.00-140.00														
T3	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
140.00-120.00														
T4	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
120.00-100.00														
T5	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
100.00-80.00														
T6 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T7 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T8 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T9 20.00-5.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T10 5.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	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 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
T2 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
T3 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
T4 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
T5 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
T6 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
T7 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
T8 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
T9 20.00-5.00	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 5.00-0.00	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 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 180.00-160.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 160.00-140.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 140.00-120.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 120.00-100.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 100.00-80.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 80.00-60.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 60.00-40.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 40.00-20.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 20.00-5.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 5.00-0.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension lb	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
82.75	EHS	A	1/2	2690.00	10%	21000	0.517	160.79	140.00	0.0000	0.00	100%
		B	1/2	2690.00	10%	21000	0.517	160.79	140.00	0.0000	0.00	100%
		C	1/2	2690.00	10%	21000	0.517	160.79	140.00	0.0000	0.00	100%
162.75	EHS	A	3/4	5830.00	10%	19000	1.155	213.21	140.00	0.0000	0.00	100%
		B	3/4	5830.00	10%	19000	1.155	213.21	140.00	0.0000	0.00	100%
		C	3/4	5830.00	10%	19000	1.155	213.21	140.00	0.0000	0.00	100%
119.667	EHS	A	1/2	2690.00	10%	21000	0.517	182.52	140.00	0.0000	0.00	100%
		B	1/2	2690.00	10%	21000	0.517	182.52	140.00	0.0000	0.00	100%
		C	1/2	2690.00	10%	21000	0.517	182.52	140.00	0.0000	0.00	100%

Guy Data *(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
82.75	Torque Arm	7.00	0.0000	Channel	A36 (36 ksi)	Channel	C10x15.3
162.75	Strap						
119.667	Strap						

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
82.75	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16
162.75	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Flat Bar	3x1/2
119.67	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Flat Bar	3x1/2

Guy Data *(cont'd)*

Guy Elevation ft	Cable Weight A lb	Cable Weight B lb	Cable Weight C lb	Cable Weight D lb	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
82.75	83.13	83.13	83.13		2.47 2.7 sec/pulse	2.47 2.7 sec/pulse	2.47 2.7 sec/pulse	
162.75	246.25	246.25	246.25		4.44 3.6 sec/pulse	4.44 3.6 sec/pulse	4.44 3.6 sec/pulse	
119.667	94.37	94.37	94.37		3.17 3.1 sec/pulse	3.17 3.1 sec/pulse	3.17 3.1 sec/pulse	

Guy Data *(cont'd)*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
82.75	No	No	1	1	1	1	1	1
162.75	No	No			1	1	1	1
119.667	No	No			1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
82.75	0.7500 A325N	2	0.0000	1	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	1
162.75	0.6250 A325N	0	0.0000	0.75	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	1
119.667	0.6250 A325N	0	0.0000	0.75	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	1

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
82.75	A	41.38	16	4	2.0457
	B	41.38	16	4	2.0457
	C	41.38	16	4	2.0457
162.75	A	81.38	19	5	2.1889
	B	81.38	19	5	2.1889
	C	81.38	19	5	2.1889
119.667	A	59.83	17	5	2.1226
	B	59.83	17	5	2.1226
	C	59.83	17	5	2.1226

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom lb	F_x lb	F_y lb	F_z lb	M_x lb-ft	M_y lb-ft	M_z lb-ft
82.75	A	30.9442	2732.74 2690.00	-58.96	1435.72	-2324.46	-2901.19	8254.77	-5025.01
	A	30.9442	2732.74	58.96	1435.72	-2324.46	-2901.19	-8254.77	5025.01

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom lb	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		lb	lb	lb	lb-ft	lb-ft	lb-ft
			2690.00						
	B	30.9442	2732.74	2042.53	1435.72	1111.17	5802.38	8254.77	0.00
			2690.00						
	B	30.9442	2732.74	1983.56	1435.72	1213.30	-2901.19	-8254.77	-5025.01
			2690.00						
	C	30.9442	2732.74	-1983.56	1435.72	1213.30	-2901.19	8254.77	5025.01
			2690.00						
	C	30.9442	2732.74	-2042.53	1435.72	1111.17	5802.38	-8254.77	0.00
			2690.00						
			Sum:	0.00	8614.30	0.00	-0.00	0.00	0.00
162.75	A	49.6993	6017.80	0.00	4640.87	-3830.96	-9163.58	0.00	0.00
			5830.00						
	B	49.6993	6017.80	3317.71	4640.87	1915.48	4581.79	0.00	-7935.89
			5830.00						
	C	49.6993	6017.80	-3317.71	4640.87	1915.48	4581.79	-0.00	7935.89
			5830.00						
			Sum:	0.00	13922.62	-0.00	0.00	0.00	0.00
119.667	A	40.9250	2751.81	0.00	1829.52	-2055.57	-3612.45	0.00	0.00
			2690.00						
	B	40.9250	2751.81	1780.17	1829.52	1027.78	1806.22	0.00	-3128.47
			2690.00						
	C	40.9250	2751.81	-1780.17	1829.52	1027.78	1806.22	-0.00	3128.47
			2690.00						
			Sum:	0.00	5488.55	-0.00	0.00	0.00	0.00

Guy-Mast Forces (Excluding Wind) - Ice

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom lb	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		lb	lb	lb	lb-ft	lb-ft	lb-ft
82.75	A	30.9442	6764.07	-140.46	3882.09	-5537.35	-7844.65	19664.57	-13587.33
			6195.76						
	A	30.9442	6764.07	140.46	3882.09	-5537.35	-7844.65	-19664.57	13587.33
			6195.76						
	B	30.9442	6764.07	4865.72	3882.09	2647.03	15689.29	19664.57	0.00
			6195.76						
	B	30.9442	6764.07	4725.26	3882.09	2890.32	-7844.65	-19664.57	-13587.33
			6195.76						
	C	30.9442	6764.07	-4725.26	3882.09	2890.32	-7844.65	19664.57	13587.33
			6195.76						
	C	30.9442	6764.07	-4865.72	3882.09	2647.03	15689.29	-19664.57	0.00
			6195.76						
			Sum:	0.00	23292.56	0.00	-0.00	0.00	0.00
162.75	A	49.6993	11880.60	0.00	9458.73	-7188.96	-18676.62	0.00	0.00
			10415.60						
	B	49.6993	11880.60	6225.82	9458.73	3594.48	9338.31	0.00	-16174.43
			10415.60						
	C	49.6993	11880.60	-6225.82	9458.73	3594.48	9338.31	-0.00	16174.43
			10415.60						
			Sum:	0.00	28376.19	-0.00	0.00	0.00	0.00
119.667	A	40.9250	7118.36	0.00	5040.37	-5026.50	-9952.40	0.00	0.00
			6244.19						

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom lb	F_x lb	F_y lb	F_z lb	M_x lb-ft	M_y lb-ft	M_z lb-ft
	B	40.9250	7118.36 6244.19	4353.08	5040.37	2513.25	4976.20	0.00	-8619.04
	C	40.9250	7118.36 6244.19	-4353.08	5040.37	2513.25	4976.20	-0.00	8619.04
			Sum:	0.00	15121.11	-0.00	0.00	0.00	0.00

Guy-Mast Forces (Excluding Wind) - Service

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom lb	F_x lb	F_y lb	F_z lb	M_x lb-ft	M_y lb-ft	M_z lb-ft
82.75	A	30.9442	2732.74 2690.00	-58.96	1435.72	-2324.46	-2901.19	8254.77	-5025.01
	A	30.9442	2732.74 2690.00	58.96	1435.72	-2324.46	-2901.19	-8254.77	5025.01
	B	30.9442	2732.74 2690.00	2042.53	1435.72	1111.17	5802.38	8254.77	0.00
	B	30.9442	2732.74 2690.00	1983.56	1435.72	1213.30	-2901.19	-8254.77	-5025.01
	C	30.9442	2732.74 2690.00	-1983.56	1435.72	1213.30	-2901.19	8254.77	5025.01
	C	30.9442	2732.74 2690.00	-2042.53	1435.72	1111.17	5802.38	-8254.77	0.00
			Sum:	0.00	8614.30	0.00	-0.00	0.00	0.00
162.75	A	49.6993	6017.80 5830.00	0.00	4640.87	-3830.96	-9163.58	0.00	0.00
	B	49.6993	6017.80 5830.00	3317.71	4640.87	1915.48	4581.79	0.00	-7935.89
	C	49.6993	6017.80 5830.00	-3317.71	4640.87	1915.48	4581.79	-0.00	7935.89
			Sum:	0.00	13922.62	-0.00	0.00	0.00	0.00
119.667	A	40.9250	2751.81 2690.00	0.00	1829.52	-2055.57	-3612.45	0.00	0.00
	B	40.9250	2751.81 2690.00	1780.17	1829.52	1027.78	1806.22	0.00	-3128.47
	C	40.9250	2751.81 2690.00	-1780.17	1829.52	1027.78	1806.22	-0.00	3128.47
			Sum:	0.00	5488.55	-0.00	0.00	0.00	0.00

Guy-Tensioning Information

Guy Elevation ft		H ft	V ft	Temperature At Time Of Tensioning: 0 F Initial Tension lb	0 F Intercept ft	20 F Initial Tension lb	20 F Intercept ft	40 F Initial Tension lb	40 F Intercept ft	60 F Initial Tension lb	60 F Intercept ft	80 F Initial Tension lb	80 F Intercept ft	100 F Initial Tension lb	100 F Intercept ft	120 F Initial Tension lb	120 F Intercept ft
82.75	A	138.02	82.75	3555	1.87	3263	2.04	2975	2.23	2690	2.47	2411	2.75	2140	3.10	1881	3.52
	B	138.02	82.75	3555	1.87	3263	2.04	2975	2.23	2690	2.47	2411	2.75	2140	3.10	1881	3.52
	C	138.02	82.75	3555	1.87	3263	2.04	2975	2.23	2690	2.47	2411	2.75	2140	3.10	1881	3.52

Guy Elevation ft		H ft	V ft	Temperature At Time Of Tensioning: 0 F Initial Tension lb	0 F Intercept ft	20 F Initial Tension lb	20 F Intercept ft	40 F Initial Tension lb	40 F Intercept ft	60 F Initial Tension lb	60 F Intercept ft	80 F Initial Tension lb	80 F Intercept ft	100 F Initial Tension lb	100 F Intercept ft	120 F Initial Tension lb	120 F Intercept ft
162.75	A	138.03	162.75	6822	3.80	6489	3.99	6158	4.20	5830	4.44	5505	4.69	5185	4.98	4869	5.30
	B	138.03	162.75	6822	3.80	6489	3.99	6158	4.20	5830	4.44	5505	4.69	5185	4.98	4869	5.30
	C	138.03	162.75	6822	3.80	6489	3.99	6158	4.20	5830	4.44	5505	4.69	5185	4.98	4869	5.30
119.667	A	138.03	119.67	3359	2.54	3134	2.72	2911	2.93	2690	3.17	2473	3.44	2260	3.76	2053	4.14
	B	138.03	119.67	3359	2.54	3134	2.72	2911	2.93	2690	3.17	2473	3.44	2260	3.76	2053	4.14
	C	138.03	119.67	3359	2.54	3134	2.72	2911	2.93	2690	3.17	2473	3.44	2260	3.76	2053	4.14

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
Feedline Ladder (Af)	C	No	No	Ar (CaAa)	171.50 - 6.00	0.1000	0	1	1	3.0000	3.0000		8.40
Safety Line 3/8	A	No	No	Ar (CaAa)	180.00 - 6.00	0.0000	0	1	1	0.3750	0.3750		0.22
4AWG	C	No	No	Ar (CaAa)	171.00 - 6.00	0.1000	0	3	3	1.5500	1.2500		0.66
1 1/4	B	No	No	Ar (CaAa)	180.00 - 6.00	0.1000	0	1	1	1.5500	1.5500		0.66
7/8	B	No	No	Ar (CaAa)	180.00 - 6.00	0.1000	0	2	2	1.1100	1.1100		0.54
1 1/4	B	No	No	Ar (CaAa)	179.00 - 6.00	0.1000	0	1	1	1.5500	1.5500		0.66
7/8	B	No	No	Ar (CaAa)	177.00 - 6.00	0.1000	0	1	1	1.1100	1.1100		0.54
7/8	B	No	No	Ar (CaAa)	163.00 - 6.00	0.1000	0	1	1	1.1100	1.1100		0.54
7/8	B	No	No	Ar (CaAa)	127.00 - 6.00	0.1000	0	1	1	1.1100	1.1100		0.54
1/2	B	No	No	Ar (CaAa)	83.00 - 6.00	0.1000	0	1	1	0.5800	0.5800		0.25

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	180.00-160.00	A	0.000	0.000	0.750	0.000	4.40
		B	0.000	0.000	12.705	0.000	58.14
		C	0.000	0.000	7.575	0.000	118.38
T2	160.00-140.00	A	0.000	0.000	0.750	0.000	4.40
		B	0.000	0.000	15.080	0.000	69.60
		C	0.000	0.000	13.500	0.000	207.60
T3	140.00-120.00	A	0.000	0.000	0.750	0.000	4.40
		B	0.000	0.000	15.857	0.000	73.38
		C	0.000	0.000	13.500	0.000	207.60
T4	120.00-100.00	A	0.000	0.000	0.750	0.000	4.40
		B	0.000	0.000	17.300	0.000	80.40
		C	0.000	0.000	13.500	0.000	207.60
T5	100.00-80.00	A	0.000	0.000	0.750	0.000	4.40
		B	0.000	0.000	17.474	0.000	81.15

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		C	0.000	0.000	13.500	0.000	207.60
T6	80.00-60.00	A	0.000	0.000	0.750	0.000	4.40
		B	0.000	0.000	18.460	0.000	85.40
		C	0.000	0.000	13.500	0.000	207.60
T7	60.00-40.00	A	0.000	0.000	0.750	0.000	4.40
		B	0.000	0.000	18.460	0.000	85.40
		C	0.000	0.000	13.500	0.000	207.60
T8	40.00-20.00	A	0.000	0.000	0.750	0.000	4.40
		B	0.000	0.000	18.460	0.000	85.40
		C	0.000	0.000	13.500	0.000	207.60
T9	20.00-5.00	A	0.000	0.000	0.525	0.000	3.08
		B	0.000	0.000	12.922	0.000	59.78
		C	0.000	0.000	9.450	0.000	145.32
T10	5.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	180.00-160.00	A	2.356	0.000	0.000	10.175	0.000	161.65
		B		0.000	0.000	60.891	0.000	988.84
		C		0.000	0.000	26.757	0.000	542.23
T2	160.00-140.00	A	2.327	0.000	0.000	10.058	0.000	158.03
		B		0.000	0.000	72.489	0.000	1188.73
		C		0.000	0.000	47.634	0.000	951.92
T3	140.00-120.00	A	2.294	0.000	0.000	9.926	0.000	153.99
		B		0.000	0.000	75.718	0.000	1234.28
		C		0.000	0.000	47.279	0.000	938.14
T4	120.00-100.00	A	2.256	0.000	0.000	9.774	0.000	149.42
		B		0.000	0.000	82.100	0.000	1331.65
		C		0.000	0.000	46.872	0.000	922.43
T5	100.00-80.00	A	2.211	0.000	0.000	9.594	0.000	144.12
		B		0.000	0.000	82.391	0.000	1315.87
		C		0.000	0.000	46.391	0.000	904.09
T6	80.00-60.00	A	2.156	0.000	0.000	9.375	0.000	137.76
		B		0.000	0.000	89.195	0.000	1394.52
		C		0.000	0.000	45.804	0.000	881.90
T7	60.00-40.00	A	2.085	0.000	0.000	9.089	0.000	129.71
		B		0.000	0.000	86.986	0.000	1326.15
		C		0.000	0.000	45.040	0.000	853.49
T8	40.00-20.00	A	1.981	0.000	0.000	8.674	0.000	118.45
		B		0.000	0.000	83.771	0.000	1229.76
		C		0.000	0.000	43.931	0.000	813.03
T9	20.00-5.00	A	1.815	0.000	0.000	5.607	0.000	71.06
		B		0.000	0.000	55.042	0.000	758.28
		C		0.000	0.000	29.513	0.000	525.36
T10	5.00-0.00	A	1.545	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	180.00-160.00	2.0412	0.2146	1.0873	-0.1960
T2	160.00-140.00	2.2538	1.0865	1.4658	0.2052
T3	140.00-120.00	2.3486	1.0054	1.5807	0.1577
T4	120.00-100.00	2.4452	0.8398	1.7304	0.0607
T5	100.00-80.00	2.3896	0.7955	1.6353	0.0432
T6	80.00-60.00	2.8228	0.7978	3.3469	-0.1024
T7	60.00-40.00	2.8228	0.7978	3.3739	-0.0831
T8	40.00-20.00	2.8228	0.7978	3.4105	-0.0524
T9	20.00-5.00	2.7009	0.7633	3.2969	0.0033
T10	5.00-0.00	0.0000	0.0000	0.0000	0.0000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	Feedline Ladder (Af)	160.00 - 171.50	0.6000	0.2306
T1	2	Safety Line 3/8	160.00 - 180.00	0.6000	0.2306
T1	3	4AWG	160.00 - 171.00	0.6000	0.2306
T1	4	1 1/4	160.00 - 180.00	0.6000	0.2306
T1	5	7/8	160.00 - 180.00	0.6000	0.2306
T1	6	1 1/4	160.00 - 179.00	0.6000	0.2306
T1	7	7/8	160.00 - 177.00	0.6000	0.2306
T1	8	7/8	160.00 - 163.00	0.6000	0.2306
T2	1	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.2622
T2	2	Safety Line 3/8	140.00 - 160.00	0.6000	0.2622
T2	3	4AWG	140.00 - 160.00	0.6000	0.2622
T2	4	1 1/4	140.00 - 160.00	0.6000	0.2622
T2	5	7/8	140.00 - 160.00	0.6000	0.2622
T2	6	1 1/4	140.00 - 160.00	0.6000	0.2622
T2	7	7/8	140.00 - 160.00	0.6000	0.2622
T2	8	7/8	140.00 - 160.00	0.6000	0.2622
T3	1	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.2688
T3	2	Safety Line 3/8	120.00 - 140.00	0.6000	0.2688
T3	3	4AWG	120.00 - 140.00	0.6000	0.2688
T3	4	1 1/4	120.00 -	0.6000	0.2688

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	5	7/8	120.00 - 140.00	0.6000	0.2688
T3	6	1 1/4	120.00 - 140.00	0.6000	0.2688
T3	7	7/8	120.00 - 140.00	0.6000	0.2688
T3	8	7/8	120.00 - 140.00	0.6000	0.2688
T3	9	7/8	120.00 - 140.00	0.6000	0.2688
T4	1	Feedline Ladder (Af)	100.00 - 127.00	0.6000	0.2712
T4	2	Safety Line 3/8	100.00 - 120.00	0.6000	0.2712
T4	3	4AWG	100.00 - 120.00	0.6000	0.2712
T4	4	1 1/4	100.00 - 120.00	0.6000	0.2712
T4	5	7/8	100.00 - 120.00	0.6000	0.2712
T4	6	1 1/4	100.00 - 120.00	0.6000	0.2712
T4	7	7/8	100.00 - 120.00	0.6000	0.2712
T4	8	7/8	100.00 - 120.00	0.6000	0.2712
T4	9	7/8	100.00 - 120.00	0.6000	0.2712
T5	1	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.2579
T5	2	Safety Line 3/8	80.00 - 100.00	0.6000	0.2579
T5	3	4AWG	80.00 - 100.00	0.6000	0.2579
T5	4	1 1/4	80.00 - 100.00	0.6000	0.2579
T5	5	7/8	80.00 - 100.00	0.6000	0.2579
T5	6	1 1/4	80.00 - 100.00	0.6000	0.2579
T5	7	7/8	80.00 - 100.00	0.6000	0.2579
T5	8	7/8	80.00 - 100.00	0.6000	0.2579
T5	9	7/8	80.00 - 100.00	0.6000	0.2579
T5	10	1/2	80.00 - 83.00	0.6000	0.2579
T6	1	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.4759
T6	2	Safety Line 3/8	60.00 - 80.00	0.6000	0.4759
T6	3	4AWG	60.00 - 80.00	0.6000	0.4759
T6	4	1 1/4	60.00 - 80.00	0.6000	0.4759
T6	5	7/8	60.00 - 80.00	0.6000	0.4759
T6	6	1 1/4	60.00 - 80.00	0.6000	0.4759
T6	7	7/8	60.00 - 80.00	0.6000	0.4759
T6	8	7/8	60.00 - 80.00	0.6000	0.4759
T6	9	7/8	60.00 - 80.00	0.6000	0.4759
T6	10	1/2	60.00 - 80.00	0.6000	0.4759
T7	1	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.4858
T7	2	Safety Line 3/8	40.00 - 60.00	0.6000	0.4858
T7	3	4AWG	40.00 - 60.00	0.6000	0.4858
T7	4	1 1/4	40.00 - 60.00	0.6000	0.4858
T7	5	7/8	40.00 - 60.00	0.6000	0.4858
T7	6	1 1/4	40.00 - 60.00	0.6000	0.4858
T7	7	7/8	40.00 - 60.00	0.6000	0.4858
T7	8	7/8	40.00 - 60.00	0.6000	0.4858
T7	9	7/8	40.00 - 60.00	0.6000	0.4858
T7	10	1/2	40.00 - 60.00	0.6000	0.4858
T8	1	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.5004
T8	2	Safety Line 3/8	20.00 - 40.00	0.6000	0.5004
T8	3	4AWG	20.00 - 40.00	0.6000	0.5004

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	4	1 1/4	20.00 - 40.00	0.6000	0.5004
T8	5	7/8	20.00 - 40.00	0.6000	0.5004
T8	6	1 1/4	20.00 - 40.00	0.6000	0.5004
T8	7	7/8	20.00 - 40.00	0.6000	0.5004
T8	8	7/8	20.00 - 40.00	0.6000	0.5004
T8	9	7/8	20.00 - 40.00	0.6000	0.5004
T8	10	1/2	20.00 - 40.00	0.6000	0.5004
T9	1	Feedline Ladder (Af)	6.00 - 20.00	0.6000	0.5132
T9	2	Safety Line 3/8	6.00 - 20.00	0.6000	0.5132
T9	3	4AWG	6.00 - 20.00	0.6000	0.5132
T9	4	1 1/4	6.00 - 20.00	0.6000	0.5132
T9	5	7/8	6.00 - 20.00	0.6000	0.5132
T9	6	1 1/4	6.00 - 20.00	0.6000	0.5132
T9	7	7/8	6.00 - 20.00	0.6000	0.5132
T9	8	7/8	6.00 - 20.00	0.6000	0.5132
T9	9	7/8	6.00 - 20.00	0.6000	0.5132
T9	10	1/2	6.00 - 20.00	0.6000	0.5132

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Lightning Rod 5/8x4'	C	None			0.0000	180.00	No Ice	0.25	0.25	31.00
							1/2" Ice	0.66	0.66	33.82
							1" Ice	0.97	0.97	39.29
12 ft Boom / Frame	A	From Leg	2.00	0.00	0.0000	150.00	No Ice	18.00	9.00	500.00
							1/2" Ice	22.00	11.00	650.00
							1" Ice	26.00	13.00	800.00
12 ft Boom / Frame	B	From Leg	2.00	0.00	0.0000	150.00	No Ice	18.00	9.00	500.00
							1/2" Ice	22.00	11.00	650.00
							1" Ice	26.00	13.00	800.00
12 ft Boom / Frame	C	From Leg	2.00	0.00	0.0000	150.00	No Ice	18.00	9.00	500.00
							1/2" Ice	22.00	11.00	650.00
							1" Ice	26.00	13.00	800.00
Station Master Antenna	B	From Leg	0.50	0.00	0.0000	180.00	No Ice	3.64	3.64	10.20
							1/2" Ice	4.21	4.21	30.00
							1" Ice	4.78	4.78	50.00
Decibel DB809	C	From Leg	3.00	0.00	0.0000	179.00	No Ice	3.68	3.68	27.00
							1/2" Ice	4.93	4.93	60.90
							1" Ice	6.21	6.21	104.80
Side Arm	C	From Leg	2.00	0.00	0.0000	179.00	No Ice	4.97	4.97	70.00
							1/2" Ice	6.12	6.12	130.00
							1" Ice	7.27	7.27	190.00
Decibel DB809	B	From Leg	3.00	0.00	0.0000	177.00	No Ice	3.68	3.68	27.00
							1/2" Ice	4.93	4.93	60.90
							1" Ice	6.21	6.21	104.80
Side Arm	B	From Leg	2.00	0.00	0.0000	177.00	No Ice	4.97	4.97	70.00
							1/2" Ice	6.12	6.12	130.00
							1" Ice	7.27	7.27	190.00
Celwave PD201	B	From Leg	3.00	0.00	0.0000	163.00	No Ice	1.18	1.18	4.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1/2" Ice	2.09	2.09	16.80
			0.00			1" Ice	3.02	3.02	36.90
Celwave PD201	B	From Leg	3.00	0.0000	83.00	No Ice	1.18	1.18	4.00
			0.00			1/2" Ice	2.09	2.09	16.80
			0.00			1" Ice	3.02	3.02	36.90
Decibel DB420	B	From Leg	3.00	0.0000	127.00	No Ice	5.19	5.19	35.00
			0.00			1/2" Ice	7.19	7.19	83.50
			0.00			1" Ice	9.20	9.20	147.80
Side Arm	B	From Leg	2.00	0.0000	127.00	No Ice	4.97	4.97	70.00
			0.00			1/2" Ice	6.12	6.12	130.00
			0.00			1" Ice	7.27	7.27	190.00
12 ft Boom / Frame (Sprint)	A	From Leg	2.00	0.0000	171.00	No Ice	18.00	9.00	500.00
			0.00			1/2" Ice	22.00	11.00	650.00
			0.00			1" Ice	26.00	13.00	800.00
12 ft Boom / Frame (Sprint)	B	From Leg	2.00	0.0000	171.00	No Ice	18.00	9.00	500.00
			0.00			1/2" Ice	22.00	11.00	650.00
			0.00			1" Ice	26.00	13.00	800.00
12 ft Boom / Frame (Sprint)	C	From Leg	2.00	0.0000	171.00	No Ice	18.00	9.00	500.00
			0.00			1/2" Ice	22.00	11.00	650.00
			0.00			1" Ice	26.00	13.00	800.00
RFS APXVAALL24_43-U-NA20	A	From Leg	2.00	0.0000	171.00	No Ice	20.27	5.07	149.90
			0.00			1/2" Ice	20.88	5.71	262.00
			0.00			1" Ice	21.50	6.33	382.00
Ericsson AIR6449 B41	A	From Leg	2.00	0.0000	171.00	No Ice	5.68	2.49	104.00
			0.00			1/2" Ice	5.95	2.71	143.00
			0.00			1" Ice	6.22	2.93	187.00
Ericsson Radio 4460 B25+B66	A	From Leg	2.00	0.0000	171.00	No Ice	2.56	1.98	109.00
			0.00			1/2" Ice	2.74	2.14	134.00
			0.00			1" Ice	2.93	2.30	163.00
Ericsson Radio 4480 B71+B85A	A	From Leg	2.00	0.0000	171.00	No Ice	2.85	1.38	84.00
			0.00			1/2" Ice	3.04	1.53	106.00
			0.00			1" Ice	3.24	4.69	131.00
RFS APXVAALL24_43-U-NA20	B	From Leg	2.00	0.0000	171.00	No Ice	20.27	5.07	149.90
			0.00			1/2" Ice	20.88	5.71	262.00
			0.00			1" Ice	21.50	6.33	382.00
Ericsson AIR6449 B41	B	From Leg	2.00	0.0000	171.00	No Ice	5.68	2.49	104.00
			0.00			1/2" Ice	5.95	2.71	143.00
			0.00			1" Ice	6.22	2.93	187.00
Ericsson Radio 4460 B25+B66	B	From Leg	2.00	0.0000	171.00	No Ice	2.56	1.98	109.00
			0.00			1/2" Ice	2.74	2.14	134.00
			0.00			1" Ice	2.93	2.30	163.00
Ericsson Radio 4480 B71+B85A	B	From Leg	2.00	0.0000	171.00	No Ice	2.85	1.38	84.00
			0.00			1/2" Ice	3.04	1.53	106.00
			0.00			1" Ice	3.24	4.69	131.00
RFS APXVAALL24_43-U-NA20	C	From Leg	2.00	0.0000	171.00	No Ice	20.27	5.07	149.90
			0.00			1/2" Ice	20.88	5.71	262.00
			0.00			1" Ice	21.50	6.33	382.00
Ericsson AIR6449 B41	C	From Leg	2.00	0.0000	171.00	No Ice	5.68	2.49	104.00
			0.00			1/2" Ice	5.95	2.71	143.00
			0.00			1" Ice	6.22	2.93	187.00
Ericsson Radio 4460 B25+B66	C	From Leg	2.00	0.0000	171.00	No Ice	2.56	1.98	109.00
			0.00			1/2" Ice	2.74	2.14	134.00
			0.00			1" Ice	2.93	2.30	163.00
Ericsson Radio 4480 B71+B85A	C	From Leg	2.00	0.0000	171.00	No Ice	2.85	1.38	84.00
			0.00			1/2" Ice	3.04	1.53	106.00
			0.00			1" Ice	3.24	4.69	131.00

Tower Pressures - No Ice

$G_H = 0.850$

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 180.00-160.00	170.00	1.15	24	72.358	A	0.806	16.613	7.917	45.45	0.750	0.000
					B	0.806	16.613		45.45	12.705	0.000
					C	0.806	16.613		45.45	7.575	0.000
T2 160.00-140.00	150.00	1.11	23	72.358	A	0.000	16.613	7.917	47.65	0.750	0.000
					B	0.000	16.613		47.65	15.080	0.000
					C	0.000	16.613		47.65	13.500	0.000
T3 140.00-120.00	130.00	1.065	22	72.358	A	0.000	16.613	7.917	47.65	0.750	0.000
					B	0.000	16.613		47.65	15.857	0.000
					C	0.000	16.613		47.65	13.500	0.000
T4 120.00-100.00	110.00	1.016	21	72.358	A	0.806	16.210	7.917	46.53	0.750	0.000
					B	0.806	16.210		46.53	17.300	0.000
					C	0.806	16.210		46.53	13.500	0.000
T5 100.00-80.00	90.00	0.959	20	73.192	A	0.398	18.167	9.583	51.62	0.750	0.000
					B	0.398	18.167		51.62	17.474	0.000
					C	0.398	18.167		51.62	13.500	0.000
T6 80.00-60.00	70.00	0.892	18	73.192	A	0.000	14.273	9.583	67.14	0.750	0.000
					B	0.000	14.273		67.14	18.460	0.000
					C	0.000	14.273		67.14	13.500	0.000
T7 60.00-40.00	50.00	0.811	17	73.192	A	0.000	14.273	9.583	67.14	0.750	0.000
					B	0.000	14.273		67.14	18.460	0.000
					C	0.000	14.273		67.14	13.500	0.000
T8 40.00-20.00	30.00	0.701	14	73.192	A	0.000	14.273	9.583	67.14	0.750	0.000
					B	0.000	14.273		67.14	18.460	0.000
					C	0.000	14.273		67.14	13.500	0.000
T9 20.00-5.00	12.50	0.7	14	54.894	A	0.000	10.892	7.188	65.99	0.525	0.000
					B	0.000	10.892		65.99	12.922	0.000
					C	0.000	10.892		65.99	9.450	0.000
T10 5.00-0.00	2.50	0.7	14	9.816	A	0.000	4.968	2.576	51.85	0.000	0.000
					B	0.000	4.968		51.85	0.000	0.000
					C	0.000	4.968		51.85	0.000	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 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 180.00-160.00	170.00	1.15	6	2.3563	80.213	A	0.806	60.907	23.625	38.28	10.175	0.000
						B	0.806	60.907		38.28	60.891	0.000
						C	0.806	60.907		38.28	26.757	0.000
T2 160.00-140.00	150.00	1.11	6	2.3270	80.115	A	0.000	59.107	23.430	39.64	10.058	0.000
						B	0.000	59.107		39.64	72.489	0.000
						C	0.000	59.107		39.64	47.634	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
T3	130.00	1.065	6	2.2939	80.005	A	0.000	58.503	23.209	39.67	9.926	0.000
140.00-120.00						B	0.000	58.503		39.67	75.718	0.000
						C	0.000	58.503		39.67	47.279	0.000
T4	110.00	1.016	6	2.2559	79.878	A	0.806	57.406	22.956	39.44	9.774	0.000
120.00-100.00						B	0.806	57.406		39.44	82.100	0.000
						C	0.806	57.406		39.44	46.872	0.000
T5 100.00-80.00	90.00	0.959	5	2.2111	80.562	A	0.398	59.385	24.324	40.69	9.594	0.000
						B	0.398	59.385		40.69	82.391	0.000
						C	0.398	59.385		40.69	46.391	0.000
T6 80.00-60.00	70.00	0.892	5	2.1562	80.379	A	0.000	42.129	23.958	56.87	9.375	0.000
						B	0.000	42.129		56.87	89.195	0.000
						C	0.000	42.129		56.87	45.804	0.000
T7 60.00-40.00	50.00	0.811	4	2.0849	80.141	A	0.000	41.207	23.482	56.99	9.089	0.000
						B	0.000	41.207		56.99	86.986	0.000
						C	0.000	41.207		56.99	45.040	0.000
T8 40.00-20.00	30.00	0.701	4	1.9810	79.795	A	0.000	39.866	22.790	57.17	8.674	0.000
						B	0.000	39.866		57.17	83.771	0.000
						C	0.000	39.866		57.17	43.931	0.000
T9 20.00-5.00	12.50	0.7	4	1.8150	59.431	A	0.000	28.932	16.262	56.21	5.607	0.000
						B	0.000	28.932		56.21	55.042	0.000
						C	0.000	28.932		56.21	29.513	0.000
T10 5.00-0.00	2.50	0.7	4	1.5452	11.177	A	0.000	12.665	5.345	42.20	0.000	0.000
						B	0.000	12.665		42.20	0.000	0.000
						C	0.000	12.665		42.20	0.000	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	170.00	1.15	9	72.358	A	0.806	16.613	7.917	45.45	0.750	0.000
180.00-160.00					B	0.806	16.613		45.45	12.705	0.000
					C	0.806	16.613		45.45	7.575	0.000
T2	150.00	1.11	9	72.358	A	0.000	16.613	7.917	47.65	0.750	0.000
160.00-140.00					B	0.000	16.613		47.65	15.080	0.000
					C	0.000	16.613		47.65	13.500	0.000
T3	130.00	1.065	8	72.358	A	0.000	16.613	7.917	47.65	0.750	0.000
140.00-120.00					B	0.000	16.613		47.65	15.857	0.000
					C	0.000	16.613		47.65	13.500	0.000
T4	110.00	1.016	8	72.358	A	0.806	16.210	7.917	46.53	0.750	0.000
120.00-100.00					B	0.806	16.210		46.53	17.300	0.000
					C	0.806	16.210		46.53	13.500	0.000
T5	90.00	0.959	8	73.192	A	0.398	18.167	9.583	51.62	0.750	0.000
100.00-80.00					B	0.398	18.167		51.62	17.474	0.000
					C	0.398	18.167		51.62	13.500	0.000
T6 80.00-60.00	70.00	0.892	7	73.192	A	0.000	14.273	9.583	67.14	0.750	0.000
					B	0.000	14.273		67.14	18.460	0.000
					C	0.000	14.273		67.14	13.500	0.000
T7 60.00-40.00	50.00	0.811	6	73.192	A	0.000	14.273	9.583	67.14	0.750	0.000
					B	0.000	14.273		67.14	18.460	0.000
					C	0.000	14.273		67.14	13.500	0.000
T8 40.00-20.00	30.00	0.701	5	73.192	A	0.000	14.273	9.583	67.14	0.750	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
					B	0.000	14.273		67.14	18.460	0.000
					C	0.000	14.273		67.14	13.500	0.000
T9 20.00-5.00	12.50	0.7	5	54.894	A	0.000	10.892	7.188	65.99	0.525	0.000
					B	0.000	10.892		65.99	12.922	0.000
					C	0.000	10.892		65.99	9.450	0.000
T10 5.00-0.00	2.50	0.7	5	9.816	A	0.000	4.968	2.576	51.85	0.000	0.000
					B	0.000	4.968		51.85	0.000	0.000
					C	0.000	4.968		51.85	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	180.92	552.04	A	0.241	2.466	24	1	1	10.487	770.03	38.50	C
180.00-160.00			B	0.241	2.466		1	1	10.487			
			C	0.241	2.466		1	1	10.487			
T2	281.60	499.67	A	0.23	2.5	23	1	1	9.640	805.24	40.26	C
160.00-140.00			B	0.23	2.5		1	1	9.640			
			C	0.23	2.5		1	1	9.640			
T3	285.38	499.67	A	0.23	2.5	22	1	1	9.640	781.62	39.08	C
140.00-120.00			B	0.23	2.5		1	1	9.640			
			C	0.23	2.5		1	1	9.640			
T4	292.40	542.87	A	0.235	2.483	21	1	1	10.232	783.50	39.18	C
120.00-100.00			B	0.235	2.483		1	1	10.232			
			C	0.235	2.483		1	1	10.232			
T5	293.15	676.58	A	0.254	2.427	20	1	1	11.042	764.79	38.24	C
100.00-80.00		TA 320.88	B	0.254	2.427		1	1	11.042			
			C	0.254	2.427		1	1	11.042			
T6	297.40	568.31	A	0.195	2.613	18	1	1	8.187	637.07	31.85	C
80.00-60.00			B	0.195	2.613		1	1	8.187			
			C	0.195	2.613		1	1	8.187			
T7	297.40	456.12	A	0.195	2.613	17	1	1	8.187	578.68	28.93	C
60.00-40.00			B	0.195	2.613		1	1	8.187			
			C	0.195	2.613		1	1	8.187			
T8	297.40	456.12	A	0.195	2.613	14	1	1	8.187	500.09	25.00	C
40.00-20.00			B	0.195	2.613		1	1	8.187			
			C	0.195	2.613		1	1	8.187			
T9 20.00-5.00	208.18	430.56	A	0.198	2.601	14	1	1	6.254	365.55	24.37	C
			B	0.198	2.601		1	1	6.254			
			C	0.198	2.601		1	1	6.254			
T10 5.00-0.00	0.00	181.65	A	0.506	1.892	14	1	1	3.420	78.82	15.76	C
			B	0.506	1.892		1	1	3.420			
			C	0.506	1.892		1	1	3.420			
Sum Weight:	2433.83	5184.46								6065.40		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	180.92	552.04	A	0.241	2.466	24	0.8	1	10.326	762.08	38.10	C
180.00-160.00			B	0.241	2.466		0.8	1	10.326			
			C	0.241	2.466		0.8	1	10.326			
T2	281.60	499.67	A	0.23	2.5	23	0.8	1	9.640	805.24	40.26	C
160.00-140.00			B	0.23	2.5		0.8	1	9.640			
			C	0.23	2.5		0.8	1	9.640			
T3	285.38	499.67	A	0.23	2.5	22	0.8	1	9.640	781.62	39.08	C
140.00-120.00			B	0.23	2.5		0.8	1	9.640			
			C	0.23	2.5		0.8	1	9.640			
T4	292.40	542.87	A	0.235	2.483	21	0.8	1	10.071	776.43	38.82	C
120.00-100.00			B	0.235	2.483		0.8	1	10.071			
			C	0.235	2.483		0.8	1	10.071			
T5	293.15	676.58	A	0.254	2.427	20	0.8	1	10.962	761.57	38.08	C
100.00-80.00		TA 320.88	B	0.254	2.427		0.8	1	10.962			
			C	0.254	2.427		0.8	1	10.962			
T6	297.40	568.31	A	0.195	2.613	18	0.8	1	8.187	637.07	31.85	C
80.00-60.00			B	0.195	2.613		0.8	1	8.187			
			C	0.195	2.613		0.8	1	8.187			
T7	297.40	456.12	A	0.195	2.613	17	0.8	1	8.187	578.68	28.93	C
60.00-40.00			B	0.195	2.613		0.8	1	8.187			
			C	0.195	2.613		0.8	1	8.187			
T8	297.40	456.12	A	0.195	2.613	14	0.8	1	8.187	500.09	25.00	C
40.00-20.00			B	0.195	2.613		0.8	1	8.187			
			C	0.195	2.613		0.8	1	8.187			
T9 20.00-5.00	208.18	430.56	A	0.198	2.601	14	0.8	1	6.254	365.55	24.37	C
			B	0.198	2.601		0.8	1	6.254			
			C	0.198	2.601		0.8	1	6.254			
T10 5.00-0.00	0.00	181.65	A	0.506	1.892	14	0.8	1	3.420	78.82	15.76	C
			B	0.506	1.892		0.8	1	3.420			
			C	0.506	1.892		0.8	1	3.420			
Sum Weight:	2433.83	5184.46								6047.16		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	180.92	552.04	A	0.241	2.466	24	0.85	1	10.366	764.07	38.20	C
180.00-160.00			B	0.241	2.466		0.85	1	10.366			
			C	0.241	2.466		0.85	1	10.366			
T2	281.60	499.67	A	0.23	2.5	23	0.85	1	9.640	805.24	40.26	C
160.00-140.00			B	0.23	2.5		0.85	1	9.640			
			C	0.23	2.5		0.85	1	9.640			
T3	285.38	499.67	A	0.23	2.5	22	0.85	1	9.640	781.62	39.08	C
140.00-120.00			B	0.23	2.5		0.85	1	9.640			
			C	0.23	2.5		0.85	1	9.640			
T4	292.40	542.87	A	0.235	2.483	21	0.85	1	10.111	778.20	38.91	C
120.00-100.00			B	0.235	2.483		0.85	1	10.111			
			C	0.235	2.483		0.85	1	10.111			
T5	293.15	676.58	A	0.254	2.427	20	0.85	1	10.982	762.37	38.12	C
100.00-80.00		TA 320.88	B	0.254	2.427		0.85	1	10.982			
			C	0.254	2.427		0.85	1	10.982			
T6	297.40	568.31	A	0.195	2.613	18	0.85	1	8.187	637.07	31.85	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
80.00-60.00			B	0.195	2.613		0.85	1	8.187			
			C	0.195	2.613		0.85	1	8.187			
T7	297.40	456.12	A	0.195	2.613	17	0.85	1	8.187	578.68	28.93	C
60.00-40.00			B	0.195	2.613		0.85	1	8.187			
			C	0.195	2.613		0.85	1	8.187			
T8	297.40	456.12	A	0.195	2.613	14	0.85	1	8.187	500.09	25.00	C
40.00-20.00			B	0.195	2.613		0.85	1	8.187			
			C	0.195	2.613		0.85	1	8.187			
T9 20.00-5.00	208.18	430.56	A	0.198	2.601	14	0.85	1	6.254	365.55	24.37	C
			B	0.198	2.601		0.85	1	6.254			
			C	0.198	2.601		0.85	1	6.254			
T10 5.00-0.00	0.00	181.65	A	0.506	1.892	14	0.85	1	3.420	78.82	15.76	C
			B	0.506	1.892		0.85	1	3.420			
			C	0.506	1.892		0.85	1	3.420			
Sum Weight:	2433.83	5184.46								6051.72		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	1692.72	3987.87	A	0.769	1.797	6	1	1	53.310	629.26	31.46	C
180.00-160.00			B	0.769	1.797		1	1	53.310			
			C	0.769	1.797		1	1	53.310			
T2	2298.67	3711.87	A	0.738	1.783	6	1	1	49.558	628.55	31.43	C
160.00-140.00			B	0.738	1.783		1	1	49.558			
			C	0.738	1.783		1	1	49.558			
T3	2326.41	3640.14	A	0.731	1.781	6	1	1	48.771	603.81	30.19	C
140.00-120.00			B	0.731	1.781		1	1	48.771			
			C	0.731	1.781		1	1	48.771			
T4	2403.51	3645.41	A	0.729	1.781	6	1	1	48.557	582.70	29.13	C
120.00-100.00			B	0.729	1.781		1	1	48.557			
			C	0.729	1.781		1	1	48.557			
T5	2364.07	3841.79	A	0.742	1.785	5	1	1	50.377	556.88	27.84	C
100.00-80.00		TA	B	0.742	1.785		1	1	50.377			
		1032.51	C	0.742	1.785		1	1	50.377			
T6	2414.17	2529.17	A	0.524	1.871	5	1	1	29.420	510.64	25.53	C
80.00-60.00			B	0.524	1.871		1	1	29.420			
			C	0.524	1.871		1	1	29.420			
T7	2309.35	2319.20	A	0.514	1.882	4	1	1	28.547	458.41	22.92	C
60.00-40.00			B	0.514	1.882		1	1	28.547			
			C	0.514	1.882		1	1	28.547			
T8	2161.24	2180.93	A	0.5	1.901	4	1	1	27.300	389.15	19.46	C
40.00-20.00			B	0.5	1.901		1	1	27.300			
			C	0.5	1.901		1	1	27.300			
T9 20.00-5.00	1354.71	1601.34	A	0.487	1.918	4	1	1	19.615	271.52	18.10	C
			B	0.487	1.918		1	1	19.615			
			C	0.487	1.918		1	1	19.615			
T10 5.00-0.00	0.00	689.01	A	1	2.1	4	1	1	12.665	75.97*	15.19	C
			B	1	2.1		1	1	12.665			
			C	1	2.1		1	1	12.665			
Sum Weight:	19324.86	29179.25			*2.1A_g limit					4706.88		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	1692.72	3987.87	A	0.769	1.797	6	0.8	1	53.149	627.72	31.39	C
180.00-160.00			B	0.769	1.797		0.8	1	53.149			
			C	0.769	1.797		0.8	1	53.149			
T2	2298.67	3711.87	A	0.738	1.783	6	0.8	1	49.558	628.55	31.43	C
160.00-140.00			B	0.738	1.783		0.8	1	49.558			
			C	0.738	1.783		0.8	1	49.558			
T3	2326.41	3640.14	A	0.731	1.781	6	0.8	1	48.771	603.81	30.19	C
140.00-120.00			B	0.731	1.781		0.8	1	48.771			
			C	0.731	1.781		0.8	1	48.771			
T4	2403.51	3645.41	A	0.729	1.781	6	0.8	1	48.396	581.35	29.07	C
120.00-100.00			B	0.729	1.781		0.8	1	48.396			
			C	0.729	1.781		0.8	1	48.396			
T5	2364.07	3841.79	A	0.742	1.785	5	0.8	1	50.298	556.25	27.81	C
100.00-80.00		TA	B	0.742	1.785		0.8	1	50.298			
		1032.51	C	0.742	1.785		0.8	1	50.298			
T6	2414.17	2529.17	A	0.524	1.871	5	0.8	1	29.420	510.64	25.53	C
80.00-60.00			B	0.524	1.871		0.8	1	29.420			
			C	0.524	1.871		0.8	1	29.420			
T7	2309.35	2319.20	A	0.514	1.882	4	0.8	1	28.547	458.41	22.92	C
60.00-40.00			B	0.514	1.882		0.8	1	28.547			
			C	0.514	1.882		0.8	1	28.547			
T8	2161.24	2180.93	A	0.5	1.901	4	0.8	1	27.300	389.15	19.46	C
40.00-20.00			B	0.5	1.901		0.8	1	27.300			
			C	0.5	1.901		0.8	1	27.300			
T9 20.00-5.00	1354.71	1601.34	A	0.487	1.918	4	0.8	1	19.615	271.52	18.10	C
			B	0.487	1.918		0.8	1	19.615			
			C	0.487	1.918		0.8	1	19.615			
T10 5.00-0.00	0.00	689.01	A	1	2.1	4	0.8	1	12.665	75.97*	15.19	C
			B	1	2.1		0.8	1	12.665			
			C	1	2.1		0.8	1	12.665			
Sum Weight:	19324.86	29179.25			*2.1A_g limit					4703.37		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	1692.72	3987.87	A	0.769	1.797	6	0.85	1	53.190	628.11	31.41	C
180.00-160.00			B	0.769	1.797		0.85	1	53.190			
			C	0.769	1.797		0.85	1	53.190			
T2	2298.67	3711.87	A	0.738	1.783	6	0.85	1	49.558	628.55	31.43	C
160.00-140.00			B	0.738	1.783		0.85	1	49.558			
			C	0.738	1.783		0.85	1	49.558			
T3	2326.41	3640.14	A	0.731	1.781	6	0.85	1	48.771	603.81	30.19	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
140.00-120.00			B	0.731	1.781		0.85	1	48.771			
			C	0.731	1.781		0.85	1	48.771			
T4	2403.51	3645.41	A	0.729	1.781	6	0.85	1	48.436	581.69	29.08	C
120.00-100.00			B	0.729	1.781		0.85	1	48.436			
			C	0.729	1.781		0.85	1	48.436			
T5	2364.07	3841.79	A	0.742	1.785	5	0.85	1	50.317	556.41	27.82	C
100.00-80.00		TA	B	0.742	1.785		0.85	1	50.317			
		1032.51	C	0.742	1.785		0.85	1	50.317			
T6	2414.17	2529.17	A	0.524	1.871	5	0.85	1	29.420	510.64	25.53	C
80.00-60.00			B	0.524	1.871		0.85	1	29.420			
			C	0.524	1.871		0.85	1	29.420			
T7	2309.35	2319.20	A	0.514	1.882	4	0.85	1	28.547	458.41	22.92	C
60.00-40.00			B	0.514	1.882		0.85	1	28.547			
			C	0.514	1.882		0.85	1	28.547			
T8	2161.24	2180.93	A	0.5	1.901	4	0.85	1	27.300	389.15	19.46	C
40.00-20.00			B	0.5	1.901		0.85	1	27.300			
			C	0.5	1.901		0.85	1	27.300			
T9 20.00-5.00	1354.71	1601.34	A	0.487	1.918	4	0.85	1	19.615	271.52	18.10	C
			B	0.487	1.918		0.85	1	19.615			
			C	0.487	1.918		0.85	1	19.615			
T10 5.00-0.00	0.00	689.01	A	1	2.1	4	0.85	1	12.665	75.97*	15.19	C
			B	1	2.1		0.85	1	12.665			
			C	1	2.1		0.85	1	12.665			
Sum Weight:	19324.86	29179.25			*2.1A_g limit					4704.25		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	180.92	552.04	A	0.241	2.466	9	1	1	10.487	294.62	14.73	C
180.00-160.00			B	0.241	2.466		1	1	10.487			
			C	0.241	2.466		1	1	10.487			
T2	281.60	499.67	A	0.23	2.5	9	1	1	9.640	308.10	15.40	C
160.00-140.00			B	0.23	2.5		1	1	9.640			
			C	0.23	2.5		1	1	9.640			
T3	285.38	499.67	A	0.23	2.5	8	1	1	9.640	299.06	14.95	C
140.00-120.00			B	0.23	2.5		1	1	9.640			
			C	0.23	2.5		1	1	9.640			
T4	292.40	542.87	A	0.235	2.483	8	1	1	10.232	299.78	14.99	C
120.00-100.00			B	0.235	2.483		1	1	10.232			
			C	0.235	2.483		1	1	10.232			
T5	293.15	676.58	A	0.254	2.427	8	1	1	11.042	292.62	14.63	C
100.00-80.00		TA 320.88	B	0.254	2.427		1	1	11.042			
			C	0.254	2.427		1	1	11.042			
T6	297.40	568.31	A	0.195	2.613	7	1	1	8.187	243.75	12.19	C
80.00-60.00			B	0.195	2.613		1	1	8.187			
			C	0.195	2.613		1	1	8.187			
T7	297.40	456.12	A	0.195	2.613	6	1	1	8.187	221.41	11.07	C
60.00-40.00			B	0.195	2.613		1	1	8.187			
			C	0.195	2.613		1	1	8.187			
T8	297.40	456.12	A	0.195	2.613	5	1	1	8.187	191.34	9.57	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
40.00-20.00			B	0.195	2.613		1	1	8.187			
			C	0.195	2.613		1	1	8.187			
T9 20.00-5.00	208.18	430.56	A	0.198	2.601	5	1	1	6.254	139.86	9.32	C
			B	0.198	2.601		1	1	6.254			
			C	0.198	2.601		1	1	6.254			
T10 5.00-0.00	0.00	181.65	A	0.506	1.892	5	1	1	3.420	30.16	6.03	C
			B	0.506	1.892		1	1	3.420			
			C	0.506	1.892		1	1	3.420			
Sum Weight:	2433.83	5184.46								2320.70		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	180.92	552.04	A	0.241	2.466	9	0.8	1	10.326	291.58	14.58	C
180.00-160.00			B	0.241	2.466		0.8	1	10.326			
			C	0.241	2.466		0.8	1	10.326			
T2	281.60	499.67	A	0.23	2.5	9	0.8	1	9.640	308.10	15.40	C
160.00-140.00			B	0.23	2.5		0.8	1	9.640			
			C	0.23	2.5		0.8	1	9.640			
T3	285.38	499.67	A	0.23	2.5	8	0.8	1	9.640	299.06	14.95	C
140.00-120.00			B	0.23	2.5		0.8	1	9.640			
			C	0.23	2.5		0.8	1	9.640			
T4	292.40	542.87	A	0.235	2.483	8	0.8	1	10.071	297.07	14.85	C
120.00-100.00			B	0.235	2.483		0.8	1	10.071			
			C	0.235	2.483		0.8	1	10.071			
T5	293.15	676.58	A	0.254	2.427	8	0.8	1	10.962	291.38	14.57	C
100.00-80.00		TA 320.88	B	0.254	2.427		0.8	1	10.962			
			C	0.254	2.427		0.8	1	10.962			
T6	297.40	568.31	A	0.195	2.613	7	0.8	1	8.187	243.75	12.19	C
80.00-60.00			B	0.195	2.613		0.8	1	8.187			
			C	0.195	2.613		0.8	1	8.187			
T7	297.40	456.12	A	0.195	2.613	6	0.8	1	8.187	221.41	11.07	C
60.00-40.00			B	0.195	2.613		0.8	1	8.187			
			C	0.195	2.613		0.8	1	8.187			
T8	297.40	456.12	A	0.195	2.613	5	0.8	1	8.187	191.34	9.57	C
40.00-20.00			B	0.195	2.613		0.8	1	8.187			
			C	0.195	2.613		0.8	1	8.187			
T9 20.00-5.00	208.18	430.56	A	0.198	2.601	5	0.8	1	6.254	139.86	9.32	C
			B	0.198	2.601		0.8	1	6.254			
			C	0.198	2.601		0.8	1	6.254			
T10 5.00-0.00	0.00	181.65	A	0.506	1.892	5	0.8	1	3.420	30.16	6.03	C
			B	0.506	1.892		0.8	1	3.420			
			C	0.506	1.892		0.8	1	3.420			
Sum Weight:	2433.83	5184.46								2313.72		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	180.92	552.04	A	0.241	2.466	9	0.85	1	10.366	292.34	14.62	C
180.00-160.00			B	0.241	2.466		0.85	1	10.366			
			C	0.241	2.466		0.85	1	10.366			
T2	281.60	499.67	A	0.23	2.5	9	0.85	1	9.640	308.10	15.40	C
160.00-140.00			B	0.23	2.5		0.85	1	9.640			
			C	0.23	2.5		0.85	1	9.640			
T3	285.38	499.67	A	0.23	2.5	8	0.85	1	9.640	299.06	14.95	C
140.00-120.00			B	0.23	2.5		0.85	1	9.640			
			C	0.23	2.5		0.85	1	9.640			
T4	292.40	542.87	A	0.235	2.483	8	0.85	1	10.111	297.75	14.89	C
120.00-100.00			B	0.235	2.483		0.85	1	10.111			
			C	0.235	2.483		0.85	1	10.111			
T5	293.15	676.58	A	0.254	2.427	8	0.85	1	10.982	291.69	14.58	C
100.00-80.00		TA 320.88	B	0.254	2.427		0.85	1	10.982			
			C	0.254	2.427		0.85	1	10.982			
T6	297.40	568.31	A	0.195	2.613	7	0.85	1	8.187	243.75	12.19	C
80.00-60.00			B	0.195	2.613		0.85	1	8.187			
			C	0.195	2.613		0.85	1	8.187			
T7	297.40	456.12	A	0.195	2.613	6	0.85	1	8.187	221.41	11.07	C
60.00-40.00			B	0.195	2.613		0.85	1	8.187			
			C	0.195	2.613		0.85	1	8.187			
T8	297.40	456.12	A	0.195	2.613	5	0.85	1	8.187	191.34	9.57	C
40.00-20.00			B	0.195	2.613		0.85	1	8.187			
			C	0.195	2.613		0.85	1	8.187			
T9 20.00-5.00	208.18	430.56	A	0.198	2.601	5	0.85	1	6.254	139.86	9.32	C
			B	0.198	2.601		0.85	1	6.254			
			C	0.198	2.601		0.85	1	6.254			
T10 5.00-0.00	0.00	181.65	A	0.506	1.892	5	0.85	1	3.420	30.16	6.03	C
			B	0.506	1.892		0.85	1	3.420			
			C	0.506	1.892		0.85	1	3.420			
Sum Weight:	2433.83	5184.46								2315.46		

Force Totals (Does not include forces on guys)

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Torques lb-ft
Leg Weight	3291.20			
Bracing Weight	1893.26			
Total Member Self-Weight	5184.46			
Guy Weight	1520.64			
Total Weight	13827.83			
Wind 0 deg - No Ice		0.00	-9176.89	2299.71
Wind 30 deg - No Ice		4581.61	-7935.58	2883.23
Wind 60 deg - No Ice		7931.63	-4579.33	2694.19
Wind 90 deg - No Ice		9163.22	0.00	1783.25
Wind 120 deg - No Ice		7947.42	4588.45	394.49
Wind 150 deg - No Ice		4581.61	7935.58	-1099.98
Wind 180 deg - No Ice		0.00	9158.66	-2299.71
Wind 210 deg - No Ice		-4581.61	7935.58	-2883.23
Wind 240 deg - No Ice		-7947.42	4588.45	-2694.19
Wind 270 deg - No Ice		-9163.22	0.00	-1783.25

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Torques lb-ft
Wind 300 deg - No Ice		-7931.63	-4579.33	-394.49
Wind 330 deg - No Ice		-4581.61	-7935.58	1099.98
Member Ice	23994.80			
Guy Ice	14889.73			
Total Weight Ice	79026.47			
Wind 0 deg - Ice		0.00	-6549.42	1659.20
Wind 30 deg - Ice		3273.39	-5669.68	1919.06
Wind 60 deg - Ice		5668.92	-3272.95	1664.71
Wind 90 deg - Ice		6546.78	0.00	964.30
Wind 120 deg - Ice		5671.96	3274.71	5.50
Wind 150 deg - Ice		3273.39	5669.68	-954.76
Wind 180 deg - Ice		0.00	6545.90	-1659.20
Wind 210 deg - Ice		-3273.39	5669.68	-1919.06
Wind 240 deg - Ice		-5671.96	3274.71	-1664.71
Wind 270 deg - Ice		-6546.78	0.00	-964.30
Wind 300 deg - Ice		-5668.92	-3272.95	-5.50
Wind 330 deg - Ice		-3273.39	-5669.68	954.76
Total Weight	13827.83			
Wind 0 deg - Service		0.00	-3511.19	879.90
Wind 30 deg - Service		1752.98	-3036.25	1103.16
Wind 60 deg - Service		3034.74	-1752.11	1030.83
Wind 90 deg - Service		3505.96	0.00	682.29
Wind 120 deg - Service		3040.78	1755.60	150.94
Wind 150 deg - Service		1752.98	3036.25	-420.87
Wind 180 deg - Service		0.00	3504.22	-879.90
Wind 210 deg - Service		-1752.98	3036.25	-1103.16
Wind 240 deg - Service		-3040.78	1755.60	-1030.83
Wind 270 deg - Service		-3505.96	0.00	-682.29
Wind 300 deg - Service		-3034.74	-1752.11	-150.94
Wind 330 deg - Service		-1752.98	-3036.25	420.87

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy
3	1.2D+1.6W (pattern 1) 0 deg - No Ice+1.0 Guy
4	1.2D+1.6W (pattern 2) 0 deg - No Ice+1.0 Guy
5	1.2D+1.6W (pattern 3) 0 deg - No Ice+1.0 Guy
6	1.2D+1.6W (pattern 4) 0 deg - No Ice+1.0 Guy
7	1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy
8	1.2D+1.6W (pattern 1) 30 deg - No Ice+1.0 Guy
9	1.2D+1.6W (pattern 2) 30 deg - No Ice+1.0 Guy
10	1.2D+1.6W (pattern 3) 30 deg - No Ice+1.0 Guy
11	1.2D+1.6W (pattern 4) 30 deg - No Ice+1.0 Guy
12	1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy
13	1.2D+1.6W (pattern 1) 60 deg - No Ice+1.0 Guy
14	1.2D+1.6W (pattern 2) 60 deg - No Ice+1.0 Guy
15	1.2D+1.6W (pattern 3) 60 deg - No Ice+1.0 Guy
16	1.2D+1.6W (pattern 4) 60 deg - No Ice+1.0 Guy
17	1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy
18	1.2D+1.6W (pattern 1) 90 deg - No Ice+1.0 Guy
19	1.2D+1.6W (pattern 2) 90 deg - No Ice+1.0 Guy

Comb. No.	Description
20	1.2D+1.6W (pattern 3) 90 deg - No Ice+1.0 Guy
21	1.2D+1.6W (pattern 4) 90 deg - No Ice+1.0 Guy
22	1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy
23	1.2D+1.6W (pattern 1) 120 deg - No Ice+1.0 Guy
24	1.2D+1.6W (pattern 2) 120 deg - No Ice+1.0 Guy
25	1.2D+1.6W (pattern 3) 120 deg - No Ice+1.0 Guy
26	1.2D+1.6W (pattern 4) 120 deg - No Ice+1.0 Guy
27	1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy
28	1.2D+1.6W (pattern 1) 150 deg - No Ice+1.0 Guy
29	1.2D+1.6W (pattern 2) 150 deg - No Ice+1.0 Guy
30	1.2D+1.6W (pattern 3) 150 deg - No Ice+1.0 Guy
31	1.2D+1.6W (pattern 4) 150 deg - No Ice+1.0 Guy
32	1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy
33	1.2D+1.6W (pattern 1) 180 deg - No Ice+1.0 Guy
34	1.2D+1.6W (pattern 2) 180 deg - No Ice+1.0 Guy
35	1.2D+1.6W (pattern 3) 180 deg - No Ice+1.0 Guy
36	1.2D+1.6W (pattern 4) 180 deg - No Ice+1.0 Guy
37	1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy
38	1.2D+1.6W (pattern 1) 210 deg - No Ice+1.0 Guy
39	1.2D+1.6W (pattern 2) 210 deg - No Ice+1.0 Guy
40	1.2D+1.6W (pattern 3) 210 deg - No Ice+1.0 Guy
41	1.2D+1.6W (pattern 4) 210 deg - No Ice+1.0 Guy
42	1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy
43	1.2D+1.6W (pattern 1) 240 deg - No Ice+1.0 Guy
44	1.2D+1.6W (pattern 2) 240 deg - No Ice+1.0 Guy
45	1.2D+1.6W (pattern 3) 240 deg - No Ice+1.0 Guy
46	1.2D+1.6W (pattern 4) 240 deg - No Ice+1.0 Guy
47	1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy
48	1.2D+1.6W (pattern 1) 270 deg - No Ice+1.0 Guy
49	1.2D+1.6W (pattern 2) 270 deg - No Ice+1.0 Guy
50	1.2D+1.6W (pattern 3) 270 deg - No Ice+1.0 Guy
51	1.2D+1.6W (pattern 4) 270 deg - No Ice+1.0 Guy
52	1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy
53	1.2D+1.6W (pattern 1) 300 deg - No Ice+1.0 Guy
54	1.2D+1.6W (pattern 2) 300 deg - No Ice+1.0 Guy
55	1.2D+1.6W (pattern 3) 300 deg - No Ice+1.0 Guy
56	1.2D+1.6W (pattern 4) 300 deg - No Ice+1.0 Guy
57	1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy
58	1.2D+1.6W (pattern 1) 330 deg - No Ice+1.0 Guy
59	1.2D+1.6W (pattern 2) 330 deg - No Ice+1.0 Guy
60	1.2D+1.6W (pattern 3) 330 deg - No Ice+1.0 Guy
61	1.2D+1.6W (pattern 4) 330 deg - No Ice+1.0 Guy
62	1.2 Dead+1.0 Ice+1.0 Temp+Guy
63	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy
64	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy
65	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy
66	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy
67	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy
68	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy
69	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy
70	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy
71	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy
72	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy
73	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy
74	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy
75	Dead+Wind 0 deg - Service+Guy
76	Dead+Wind 30 deg - Service+Guy
77	Dead+Wind 60 deg - Service+Guy
78	Dead+Wind 90 deg - Service+Guy
79	Dead+Wind 120 deg - Service+Guy
80	Dead+Wind 150 deg - Service+Guy
81	Dead+Wind 180 deg - Service+Guy

Comb. No.	Description
82	Dead+Wind 210 deg - Service+Guy
83	Dead+Wind 240 deg - Service+Guy
84	Dead+Wind 270 deg - Service+Guy
85	Dead+Wind 300 deg - Service+Guy
86	Dead+Wind 330 deg - Service+Guy

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Mast	Max. Vert	67	127812.69	-372.44	-236.95
	Max. H_x	50	46621.27	1244.32	26.36
	Max. H_z	5	45775.39	3.46	1260.56
	Max. M_x	1	0.00	2.83	7.68
	Max. M_z	1	0.00	2.83	7.68
	Max. Torsion	37	568.04	533.52	-979.26
	Min. Vert	1	40311.38	2.83	7.68
	Min. H_x	20	46641.77	-1235.38	26.14
	Min. H_z	35	46951.51	5.65	-1244.73
	Min. M_x	1	0.00	2.83	7.68
	Min. M_z	1	0.00	2.83	7.68
	Min. Torsion	7	-607.59	-587.97	963.13
Guy C @ 140 ft Elev 0 ft Azimuth 240 deg	Max. Vert	42	-1606.75	-1918.91	1116.87
	Max. H_x	42	-1606.75	-1918.91	1116.87
	Max. H_z	65	-19400.68	-23066.76	13312.58
	Min. Vert	65	-19400.68	-23066.76	13312.58
	Min. H_x	65	-19400.68	-23066.76	13312.58
	Min. H_z	42	-1606.75	-1918.91	1116.87
Guy B @ 140 ft Elev 0 ft Azimuth 120 deg	Max. Vert	22	-1603.72	1920.09	1109.92
	Max. H_x	73	-19279.91	23004.32	13281.15
	Max. H_z	73	-19279.91	23004.32	13281.15
	Min. Vert	73	-19279.91	23004.32	13281.15
	Min. H_x	22	-1603.72	1920.09	1109.92
	Min. H_z	22	-1603.72	1920.09	1109.92
Guy A @ 140 ft Elev 0 ft Azimuth 0 deg	Max. Vert	2	-1603.67	6.51	-2212.55
	Max. H_x	72	-15290.17	674.57	-21684.68
	Max. H_z	2	-1603.67	6.51	-2212.55
	Min. Vert	69	-19396.42	-4.41	-26610.21
	Min. H_x	66	-15309.16	-675.25	-21698.91
	Min. H_z	69	-19396.42	-4.41	-26610.21

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	40311.38	-2.83	-7.68	0.00	0.00	14.84
1.2 Dead+1.6 Wind 0 deg - No	47413.57	-3.64	-1118.03	0.00	0.00	510.01

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Ice+1.0 Guy						
1.2D+1.6W (pattern 1) 0 deg - No Ice+1.0 Guy	47578.39	-3.43	-441.21	0.00	0.00	506.18
1.2D+1.6W (pattern 2) 0 deg - No Ice+1.0 Guy	47109.41	-3.20	-1147.07	0.00	0.00	502.51
1.2D+1.6W (pattern 3) 0 deg - No Ice+1.0 Guy	45775.39	-3.46	-1260.56	0.00	0.00	476.40
1.2D+1.6W (pattern 4) 0 deg - No Ice+1.0 Guy	44687.58	-3.86	-1235.96	0.00	0.00	509.02
1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy	47810.71	587.97	-963.13	0.00	0.00	607.59
1.2D+1.6W (pattern 1) 30 deg - No Ice+1.0 Guy	47836.19	253.58	-375.44	0.00	0.00	592.92
1.2D+1.6W (pattern 2) 30 deg - No Ice+1.0 Guy	47509.62	595.49	-982.41	0.00	0.00	591.36
1.2D+1.6W (pattern 3) 30 deg - No Ice+1.0 Guy	46607.73	630.22	-1077.76	0.00	0.00	566.45
1.2D+1.6W (pattern 4) 30 deg - No Ice+1.0 Guy	45937.89	600.91	-1051.13	0.00	0.00	593.12
1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy	47566.08	999.65	-591.35	0.00	0.00	508.26
1.2D+1.6W (pattern 1) 60 deg - No Ice+1.0 Guy	47481.56	416.50	-254.65	0.00	0.00	499.98
1.2D+1.6W (pattern 2) 60 deg - No Ice+1.0 Guy	47316.84	1011.95	-598.01	0.00	0.00	496.05
1.2D+1.6W (pattern 3) 60 deg - No Ice+1.0 Guy	46948.89	1081.53	-638.00	0.00	0.00	469.91
1.2D+1.6W (pattern 4) 60 deg - No Ice+1.0 Guy	46671.52	1037.29	-612.68	0.00	0.00	474.86
1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy	47857.22	1114.53	-47.82	0.00	0.00	256.64
1.2D+1.6W (pattern 1) 90 deg - No Ice+1.0 Guy	47890.11	438.16	-51.46	0.00	0.00	255.29
1.2D+1.6W (pattern 2) 90 deg - No Ice+1.0 Guy	47561.06	1134.78	-43.56	0.00	0.00	250.28
1.2D+1.6W (pattern 3) 90 deg - No Ice+1.0 Guy	46641.77	1235.38	-26.14	0.00	0.00	232.88
1.2D+1.6W (pattern 4) 90 deg - No Ice+1.0 Guy	45938.21	1198.42	-14.69	0.00	0.00	217.98
1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy	47485.60	953.47	543.81	0.00	0.00	-13.11
1.2D+1.6W (pattern 1) 120 deg - No Ice+1.0 Guy	47655.86	367.57	205.43	0.00	0.00	-14.01
1.2D+1.6W (pattern 2) 120 deg - No Ice+1.0 Guy	47182.76	978.94	558.59	0.00	0.00	-13.80
1.2D+1.6W (pattern 3) 120 deg - No Ice+1.0 Guy	45833.89	1077.47	615.42	0.00	0.00	-13.56
1.2D+1.6W (pattern 4) 120 deg - No Ice+1.0 Guy	44698.81	1056.97	603.43	0.00	0.00	-41.12
1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy	47850.32	521.79	978.71	0.00	0.00	-268.59
1.2D+1.6W (pattern 1) 150 deg - No Ice+1.0 Guy	47883.97	180.65	394.75	0.00	0.00	-269.86
1.2D+1.6W (pattern 2) 150 deg - No Ice+1.0 Guy	47555.00	535.55	994.27	0.00	0.00	-264.66
1.2D+1.6W (pattern 3) 150 deg - No Ice+1.0 Guy	46637.01	601.01	1072.63	0.00	0.00	-246.12
1.2D+1.6W (pattern 4) 150 deg - No Ice+1.0 Guy	45937.73	592.38	1034.75	0.00	0.00	-282.28
1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy	47569.17	-6.08	1150.46	0.00	0.00	-496.64

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
1.2D+1.6W (pattern 1) 180 deg - No Ice+1.0 Guy	47485.54	-5.85	477.09	0.00	0.00	-489.77
1.2D+1.6W (pattern 2) 180 deg - No Ice+1.0 Guy	47320.64	-5.77	1164.45	0.00	0.00	-485.75
1.2D+1.6W (pattern 3) 180 deg - No Ice+1.0 Guy	46951.51	-5.65	1244.73	0.00	0.00	-459.02
1.2D+1.6W (pattern 4) 180 deg - No Ice+1.0 Guy	46675.42	-6.02	1193.82	0.00	0.00	-494.99
1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy	47845.36	-533.52	979.26	0.00	0.00	-568.04
1.2D+1.6W (pattern 1) 210 deg - No Ice+1.0 Guy	47872.13	-191.56	396.01	0.00	0.00	-553.36
1.2D+1.6W (pattern 2) 210 deg - No Ice+1.0 Guy	47545.40	-546.39	995.40	0.00	0.00	-552.02
1.2D+1.6W (pattern 3) 210 deg - No Ice+1.0 Guy	46634.04	-611.89	1073.30	0.00	0.00	-527.87
1.2D+1.6W (pattern 4) 210 deg - No Ice+1.0 Guy	45951.86	-603.71	1034.73	0.00	0.00	-555.20
1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy	47464.39	-963.23	544.12	0.00	0.00	-438.58
1.2D+1.6W (pattern 1) 240 deg - No Ice+1.0 Guy	47628.98	-376.76	206.19	0.00	0.00	-433.72
1.2D+1.6W (pattern 2) 240 deg - No Ice+1.0 Guy	47158.54	-988.11	559.09	0.00	0.00	-430.71
1.2D+1.6W (pattern 3) 240 deg - No Ice+1.0 Guy	45816.17	-1086.73	615.67	0.00	0.00	-406.51
1.2D+1.6W (pattern 4) 240 deg - No Ice+1.0 Guy	44703.77	-1066.11	603.14	0.00	0.00	-412.74
1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy	47831.18	-1123.52	-48.00	0.00	0.00	-217.46
1.2D+1.6W (pattern 1) 270 deg - No Ice+1.0 Guy	47862.93	-447.09	-51.37	0.00	0.00	-215.94
1.2D+1.6W (pattern 2) 270 deg - No Ice+1.0 Guy	47535.11	-1143.69	-43.78	0.00	0.00	-211.16
1.2D+1.6W (pattern 3) 270 deg - No Ice+1.0 Guy	46621.27	-1244.32	-26.36	0.00	0.00	-194.54
1.2D+1.6W (pattern 4) 270 deg - No Ice+1.0 Guy	45928.10	-1207.04	-15.11	0.00	0.00	-180.38
1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy	47539.01	-1008.29	-590.32	0.00	0.00	46.84
1.2D+1.6W (pattern 1) 300 deg - No Ice+1.0 Guy	47454.71	-425.35	-253.57	0.00	0.00	48.28
1.2D+1.6W (pattern 2) 300 deg - No Ice+1.0 Guy	47291.48	-1020.47	-597.28	0.00	0.00	48.19
1.2D+1.6W (pattern 3) 300 deg - No Ice+1.0 Guy	46927.75	-1090.02	-637.39	0.00	0.00	47.01
1.2D+1.6W (pattern 4) 300 deg - No Ice+1.0 Guy	46651.02	-1045.95	-611.73	0.00	0.00	77.47
1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy	47790.83	-596.38	-961.20	0.00	0.00	307.89
1.2D+1.6W (pattern 1) 330 deg - No Ice+1.0 Guy	47821.65	-261.48	-373.60	0.00	0.00	309.16
1.2D+1.6W (pattern 2) 330 deg - No Ice+1.0 Guy	47494.50	-602.96	-980.89	0.00	0.00	303.74
1.2D+1.6W (pattern 3) 330 deg - No Ice+1.0 Guy	46590.96	-638.12	-1076.43	0.00	0.00	284.39
1.2D+1.6W (pattern 4) 330 deg - No Ice+1.0 Guy	45913.99	-609.65	-1049.41	0.00	0.00	319.86
1.2 Dead+1.0 Ice+1.0 Temp+Guy	126383.73	-47.09	-4.80	0.00	0.00	48.49
1.2 Dead+1.0 Wind 0 deg+1.0	127752.64	-51.25	-499.95	0.00	0.00	346.27

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Ice+1.0 Temp+1.0 Guy 1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy	127306.44	183.17	-436.39	0.00	0.00	368.31
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy	126904.46	363.43	-248.71	0.00	0.00	263.91
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	127341.30	435.02	1.39	0.00	0.00	102.57
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy	127812.69	372.44	236.95	0.00	0.00	-32.55
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy	127341.45	199.63	408.68	0.00	0.00	-145.88
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	126905.73	-52.93	471.58	0.00	0.00	-248.05
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy	127309.79	-305.49	409.08	0.00	0.00	-270.40
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy	127757.07	-477.53	237.66	0.00	0.00	-166.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	127283.92	-538.99	2.42	0.00	0.00	-4.10
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy	126859.72	-466.30	-247.84	0.00	0.00	130.43
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy	127280.79	-285.81	-435.68	0.00	0.00	243.95
Dead+Wind 0 deg - Service+Guy	40482.51	-3.30	-298.33	0.00	0.00	131.91
Dead+Wind 30 deg - Service+Guy	40445.68	140.40	-259.06	0.00	0.00	147.91
Dead+Wind 60 deg - Service+Guy	40413.59	246.30	-152.00	0.00	0.00	123.64
Dead+Wind 90 deg - Service+Guy	40444.98	285.99	-6.76	0.00	0.00	70.98
Dead+Wind 120 deg - Service+Guy	40482.00	248.02	137.35	0.00	0.00	9.10
Dead+Wind 150 deg - Service+Guy	40444.90	142.15	242.25	0.00	0.00	-51.07
Dead+Wind 180 deg - Service+Guy	40413.55	-3.50	280.44	0.00	0.00	-97.99
Dead+Wind 210 deg - Service+Guy	40445.84	-149.13	242.15	0.00	0.00	-114.24
Dead+Wind 240 deg - Service+Guy	40482.85	-254.94	137.25	0.00	0.00	-90.27
Dead+Wind 270 deg - Service+Guy	40444.90	-292.85	-6.94	0.00	0.00	-37.39
Dead+Wind 300 deg - Service+Guy	40412.59	-253.06	-152.18	0.00	0.00	25.19
Dead+Wind 330 deg - Service+Guy	40444.65	-147.14	-259.14	0.00	0.00	84.81

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-13827.69	0.00	3.31	13816.34	6.81	0.099%
2	-0.00	-16414.60	-16528.82	-0.01	16414.33	16521.12	0.033%
3	-0.00	-16414.60	-14973.46	-0.01	16414.33	14966.09	0.033%
4	-0.00	-16414.60	-15227.90	-0.01	16414.33	15220.11	0.035%
5	-0.00	-16414.60	-14829.26	-0.02	16414.35	14820.72	0.039%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
6	-0.00	-16414.60	-14534.27	-0.06	16414.40	14518.74	0.071%
7	8251.08	-16289.13	-14291.29	-8252.05	16288.88	14282.57	0.038%
8	7473.40	-16289.13	-12944.31	-7474.31	16288.88	12936.08	0.037%
9	7603.40	-16289.13	-13169.47	-7604.41	16288.87	13160.49	0.041%
10	7401.30	-16289.13	-12819.43	-7402.46	16288.91	12809.59	0.045%
11	7255.95	-16289.13	-12567.67	-7256.41	16288.93	12552.41	0.070%
12	14289.10	-16163.65	-8249.82	-14273.11	16163.34	8241.58	0.078%
13	12942.13	-16163.65	-7472.14	-12929.70	16163.37	7465.87	0.063%
14	13168.89	-16163.65	-7603.06	-13154.33	16163.37	7595.61	0.074%
15	12817.24	-16163.65	-7400.04	-12799.31	16163.36	7390.45	0.093%
16	12566.73	-16163.65	-7255.40	-12547.33	16163.37	7244.66	0.102%
17	16502.16	-16289.13	0.00	-16494.77	16288.87	5.35	0.039%
18	14946.80	-16289.13	0.00	-14939.84	16288.87	5.04	0.039%
19	15206.80	-16289.13	0.00	-15199.97	16288.89	4.97	0.038%
20	14802.60	-16289.13	0.00	-14795.09	16288.92	5.54	0.042%
21	14511.90	-16289.13	0.00	-14500.03	16288.93	7.43	0.064%
22	14314.38	-16414.60	8264.41	-14307.49	16414.32	-8260.44	0.034%
23	12967.40	-16414.60	7486.73	-12960.81	16414.32	-7482.93	0.034%
24	13187.75	-16414.60	7613.95	-13180.75	16414.32	-7609.91	0.036%
25	12842.51	-16414.60	7414.63	-12835.50	16414.36	-7410.59	0.037%
26	12587.04	-16414.60	7267.13	-12574.69	16414.41	-7260.01	0.065%
27	8251.08	-16289.13	14291.29	-8242.73	16288.87	-14287.58	0.039%
28	7473.40	-16289.13	12944.31	-7465.53	16288.87	-12940.81	0.039%
29	7603.40	-16289.13	13169.47	-7595.66	16288.89	-13166.06	0.038%
30	7401.30	-16289.13	12819.43	-7392.74	16288.92	-12815.72	0.042%
31	7255.95	-16289.13	12567.67	-7243.59	16288.94	-12561.14	0.064%
32	0.00	-16163.65	16499.64	0.38	16163.34	-16481.63	0.078%
33	0.00	-16163.65	14944.28	0.32	16163.37	-14930.35	0.063%
34	0.00	-16163.65	15206.13	0.36	16163.36	-15189.76	0.074%
35	0.00	-16163.65	14800.08	0.30	16163.35	-14779.73	0.093%
36	0.00	-16163.65	14510.81	0.19	16163.37	-14488.61	0.102%
37	-8251.08	-16289.13	14291.29	8242.87	16288.88	-14287.68	0.039%
38	-7473.40	-16289.13	12944.31	7465.66	16288.87	-12940.90	0.038%
39	-7603.40	-16289.13	13169.47	7595.81	16288.89	-13166.16	0.037%
40	-7401.30	-16289.13	12819.43	7391.94	16288.90	-12815.39	0.046%
41	-7255.95	-16289.13	12567.67	7243.74	16288.94	-12561.28	0.063%
42	-14314.38	-16414.60	8264.41	14307.59	16414.33	-8260.51	0.034%
43	-12967.40	-16414.60	7486.73	12960.91	16414.33	-7483.00	0.034%
44	-13187.75	-16414.60	7613.95	13180.87	16414.32	-7610.00	0.035%
45	-12842.51	-16414.60	7414.63	12834.88	16414.34	-7410.25	0.040%
46	-12587.04	-16414.60	7267.13	12574.85	16414.41	-7260.15	0.064%
47	-16502.16	-16289.13	-0.00	16494.89	16288.87	5.27	0.039%
48	-14946.80	-16289.13	-0.00	14939.95	16288.87	4.97	0.038%
49	-15206.80	-16289.13	-0.00	15200.09	16288.89	4.89	0.037%
50	-14802.60	-16289.13	-0.00	14794.36	16288.90	6.06	0.046%
51	-14511.90	-16289.13	-0.00	14500.20	16288.94	7.31	0.063%
52	-14289.10	-16163.65	-8249.82	14273.36	16163.34	8241.28	0.078%
53	-12942.13	-16163.65	-7472.14	12927.93	16163.33	7464.53	0.073%
54	-13168.89	-16163.65	-7603.06	13154.57	16163.37	7595.33	0.073%
55	-12817.24	-16163.65	-7400.04	12799.53	16163.36	7390.23	0.092%
56	-12566.73	-16163.65	-7255.40	12547.49	16163.38	7244.55	0.102%
57	-8251.08	-16289.13	-14291.29	8252.01	16288.88	14282.53	0.038%
58	-7473.40	-16289.13	-12944.31	7474.28	16288.88	12936.06	0.038%
59	-7603.40	-16289.13	-13169.47	7604.38	16288.87	13160.45	0.041%
60	-7401.30	-16289.13	-12819.43	7402.42	16288.91	12809.54	0.045%
61	-7255.95	-16289.13	-12567.67	7256.32	16288.92	12552.42	0.070%
62	-0.00	-81486.45	0.00	4.49	81486.43	0.37	0.006%
63	-0.00	-81664.64	-9039.36	-0.10	81664.55	9026.00	0.016%
64	4514.80	-81486.45	-7819.86	-4511.74	81486.36	7805.18	0.018%
65	7825.27	-81308.26	-4517.92	-7809.37	81308.14	4509.59	0.022%
66	9029.60	-81486.45	0.00	-9017.61	81486.37	4.47	0.016%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
67	7828.31	-81664.64	4519.68	-7817.32	81664.54	-4513.36	0.015%
68	4514.80	-81486.45	7819.86	-4504.88	81486.37	-7811.76	0.016%
69	0.00	-81308.26	9035.84	0.83	81308.15	-9017.98	0.022%
70	-4514.80	-81486.45	7819.86	4503.66	81486.36	-7809.91	0.018%
71	-7828.31	-81664.64	4519.68	7816.72	81664.55	-4513.11	0.016%
72	-9029.60	-81486.45	-0.00	9015.12	81486.36	4.64	0.019%
73	-7825.27	-81308.26	-4517.92	7809.71	81308.15	4508.86	0.022%
74	-4514.80	-81486.45	-7819.86	4511.62	81486.36	7804.94	0.019%
75	0.00	-13857.69	-3952.58	0.01	13857.68	3924.98	0.192%
76	1973.10	-13827.69	-3417.52	-1958.28	13827.66	3393.84	0.194%
77	3416.99	-13797.68	-1972.80	-3392.04	13797.64	1958.47	0.200%
78	3946.21	-13827.69	0.00	-3918.20	13827.66	-0.89	0.195%
79	3423.04	-13857.69	1976.29	-3399.02	13857.68	-1962.39	0.193%
80	1973.10	-13827.69	3417.52	-1959.91	13827.66	-3392.77	0.195%
81	-0.00	-13797.68	3945.60	0.03	13797.64	-3916.76	0.201%
82	-1973.10	-13827.69	3417.52	1959.97	13827.66	-3392.76	0.195%
83	-3423.04	-13857.69	1976.29	3399.08	13857.68	-1962.39	0.192%
84	-3946.21	-13827.69	-0.00	3918.25	13827.66	-0.88	0.195%
85	-3416.99	-13797.68	-1972.80	3392.07	13797.64	1958.49	0.200%
86	-1973.10	-13827.69	-3417.52	1958.30	13827.66	3393.84	0.194%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	75	0.00000001	0.00000000
2	Yes	199	0.00000001	0.00007812
3	Yes	200	0.00000001	0.00007862
4	Yes	196	0.00000001	0.00008039
5	Yes	186	0.00000001	0.00008461
6	Yes	168	0.00000001	0.00007071
7	Yes	192	0.00000001	0.00007800
8	Yes	193	0.00000001	0.00007905
9	Yes	190	0.00000001	0.00008198
10	Yes	182	0.00000001	0.00007938
11	Yes	171	0.00000001	0.00006733
12	Yes	165	0.00000001	0.00006930
13	Yes	166	0.00000001	0.00007569
14	Yes	165	0.00000001	0.00006823
15	Yes	163	0.00000001	0.00006937
16	Yes	162	0.00000001	0.00007875
17	Yes	192	0.00000001	0.00008150
18	Yes	193	0.00000001	0.00008232
19	Yes	191	0.00000001	0.00007788
20	Yes	183	0.00000001	0.00007681
21	Yes	172	0.00000001	0.00006717
22	Yes	199	0.00000001	0.00008056
23	Yes	200	0.00000001	0.00008094
24	Yes	196	0.00000001	0.00008308
25	Yes	187	0.00000001	0.00008135
26	Yes	169	0.00000001	0.00007060
27	Yes	192	0.00000001	0.00008153
28	Yes	193	0.00000001	0.00008243
29	Yes	191	0.00000001	0.00007785
30	Yes	183	0.00000001	0.00007672
31	Yes	172	0.00000001	0.00006679

32	Yes	165	0.00000001	0.00006931
33	Yes	166	0.00000001	0.00007595
34	Yes	165	0.00000001	0.00006839
35	Yes	163	0.00000001	0.00006930
36	Yes	162	0.00000001	0.00007842
37	Yes	192	0.00000001	0.00007970
38	Yes	193	0.00000001	0.00008068
39	Yes	191	0.00000001	0.00007615
40	Yes	182	0.00000001	0.00008173
41	Yes	172	0.00000001	0.00006363
42	Yes	199	0.00000001	0.00007925
43	Yes	200	0.00000001	0.00007967
44	Yes	196	0.00000001	0.00008163
45	Yes	186	0.00000001	0.00008710
46	Yes	169	0.00000001	0.00006731
47	Yes	192	0.00000001	0.00008009
48	Yes	193	0.00000001	0.00008105
49	Yes	191	0.00000001	0.00007657
50	Yes	182	0.00000001	0.00008254
51	Yes	172	0.00000001	0.00006524
52	Yes	165	0.00000001	0.00006868
53	Yes	165	0.00000001	0.00008465
54	Yes	165	0.00000001	0.00006769
55	Yes	163	0.00000001	0.00006892
56	Yes	162	0.00000001	0.00007844
57	Yes	192	0.00000001	0.00007861
58	Yes	193	0.00000001	0.00007959
59	Yes	190	0.00000001	0.00008263
60	Yes	182	0.00000001	0.00008023
61	Yes	171	0.00000001	0.00006903
62	Yes	136	0.00000001	0.00005606
63	Yes	185	0.00000001	0.00001714
64	Yes	181	0.00000001	0.00001743
65	Yes	176	0.00000001	0.00002342
66	Yes	183	0.00000001	0.00002069
67	Yes	186	0.00000001	0.00002111
68	Yes	183	0.00000001	0.00002033
69	Yes	176	0.00000001	0.00002267
70	Yes	181	0.00000001	0.00001772
71	Yes	185	0.00000001	0.00001780
72	Yes	181	0.00000001	0.00001956
73	Yes	176	0.00000001	0.00002269
74	Yes	181	0.00000001	0.00001889
75	Yes	146	0.00000001	0.00009151
76	Yes	146	0.00000001	0.00009215
77	Yes	146	0.00000001	0.00009419
78	Yes	146	0.00000001	0.00009163
79	Yes	146	0.00000001	0.00009042
80	Yes	146	0.00000001	0.00009101
81	Yes	146	0.00000001	0.00009373
82	Yes	146	0.00000001	0.00009055
83	Yes	146	0.00000001	0.00009101
84	Yes	146	0.00000001	0.00009239
85	Yes	146	0.00000001	0.00009459
86	Yes	146	0.00000001	0.00009263

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	1.346	81	0.0851	0.2214
T2	160 - 140	1.001	81	0.0679	0.2035
T3	140 - 120	0.750	77	0.0585	0.1830
T4	120 - 100	0.522	85	0.0447	0.1488
T5	100 - 80	0.381	85	0.0240	0.0968
T6	80 - 60	0.315	85	0.0045	0.0510
T7	60 - 40	0.340	85	0.0016	0.0576
T8	40 - 20	0.321	85	0.0170	0.0560
T9	20 - 5	0.199	85	0.0394	0.0471
T10	5 - 0	0.051	85	0.0471	0.0266

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Lightning Rod 5/8x4'	81	1.346	0.0851	0.2214	128053
179.00	Decibel DB809	81	1.328	0.0842	0.2204	128053
177.00	Decibel DB809	81	1.291	0.0822	0.2183	128053
171.00	12 ft Boom / Frame	81	1.182	0.0766	0.2122	71141
163.00	Celwave PD201	81	1.047	0.0699	0.2059	37932
162.75	Guy	81	1.043	0.0698	0.2057	37491
150.00	12 ft Boom / Frame	81	0.868	0.0628	0.1944	87174
127.00	Decibel DB420	77	0.596	0.0505	0.1628	67311
119.67	Guy	85	0.519	0.0444	0.1481	39316
83.00	Celwave PD201	85	0.319	0.0068	0.0546	37599
82.75	Guy	85	0.318	0.0066	0.0542	37361

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	8.059	23	0.5411	0.9292
T2	160 - 140	5.924	23	0.4743	0.8489
T3	140 - 120	4.171	23	0.4157	0.7707
T4	120 - 100	2.697	17	0.3199	0.6354
T5	100 - 80	1.932	56	0.2029	0.4268
T6	80 - 60	1.620	56	0.1084	0.2448
T7	60 - 40	1.675	56	0.0537	0.2587
T8	40 - 20	1.526	56	0.0897	0.2375
T9	20 - 5	0.928	56	0.1871	0.1851
T10	5 - 0	0.237	56	0.2200	0.1116

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Lightning Rod 5/8x4'	23	8.059	0.5411	0.9292	29656
179.00	Decibel DB809	23	7.947	0.5376	0.9250	29656
177.00	Decibel DB809	23	7.724	0.5304	0.9165	29656
171.00	12 ft Boom / Frame	23	7.063	0.5093	0.8911	16476
163.00	Celwave PD201	23	6.221	0.4832	0.8585	8769
162.75	Guy	23	6.196	0.4824	0.8577	8660
150.00	12 ft Boom / Frame	23	5.016	0.4475	0.8142	10909
127.00	Decibel DB420	18	3.155	0.3552	0.6915	8519
119.67	Guy	17	2.678	0.3181	0.6325	5825
83.00	Celwave PD201	56	1.640	0.1204	0.2596	7444
82.75	Guy	56	1.638	0.1193	0.2581	7412

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.7500	4	13.47	29820.60	0.000 ✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	2081.29	5904.86	0.352 ✓	1	Member Bearing
		Top Girt	A325N	0.5000	1	16.26	5904.86	0.003 ✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	361.29	3967.20	0.091 ✓	1	Member Bearing
T2	160	Leg	A325N	0.7500	4	1400.53	29820.60	0.047 ✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1158.32	6681.60	0.173 ✓	1	Member Bearing
		Top Girt	A325N	0.5000	1	423.30	5904.86	0.072 ✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	310.95	3967.20	0.078 ✓	1	Member Bearing
T3	140	Leg	A325N	0.7500	4	1487.80	29820.60	0.050 ✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1693.12	6681.60	0.253 ✓	1	Member Bearing
		Top Girt	A325N	0.5000	1	423.71	5904.86	0.072 ✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	423.71	3967.20	0.107 ✓	1	Member Bearing
T4	120	Leg	A325N	0.7500	4	2039.62	29820.60	0.068 ✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	987.43	6681.60	0.148 ✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	525.41	3967.20	0.132 ✓	1	Member Bearing
T5	100	Leg	A325N	0.7500	4	2529.02	29820.60	0.085 ✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1740.35	6681.60	0.260 ✓	1	Member Bearing
		Top Girt	A325N	0.5000	1	712.34	5904.86	0.121 ✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	712.34	3967.20	0.180 ✓	1	Member Bearing
		Torque Arm Top@82.75	A325N	0.7500	2	2120.69	16077.60	0.132 ✓	1	Member Bearing
T6	80	Leg	A325N	0.7500	4	3428.39	29820.60	0.115 ✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	2038.00	5904.86	0.345 ✓	1	Member Bearing
		Top Girt	A325N	0.5000	1	856.57	5904.86	0.145 ✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	712.58	3967.20	0.180 ✓	1	Member Bearing
T7	60	Leg	A325N	0.7500	4	3357.28	29820.60	0.113 ✓	1	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325N	0.5000	1	1243.24	6681.60	0.186 ✔	1	Member Bearing
		Top Girt	A325N	0.5000	1	775.11	5904.86	0.131 ✔	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	775.11	3967.20	0.195 ✔	1	Member Bearing
T8	40	Leg	A325N	0.7500	4	3730.23	29820.60	0.125 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	684.62	6681.60	0.102 ✔	1	Member Bearing
		Top Girt	A325N	0.5000	1	790.25	5904.86	0.134 ✔	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	790.25	3967.20	0.199 ✔	1	Member Bearing
T9	20	Leg	A325N	0.7500	4	3778.39	29820.60	0.127 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1137.47	5904.86	0.193 ✔	1	Member Bearing
		Top Girt	A325N	0.5000	1	785.32	5904.86	0.133 ✔	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	3694.05	3967.20	0.931 ✔	1	Member Bearing
T10	5	Leg	A325N	0.7500	4	3568.69	29820.60	0.120 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1671.62	5904.86	0.283 ✔	1	Member Bearing
		Top Girt	A325N	0.5000	1	4009.92	5904.86	0.679 ✔	1	Member Bearing

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T_u lb	Allowable ϕT_n lb	Required S.F.	Actual S.F.
T1	162.75 (A) (462)	3/4 EHS	5830.00	58299.91	14593.30	34980.00	1.000	2.397 ✔
	162.75 (B) (461)	3/4 EHS	5830.00	58299.91	14533.50	34980.00	1.000	2.407 ✔
	162.75 (C) (460)	3/4 EHS	5830.00	58299.91	14561.50	34980.00	1.000	2.402 ✔
T4	119.67 (A) (465)	1/2 EHS	2690.00	26900.04	7962.06	16140.00	1.000	2.027 ✔
	119.67 (B) (464)	1/2 EHS	2690.00	26900.04	7983.52	16140.00	1.000	2.022 ✔
	119.67 (C) (463)	1/2 EHS	2690.00	26900.04	7988.98	16140.00	1.000	2.020 ✔
T5	82.75 (A) (453)	1/2 EHS	2690.00	26900.04	7468.01	16140.00	1.000	2.161 ✔
	82.75 (A) (454)	1/2 EHS	2690.00	26900.04	7341.44	16140.00	1.000	2.198 ✔
	82.75 (B) (449)	1/2 EHS	2690.00	26900.04	7466.01	16140.00	1.000	2.162 ✔
	82.75 (B) (450)	1/2 EHS	2690.00	26900.04	7457.48	16140.00	1.000	2.164 ✔
	82.75 (C) (442)	1/2 EHS	2690.00	26900.04	7360.56	16140.00	1.000	2.193 ✔
	82.75 (C) (443)	1/2 EHS	2690.00	26900.04	7480.48	16140.00	1.000	2.158 ✔

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	Mast Stability Index	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	P2x.218	20.00	2.42	37.8 K=1.00	1.4773	1.00	-16794.20	59870.70	0.281 [1] ✔
T2	160 - 140	P2x.218	20.00	2.42	37.8 K=1.00	1.4773	1.00	-17952.60	59870.70	0.300 [1] ✔
T3	140 - 120	P2x.218	20.00	2.42	37.8 K=1.00	1.4773	1.00	-24463.00	59870.70	0.409 [1] ✔
T4	120 - 100	P2x.218	20.00	2.42	37.8 K=1.00	1.4773	1.00	-30334.60	59870.70	0.507 [1] ✔
T5	100 - 80	P2.5x.276	20.00	2.42	31.4 K=1.00	2.2535	1.00	-41127.00	94363.10	0.436 [1] ✔
T6	80 - 60	P2.5x.276	20.00	2.42	62.8 K=2.00	2.2535	1.00	-41140.60	76028.20	0.541 [1] ✔
T7	60 - 40	P2.5x.203	20.00	2.42	61.2 K=2.00	1.7040	1.00	-44751.00	58302.40	0.768 [1] ✔
T8	40 - 20	P2.5x.203	20.00	2.42	61.2 K=2.00	1.7040	1.00	-45625.30	58302.40	0.783 [1] ✔
T9	20 - 5	P2.5x.276	15.00	2.39	62.0 K=2.00	2.2535	1.00	-45340.60	76530.40	0.592 [1] ✔
T10	5 - 0	P2.5x.276	5.38	1.06	13.7 K=1.00	2.2535	0.78	-47135.30	78031.70	0.604 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN TS1.5x16 ga	4.19	3.95	92.8 K=1.00	0.2627	-1998.96	6038.67	0.331 [1] ✔
T2	160 - 140	ROHN TS1.5x16 ga	4.19	3.95	92.8 K=1.00	0.2627	-1158.32	6038.67	0.192 [1] ✔
T3	140 - 120	ROHN TS1.5x16 ga	4.19	3.95	92.8 K=1.00	0.2627	-1693.12	6038.67	0.280 [1] ✔
T4	120 - 100	ROHN TS1.5x16 ga	4.19	3.95	92.8 K=1.00	0.2627	-987.43	6038.67	0.164 [1] ✔
T5	100 - 80	ROHN TS1.5x16 ga	4.19	3.89	91.6 K=1.00	0.2627	-1740.35	6127.23	0.284 [1] ✔
T6	80 - 60	ROHN TS1.5x16 ga	4.19	3.89	91.6 K=1.00	0.2627	-2156.65	6127.23	0.352 [1] ✔
T7	60 - 40	ROHN TS1.5x16 ga	4.19	3.89	91.6 K=1.00	0.2627	-1243.24	6127.23	0.203 [1] ✔
T8	40 - 20	ROHN TS1.5x16 ga	4.19	3.89	91.6	0.2627	-684.62	6127.23	0.112 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T9	20 - 5	ROHN TS1.5x16 ga	4.17	3.88	91.2 K=1.00	0.2627	-1101.96	6153.03	0.179 [1] ✔
T10	5 - 0	ROHN TS1.5x16 ga	1.42	0.78	18.4 K=1.00	0.2627	-1043.10	10407.00	0.100 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN TS1.5x16 ga	3.42	3.22	75.8 K=1.00	0.2627	-18.00	7292.66	0.002 [1] ✔
T2	160 - 140	ROHN TS1.5x16 ga	3.42	3.22	75.8 K=1.00	0.2627	-310.95	7292.66	0.043 [1] ✔
T3	140 - 120	ROHN TS1.5x16 ga	3.42	3.22	75.8 K=1.00	0.2627	-423.71	7292.66	0.058 [1] ✔
T5	100 - 80	ROHN TS1.5x16 ga	3.42	3.18	74.8 K=1.00	0.2627	-712.34	7363.82	0.097 [1] ✔
T6	80 - 60	ROHN TS1.5x16 ga	3.42	3.18	74.8 K=1.00	0.2627	-712.58	7363.82	0.097 [1] ✔
T7	60 - 40	ROHN TS1.5x16 ga	3.42	3.18	74.8 K=1.00	0.2627	-775.11	7363.82	0.105 [1] ✔
T8	40 - 20	ROHN TS1.5x16 ga	3.42	3.18	74.8 K=1.00	0.2627	-790.25	7363.82	0.107 [1] ✔
T9	20 - 5	ROHN TS1.5x16 ga	3.42	3.18	74.8 K=1.00	0.2627	-785.32	7363.82	0.107 [1] ✔
T10	5 - 0	ROHN TS1.5x16 ga	3.36	3.12	73.5 K=1.00	0.2627	-861.14	7460.76	0.115 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN TS1.5x16 ga	3.42	3.22	75.8 K=1.00	0.2627	-290.88	7292.66	0.040 [1] ✔
T2	160 - 140	ROHN TS1.5x16 ga	3.42	3.22	75.8 K=1.00	0.2627	-310.95	7292.66	0.043 [1] ✔
T3	140 - 120	ROHN TS1.5x16 ga	3.42	3.22	75.8 K=1.00	0.2627	-423.71	7292.66	0.058 [1] ✔
T4	120 - 100	ROHN TS1.5x16 ga	3.42	3.22	75.8 K=1.00	0.2627	-525.41	7292.66	0.072 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T5	100 - 80	ROHN TS1.5x16 ga	3.42	3.18	74.8 K=1.00	0.2627	-712.34	7363.82	0.097 [1]
T6	80 - 60	ROHN TS1.5x16 ga	3.42	3.18	74.8 K=1.00	0.2627	-712.58	7363.82	0.097 [1]
T7	60 - 40	ROHN TS1.5x16 ga	3.42	3.18	74.8 K=1.00	0.2627	-775.11	7363.82	0.105 [1]
T8	40 - 20	ROHN TS1.5x16 ga	3.42	3.18	74.8 K=1.00	0.2627	-790.25	7363.82	0.107 [1]
T9	20 - 5	ROHN TS1.5x16 ga	3.42	3.18	74.8 K=1.00	0.2627	-785.32	7363.82	0.107 [1]

[1] P_u / ϕP_n controls

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T5	100 - 80	L1 1/2x1 1/2x3/16	3.42	3.18	130.1 K=1.00	0.5273	-1761.99	7008.98	0.251 [1]

[1] P_u / ϕP_n controls

Top Guy Pull-Off Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T5	100 - 80	L1 1/2x1 1/2x3/16	0.00	711.05	0.000	0.00	368.03	0.000

Top Guy Pull-Off Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T5	100 - 80	L1 1/2x1 1/2x3/16	0.251	0.000	0.000	0.251 [1]	1.000	4.8.1

[1] P_u / ϕP_n controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T5	100 - 80 (444)	C10x15.3	3.50	3.38	56.9 K=1.00	4.4900	-361.84	122682.00	0.003
T5	100 - 80 (445)	C10x15.3	3.50	3.38	56.9 K=1.00	4.4900	-363.40	122682.00	0.003
T5	100 - 80 (451)	C10x15.3	3.50	3.38	56.9 K=1.00	4.4900	-618.69	122682.00	0.005
T5	100 - 80 (452)	C10x15.3	3.50	3.38	56.9 K=1.00	4.4900	-840.71	122682.00	0.007
T5	100 - 80 (455)	C10x15.3	3.50	3.38	56.9 K=1.00	4.4900	-595.66	122682.00	0.005
T5	100 - 80 (456)	C10x15.3	3.50	3.38	56.9 K=1.00	4.4900	-830.32	122682.00	0.007

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T5	100 - 80 (444)	C10x15.3	-8692.92	41799.58	0.208	0.00	4698.00	0.000
T5	100 - 80 (445)	C10x15.3	-8648.58	41799.58	0.207	-0.00	4698.00	0.000
T5	100 - 80 (451)	C10x15.3	-8633.33	41799.58	0.207	0.00	4698.00	0.000
T5	100 - 80 (452)	C10x15.3	-8553.83	41799.58	0.205	0.00	4698.00	0.000
T5	100 - 80 (455)	C10x15.3	-8619.25	41799.58	0.206	-0.00	4698.00	0.000
T5	100 - 80 (456)	C10x15.3	-8584.00	41799.58	0.205	-0.00	4698.00	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T5	100 - 80 (444)	C10x15.3	0.003	0.208	0.000	0.209 ✔	1.000	4.8.1 ✔
T5	100 - 80 (445)	C10x15.3	0.003	0.207	0.000	0.208 ✔	1.000	4.8.1 ✔
T5	100 - 80 (451)	C10x15.3	0.005	0.207	0.000	0.209 ✔	1.000	4.8.1 ✔
T5	100 - 80 (452)	C10x15.3	0.007	0.205	0.000	0.208 ✔	1.000	4.8.1 ✔
T5	100 - 80 (455)	C10x15.3	0.005	0.206	0.000	0.209 ✔	1.000	4.8.1 ✔
T5	100 - 80 (456)	C10x15.3	0.007	0.205	0.000	0.209 ✔	1.000	4.8.1 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	P2x.218	20.00	2.42	37.8	1.4773	10812.30	66476.60	0.163 [1] ✔
T2	160 - 140	P2x.218	20.00	2.42	37.8	1.4773	1285.53	66476.60	0.019 [1] ✔
T3	140 - 120	P2x.218	20.00	2.42	37.8	1.4773	1602.97	66476.60	0.024 [1] ✔
T4	120 - 100	P2x.218	20.00	2.42	37.8	1.4773	1602.21	66476.60	0.024 [1] ✔
T5	100 - 80	P2.5x.276	20.00	2.42	31.4	2.2535	1954.27	101409.00	0.019 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN TS1.5x16 ga	4.19	3.95	92.8	0.2627	2081.29	10641.40	0.196 [1] ✔
T2	160 - 140	ROHN TS1.5x16 ga	4.19	3.95	92.8	0.2627	1016.06	10641.40	0.095 [1] ✔
T3	140 - 120	ROHN TS1.5x16 ga	4.19	3.95	92.8	0.2627	1417.73	10641.40	0.133 [1] ✔
T4	120 - 100	ROHN TS1.5x16 ga	4.19	3.95	92.8	0.2627	852.99	10641.40	0.080 [1] ✔
T5	100 - 80	ROHN TS1.5x16 ga	4.19	3.89	91.6	0.2627	1199.61	10641.40	0.113 [1] ✔
T6	80 - 60	ROHN TS1.5x16 ga	4.19	3.89	91.6	0.2627	2038.00	10641.40	0.192 [1] ✔
T7	60 - 40	ROHN TS1.5x16 ga	4.19	3.89	91.6	0.2627	1089.11	10641.40	0.102 [1] ✔
T8	40 - 20	ROHN TS1.5x16 ga	4.19	3.89	91.6	0.2627	590.03	10641.40	0.055 [1] ✔
T9	20 - 5	ROHN TS1.5x16 ga	4.17	3.88	91.2	0.2627	1137.47	10641.40	0.107 [1] ✔
T10	5 - 0	ROHN TS1.5x16 ga	3.19	1.61	37.8	0.2627	1671.62	10641.40	0.157 [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 lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN TS1.5x16 ga	3.42	3.22	75.8	0.2627	16.26	10641.40	0.002 [1] ✔
T2	160 - 140	ROHN TS1.5x16 ga	3.42	3.22	75.8	0.2627	423.30	10641.40	0.040 [1] ✔
T3	140 - 120	ROHN TS1.5x16 ga	3.42	3.22	75.8	0.2627	423.71	10641.40	0.040 [1] ✔
T5	100 - 80	ROHN TS1.5x16 ga	3.42	3.18	74.8	0.2627	712.34	10641.40	0.067 [1] ✔
T6	80 - 60	ROHN TS1.5x16 ga	3.42	3.18	74.8	0.2627	856.57	10641.40	0.080 [1] ✔
T7	60 - 40	ROHN TS1.5x16 ga	3.42	3.18	74.8	0.2627	775.11	10641.40	0.073 [1] ✔
T8	40 - 20	ROHN TS1.5x16 ga	3.42	3.18	74.8	0.2627	790.25	10641.40	0.074 [1] ✔
T9	20 - 5	ROHN TS1.5x16 ga	3.42	3.18	74.8	0.2627	785.32	10641.40	0.074 [1] ✔
T10	5 - 0	ROHN TS1.5x16 ga	3.36	3.12	73.5	0.2627	4009.92	10641.40	0.377 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN TS1.5x16 ga	3.42	3.22	75.8	0.2627	361.29	10641.40	0.034 [1] ✔
T2	160 - 140	ROHN TS1.5x16 ga	3.42	3.22	75.8	0.2627	310.95	10641.40	0.029 [1] ✔
T3	140 - 120	ROHN TS1.5x16 ga	3.42	3.22	75.8	0.2627	423.71	10641.40	0.040 [1] ✔
T4	120 - 100	ROHN TS1.5x16 ga	3.42	3.22	75.8	0.2627	525.41	10641.40	0.049 [1] ✔
T5	100 - 80	ROHN TS1.5x16 ga	3.42	3.18	74.8	0.2627	712.34	10641.40	0.067 [1] ✔
T6	80 - 60	ROHN TS1.5x16 ga	3.42	3.18	74.8	0.2627	712.58	10641.40	0.067 [1] ✔
T7	60 - 40	ROHN TS1.5x16 ga	3.42	3.18	74.8	0.2627	775.11	10641.40	0.073 [1] ✔
T8	40 - 20	ROHN TS1.5x16 ga	3.42	3.18	74.8	0.2627	790.25	10641.40	0.074 [1] ✔
T9	20 - 5	ROHN TS1.5x16 ga	3.42	3.18	74.8	0.2627	3694.05	10641.40	0.347 [1] ✔

[1] P_u / ϕP_n controls

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	3x1/2	3.42	3.22	267.9	1.5000	4661.73	48600.00	0.096 [1]
T4	120 - 100	3x1/2	3.42	3.22	267.9	1.5000	3447.08	48600.00	0.071 [1]
T5	100 - 80	L1 1/2x1 1/2x3/16	3.42	3.18	83.6	0.5273	2641.60	17085.90	0.155 [1]

[1] $P_u / \phi P_n$ controls

Top Guy Pull-Off Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	180 - 160	3x1/2	0.00	3037.50	0.000	0.00	506.25	0.000
T4	120 - 100	3x1/2	0.00	3037.50	0.000	0.00	506.25	0.000
T5	100 - 80	L1 1/2x1 1/2x3/16	0.00	711.05	0.000	0.00	368.03	0.000

Top Guy Pull-Off Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	180 - 160	3x1/2	0.096	0.000	0.000	0.096 [1] ✔	1.000	4.8.1 ✔
T4	120 - 100	3x1/2	0.071	0.000	0.000	0.071 [1] ✔	1.000	4.8.1 ✔
T5	100 - 80	L1 1/2x1 1/2x3/16	0.155	0.000	0.000	0.155 [1] ✔	1.000	4.8.1 ✔

[1] $P_u / \phi P_n$ controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T5	100 - 80 (444)	C10x15.3	3.50	3.38	56.9	4.4900	2399.53	145476.00	0.016
T5	100 - 80 (445)	C10x15.3	3.50	3.38	56.9	4.4900	2426.68	145476.00	0.017
T5	100 - 80 (451)	C10x15.3	3.50	3.38	56.9	4.4900	2390.75	145476.00	0.016
T5	100 - 80 (452)	C10x15.3	3.50	3.38	56.9	4.4900	2291.52	145476.00	0.016
T5	100 - 80 (455)	C10x15.3	3.50	3.38	56.9	4.4900	2386.61	145476.00	0.016
T5	100 - 80 (456)	C10x15.3	3.50	3.38	56.9	4.4900	2289.71	145476.00	0.016

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T5	100 - 80 (444)	C10x15.3	-14881.75	41799.58	0.356	0.00	4698.00	0.000
T5	100 - 80 (445)	C10x15.3	-14800.83	41799.58	0.354	-0.00	4698.00	0.000
T5	100 - 80 (451)	C10x15.3	-14927.50	41799.58	0.357	0.00	4698.00	0.000
T5	100 - 80 (452)	C10x15.3	-14793.08	41799.58	0.354	0.00	4698.00	0.000
T5	100 - 80 (455)	C10x15.3	-14892.92	41799.58	0.356	-0.00	4698.00	0.000
T5	100 - 80 (456)	C10x15.3	-14804.50	41799.58	0.354	-0.00	4698.00	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T5	100 - 80 (444)	C10x15.3	0.016	0.356	0.000	0.364 ✔	1.000	4.8.1 ✔
T5	100 - 80 (445)	C10x15.3	0.017	0.354	0.000	0.362 ✔	1.000	4.8.1 ✔
T5	100 - 80 (451)	C10x15.3	0.016	0.357	0.000	0.365 ✔	1.000	4.8.1 ✔
T5	100 - 80 (452)	C10x15.3	0.016	0.354	0.000	0.362 ✔	1.000	4.8.1 ✔
T5	100 - 80 (455)	C10x15.3	0.016	0.356	0.000	0.364 ✔	1.000	4.8.1 ✔
T5	100 - 80 (456)	C10x15.3	0.016	0.354	0.000	0.362 ✔	1.000	4.8.1 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	180 - 160	Leg	P2x.218	2	-16794.20	59870.70	28.1	Pass
		Diagonal	ROHN TS1.5x16 ga	29	-1998.96	6038.67	33.1 35.2 (b)	Pass
		Top Girt	ROHN TS1.5x16 ga	5	-18.00	7292.66	0.4	Pass
		Bottom Girt	ROHN TS1.5x16 ga	7	-290.88	7292.66	4.0 9.1 (b)	Pass
		Guy A@162.75	3/4	462	14593.30	34980.00	41.7	Pass
		Guy B@162.75	3/4	461	14533.50	34980.00	41.5	Pass
		Guy C@162.75	3/4	460	14561.50	34980.00	41.6	Pass
		Top Guy Pull-Off@162.75	3x1/2	457	4661.73	48600.00	9.6	Pass
T2	160 - 140	Leg	P2x.218	59	-17952.60	59870.70	30.0	Pass
		Diagonal	ROHN TS1.5x16 ga	113	-1158.32	6038.67	19.2	Pass
		Top Girt	ROHN TS1.5x16 ga	61	-310.95	7292.66	4.3 7.2 (b)	Pass
		Bottom Girt	ROHN TS1.5x16 ga	64	-310.95	7292.66	4.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
							7.8 (b)	
T3	140 - 120	Leg	P2x.218	116	-24463.00	59870.70	40.9	Pass
		Diagonal	ROHN TS1.5x16 ga	124	-1693.12	6038.67	28.0	Pass
		Top Girt	ROHN TS1.5x16 ga	118	-423.71	7292.66	5.8	Pass
							7.2 (b)	
		Bottom Girt	ROHN TS1.5x16 ga	121	-423.71	7292.66	5.8	Pass
							10.7 (b)	
T4	120 - 100	Leg	P2x.218	173	-30334.60	59870.70	50.7	Pass
		Diagonal	ROHN TS1.5x16 ga	181	-987.43	6038.67	16.4	Pass
		Bottom Girt	ROHN TS1.5x16 ga	178	-525.41	7292.66	7.2	Pass
							13.2 (b)	
		Guy A@119.667	1/2	465	7962.06	16140.00	49.3	Pass
		Guy B@119.667	1/2	464	7983.52	16140.00	49.5	Pass
		Guy C@119.667	1/2	463	7988.98	16140.00	49.5	Pass
		Top Guy Pull-Off@119.667	3x1/2	175	3447.08	48600.00	7.1	Pass
T5	100 - 80	Leg	P2.5x.276	230	-41127.00	94363.10	43.6	Pass
		Diagonal	ROHN TS1.5x16 ga	240	-1740.35	6127.23	28.4	Pass
		Top Girt	ROHN TS1.5x16 ga	232	-712.34	7363.82	9.7	Pass
							12.1 (b)	
		Bottom Girt	ROHN TS1.5x16 ga	235	-712.34	7363.82	9.7	Pass
							18.0 (b)	
		Guy A@82.75	1/2	453	7468.01	16140.00	46.3	Pass
		Guy B@82.75	1/2	449	7466.01	16140.00	46.3	Pass
		Guy C@82.75	1/2	443	7480.48	16140.00	46.3	Pass
		Top Guy Pull-Off@82.75	L1 1/2x1 1/2x3/16	447	-1761.99	7008.98	25.1	Pass
		Torque Arm Top@82.75	C10x15.3	451	2390.75	145476.00	36.5	Pass
T6	80 - 60	Leg	P2.5x.276	287	-41140.60	76028.20	54.1	Pass
		Diagonal	ROHN TS1.5x16 ga	317	-2156.65	6127.23	35.2	Pass
		Top Girt	ROHN TS1.5x16 ga	289	-712.58	7363.82	9.7	Pass
							14.5 (b)	
		Bottom Girt	ROHN TS1.5x16 ga	292	-712.58	7363.82	9.7	Pass
							18.0 (b)	
T7	60 - 40	Leg	P2.5x.203	320	-44751.00	58302.40	76.8	Pass
		Diagonal	ROHN TS1.5x16 ga	350	-1243.24	6127.23	20.3	Pass
		Top Girt	ROHN TS1.5x16 ga	322	-775.11	7363.82	10.5	Pass
							13.1 (b)	
		Bottom Girt	ROHN TS1.5x16 ga	325	-775.11	7363.82	10.5	Pass
							19.5 (b)	
T8	40 - 20	Leg	P2.5x.203	353	-45625.30	58302.40	78.3	Pass
		Diagonal	ROHN TS1.5x16 ga	362	-684.62	6127.23	11.2	Pass
		Top Girt	ROHN TS1.5x16 ga	355	-790.25	7363.82	10.7	Pass
							13.4 (b)	
		Bottom Girt	ROHN TS1.5x16 ga	358	-790.25	7363.82	10.7	Pass
							19.9 (b)	
T9	20 - 5	Leg	P2.5x.276	386	-45340.60	76530.40	59.2	Pass
		Diagonal	ROHN TS1.5x16 ga	395	-1101.96	6153.03	17.9	Pass
							19.3 (b)	
		Top Girt	ROHN TS1.5x16 ga	388	-785.32	7363.82	10.7	Pass
							13.3 (b)	
		Bottom Girt	ROHN TS1.5x16 ga	392	3694.05	10641.40	34.7	Pass
							93.1 (b)	
T10	5 - 0	Leg	P2.5x.276	413	-47135.30	78031.70	60.4	Pass
		Diagonal	ROHN TS1.5x16 ga	439	1671.62	10641.40	15.7	Pass
							28.3 (b)	
		Top Girt	ROHN TS1.5x16 ga	416	4009.92	10641.40	37.7	Pass
							67.9 (b)	
							Summary	
						Leg (T8)	78.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
						Diagonal (T1)	35.2	Pass
						Top Girt (T10)	67.9	Pass
						Bottom Girt (T9)	93.1	Pass
						Guy A (T4)	49.3	Pass
						Guy B (T4)	49.5	Pass
						Guy C (T4)	49.5	Pass
						Top Guy Pull-Off (T5)	25.1	Pass
						Torque Arm Top (T5)	36.5	Pass
						Bolt Checks	93.1	Pass
						RATING =	**93.1**	**Pass**

Site Name:	**Hampden Road**
Client:	**CDT**
Job Number:	**121-23082**
Date:	**9/6/2021**

Design Base Loads (Factored) per TIA-222-G

Moment (M_u):	0.0	k-ft
Shear/Leg (V_u):	1.3	k
Compression/Leg (P_u):	127.8	k
Uplift/Leg (T_u):	0.0	k
Diameter of Prismatic Portion of Pier (d):	1.0	ft
Depth to Base of Foundation:	4.0	ft
Pier Height Above Ground (h):	1.7	ft
Length / Width of Pad (w):	5.0	ft
Thickness of Pad (t):	4.0	ft
Depth Below Ground Surface to Water Table (w):	20.0	ft
Unit Weight of Concrete:	150.0	pcf
Unit Weight of Water:	62.4	pcf
Unit Weight of Soil Above Water Table:	120.0	pcf
Unit Weight of Soil Below Water Table:	65.0	pcf
Friction Angle of Uplift from Top of Pad:	30	Degrees
Friction Angle of Uplift from Base of Pad:	30	Degrees
Uplift Angle Started at Top or Base of Pad (T/B):	T	
Ultimate Skin Friction:	0	psf
Ultimate Compressive Bearing Pressure:	10000	psf
Capacity Increase (Due to Transient Loads):	1.00	
Bearing Strength Reduction Factor (ϕ_s):	0.60	
Uplift Strength Reduction Factor (ϕ_s):	0.75	

Axial Capacities

Nominal Uplift Capacity per Leg ($\phi_s T_n$):	11.4	k
Nominal Compressive Capacity per Leg ($\phi_s P_n$):	150.0	k
P_u:	131.6	k
$T_u/\phi_s T_n$:	0.00	Result: OK
$P_u/\phi_s P_n$:	0.88	Result: OK

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

T-Mobile Site #: CTHA830A

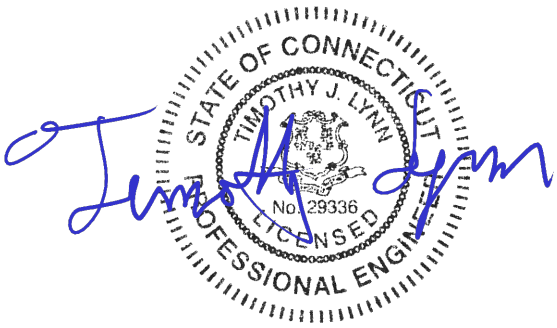
157 Hampden Road
Stafford Springs, CT

Centek Project No. 21005.22

~~Date: May 4, 2021~~

Rev 1: August 11, 2021

Max Stress Ratio = 70.8%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

August 11, 2021

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

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CTHA830A
157 Hampden Road
Stafford Springs, CT 06076

Centek Project No. 21005.22

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 proposed mount, consisting of three (3) V-frame sector mounts (SitePro P/N: VFA12) to support the proposed 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 4480 remote radio heads and three (3) Ericsson 4460 remote radio heads mounted on three (3) V-Frames with a RAD center elevation of 171-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 97 mph for Stafford 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

Prepared by:

Fernando J. Palacios
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: Loads on Equipment

Location: Stafford Springs, CT

Rev. 0: 08/04/2021

Prepared by: F.J.P.. Checked by: T.J.L.
Job No. 21005.22

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

Wind Speeds

Basic Wind Speed	$V := 97$	mph	(User Input - 2018 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 =	$h := 180$	ft	(User Input)
Height to Center of Antennas =	$z := 171$	ft	(User Input)
Radial Ice Thickness =	$t_i := 1.00$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topographic Factor =	$K_{zt} := 1.0$		(User Input)
	$K_a := 1.0$		(User Input)
Gust Response Factor =	$G_H = 1.12$		(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)

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

Importance Factors =

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

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

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

$$K_{iz} := \left(\frac{z}{33}\right)^{0.1} = 1.179$$

Velocity Pressure Coefficient Antennas =

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.358$$

$$Kz := 2.01 \cdot \left(\left(\frac{z}{zg}\right)\right)^{\overline{\alpha}} = 1.417$$

Velocity Pressure w/o Ice Antennas = $qz := 0.00256 \cdot K_d \cdot Kz \cdot V^2 \cdot I_{Wind} = 29$ psf

Velocity Pressure with Ice Antennas = $qz_{ice} := 0.00256 \cdot K_d \cdot Kz \cdot V_i^2 \cdot I_{Wind} = 8$ psf

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAALL24_43-U-NA20		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24.0$	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 Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 658$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.7$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 233$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 20.1$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 219$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 9.2$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 101$	lbs

Gravity Load (without ice)

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

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \cdot 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 2 \cdot 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 603$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 603$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson - AIR6449 B41		
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 Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 184$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 74$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.6$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 69$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3.4$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 35$	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 =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 6778$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 220$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 220$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 4480 B71+B85		
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 =	$N_{RRUS} := 1$		
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 =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 93$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 44$	lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 3.8$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 39$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 2.2$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 23$	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 =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 4045$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 131$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 131$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 4460 B25+B66		
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 =	$N_{RRUS} := 1$		
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 =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 83$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.6$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 64$	lbs

Wind Load (with ice)

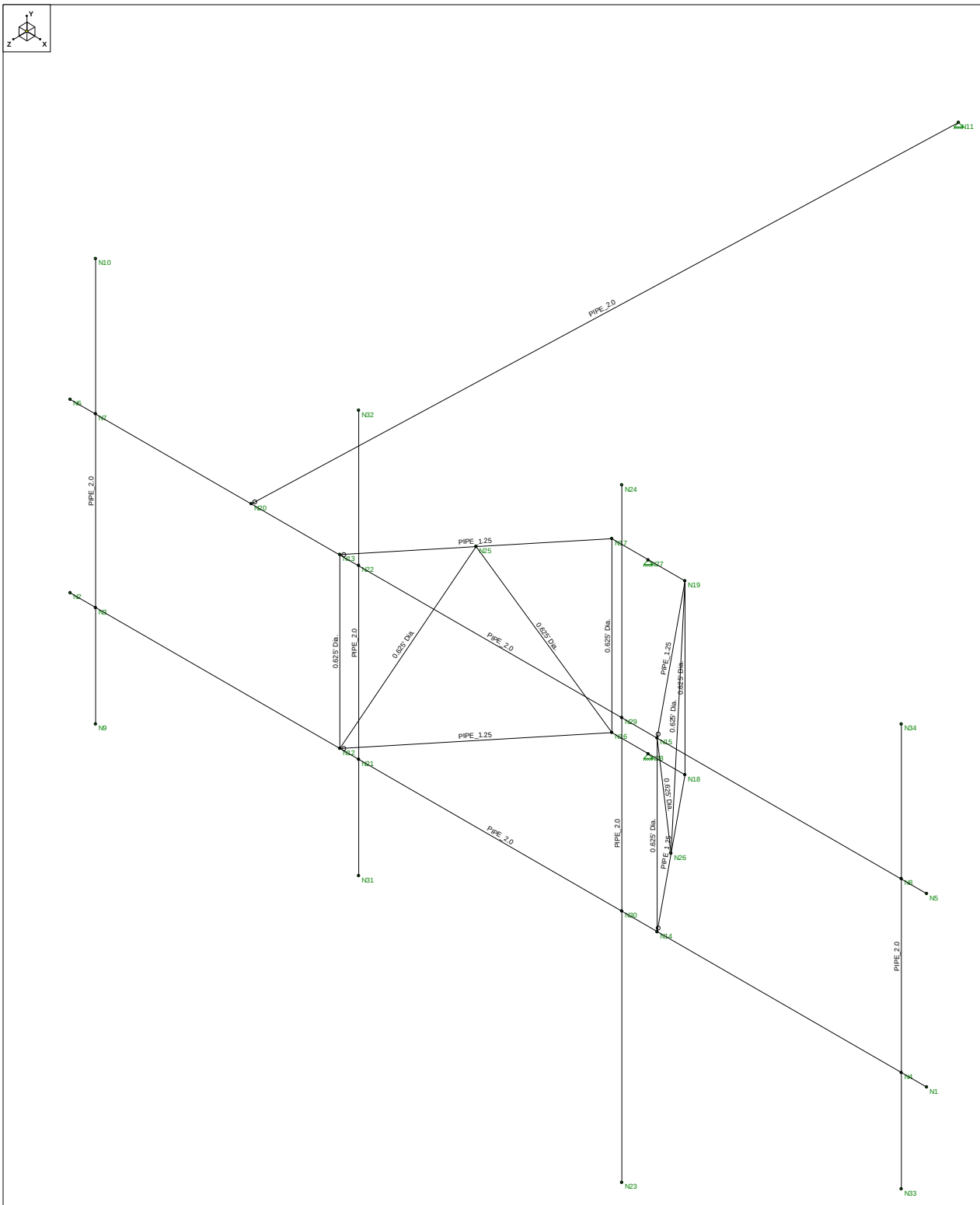
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 3.4$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 36$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 2.8$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 29$	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 =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 4624$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 150$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 150$	lbs



Envelope Only Solution

Centek Engineering		
FJP	CTHA830A	Aug 11, 2021 at 3:49 PM
21005.22	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

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1...	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 Grad...	Typical	1.02	.627	.627	1.25
2	2" Pipe	PIPE_2.0	Beam	Pipe	A53 Grad...	Typical	1.02	.627	.627	1.25
3	1" Pipe	PIPE_1.0	Beam	Pipe	A53 Grad...	Typical	.469	.083	.083	.166
4	Outrigger_1.25" Pipe	PIPE_1.25	Beam	Pipe	A53 Grad...	Typical	.625	.184	.184	.368
5	Stabilizer	PIPE_2.0	Beam	Pipe	A53 Grad...	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	12.75	Segment	Segment	Lbyy			2.1	2.1		Lateral
2	M2	2" Pipe	12.75	Segment	Segment	Lbyy			2.1	2.1		Lateral
3	M3	Stabilizer	10.186			Lbyy			1	1		Lateral
4	M4	Outrigger_...	2.88	Segment	Segment	Lbyy			.8	.8		Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
5	M5	Outrigger_...	2.88	Segment	Segment	Lbyy			.8	.8		Lateral
6	M6	Outrigger_...	2.88	Segment	Segment	Lbyy			.8	.8		Lateral
7	M7	Outrigger_...	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 M...	6	Segment	Segment	Lbyy			2.1	2.1		Lateral
17	M17	Antenna M...	9	Segment	Segment	Lbyy			2.1	2.1		Lateral
18	M20	Antenna M...	6	Segment	Segment	Lbyy			2.1	2.1		Lateral
19	M21	Antenna M...	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 ...
1	M1	N2	N1			2" Pipe	Beam	Pipe	A53 Gr...	Typical
2	M2	N6	N5			2" Pipe	Beam	Pipe	A53 Gr...	Typical
3	M3	N20	N11			Stabilizer	Beam	Pipe	A53 Gr...	Typical
4	M4	N13	N17			Outrigger_1.25" Pipe	Beam	Pipe	A53 Gr...	Typical
5	M5	N12	N16			Outrigger_1.25" Pipe	Beam	Pipe	A53 Gr...	Typical
6	M6	N14	N18			Outrigger_1.25" Pipe	Beam	Pipe	A53 Gr...	Typical
7	M7	N15	N19			Outrigger_1.25" Pipe	Beam	Pipe	A53 Gr...	Typical
8	M8	N13	N12			.625" Bar	Colu...	BAR	A36 Gr...	Typical
9	M9	N15	N14			.625" Bar	Colu...	BAR	A36 Gr...	Typical
10	M10	N12	N25			.625" Bar	Colu...	BAR	A36 Gr...	Typical
11	M11	N25	N16			.625" Bar	Colu...	BAR	A36 Gr...	Typical
12	M12	N19	N26			.625" Bar	Colu...	BAR	A36 Gr...	Typical
13	M13	N26	N15			.625" Bar	Colu...	BAR	A36 Gr...	Typical
14	M14	N19	N18			.625" Bar	Colu...	BAR	A36 Gr...	Typical
15	M15	N17	N16			.625" Bar	Colu...	BAR	A36 Gr...	Typical
16	M16	N10	N9			Antenna Mast	Colu...	Pipe	A53 Gr...	Typical
17	M17	N24	N23			Antenna Mast	Colu...	Pipe	A53 Gr...	Typical
18	M18	N17	N19			RIGID	None	None	RIGID	Typical
19	M19	N16	N18			RIGID	None	None	RIGID	Typical
20	M20	N32	N31			Antenna Mast	Colu...	Pipe	A53 Gr...	Typical
21	M21	N34	N33			Antenna Mast	Colu...	Pipe	A53 Gr...	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
1	N1	12.375	.5	2.230259	0	
2	N2	-.375	.5	2.230259	0	
3	N3	0	.5	2.230259	0	
4	N4	12	.5	2.230259	0	
5	N5	12.375	3	2.230259	0	
6	N6	-.375	3	2.230259	0	
7	N7	0	3	2.230259	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
8	N8	12	3	2.230259	0	
9	N9	0	-1	2.230259	0	
10	N10	0	5	2.230259	0	
11	N11	2.67	3	-7.949741	0	
12	N12	3.635258	.5	2.230259	0	
13	N13	3.635258	3	2.230259	0	
14	N14	8.364742	.5	2.230259	0	
15	N15	8.364742	3	2.230259	0	
16	N16	5.457714	.5	-0.000003	0	
17	N17	5.457714	3	-0.000003	0	
18	N18	6.542286	.5	0.000003	0	
19	N19	6.542286	3	0.000003	0	
20	N20	2.318333	3	2.230259	0	
21	N21	3.916667	.5	2.230259	0	
22	N22	3.916667	3	2.230259	0	
23	N23	7.833333	-3	2.230259	0	
24	N24	7.833333	6	2.230259	0	
25	N25	4.546486	3	1.115128	0	
26	N26	7.453514	.5	1.115131	0	
27	N27	6.	3	-0.	0	
28	N28	6.	.5	-0.	0	
29	N29	7.833334	3	2.230259	0	
30	N30	7.833334	.5	2.230259	0	
31	N31	3.916667	-1	2.230259	0	
32	N32	3.916667	5	2.230259	0	
33	N33	12	-1	2.230259	0	
34	N34	12	5	2.230259	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	N11	Reaction	Reaction	Reaction			
2	N16						
3	N17						
4	N18						
5	N19						
6	N27	Reaction	Reaction	Reaction			
7	N28	Reaction	Reaction	Reaction			
8	N21						
9	N22						
10	N29						
11	N30						

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
3	M17	Y	-.075	.5
4	M17	Y	-.075	7.5
5	M17	Y	-.109	3

Member Point Loads (BLC 2 : Dead Load) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
6	M17	Y	-.084	6

Member Point Loads (BLC 3 : Ice Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Y	-.11	.5
2	M16	Y	-.11	3
3	M17	Y	-.302	.5
4	M17	Y	-.302	7.5
5	M17	Y	-.15	3
6	M17	Y	-.131	6

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	X	.018	.5
2	M16	X	.018	3
3	M17	X	.051	.5
4	M17	X	.051	7.5
5	M17	X	.029	3
6	M17	X	.023	6

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	X	.037	.5
2	M16	X	.037	3
3	M17	X	.117	.5
4	M17	X	.117	7.5
5	M17	X	.064	3
6	M17	X	.044	6

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Z	.035	.5
2	M16	Z	.035	3
3	M17	Z	.11	.5
4	M17	Z	.11	7.5
5	M17	Z	.064	3
6	M17	Z	.044	6

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Z	.092	.5
2	M16	Z	.092	3
3	M17	Z	.329	.5
4	M17	Z	.329	7.5
5	M17	Z	.083	3
6	M17	Z	.093	6

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M16	X	.003	.003	0	0
2	M17	X	.003	.003	0	0
3	M5	X	.003	.003	0	0
4	M4	X	.003	.003	0	0
5	M7	X	.003	.003	0	0
6	M6	X	.003	.003	0	0
7	M3	X	.003	.003	0	0
8	M20	X	.003	.003	0	0
9	M21	X	.003	.003	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M16	X	.009	.009	0	0
2	M17	X	.009	.009	0	0
3	M5	X	.009	.009	0	0
4	M4	X	.009	.009	0	0
5	M7	X	.009	.009	0	0
6	M6	X	.009	.009	0	0
7	M3	X	.009	.009	0	0
8	M20	X	.009	.009	0	0
9	M21	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/ft,F,ksf]	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
15	M20	Z	.003	.003	0	0
16	M21	Z	.003	.003	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	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

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
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
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
15	M20	Z	.009	.009	0	0
16	M21	Z	.009	.009	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	J...	Point	Distribu...	Area(M...	Surface...
1	Self Weight	DL		-1						
2	Dead Load	None					6			
3	Ice Load	None					6			
4	Wind with Ice X	None					6	9		
5	Wind X	None					6	9		
6	Wind with Ice Z	None					6	16		
7	Wind Z	None					6	16		

Load Combinations

	Description	Solve	PDelta	...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2D + 1.6W (X-directi...	Yes	Y		1	1.2	2	1.2	5	1.6																
2	0.9D + 1.6W (X-directi...	Yes	Y		1	.9	2	.9	5	1.6																
3	1.2D + 1.0Di + 1.0Wi (...	Yes	Y		1	1.2	2	1.2	3	1	4	1														
4	1.2D + 1.6W (Z-directi...	Yes	Y		1	1.2	2	1.2	7	1.6																
5	0.9D + 1.6W (Z-directi...	Yes	Y		1	.9	2	.9	7	1.6																
6	1.2D + 1.0Di + 1.0Wi (...	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	N11	max	-.002	6	.021	1	.272	4	0	6	0	6	0	6
2		min	-.048	2	.016	5	-.748	1	0	1	0	1	0	1
3	N27	max	.037	4	1.16	6	.21	2	0	6	0	6	0	6
4		min	-.817	2	.186	2	-2.579	4	0	1	0	1	0	1
5	N28	max	.097	6	.845	3	1.702	3	0	6	0	6	0	6
6		min	-.504	1	.151	5	-.518	5	0	1	0	1	0	1
7	Totals:	max	0	6	1.959	6	0	1						
8		min	-1.365	1	.64	2	-2.645	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	.185	1	-.003	3	.955	5	1.957e-3	3	8.977e-3	1	1.143e-3	3
2		min	-.198	5	-.03	5	-.608	1	-2.313e-3	5	-1.665e-2	5	-4.759e-4	5
3	N2	max	.185	1	-.047	5	.316	4	6.707e-3	5	1.517e-2	4	2.79e-3	3

Envelope Joint Displacements (Continued)

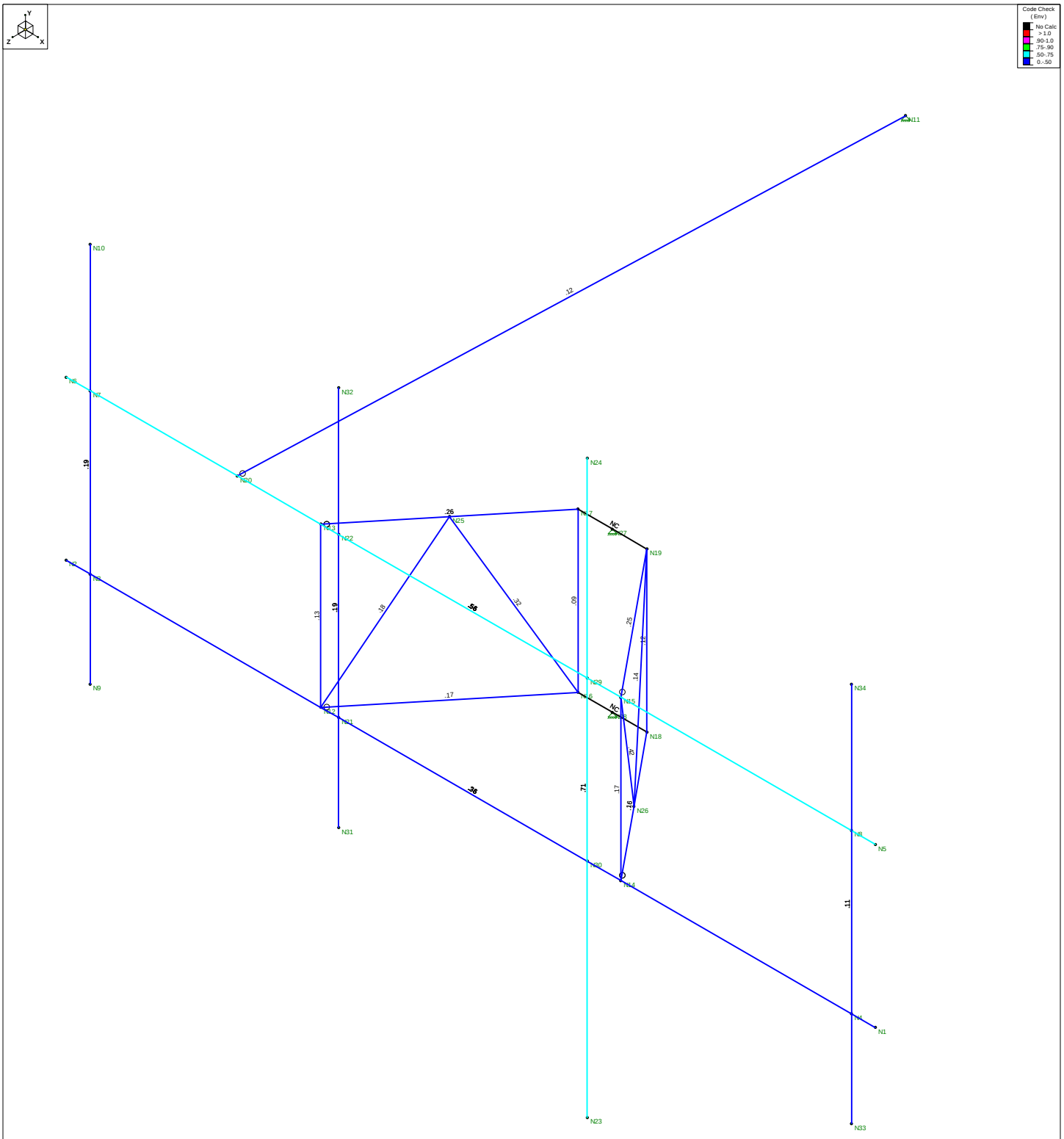
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
4		min	-.196	5	-.195	3	-.027	2	-5.356e-3	1	-5.682e-3	2	1.492e-4	5
5	N3	max	.185	1	-.046	5	.247	4	6.707e-3	5	1.517e-2	4	2.789e-3	3
6		min	-.196	5	-.183	3	-.002	2	-5.356e-3	1	-5.682e-3	2	1.489e-4	5
7	N4	max	.185	1	-.008	3	.88	5	1.957e-3	3	8.977e-3	1	1.143e-3	3
8		min	-.198	5	-.028	4	-.567	1	-2.313e-3	5	-1.665e-2	5	-4.756e-4	5
9	N5	max	.158	2	-.004	3	.954	5	2.392e-3	4	9.075e-3	1	1.022e-3	3
10		min	-.187	4	-.03	5	-.562	1	1.346e-3	2	-1.691e-2	5	-4.602e-4	5
11	N6	max	.158	2	-.046	5	.567	4	8.893e-3	5	1.817e-2	4	2.523e-3	3
12		min	-.185	4	-.194	3	-.197	2	-5.359e-3	1	-5.753e-3	2	7.828e-5	5
13	N7	max	.158	2	-.046	5	.485	4	8.893e-3	5	1.816e-2	4	2.523e-3	3
14		min	-.185	4	-.183	3	-.171	2	-5.359e-3	1	-5.753e-3	2	7.8e-5	5
15	N8	max	.158	2	-.008	3	.878	5	2.392e-3	4	9.075e-3	1	1.022e-3	3
16		min	-.187	4	-.028	4	-.521	1	1.346e-3	2	-1.69e-2	5	-4.599e-4	5
17	N9	max	.217	1	-.046	5	.129	4	6.707e-3	5	1.517e-2	4	2.806e-3	3
18		min	-.194	5	-.183	3	.092	2	-5.356e-3	1	-5.682e-3	2	1.489e-4	5
19	N10	max	.154	2	-.046	5	.727	5	1.054e-2	5	1.816e-2	4	2.386e-3	6
20		min	-.195	4	-.183	3	-.298	1	-5.363e-3	1	-5.753e-3	2	-7.193e-5	2
21	N11	max	0	6	0	6	0	6	2.073e-3	6	7.566e-3	2	5.36e-3	3
22		min	0	1	0	1	0	1	1.409e-3	2	-1.518e-3	4	1.139e-3	5
23	N12	max	.185	1	.013	3	.172	1	-4.04e-4	5	2.641e-3	4	1.772e-3	3
24		min	-.197	5	-.005	4	-.21	5	-1.543e-3	1	-3.139e-4	2	2.756e-4	5
25	N13	max	.157	2	.012	3	.125	2	3.421e-3	5	6.092e-3	4	2.098e-3	3
26		min	-.185	4	-.006	4	-.19	4	-1.538e-3	1	-4.628e-3	2	4.104e-4	5
27	N14	max	.185	1	-.007	5	.214	5	1.377e-3	3	9.245e-3	1	9.389e-4	3
28		min	-.198	5	-.045	3	-.173	1	-8.692e-3	5	-1.241e-2	5	-9.118e-5	5
29	N15	max	.158	2	-.007	5	.199	4	8.625e-3	4	8.859e-3	1	1.162e-3	3
30		min	-.187	4	-.044	3	-.128	2	1.092e-3	2	-1.242e-2	5	-1.792e-4	5
31	N16	max	0	6	.009	6	.022	1	5.223e-4	1	3.336e-3	1	4.725e-4	1
32		min	0	1	-.003	1	-.05	5	-3.054e-4	5	-7.745e-3	5	-1.324e-3	6
33	N17	max	0	6	.011	6	0	1	8.884e-4	4	-4.147e-5	1	3.762e-4	2
34		min	0	1	-.002	2	-.043	5	-2.275e-4	2	-6.623e-3	5	-1.617e-3	6
35	N18	max	0	6	.003	1	.05	5	5.223e-4	1	3.336e-3	1	4.725e-4	1
36		min	0	1	-.009	6	-.022	1	-3.054e-4	5	-7.745e-3	5	-1.324e-3	6
37	N19	max	0	6	.002	2	.043	5	8.884e-4	4	-4.147e-5	1	3.762e-4	2
38		min	0	1	-.011	6	0	1	-2.275e-4	2	-6.623e-3	5	-1.617e-3	6
39	N20	max	.157	2	-.014	2	.009	2	5.403e-3	5	1.533e-2	4	5.226e-3	3
40		min	-.185	4	-.053	6	-.008	4	-2.922e-3	1	-7.932e-3	2	1.274e-3	5
41	N21	max	.185	1	.017	3	.171	1	-1.031e-3	5	1.173e-3	6	8.636e-4	3
42		min	-.197	5	-.004	4	-.216	5	-1.284e-3	3	4.748e-4	2	-1.471e-5	5
43	N22	max	.157	2	.017	3	.138	2	3.047e-3	5	3.344e-3	4	1.154e-3	3
44		min	-.185	4	-.004	4	-.206	4	-1.264e-3	1	-2.759e-3	2	7.198e-5	5
45	N23	max	.397	1	-.007	5	.914	5	1.323e-3	3	9.148e-3	1	5.97e-3	1
46		min	-.205	5	-.052	3	-.164	1	-2.04e-2	5	-1.17e-2	5	-1.813e-4	5
47	N24	max	.354	2	-.007	5	.91	4	2.629e-2	4	8.685e-3	2	7.057e-4	6
48		min	-.186	4	-.052	3	-.033	2	1.075e-3	2	-1.173e-2	5	-7.161e-3	2
49	N25	max	.05	2	.01	3	.04	1	1.142e-3	5	6.583e-3	2	7.16e-4	1
50		min	-.089	4	0	4	-.113	5	-1.189e-3	1	-6.788e-3	4	-8.769e-4	5
51	N26	max	.076	1	-.006	5	.135	5	1.303e-3	3	7.382e-3	1	1.819e-4	1
52		min	-.103	5	-.026	3	-.084	1	-1.888e-3	5	-7.437e-3	5	-2.281e-3	5
53	N27	max	0	6	0	6	0	6	8.884e-4	4	-4.147e-5	1	3.762e-4	2
54		min	0	1	0	1	0	1	-2.275e-4	2	-6.623e-3	5	-1.617e-3	6
55	N28	max	0	6	0	6	0	6	5.223e-4	1	3.336e-3	1	4.725e-4	1

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
56		min	0	1	0	1	0	1	-3.054e-4	5	-7.745e-3	5	-1.324e-3	6
57	N29	max	.158	2	-.007	5	.124	4	9.954e-3	4	8.685e-3	2	6.994e-4	6
58		min	-.187	4	-.051	3	-.072	2	1.073e-3	2	-1.173e-2	5	-7.435e-4	2
59	N30	max	.185	1	-.007	5	.138	5	1.349e-3	3	9.148e-3	1	1.205e-3	1
60		min	-.198	5	-.051	3	-.114	1	-9.884e-3	5	-1.17e-2	5	-1.822e-4	5
61	N31	max	.195	1	.017	3	.194	1	-1.111e-3	5	1.173e-3	6	8.802e-4	3
62		min	-.197	5	-.004	4	-.196	5	-1.284e-3	3	4.748e-4	2	-1.471e-5	5
63	N32	max	.146	2	.017	3	.11	2	3.238e-3	5	3.344e-3	4	1.114e-3	3
64		min	-.191	4	-.004	4	-.131	4	-1.264e-3	1	-2.759e-3	2	7.198e-5	5
65	N33	max	.2	1	-.008	3	.923	5	1.957e-3	3	8.977e-3	1	1.16e-3	3
66		min	-.206	5	-.028	4	-.595	1	-2.393e-3	5	-1.665e-2	5	-4.756e-4	5
67	N34	max	.149	2	-.008	3	.938	4	2.583e-3	4	9.075e-3	1	9.83e-4	3
68		min	-.178	4	-.029	4	-.488	2	1.346e-3	2	-1.69e-2	5	-4.599e-4	5

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

	Me...	Sha...	Code C...	Lo...	LC	Shea...	Loc...	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y...	phi*Mn...	Cb	Eqn
1	M1	PIP...	.364	4.3...	5	.180	8.6...		4	14.277	32.13	1.872	1.872	2.578	H1-1b
2	M2	PIP...	.561	3.9...	4	.212	8.6...		4	29.315	32.13	1.872	1.872	2.8	H1-1b
3	M3	PIP...	.115	5.0...	1	.008	0		1	9.481	32.13	1.872	1.872	1.136	H1-1b
4	M4	PIP...	.263	2.88	2	.064	2.88		3	19.044	19.688	.801	.801	1.999	H1-1b
5	M5	PIP...	.171	2.88	1	.048	2.88		3	17.237	19.688	.801	.801	1.52	H1-1b
6	M6	PIP...	.165	2.88	1	.080	1.44		5	19.044	19.688	.801	.801	2.397	H1-1b
7	M7	PIP...	.255	2.88	2	.084	2.88		4	17.237	19.688	.801	.801	1.782	H1-1b
8	M8	0.6...	.132	0	4	.026	0		1	4.378	9.94	.104	.104	2.26	H1-1b
9	M9	0.6...	.171	0	4	.006	2.5		6	4.378	9.94	.104	.104	2.253	H1-1b
10	M10	0.6...	.182	0	4	.042	0		4	3.341	9.94	.104	.104	2.593	H1-1b
11	M11	0.6...	.321	2.8...	3	.018	0		2	3.341	9.94	.104	.104	2.711	H1-1a
12	M12	0.6...	.136	2.8...	4	.032	0		1	3.341	9.94	.104	.104	2.859	H1-1b
13	M13	0.6...	.424	2.8...	6	.008	2.8...		4	3.341	9.94	.104	.104	2.752	H1-1a
14	M14	0.6...	.117	0	4	.021	0		3	4.378	9.94	.104	.104	2.265	H1-1b
15	M15	0.6...	.094	0	4	.021	0		3	4.378	9.94	.104	.104	2.265	H1-1b
16	M16	PIP...	.186	4.5	6	.087	3.0...		4	23.088	32.13	1.872	1.872	2.008	H1-1b
17	M17	PIP...	.708	3	4	.070	5.5...		5	19.964	32.13	1.872	1.872	5	H1-1b
18	M20	PIP...	.187	2	4	.086	2		1	26.005	32.13	1.872	1.872	5	H1-1b
19	M21	PIP...	.105	2	5	.009	2		5	26.005	32.13	1.872	1.872	2.04	H1-1b



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering		
FJP	CTHA830A	Aug 11, 2021 at 3:52 PM
21005.22	Member Unity Check	Mount.R3D

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

CTHA830A_Sprint Retain_1_draft

Print Name: Standard (2)
PORs: New Build_Sprint Keep

Section 1 - Site Information

Site ID: CTHA830A
Status: Draft
Version: 1
Project Type: Sprint Retain
Approved: Not Approved
Approved By: Not Approved
Last Modified: 7/9/2021 4:16:47 PM
Last Modified By: Michael.Low1@T-Mobile.com

Site Name: CTHA830A
Site Class: Monopole
Site Type: Structure Non Building
Plan Year: 2021
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Not Specified

Latitude: 41.99961388
Longitude: -72.35560000
Address: 157 Hampden Rd
City, State: Stafford Springs, CT
Region: NORTHEAST

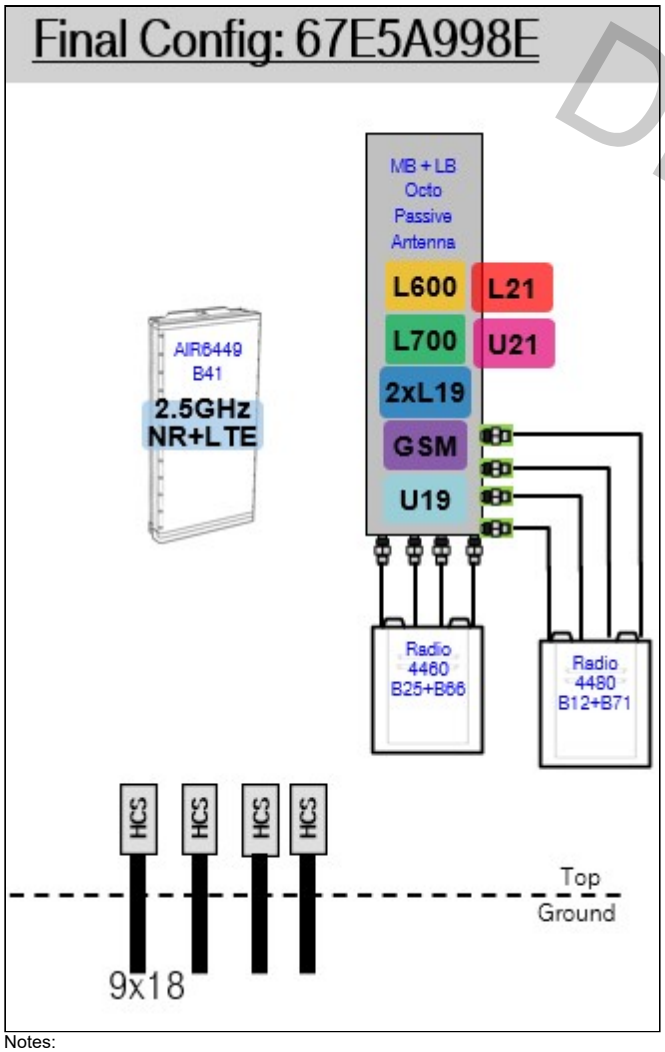
RAN Template: 67E5A998E 6160			AL Template: 67E5998E_1xAIR+1OP	
Sector Count: 3	**Antenna Count:** 6	**Coax Line Count:** 0	**TMA Count:** 0	**RRU Count:** 6

Section 2 - Existing Template Images

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

Section 3 - Proposed Template Images

67E5A998E.jpg



Notes:

Section 4 - Siteplan Images

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

CTHA830A_Sprint Retain_1_draft

Print Name: Standard (2)
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
Enclosure Type	Enclosure 6160	RBS 6601	B160
Baseband	BB 6648 (L700, L600, N600); BB 6648 (L2500, N2500); BB 6648 (L2100, L1900)	DUG20 (G1900)	
Transport System	CSR IXRe V2 (Gen2)		
Functionality Groups	Ericsson Hybrid Trunk 6/24 4AWG *Select Length* **(x 3)**		

RAN Scope of Work:

CT33XC553
Existing & planned azimuth: 0 / 120 / 240
Existing 200A service
SA @ 66%
Antenna - omni to be researched - Fire Dept possible
Generator needed - space is available

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

CTHA830A_Sprint Retain_1_draft

Print Name: Standard (2)
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	0				0	
M. Tilt	0				0	
Height	171				171	
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

CTHA830A_Sprint Retain_1_draft

Print Name: Standard (2)
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	120				120	
M. Tilt	0				0	
Height	171				171	
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

CTHA830A_Sprint Retain_1_draft

Print Name: Standard (2)
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	240				240	
M. Tilt	0				0	
Height	171				171	
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

CTHA830A_Sprint Retain_1_draft

Print Name: Standard (2)
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: CTHA830A

157 Hampden Road
Stafford Springs, Connecticut 06076

October 18, 2021

EBI Project Number: 6221006192

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**7.92%**

October 18, 2021

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

Emissions Analysis for Site: CTHA830A

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **157 Hampden Road** in **Stafford Springs, 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 157 Hampden Road in Stafford Springs, 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 171 feet above ground level (AGL).

15) Emissions from additional carriers were not included because emissions data for the site location are not available.

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):	171 feet	Height (AGL):	171 feet	Height (AGL):	171 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 %:	**3.12%**	Antenna B1 MPE %:	**3.12%**	Antenna C1 MPE %:	**3.12%**
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):	171 feet	Height (AGL):	171 feet	Height (AGL):	171 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 %:	**4.80%**	Antenna B2 MPE %:	**4.80%**	Antenna C2 MPE %:	**4.80%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	7.92%
no additional carriers	N/A
Site Total MPE % :	7.92%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	7.92%
T-Mobile Sector B Total:	7.92%
T-Mobile Sector C Total:	7.92%
Site Total MPE % :	7.92%

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	171.0	1.56	600 MHz LTE	400	0.39%
T-Mobile 600 MHz NR	1	1577.94	171.0	2.08	600 MHz NR	400	0.52%
T-Mobile 700 MHz LTE	2	695.22	171.0	1.84	700 MHz LTE	467	0.39%
T-Mobile 1900 MHz GSM	4	1052.26	171.0	5.56	1900 MHz GSM	1000	0.56%
T-Mobile 1900 MHz LTE	2	2104.51	171.0	5.56	1900 MHz LTE	1000	0.56%
T-Mobile 2100 MHz LTE	2	2649.42	171.0	7.00	2100 MHz LTE	1000	0.70%
T-Mobile 2500 MHz LTE 1C & 2C Traffic	1	11044.63	171.0	14.58	2500 MHz LTE 1C & 2C Traffic	1000	1.46%
T-Mobile 2500 MHz LTE 1C & 2C Broadcast	1	1074.06	171.0	1.42	2500 MHz LTE 1C & 2C Broadcast	1000	0.14%
T-Mobile 2500 MHz NR Traffic	1	22089.26	171.0	29.17	2500 MHz NR Traffic	1000	2.92%
T-Mobile 2500 MHz NR Broadcast	1	2148.13	171.0	2.84	2500 MHz NR Broadcast	1000	0.28%
						Total:	**7.92%**

• 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:	7.92%
Sector B:	7.92%
Sector C:	7.92%
T-Mobile Maximum MPE % (Sector A):	7.92%
Site Total:	7.92%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **7.92%** 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.