10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

Transcend Wireless

June 16, 2021

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

RE: Notice of Exempt Modification
497 Old Post Road, Tolland, CT, 06084
Latitude: 41.86073
Longitude: -72.40337
T-Mobile Site#: CTHA813A – Sprint Keep Project
Sprint Site #: CT03XC212

Dear Ms. Bachman:

T-Mobile/Sprint currently maintains six (6) antennas at the 147-foot level of the existing 147-foot guyed tower at 497 Old Post Road in Tolland, CT. The 147-foot guyed tower is owned by Clearview Towers Company II LLC. T-Mobile now intends to remove all existing Sprint equipment including antennas, cables, and ground equipment. T-Mobile will be adding nine (9) antennas. The new antennas will be installed at the same 147-foot level of the tower. The new antennas support 5G services.

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

Install New:
(3) RFS-APX16DWV Antennas
(3) RFS-APXVAALL24 Antennas
(3) Ericsson AIR6449 B41 Antennas
(3) Radio 4415 B66A
(3) Radio 4449 B71+B85
(3) Radio 4424 B25

(3) 6/24 4AWG Hybrid Cables

Ground:
Install New:
(1) Enclosure 6160 Cabinet
(1) B160 Battery Cabinet

Remove:
All Sprint Ground Equipment

This tower was not originally approved by the Connecticut Siting Council. The original zoning approval from the Town of Tolland was issued in 1999. The original approval is included in this package.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to Town Manager Michael Rosen, Appointed Official, and David Corcoran, Director of Planning and Development, as well as the Tower Owner and the 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: Michael Rosen - Town Manager
David Corcoran - Director of Planning and Zoning
Clearview Towers Company - Property/Tower Owner

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS 1 OF 1

SHIP TO:
MICHAEL ROSEN
21 TOLLAND GREEN
TOLLAND CT 06084

CT 061 9-99

UPS GROUND
TRACKING #: 1Z V25 742 43 9549 3879

BILLING: P/P

Reference #1: CTHA813A

XOL 21.05.18 NV45 25.0A 06/2021*

ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430

1 LBS 1 OF 1

SHIP TO:
CLEARVIEW TOWERS COMPANY
26 YOLANDA DRIVE
EDISON NJ 08817

NJ 089 9-02

UPS GROUND
TRACKING #: 1Z V25 742 43 9774 3863

BILLING: P/P

Reference #1: CTHA813A

XOL 21.05.18 NV45 25.0A 06/2021*


ERIC BREUN
2016587728
10 INDUSTRIAL AVE
MAHWAH NJ 07430
1 LBS
1 OF 1
SHIP TO:
DAVID CORCORAN
21 TOLLAND GREEN
TOLLAND CT 06084
CT 061 9-99
UPS GROUND
TRACKING #: 1Z V25 742 43 9826 3880
BILLING: P/P
Reference #1: CTHA813A
XOL 21.05.18
NV45 25.0A 06/2021*

497 OLD POST ROAD

Sales | Print | Map It

Location	497 OLD POST ROAD	**Mblu**	20/ K/ 30/00 /
Acct#	1186	**Owner**	CLEARVIEW TOWER COMPANY II LLC
Assessment	$437,200	**Appraisal**	$624,600
PID	3167	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$67,200	$557,400	$624,600
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$47,000	$390,200	$437,200

Owner of Record

Owner	CLEARVIEW TOWER COMPANY II LLC	**Sale Price**	$671,000
Co-Owner		**Certificate**	
Address	26 YOLANDA DR EDISON, NJ 08817	**Book & Page**	1480/0256
		Sale Date	05/20/2019
		Instrument	00

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
CLEARVIEW TOWER COMPANY II LLC	$671,000		1480/0256	00	05/20/2019
OLD POST ROAD HOLDINGS LLC	$825,000		0642/0286	00	12/06/1999

Building Information

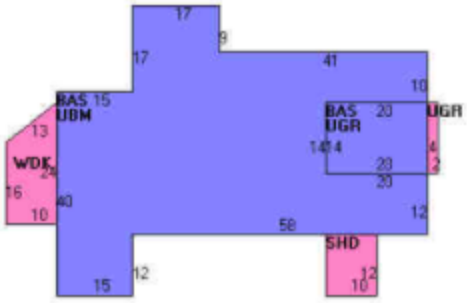
Building 1 : Section 1

Year Built:	1966
Living Area:	2,841
Replacement Cost:	$229,338
Building Percent Good:	25
Replacement Cost Less Depreciation:	$57,300

Building Attributes	
Field	**Description**
Style:	Ranch
Model	Residential
Grade:	Average +20
Stories:	1 Story
Occupancy	1
Exterior Wall 1	Wood on Sheath
Exterior Wall 2	Aluminum Sidng
Roof Structure:	Gable/Hip
Roof Cover	Architect Shin
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Flr 1	Minimum/Plywd
Interior Flr 2	
Heat Fuel	None
Heat Type:	None

Building Photo

Building Layout



AC Type:	Partial
Total Bedrooms:	3 Bedrooms
Total Bthrms:	0
Total Half Baths:	0
Total Xtra Fixtrs:	0
Total Rooms:	7 Rooms
Bath Style:	Modern
Kitchen Style:	Average
Num Kitchens	
Cndtn	
Func Code	
Econ Code	
Num Park	
Fireplaces	
Solar	
Solar Type	
Fndtn Cndtn	
Basement	

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	Main Floor	2,841	2,841
SHD	Shed-Attached	120	0
UBM	Basement	2,561	0
UGR	Garage Under	308	0
WDK	Wood Deck	200	0
		6,030	2,841

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
FPL3	FIREPLACE 2 ST	1.00 UNITS	$1,000	1
A/C	AIR CONDITIONING	198.00 S.F.	$100	1

Land

Land Use

Use Code	200R
Description	Commercial
Zone	RDD
Neighborhood	R35
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.84
Frontage	165
Depth	
Assessed Value	$390,200
Appraised Value	$557,400

Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
SHD	SHED	1F	1 Stry Frame	472.00 S.F.	$900	1
SHD	SHED	1BQ	BQ Shed	196.00 S.F.	$2,900	1
FDN	FOUNDATION	G	Garage	1.00 UNITS	$5,000	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
4000	$67,200	$557,400	$624,600
2020	$67,200	$557,400	$624,600
2019	$67,200	$557,400	$624,600

Assessment			
Valuation Year	Improvements	Land	Total
4000	$47,000	$390,200	$437,200
2020	$47,000	$390,200	$437,200
2019	$47,000	$390,200	$437,200

Property Information

Property ID	20/K/030
Location	497 OLD POST ROAD
Owner	CLEARVIEW TOWER COMPANY II LLC

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Tolland, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 08/03/2020
Data updated 11/19/2018

Print map scale is approximate. Critical layout or measurement activities should not be done using this resource.

HURWITZ & SAGARIN LLC

July 26, 1999

Roseanne Martino
Sprint Spectrum LP
Crossroads Corporate Center
1 International Boulevard
Suite 800
Mahwah, New Jersey 07495

Re: Site 212; Tolland

Dear Roseanne:

Enclosed please find original zoning approval for the above referenced site. Please note the requirements prior to installation of the PCS. Please let me know if you have any questions or would like me to do anything else on this site.

Very truly yours,

JULIE M. CASHIN
JMC/dsw
Enc.

cc: Rob Cobane
Joe O'Hagan
Jeff York
Steve Kotfila

LAW OFFICES
147 North Broad Street, P.O. Box 112, Milford, Connecticut 06460-0112 Tel. 203-877-8000 • Fax 203-878-9800

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TOWN of TOLLAND / 21 tolland green, tolland, connecticut 06084

Ronald E. Blake
Town Planner

CERTIFIED MAIL
Z 336 011 847
July 19, 1999

Julie M. Cashin, Esq.
Hurwitz & Sagarin LLC
147 Broad Srtreet,PO Box 113
Milford, CT 06460-0112

RE: P&Z App. #614 – Sprint PCS, Site Plan approval - 497 Old Post Road, Tolland, CT.

Dear Attorney Cashin:

You are hereby advised that the Planning & Zoning Commission, at a meeting on July 12, 1999 APPROVED the Sprint PCS request as described below:

1. Sprint PCS is permitted to co-locate panel antennas on the existing 150-foot tower and to install equipment cabinets. The height of the panel installation, the design of the antenna arrays and panels, and the size, shape and location of the equipment structures must be as shown on the approved plan entitled in part "...Sprint PCS SITE I.D. #CT03XC212 TOLLAND MESSAGE CENTER...URS Greiner Woodward Clyde...Rocky Hill, Connecticut..." The plans (Drawing numbers T1, S1 & Z1 & 2) are all revised to 7-6-99.
2. The installation may not begin until Zoning and Building Permits have been issued by the Town.
3. Please note that the conditions of approval are subject to an annual review to assure Zoning compliance. I have enclosed as copy of the related Zoning Regulation (§170-93 R).
4. Note also, that upon completion of the Sprint PSC project, an "as-built" plan must be submitted before a Certificate of Compliance (Certificate of Occupancy) will be issued. The as-built must be prepared by a licensed engineer and must demonstrate that the structure has been built and sited in accordance with the APPROVED plan that is on file in the Planning Office. The maximum height of the panel assemblies and supports must be ascertained. No part of the panels or the mounts may exceed 150 feet above grade.
5. A copy of the APPROVED plan, dated and endorsed by the PZC Chairperson, is enclosed for your files.

If you have any questions, please contact me at 871-3601 Monday through Wednesday 9:00am to 4:30pm, Thursday 9:00am to 4:30pm and 5:30pm to 8:30pm and Friday 9:00am to 12:30pm.

Very truly yours,

R. E. Blake

Ronald E. Blake
Town Planner

Enclosures: 2

SUBAPPRV1.DOC 072099/0800 REB

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application shall be deemed incomplete until these fees have been submitted.

(3) For the purpose of this section "outside consultant" means a professional who is not an employee of the town. "Outside consultants" shall be, but will not be limited to, engineering, traffic, environmental and planning professionals.

(4) Any portion of the surcharge fee not expended by the town on the project shall be returned to the applicant upon completion of the review, evaluation and processing of the application.

(5) The Commission shall bill the applicant for any costs incurred by the town in excess of the surcharge fee. This bill shall be paid by the applicant before the issuance of a zoning permit for the project.

R. Annual review, inspection and fee. The Commission or its agent will review the approved special permit and site plan and inspect the WTS annually to determine if all conditions of approval are being strictly addressed. If improvements or maintenance is required, the property owner will be directed make the required corrections. To help defray the cost for the review, an annual fee shall be paid to the Town of Tolland, via the Planning Office. The fee shall be paid by the property owner or providers using the equipment. The annual review dates and fee payment requirements will be determined by the Commission based on the approval date.

~~(Cont'd on page 17093)~~

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Sprint Now part of T-Mobile™

SPRINT ID: CT03XC212
SITE ID: CTHA813A
497 OLD POST RD
TOLLAND, CT 06084

T-MOBILE RAN TEMPLATE (PROVIDED BY RFDS)
67D5A998C 6160

T-MOBILE A+L TEMPLATE (PROVIDED BY RFDS)
67D5998C_1xAIR+1QP+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 CONSTRUCTON, 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.

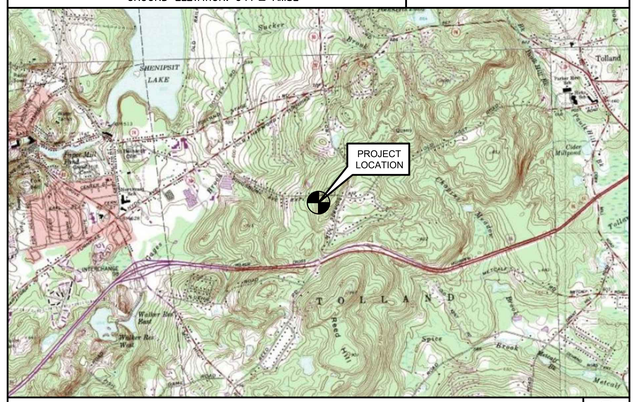
SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH, BLOOMFIELD, CT 06002 **TO:** 497 OLD POST RD, TOLLAND, CT 06084

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°-51'-39" N
LONGITUDE: 72°-24'-11" W
GROUND ELEVATION: 941'± 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) APX16DWV-16DWV-S-E-A20 ANTENNA PER SECTOR. TOTAL (3)
3. INSTALL (1) APXVAALL24_43-U-NA20 ANTENNA PER SECTOR. TOTAL (3)
4. INSTALL (1) ERICSSON AIR6449 B41 ANTENNA PER SECTOR TOTAL (3)
5. INSTALL (1) RADIO 4449 B71+B85 PER SECTOR. TOTAL OF (3)
6. INSTALL (1) RADIO 4415 B66A PER SECTOR. TOTAL OF (3)
7. INSTALL (1) RADIO 4424 B25 PER SECTOR. TOTAL OF (3)
8. INSTALL 150A CIRCUIT BREAKER.
9. REMOVE ALL EXISTING HYBRID, INSTALL (3) 6/24 4AWG HYBRIDS
10. INSTALL (1) T-MOBILE POWER ENCLOSURE 6160
11. INSTALL (1) T-MOBILE BATTERY CABINET B160
12. INSTALL (1) ANTENNA MOUNT AND 9' ANTENNA MAST PER SECTOR FOR POS.2 ANTENNA. TOTAL OF (3)

PROJECT INFORMATION

SPRINT ID:	CT03XC212
SITE ID:	CTHA813A
SITE ADDRESS:	497 OLD POST RD TOLLAND, CT 06084
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°-51'-39" N LONGITUDE: 72°-24'-11" W GROUND ELEVATION: 941'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/03/21	JLW	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

Sprint Now part of T-Mobile — Transcend Wireless

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

T-MOBILE NORTHEAST LLC

SPRINT ID: CT03XC212
SITE ID: CTHA813A
497 OLD POST RD
TOLLAND, CT 06084

DATE: 04/22/21
SCALE: AS NOTED
JOB NO. 21005.21

TITLE SHEET

T-1

Sheet No. 1 of 7

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): 124 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.
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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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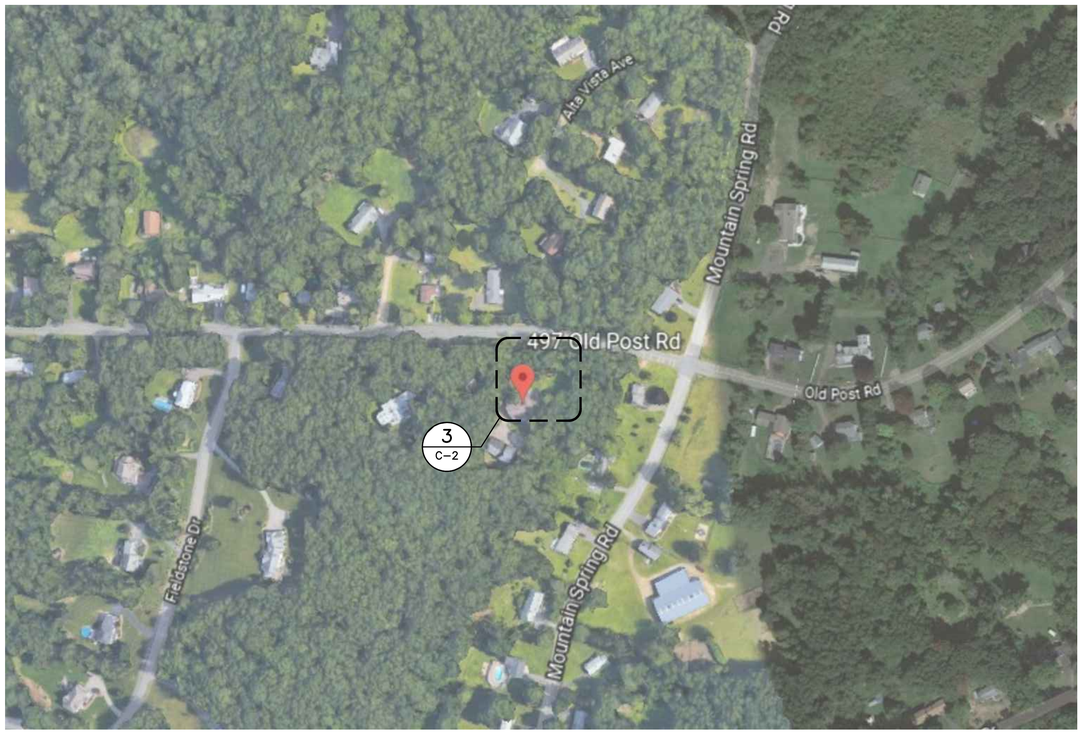
GENERAL NOTES AND SPECIFICATIONS

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 (EST. LENGTH)
A1	PROPOSED	RFS–APX16DWV–16DWV–S–E–A20	55.9 x 13 x 3.15	147'	0°	(P) RADIO 4415 B66A (1)		(1) 6/24 4AWG HYBRID CABLE (±180)
A2	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	147'	0°	(P) RADIO 4449 B71+B85 (1), (P) RADIO 4424 B25 (1)		
A3	PROPOSED	ERICSSON AIR6449 B41	33.1 x 20.6 x 8.6	147'	0°			
B1	PROPOSED	RFS–APX16DWV–16DWV–S–E–A20	55.9 x 13 x 3.15	147'	120°	(P) RADIO 4415 B66A (1)		(1) 6/24 4AWG HYBRID CABLE (±180)
B2	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	147'	120°	(P) RADIO 4449 B71+B85 (1), (P) RADIO 4424 B25 (1)		
B3	PROPOSED	ERICSSON AIR6449 B41	33.1 x 20.6 x 8.6	147'	120°			
C1	PROPOSED	RFS–APX16DWV–16DWV–S–E–A20	55.9 x 13 x 3.15	147'	275°	(P) RADIO 4415 B66A (1)		(1) 6/24 4AWG HYBRID CABLE (±180)
C2	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	147'	275°	(P) RADIO 4449 B71+B85 (1), (P) RADIO 4424 B25 (1)		
C3	PROPOSED	ERICSSON AIR6449 B41	33.1 x 20.6 x 8.6	147'	275°			



1 / C-1 **SITE LOCATION PLAN**
SCALE: NOT TO SCALE

TRUE NORTH

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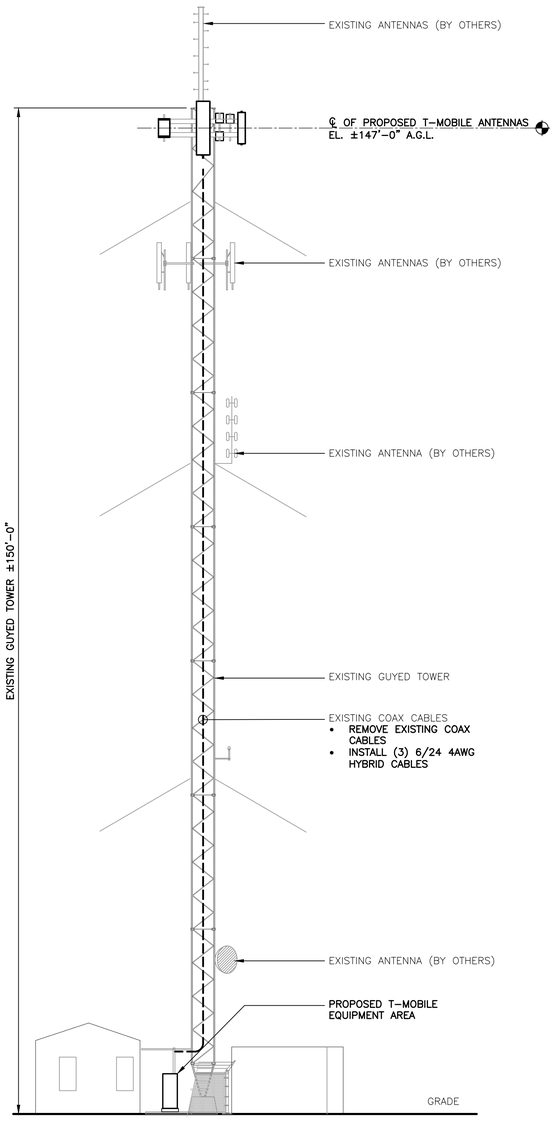
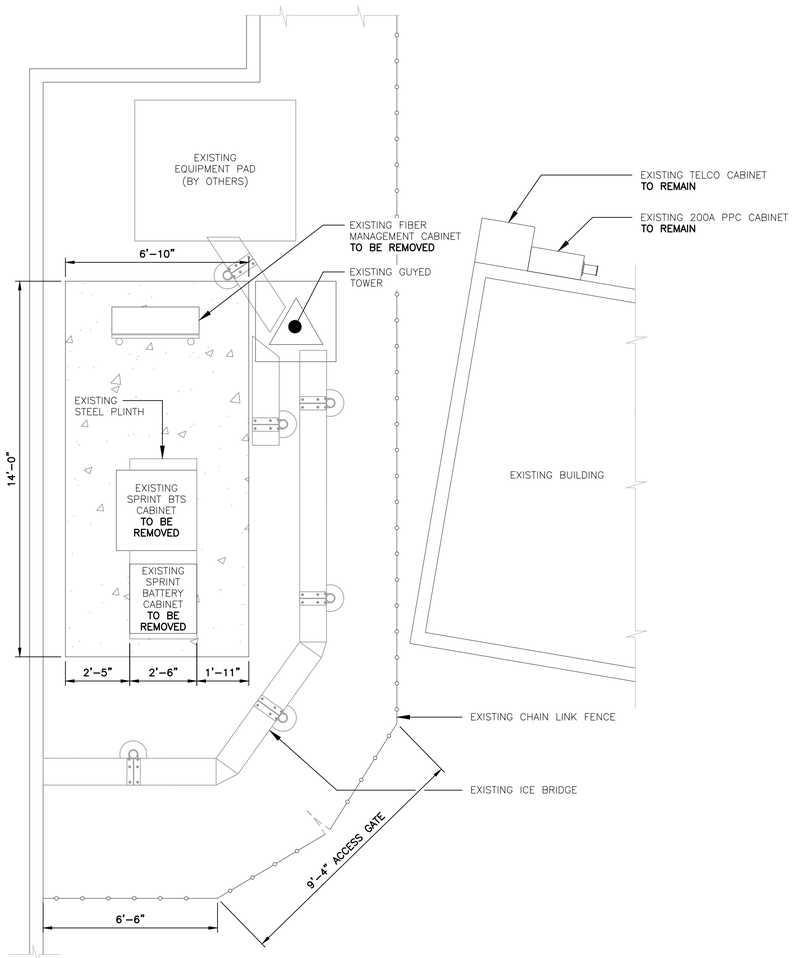
SITE LOCATION PLAN

C-1
Sheet No. 3 of 7

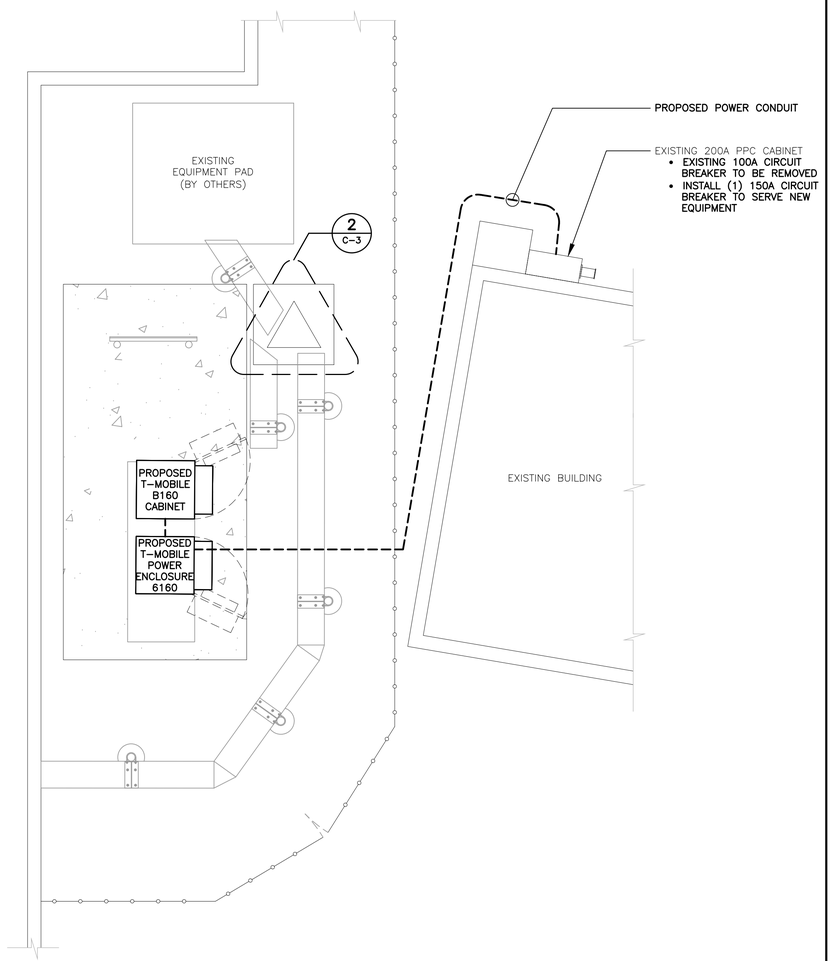
STRUCTURAL COMPLIANCE
ANTENNA MOUNTS A STRUCTURAL ANALYSIS OF THE ANTENNA MOUNTS WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.. REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 21005.21) DATED 05/04/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS. TOWER AND TOWER FOUNDATION A STRUCTURAL ANALYSIS OF THE TOWER AND TOWER FOUNDATION WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING. REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 21005.21) DATED 05/04/21 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 **SOUTH TOWER ELEVATION - PROPOSED**
SCALE: 3/32" = 1'



2 / C-2 **EQUIPMENT PLAN - EXISTING** TRUE NORTH
SCALE: 3/8" = 1'



3 / C-2 **EQUIPMENT PLAN - PROPOSED** TRUE NORTH
SCALE: 3/8" = 1'

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COMPOUND/ EQUIPMENT PLANS, AND ELEVATION

C-2

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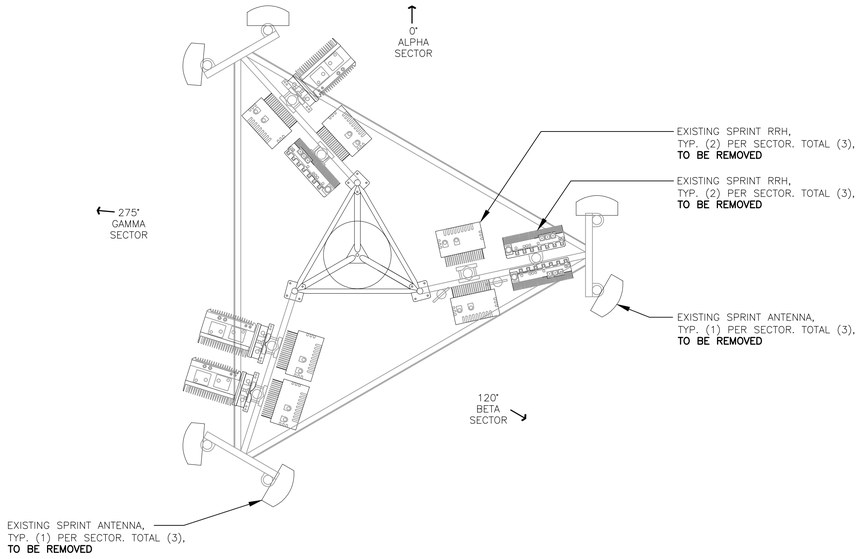
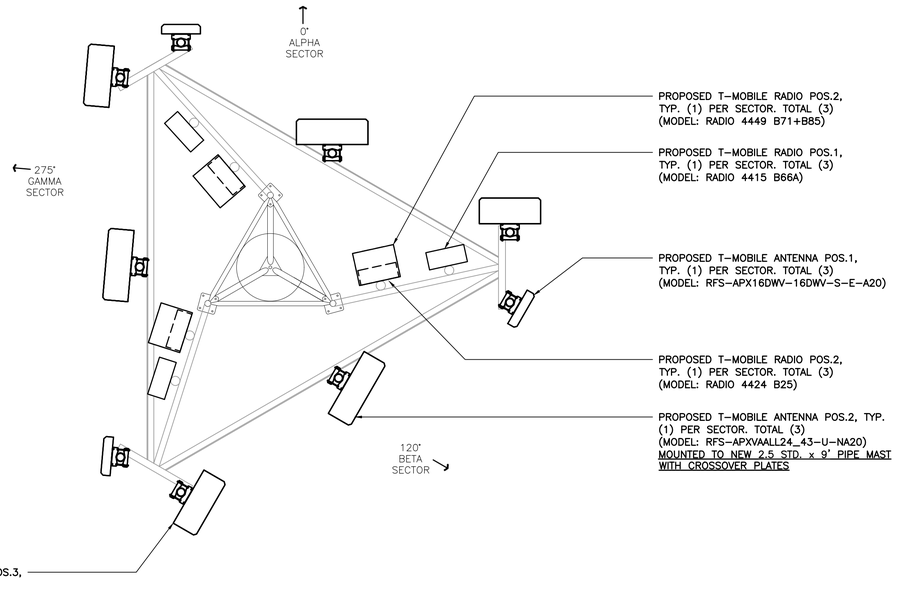
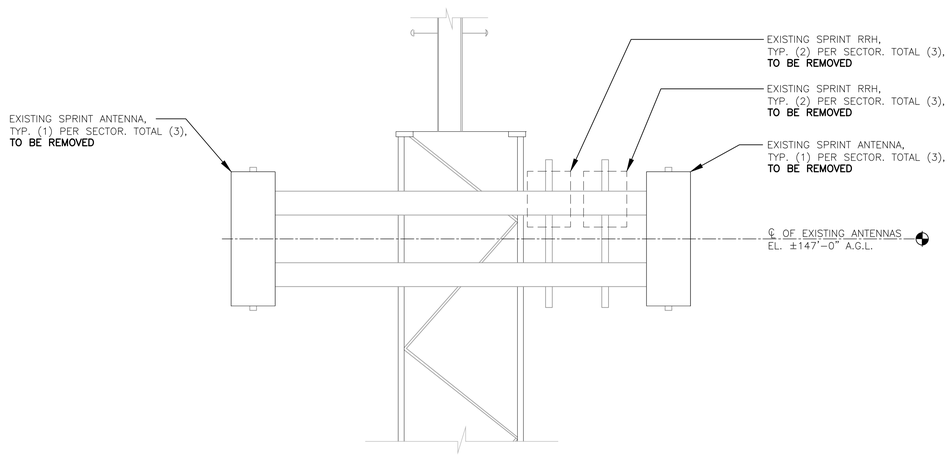


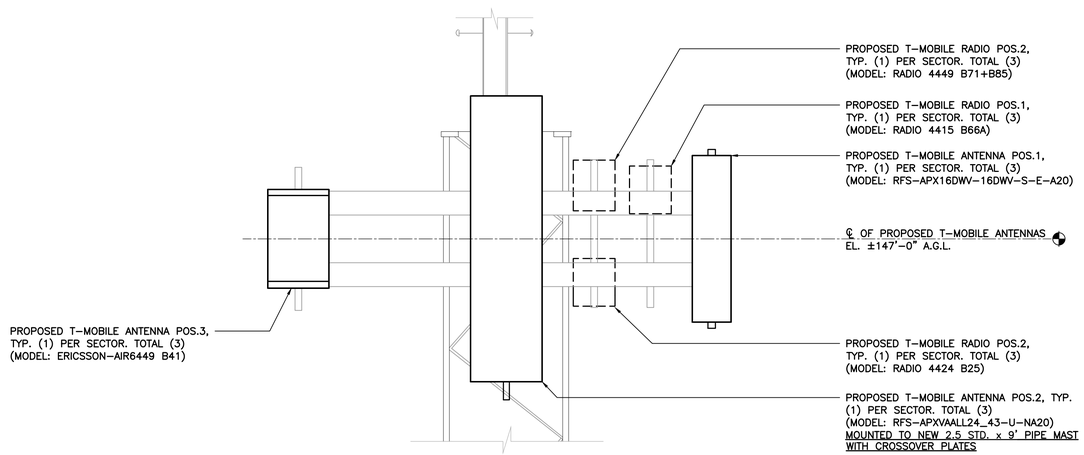
1 C-3 **ANTENNA PLAN - EXISTING**
SCALE: 1/2" = 1'
TRUE NORTH



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



1A C-3 **ANTENNA ELEVATION - EXISTING**
SCALE: 1/2" = 1'



2A C-3 **ANTENNA ELEVATION - PROPOSED**
SCALE: 1/2" = 1'

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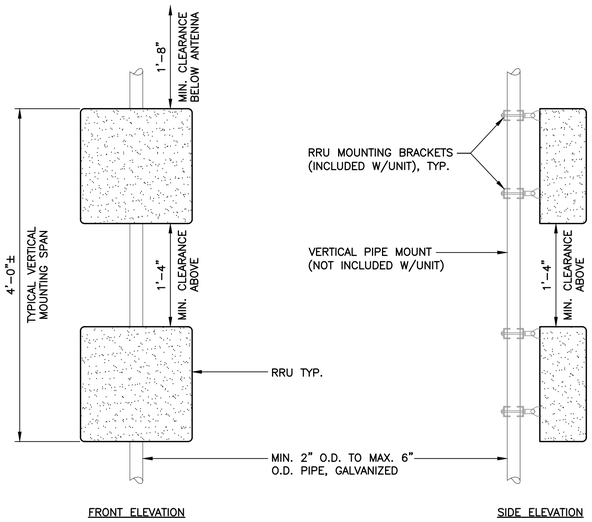
ANTENNA PLANS AND ELEVATIONS

C-3
Sheet No. 5 of 7



NOTES:

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. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

1 / C-4 **TYPICAL RRU MOUNTING DETAIL**
SCALE: NOT TO SCALE

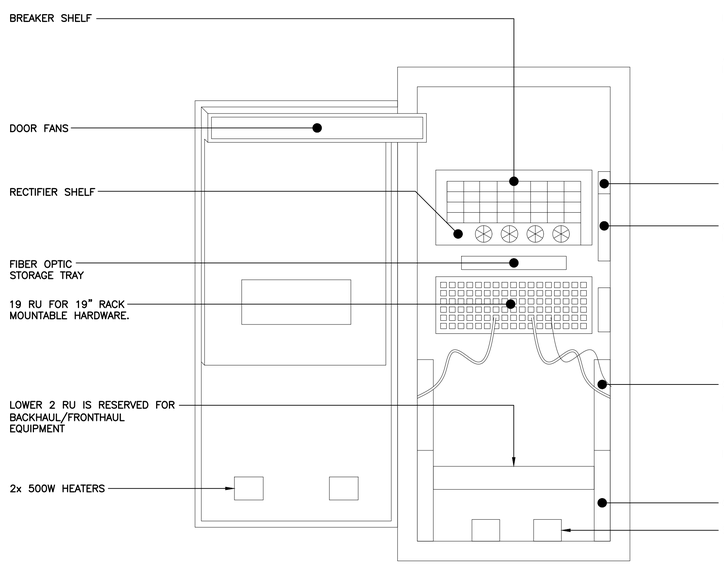

AIR6449 B41


APXVAALL24_43-U-NA20


APX16DWV-16DWV-S-E-A20

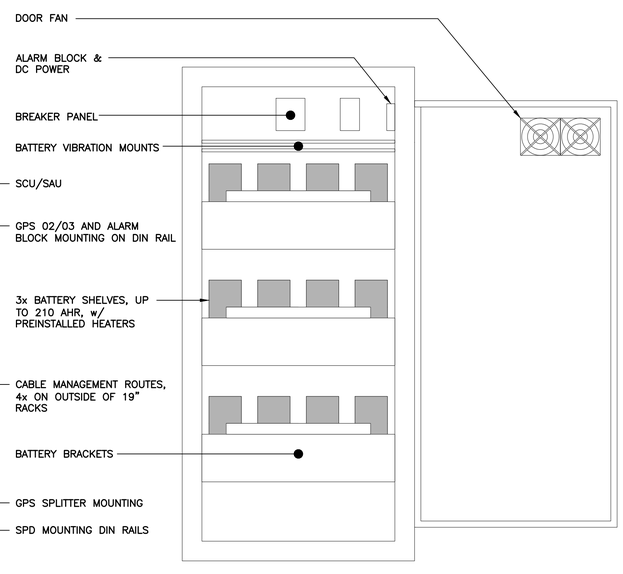
ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: AIR6449 B41	33.1"L x 20.6"W x 8.6"D	±104 LBS.
MAKE: RFS MODEL: APXVAALL24_43-U-NA20	95.9"L x 24.0"W x 8.5"D	±150 LBS.
MAKE: RFS MODEL: APX16DWV-16DWV-S-E-A20	55.9"L x 13"W x 3.15"D	±132 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

2 / C-4 **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-4 **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-4 **BATTERY B160 CABINET DETAIL**
SCALE: NOT TO SCALE


RADIO 4415 B66A


RADIO 4449 B71+B85


RADIO 4424 B25

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4415 B66A	16.5"L x 13.5"W x 5.9"D	±44 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
MAKE: ERICSSON MODEL: RADIO 4449 B71+B85	14.9"L x 13.2"W x 5.4"D	±74 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
MAKE: ERICSSON MODEL: RADIO 4424 B25	17.1"L x 14.4"W x 11.3"D	±86 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-4 **PROPOSED RRU DETAIL**
SCALE: NOT TO SCALE

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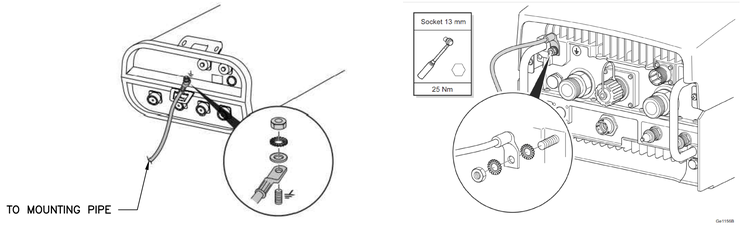
TYPICAL EQUIPMENT DETAILS

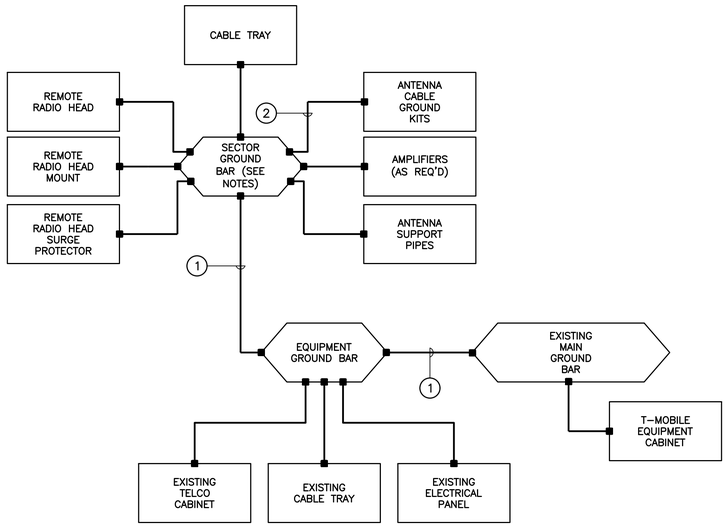
C-4

Sheet No. 6 of 7



1 E-1 TYPICAL ANTENNA/RRU GROUNDING DETAILS

SCALE: NOT TO SCALE



GROUNDING SCHEMATIC NOTES

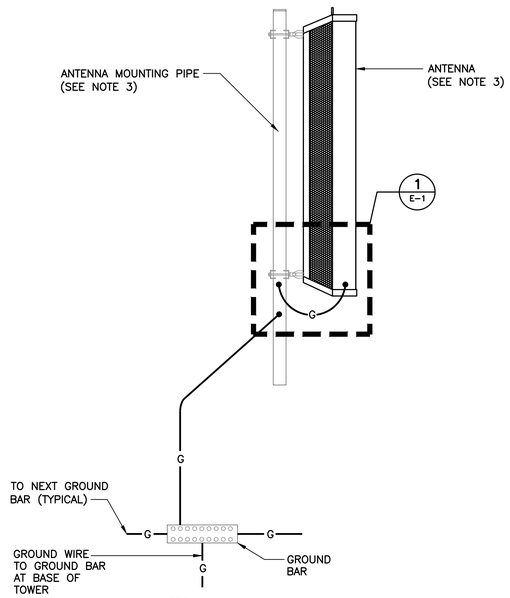
1. #2 AWG
2. #6 AWG

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. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
4. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
5. COORDINATE ALL ROOF MOUNTED EQUIPMENT WITH OWNER.
6. ALL ROOF MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
7. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

4 E-1 TYPICAL GROUNDING SCHEMATIC DETAIL

SCALE: NOT TO SCALE

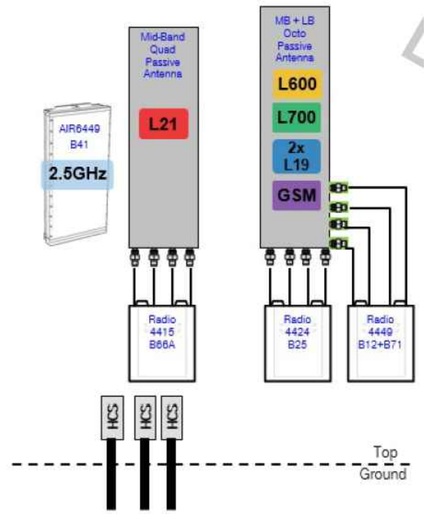


NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

2 E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE

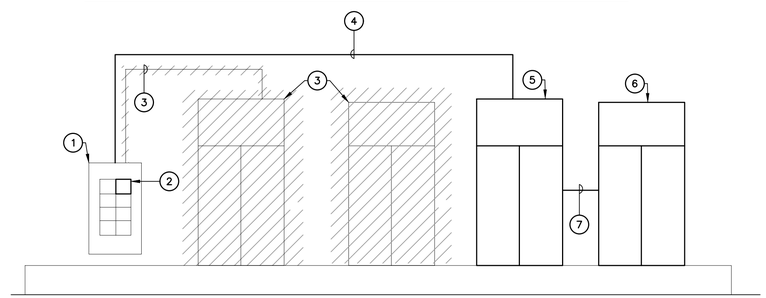


3 E-1 PLUMBING DIAGRAM (PROVIDED BY RFDS)

SCALE: NOT TO SCALE

RISER DIAGRAM NOTES

1. EXISTING 200A, PPC CABINET TO REMAIN.
2. NEW 150A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT
3. EXISTING CABINETS AND ASSOCIATED CONDUITS AND CONDUCTORS TO BE REMOVED.
4. (3) 1/0 AWG, (1) #6 AWG GROUND, 2" CONDUIT.
5. NEW T-MOBILE EQUIPMENT CABINET
6. NEW T-MOBILE BATTERY CABINET
7. DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.



5 E-1 ELECTRICAL POWER RISER DIAGRAM

SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/03/21	JLW	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

Sprint T-Mobile Transcend Wireless

CENTEK engineering
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Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

SPRINT ID: CT03XC212
SITE ID: CTHA813A
497 OLD POST RD
TOLLAND, CT 06084

DATE: 04/22/21
SCALE: AS NOTED
JOB NO. 21005.21

TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 7 of 7

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

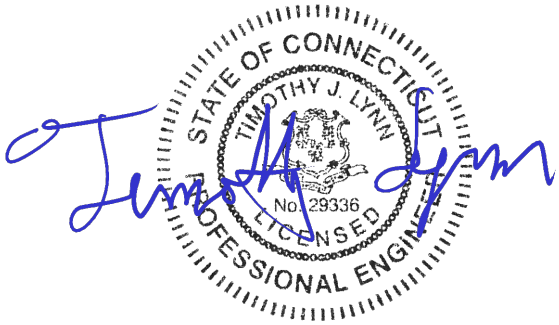
T-Mobile Site #: CTHA813A

497 Old Post Road
Tolland, CT

Centek Project No. 21005.21

Date: May 4, 2021

Max Stress Ratio = 79%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

May 4, 2021

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

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CTHA813A
497 Old Post Road
Tolland, CT 06084

Centek Project No. 21005.21

Dear Mr. Richers,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting of three (3) 6-ft side arms and (6) 12.5-ft horizontal pipes 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:

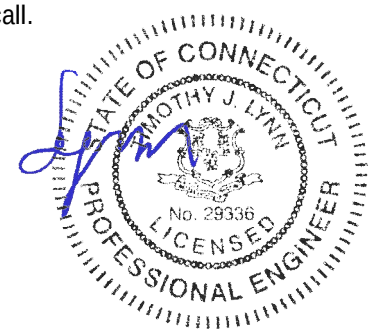
- T-Mobile:
  Frames: Three (3) Ericsson AIR6449 panel antennas, three (3) RFS APX16DWV-16DWVS panel antennas, three (3) RFS APXVAALL24_43-U-NA20 panel antennas, three (3) Ericsson 4449 remote radio heads, three (3) Ericsson 4415 remote radio heads and three (3) Ericsson 4424 remote radio heads mounted on three (3) Frames with a RAD center elevation of 147-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 Tolland 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

Section 2 - Calculations

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

Subject: TIA-222-G Loads

Location: Tolland, CT

Rev. 0: 5/4/21

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 21005.21

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

Wind Speeds

Basic Wind Speed $V := 97$ mph (User Input - 2016 CSBC Appendix N)

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

Input

Structure Type = $Structure\_Type := Lattice$ (User Input)

Structure Category = $SC := II$ (User Input)

Exposure Category = $Exp := C$ (User Input)

Structure Height = $h := 150$ ft (User Input)

Height to Center of Antennas = $z_{Ant} := 147$ 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)

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

$K_a := 1.0$ (User Input)

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

Output

Wind Direction Probability Factor =

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

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

Importance Factors =

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

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

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

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

$$K_{iz} := \left(\frac{z_{Ant}}{33}\right)^{0.1} = 1.161$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.322$$

Velocity Pressure Coefficient Antennas =

$$Kz_{Ant} := 2.01\left(\left(\frac{z_{Ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.373$$

Velocity Pressure w/o Ice Antennas =

$$qz_{Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V^2 \cdot I_{Wind} = 28.102$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V_i^2 \cdot I_{Wind} = 7.467$$

CENTEK engineering
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Branford, CT 06405 F: (203) 488-8587

Subject:	TIA-222-G Loads
Location:	Tolland, CT
Rev. 0: 5/4/21	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21005.21

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 484$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.7$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 171$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 20$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 161$	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 =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 74$	lbs

Gravity Load (without ice)

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

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 2 \times 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 593$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 593$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 135$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 55$	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 =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 50$	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 =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 26$	lbs

Gravity Load (without ice)

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

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5632$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 6653$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 216$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 216$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFSAPX16DWV-16DWVS		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 13$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 46$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 154$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.2$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 37$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 7.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 60$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3.3$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 27$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 46$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 6038$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 196$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 196$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model = Ericsson 4449

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.2$ in (User Input)

RRUS Thickness = $T_{RRUS} := 10.4$ in (User Input)

RRUS Weight = $WT_{RRUS} := 74$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 39$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 31$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.4$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 18$ lbs

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

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 16$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 74$ lbs

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 3201$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 104$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 104$ lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model = Ericsson 4415

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 16.5$ in (User Input)

RRUS Width = $W_{RRUS} := 13.4$ in (User Input)

RRUS Thickness = $T_{RRUS} := 5.9$ in (User Input)

RRUS Weight = $WT_{RRUS} := 46$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.2$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.5$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 44$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.7$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 19$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.6$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 20$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.5$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 12$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 46$ lbs

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 1304$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2719$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 88$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 88$ lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 4424		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 17.1$	in	(User Input)
RRUS Width =	$W_{RRUS} := 14.4$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 11.3$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 86$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		(User Input)
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.2$		
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$		

Wind Load (without ice)

Surface Area for One RRUS =	$SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.7$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 49$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.3$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 38$	lbs

Wind Load (with ice)

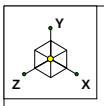
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.9$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 22$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 2.4$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 18$	lbs

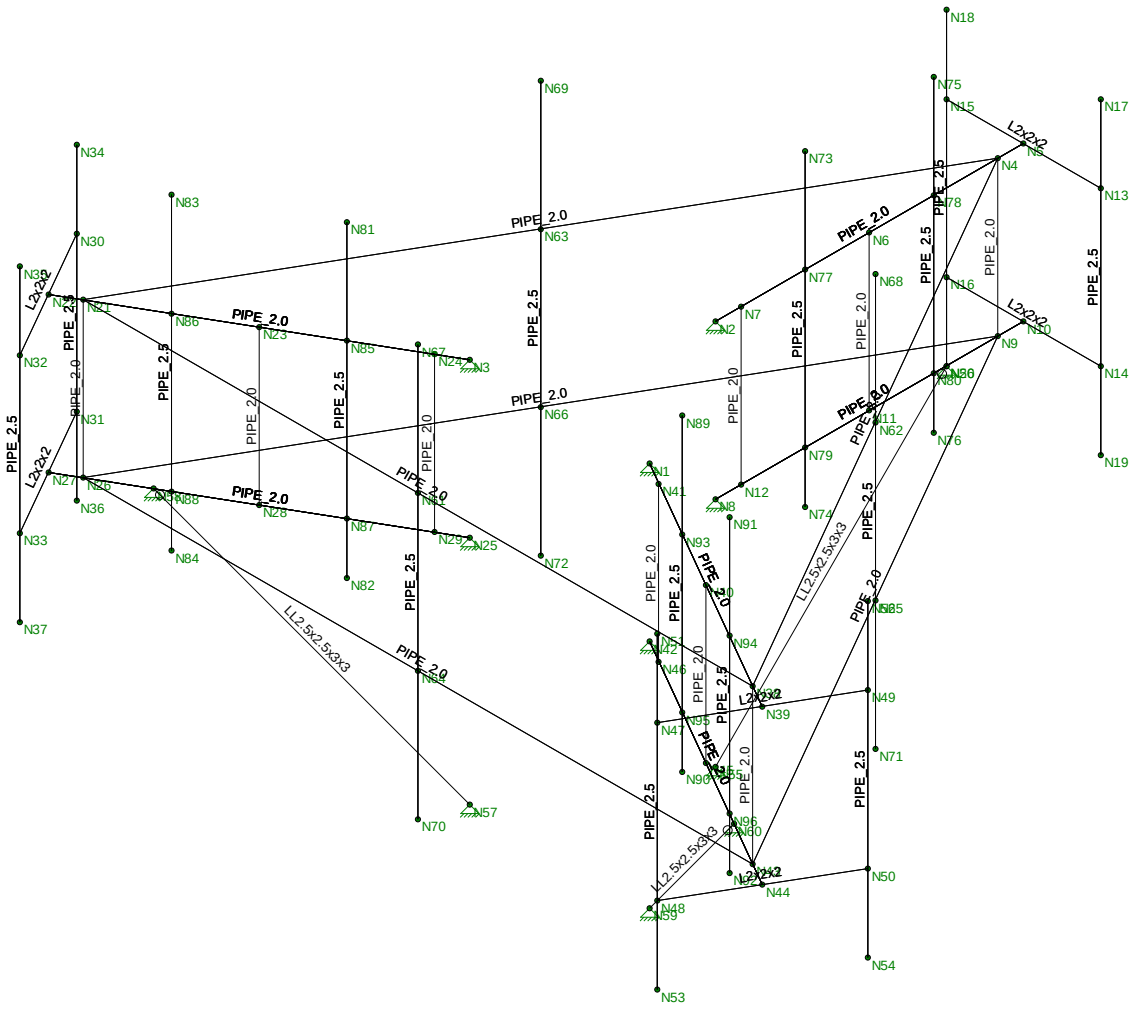
Gravity Load (without ice)

Weight of All RRUSs =	$WT_{RRUS} \cdot N_{RRUS} = 86$	lbs

Gravity Loads (ice only)

Volume of Each RRUS =	$V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2783$	cu in
Volume of Ice on Each RRUS =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 3820$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 124$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 124$	lbs





Envelope Only Solution

Centek		
TJL	CTHA813A - Mount	May 4, 2021 at 11:54 AM
21005.21	Member Framing	Existing 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?	Yes
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	4
Cd X	4
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	150.001
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	2
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Antenna Mast	PIPE_2.5	Column	Pipe	A53 Grade B	Typical	1.61	1.45	1.45	2.89
2	Horz	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
3	Arm	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
4	Brace	PIPE_2.0	Column	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
5	Corner	L2x2x2	Beam	Wide Flange	A36 Gr.36	Typical	.491	.189	.189	.003
6	Kicker	LL2.5x2.5x3x3	VBrace	Wide Flange	A36 Gr.36	Typical	1.8	2.46	1.07	.023

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	Arm	6			Lbyy						Lateral
2	M2	Arm	6			Lbyy						Lateral
3	M3	Brace	3									Lateral
4	M4	Brace	3									Lateral
5	M5	Brace	3									Lateral
6	M6	Antenna Mast	6									Lateral
7	M7	Antenna Mast	6									Lateral
8	M8	Corner	3			Lbyy						Lateral
9	M9	Corner	3			Lbyy						Lateral
10	M10	Arm	6			Lbyy						Lateral
11	M11	Arm	6			Lbyy						Lateral
12	M12	Brace	3									Lateral
13	M13	Brace	3									Lateral
14	M14	Brace	3									Lateral
15	M15	Antenna Mast	6									Lateral
16	M16	Antenna Mast	6									Lateral
17	M17	Corner	3			Lbyy						Lateral
18	M18	Corner	3			Lbyy						Lateral
19	M19	Arm	6			Lbyy						Lateral
20	M20	Arm	6			Lbyy						Lateral
21	M21	Brace	3									Lateral
22	M22	Brace	3									Lateral
23	M23	Brace	3									Lateral
24	M24	Antenna Mast	6									Lateral
25	M25	Antenna Mast	6									Lateral
26	M26	Corner	3			Lbyy						Lateral
27	M27	Corner	3			Lbyy						Lateral
28	M28	Horz	13.026			Lbyy						Lateral
29	M29	Horz	13.026			Lbyy						Lateral
30	M30	Horz	13.026			Lbyy						Lateral
31	M31	Horz	13.026			Lbyy						Lateral
32	M32	Horz	13.026			Lbyy						Lateral
33	M33	Horz	13.026			Lbyy						Lateral
34	M34	Kicker	6.364									Lateral
35	M35	Kicker	6.364									Lateral
36	M36	Kicker	6.364									Lateral
37	M37	Antenna Mast	8									Lateral
38	M38	Antenna Mast	8									Lateral
39	M39	Antenna Mast	8									Lateral
40	M40	Antenna Mast	6									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...
41	M41	Antenna Mast	6									Lateral
42	M42	Antenna Mast	6									Lateral
43	M43	Antenna Mast	6									Lateral
44	M44	Antenna Mast	6									Lateral
45	M45	Antenna Mast	6									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
1	M1	N2	N5			Arm	Beam	Pipe	A53 Grade B	Typical
2	M2	N8	N10			Arm	Beam	Pipe	A53 Grade B	Typical
3	M3	N7	N12			Brace	Column	Pipe	A53 Grade B	Typical
4	M4	N6	N11			Brace	Column	Pipe	A53 Grade B	Typical
5	M5	N4	N9			Brace	Column	Pipe	A53 Grade B	Typical
6	M6	N18	N20			Antenna Mast	Column	Pipe	A53 Grade B	Typical
7	M7	N17	N19			Antenna Mast	Column	Pipe	A53 Grade B	Typical
8	M8	N15	N13			Corner	Beam	Wide Flange	A36 Gr.36	Typical
9	M9	N16	N14			Corner	Beam	Wide Flange	A36 Gr.36	Typical
10	M10	N3	N22			Arm	Beam	Pipe	A53 Grade B	Typical
11	M11	N25	N27			Arm	Beam	Pipe	A53 Grade B	Typical
12	M12	N24	N29			Brace	Column	Pipe	A53 Grade B	Typical
13	M13	N23	N28			Brace	Column	Pipe	A53 Grade B	Typical
14	M14	N21	N26			Brace	Column	Pipe	A53 Grade B	Typical
15	M15	N35	N37			Antenna Mast	Column	Pipe	A53 Grade B	Typical
16	M16	N34	N36			Antenna Mast	Column	Pipe	A53 Grade B	Typical
17	M17	N32	N30			Corner	Beam	Wide Flange	A36 Gr.36	Typical
18	M18	N33	N31			Corner	Beam	Wide Flange	A36 Gr.36	Typical
19	M19	N1	N39			Arm	Beam	Pipe	A53 Grade B	Typical
20	M20	N42	N44			Arm	Beam	Pipe	A53 Grade B	Typical
21	M21	N41	N46			Brace	Column	Pipe	A53 Grade B	Typical
22	M22	N40	N45			Brace	Column	Pipe	A53 Grade B	Typical
23	M23	N38	N43			Brace	Column	Pipe	A53 Grade B	Typical
24	M24	N52	N54			Antenna Mast	Column	Pipe	A53 Grade B	Typical
25	M25	N51	N53			Antenna Mast	Column	Pipe	A53 Grade B	Typical
26	M26	N49	N47			Corner	Beam	Wide Flange	A36 Gr.36	Typical
27	M27	N50	N48			Corner	Beam	Wide Flange	A36 Gr.36	Typical
28	M28	N21	N38			Horz	Beam	Pipe	A53 Grade B	Typical
29	M29	N38	N4			Horz	Beam	Pipe	A53 Grade B	Typical
30	M30	N4	N21			Horz	Beam	Pipe	A53 Grade B	Typical
31	M31	N26	N43			Horz	Beam	Pipe	A53 Grade B	Typical
32	M32	N43	N9			Horz	Beam	Pipe	A53 Grade B	Typical
33	M33	N9	N26			Horz	Beam	Pipe	A53 Grade B	Typical
34	M34	N56	N55			Kicker	VBrace	Wide Flange	A36 Gr.36	Typical
35	M35	N58	N57			Kicker	VBrace	Wide Flange	A36 Gr.36	Typical
36	M36	N60	N59			Kicker	VBrace	Wide Flange	A36 Gr.36	Typical
37	M37	N67	N70			Antenna Mast	Column	Pipe	A53 Grade B	Typical
38	M38	N69	N72			Antenna Mast	Column	Pipe	A53 Grade B	Typical
39	M39	N68	N71			Antenna Mast	Column	Pipe	A53 Grade B	Typical
40	M40	N73	N74			Antenna Mast	Column	Pipe	A53 Grade B	Typical
41	M41	N75	N76			Antenna Mast	Column	Pipe	A53 Grade B	Typical
42	M42	N81	N82			Antenna Mast	Column	Pipe	A53 Grade B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
43	M43	N83	N84			Antenna Mast	Column	Pipe	A53 Grade B	Typical
44	M44	N89	N90			Antenna Mast	Column	Pipe	A53 Grade B	Typical
45	M45	N91	N92			Antenna Mast	Column	Pipe	A53 Grade B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
1	N1	1.749999	3	1.010363	0	
2	N2	-0.	3	-2.020725	0	
3	N3	-1.749999	3	1.010363	0	
4	N4	-0.	3	-7.520725	0	
5	N5	-0.	3	-8.020725	0	
6	N6	-0.	3	-5.020725	0	
7	N7	-0.	3	-2.520725	0	
8	N8	-0.	0	-2.020725	0	
9	N9	-0.	0	-7.520725	0	
10	N10	-0.	0	-8.020725	0	
11	N11	-0.	0	-5.020725	0	
12	N12	-0.	0	-2.520725	0	
13	N13	1.5	3	-8.020725	0	
14	N14	1.5	0	-8.020725	0	
15	N15	-1.5	3	-8.020725	0	
16	N16	-1.5	0	-8.020725	0	
17	N17	1.5	4.5	-8.020725	0	
18	N18	-1.5	4.5	-8.020725	0	
19	N19	1.5	-1.5	-8.020725	0	
20	N20	-1.5	-1.5	-8.020725	0	
21	N21	-6.513139	3	3.760363	0	
22	N22	-6.946152	3	4.010363	0	
23	N23	-4.348075	3	2.510363	0	
24	N24	-2.183012	3	1.260363	0	
25	N25	-1.749999	0	1.010363	0	
26	N26	-6.513139	0	3.760363	0	
27	N27	-6.946152	0	4.010363	0	
28	N28	-4.348075	0	2.510363	0	
29	N29	-2.183012	0	1.260363	0	
30	N30	-7.696152	3	2.711324	0	
31	N31	-7.696152	0	2.711324	0	
32	N32	-6.196152	3	5.309401	0	
33	N33	-6.196152	0	5.309401	0	
34	N34	-7.696152	4.5	2.711324	0	
35	N35	-6.196152	4.5	5.309401	0	
36	N36	-7.696152	-1.5	2.711324	0	
37	N37	-6.196152	-1.5	5.309401	0	
38	N38	6.513139	3	3.760362	0	
39	N39	6.946152	3	4.010362	0	
40	N40	4.348075	3	2.510362	0	
41	N41	2.183012	3	1.260362	0	
42	N42	1.749999	0	1.010362	0	
43	N43	6.513139	0	3.760362	0	
44	N44	6.946152	0	4.010362	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
45	N45	4.348075	0	2.510362	0	
46	N46	2.183012	0	1.260362	0	
47	N47	6.196152	3	5.309401	0	
48	N48	6.196152	0	5.309401	0	
49	N49	7.696152	3	2.711324	0	
50	N50	7.696152	0	2.711324	0	
51	N51	6.196152	4.5	5.309401	0	
52	N52	7.696152	4.5	2.711324	0	
53	N53	6.196152	-1.5	5.309401	0	
54	N54	7.696152	-1.5	2.711324	0	
55	N55	-0.	-4.5	-2.020725	0	
56	N56	-0.	0	-6.520725	0	
57	N57	-1.749999	-4.5	1.010363	0	
58	N58	-5.647114	0	3.260363	0	
59	N59	1.749999	-4.5	1.010362	0	
60	N60	5.647114	0	3.260362	0	
61	N61	0.	3	3.760363	0	
62	N62	3.256569	3	-1.880181	0	
63	N63	-3.256569	3	-1.880181	0	
64	N64	0.	0	3.760363	0	
65	N65	3.256569	0	-1.880181	0	
66	N66	-3.256569	0	-1.880181	0	
67	N67	0.	5.5	3.760363	0	
68	N68	3.256569	5.5	-1.880181	0	
69	N69	-3.256569	5.5	-1.880181	0	
70	N70	0.	-2.5	3.760363	0	
71	N71	3.256569	-2.5	-1.880181	0	
72	N72	-3.256569	-2.5	-1.880181	0	
73	N73	0	5	-3.770725	0	
74	N74	0	-1	-3.770725	0	
75	N75	0	5	-6.270725	0	
76	N76	0	-1	-6.270725	0	
77	N77	-0.	3	-3.770725	0	
78	N78	-0.	3	-6.270725	0	
79	N79	-0.	0	-3.770725	0	
80	N80	-0.	0	-6.270725	0	
81	N81	-3.265544	5	1.885363	0	
82	N82	-3.265544	-1	1.885363	0	
83	N83	-5.430607	5	3.135363	0	
84	N84	-5.430607	-1	3.135363	0	
85	N85	-3.265544	3	1.885363	0	
86	N86	-5.430607	3	3.135363	0	
87	N87	-3.265544	0	1.885363	0	
88	N88	-5.430607	0	3.135363	0	
89	N89	3.265544	5	1.885362	0	
90	N90	3.265544	-1	1.885362	0	
91	N91	5.430607	5	3.135362	0	
92	N92	5.430607	-1	3.135362	0	
93	N93	3.265544	3	1.885362	0	
94	N94	5.430607	3	3.135362	0	
95	N95	3.265544	0	1.885362	0	
96	N96	5.430607	0	3.135362	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	N2	Reaction	Reaction	Reaction			
2	N1	Reaction	Reaction	Reaction			
3	N3	Reaction	Reaction	Reaction			
4	N4						
5	N5						
6	N6						
7	N7						
8	N8	Reaction	Reaction	Reaction			
9	N9						
10	N10						
11	N11						
12	N12						
13	N13						
14	N14						
15	N15						
16	N16						
17	N17						
18	N18						
19	N19						
20	N20						
21	N21						
22	N22						
23	N23						
24	N24						
25	N25	Reaction	Reaction	Reaction			
26	N26						
27	N27						
28	N28						
29	N29						
30	N30						
31	N31						
32	N32						
33	N33						
34	N34						
35	N35						
36	N36						
37	N37						
38	N38						
39	N39						
40	N40						
41	N41						
42	N42	Reaction	Reaction	Reaction			
43	N43						
44	N44						
45	N45						
46	N46						
47	N47						
48	N48						
49	N49						
50	N50						
51	N51						

Joint Boundary Conditions (Continued)

	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]
52	N52						
53	N53						
54	N54						
55	N55	Reaction	Reaction	Reaction			
56	N56	Reaction	Reaction	Reaction			
57	N57	Reaction	Reaction	Reaction			
58	N58	Reaction	Reaction	Reaction			
59	N59	Reaction	Reaction	Reaction			
60	N60	Reaction	Reaction	Reaction			
61	N73						
62	N74						
63	N75						
64	N76						
65	N81						
66	N82						
67	N83						
68	N84						
69	N89						
70	N90						
71	N91						
72	N92						

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	Y	-.052	.5
2	M15	Y	-.052	.5
3	M24	Y	-.052	.5
4	M6	Y	-.052	3
5	M15	Y	-.052	3
6	M24	Y	-.052	3
7	M7	Y	-.023	.5
8	M16	Y	-.023	.5
9	M25	Y	-.023	.5
10	M7	Y	-.023	5
11	M16	Y	-.023	5
12	M25	Y	-.023	5
13	M37	Y	-.075	.5
14	M38	Y	-.075	.5
15	M39	Y	-.075	.5
16	M37	Y	-.075	7.5
17	M38	Y	-.075	7.5
18	M39	Y	-.075	7.5
19	M41	Y	-.046	1.5
20	M43	Y	-.046	1.5
21	M45	Y	-.046	1.5
22	M40	Y	-.074	1.5
23	M42	Y	-.074	1.5
24	M44	Y	-.074	1.5
25	M40	Y	-.086	1.5
26	M42	Y	-.086	1.5

Member Point Loads (BLC 2 : Equipment Weight) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
27	M44	Y	-.086	1.5

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	Y	-.108	.5
2	M15	Y	-.108	.5
3	M24	Y	-.108	.5
4	M6	Y	-.108	3
5	M15	Y	-.108	3
6	M24	Y	-.108	3
7	M7	Y	-.098	.5
8	M16	Y	-.098	.5
9	M25	Y	-.098	.5
10	M7	Y	-.098	5
11	M16	Y	-.098	5
12	M25	Y	-.098	5
13	M37	Y	-.297	.5
14	M38	Y	-.297	.5
15	M39	Y	-.297	.5
16	M37	Y	-.297	7.5
17	M38	Y	-.297	7.5
18	M39	Y	-.297	7.5
19	M41	Y	-.088	1.5
20	M43	Y	-.088	1.5
21	M45	Y	-.088	1.5
22	M40	Y	-.104	1.5
23	M42	Y	-.104	1.5
24	M44	Y	-.104	1.5
25	M40	Y	-.124	1.5
26	M42	Y	-.124	1.5
27	M44	Y	-.124	1.5

Member Point Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M15	X	.013	.5
2	M15	X	.013	3
3	M6	X	.025	.5
4	M24	X	.025	.5
5	M6	X	.025	3
6	M24	X	.025	3
7	M25	X	.014	.5
8	M25	X	.014	5
9	M7	X	.03	.5
10	M16	X	.03	.5
11	M7	X	.03	5
12	M16	X	.03	5
13	M37	X	.037	.5
14	M37	X	.037	7.5
15	M38	X	.081	.5
16	M39	X	.081	.5
17	M38	X	.081	7.5

Member Point Loads (BLC 4 : Wind w/ Ice X) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
18	M39	X	.081	7.5
19	M41	X	.02	1.5
20	M43	X	.02	1.5
21	M45	X	.02	1.5
22	M40	X	.022	1.5
23	M42	X	.022	1.5
24	M44	X	.022	1.5

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M15	X	.028	.5
2	M15	X	.028	3
3	M6	X	.068	.5
4	M24	X	.068	.5
5	M6	X	.068	3
6	M24	X	.068	3
7	M25	X	.019	.5
8	M25	X	.019	5
9	M7	X	.077	.5
10	M16	X	.077	.5
11	M7	X	.077	5
12	M16	X	.077	5
13	M37	X	.086	.5
14	M37	X	.086	7.5
15	M38	X	.242	.5
16	M39	X	.242	.5
17	M38	X	.242	7.5
18	M39	X	.242	7.5
19	M41	X	.044	1.5
20	M43	X	.044	1.5
21	M45	X	.044	1.5
22	M40	X	.049	1.5
23	M42	X	.049	1.5
24	M44	X	.049	1.5

Member Point Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M15	Z	.025	.5
2	M15	Z	.025	3
3	M6	Z	.013	.5
4	M24	Z	.013	.5
5	M6	Z	.013	3
6	M24	Z	.013	3
7	M25	Z	.03	.5
8	M25	Z	.03	5
9	M7	Z	.014	.5
10	M16	Z	.014	.5
11	M7	Z	.014	5
12	M16	Z	.014	5
13	M37	Z	.081	.5
14	M37	Z	.081	7.5

Member Point Loads (BLC 6 : Wind w/ Ice Z) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
15	M38	Z	.037	.5
16	M39	Z	.037	.5
17	M38	Z	.037	7.5
18	M39	Z	.037	7.5
19	M41	Z	.02	1.5
20	M43	Z	.02	1.5
21	M45	Z	.02	1.5
22	M40	Z	.022	1.5
23	M42	Z	.022	1.5
24	M44	Z	.022	1.5

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M15	Z	.068	.5
2	M15	Z	.068	3
3	M6	Z	.028	.5
4	M24	Z	.028	.5
5	M6	Z	.028	3
6	M24	Z	.028	3
7	M25	Z	.077	.5
8	M25	Z	.077	5
9	M7	Z	.019	.5
10	M16	Z	.019	.5
11	M7	Z	.019	5
12	M16	Z	.019	5
13	M37	Z	.242	.5
14	M37	Z	.242	7.5
15	M38	Z	.086	.5
16	M39	Z	.086	.5
17	M38	Z	.086	7.5
18	M39	Z	.086	7.5
19	M41	Z	.044	1.5
20	M43	Z	.044	1.5
21	M45	Z	.044	1.5
22	M40	Z	.049	1.5
23	M42	Z	.049	1.5
24	M44	Z	.049	1.5

Member Distributed Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M30	X	.002	.002	0	0
2	M33	X	.002	.002	0	0
3	M29	X	.002	.002	0	0
4	M32	X	.002	.002	0	0
5	M6	X	.002	.002	0	0
6	M7	X	.002	.002	0	0
7	M1	X	.002	.002	0	0
8	M2	X	.002	.002	0	0
9	M10	X	.002	.002	0	0
10	M11	X	.002	.002	0	0

Member Distributed Loads (BLC 4 : Wind w/ Ice X) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
11	M19	X	.002	.002	0	0
12	M20	X	.002	.002	0	0
13	M43	X	.002	.002	0	0
14	M13	X	.002	.002	0	0
15	M42	X	.002	.002	0	0
16	M12	X	.002	.002	0	0
17	M3	X	.002	.002	0	0
18	M40	X	.002	.002	0	0
19	M4	X	.002	.002	0	0
20	M41	X	.002	.002	0	0
21	M5	X	.002	.002	0	0
22	M14	X	.002	.002	0	0
23	M37	X	.002	.002	0	0
24	M17	X	.002	.002	0	0
25	M18	X	.002	.002	0	0
26	M26	X	.002	.002	0	0
27	M27	X	.002	.002	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M30	X	.007	.007	0	0
2	M33	X	.007	.007	0	0
3	M29	X	.007	.007	0	0
4	M32	X	.007	.007	0	0
5	M6	X	.007	.007	0	0
6	M7	X	.007	.007	0	0
7	M1	X	.007	.007	0	0
8	M2	X	.007	.007	0	0
9	M10	X	.007	.007	0	0
10	M11	X	.007	.007	0	0
11	M19	X	.007	.007	0	0
12	M20	X	.007	.007	0	0
13	M43	X	.007	.007	0	0
14	M13	X	.007	.007	0	0
15	M42	X	.007	.007	0	0
16	M12	X	.007	.007	0	0
17	M3	X	.007	.007	0	0
18	M40	X	.007	.007	0	0
19	M4	X	.007	.007	0	0
20	M41	X	.007	.007	0	0
21	M5	X	.007	.007	0	0
22	M14	X	.007	.007	0	0
23	M37	X	.007	.007	0	0
24	M17	X	.007	.007	0	0
25	M18	X	.007	.007	0	0
26	M26	X	.007	.007	0	0
27	M27	X	.007	.007	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M8	Z	.002	.002	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
2	M9	Z	.002	.002	0	0
3	M6	Z	.002	.002	0	0
4	M38	Z	.002	.002	0	0
5	M16	Z	.002	.002	0	0
6	M7	Z	.002	.002	0	0
7	M39	Z	.002	.002	0	0
8	M24	Z	.002	.002	0	0
9	M26	Z	.002	.002	0	0
10	M27	Z	.002	.002	0	0
11	M17	Z	.002	.002	0	0
12	M18	Z	.002	.002	0	0
13	M28	Z	.002	.002	0	0
14	M31	Z	.002	.002	0	0
15	M10	Z	.002	.002	0	0
16	M11	Z	.002	.002	0	0
17	M14	Z	.002	.002	0	0
18	M43	Z	.002	.002	0	0
19	M13	Z	.002	.002	0	0
20	M42	Z	.002	.002	0	0
21	M12	Z	.002	.002	0	0
22	M19	Z	.002	.002	0	0
23	M20	Z	.002	.002	0	0
24	M21	Z	.002	.002	0	0
25	M44	Z	.002	.002	0	0
26	M22	Z	.002	.002	0	0
27	M45	Z	.002	.002	0	0
28	M23	Z	.002	.002	0	0
29	M30	Z	.002	.002	0	0
30	M33	Z	.002	.002	0	0
31	M32	Z	.002	.002	0	0
32	M29	Z	.002	.002	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M8	Z	.007	.007	0	0
2	M9	Z	.007	.007	0	0
3	M6	Z	.007	.007	0	0
4	M38	Z	.007	.007	0	0
5	M16	Z	.007	.007	0	0
6	M7	Z	.007	.007	0	0
7	M39	Z	.007	.007	0	0
8	M24	Z	.007	.007	0	0
9	M26	Z	.007	.007	0	0
10	M27	Z	.007	.007	0	0
11	M17	Z	.007	.007	0	0
12	M18	Z	.007	.007	0	0
13	M28	Z	.007	.007	0	0
14	M31	Z	.007	.007	0	0
15	M10	Z	.007	.007	0	0
16	M11	Z	.007	.007	0	0
17	M14	Z	.007	.007	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
18	M43	Z	.007	.007	0	0
19	M13	Z	.007	.007	0	0
20	M42	Z	.007	.007	0	0
21	M12	Z	.007	.007	0	0
22	M19	Z	.007	.007	0	0
23	M20	Z	.007	.007	0	0
24	M21	Z	.007	.007	0	0
25	M44	Z	.007	.007	0	0
26	M22	Z	.007	.007	0	0
27	M45	Z	.007	.007	0	0
28	M23	Z	.007	.007	0	0
29	M30	Z	.007	.007	0	0
30	M33	Z	.007	.007	0	0
31	M32	Z	.007	.007	0	0
32	M29	Z	.007	.007	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib...	Area(...	Surfa...
1	Self Weight	DL		-1						
2	Equipment Weight	DL					27			
3	Ice Weight	LL					27			
4	Wind w/ Ice X	WLX					24	27		
5	Wind X	WLX					24	27		
6	Wind w/ Ice Z	WLZ					24	32		
7	Wind Z	WLZ					24	32		

Load Combinations

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

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N2	max	.014	6	.14	6	-.022	2	0	6	0	6	0	6
2		min	-.334	2	.058	2	-1.526	4	0	1	0	1	0	1
3	N1	max	-.093	6	.137	6	-.098	6	0	6	0	6	0	6
4		min	-1.317	2	.049	2	-.653	2	0	1	0	1	0	1
5	N3	max	.62	5	.138	3	.672	2	0	6	0	6	0	6
6		min	-1.4	1	.057	5	-.653	4	0	1	0	1	0	1
7	N8	max	.144	2	.147	6	-.023	2	0	6	0	6	0	6
8		min	-.013	6	.059	2	-.06	6	0	1	0	1	0	1
9	N25	max	.044	5	.148	3	.053	4	0	6	0	6	0	6
10		min	-.095	1	.044	5	.018	2	0	1	0	1	0	1

Envelope Joint Reactions (Continued)

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
11	N42	max	.05	3	.139	6	.036	4	0	6	0	6	0	6
12		min	-.036	5	.043	2	.012	2	0	1	0	1	0	1
13	N55	max	0	6	.023	6	0	6	0	6	0	6	0	6
14		min	0	1	.018	2	0	1	0	1	0	1	0	1
15	N56	max	.002	6	2.091	3	.501	4	0	6	0	6	0	6
16		min	-2.262	2	.622	5	.086	2	0	1	0	1	0	1
17	N57	max	0	6	.023	6	0	6	0	6	0	6	0	6
18		min	0	1	.018	2	0	1	0	1	0	1	0	1
19	N58	max	.18	3	2.097	6	-.29	3	0	6	0	6	0	6
20		min	-.784	5	.622	2	-1.267	4	0	1	0	1	0	1
21	N59	max	0	6	.023	6	0	6	0	6	0	6	0	6
22		min	0	1	.018	2	0	1	0	1	0	1	0	1
23	N60	max	.814	5	2.101	3	.799	2	0	6	0	6	0	6
24		min	-.181	3	.697	5	-1.277	4	0	1	0	1	0	1
25	Totals:	max	0	6	7.183	6	0	3						
26		min	-5.164	1	2.413	2	-4.8	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
1	N1	max	0	6	0	6	0	6	8.346e-04	4	1.885e-03	1	1.6e-04	5
2		min	0	1	0	1	0	1	-6.069e-05	2	-3.966e-03	5	-6.852e-04	3
3	N2	max	0	6	0	6	0	6	-2.947e-04	2	3.013e-04	6	8.63e-05	6
4		min	0	1	0	1	0	1	-7.397e-04	6	-5.738e-03	2	-1.376e-03	2
5	N3	max	0	6	0	6	0	6	9.61e-04	4	4.499e-03	4	5.708e-04	3
6		min	0	1	0	1	0	1	3.706e-04	2	7.537e-04	3	-2.167e-04	5
7	N4	max	.078	2	0	5	.004	4	2.206e-03	3	7.597e-03	1	4.662e-04	6
8		min	-.017	6	-.002	1	0	2	4.581e-04	5	2.585e-04	6	-2.326e-03	2
9	N5	max	.036	2	.01	6	.004	4	1.774e-03	3	6.81e-03	1	6.312e-04	6
10		min	-.019	6	0	2	0	2	3.117e-04	5	2.838e-04	6	-2.148e-03	2
11	N6	max	.142	2	-.003	2	.002	4	4.159e-04	3	2.505e-04	6	2.727e-04	6
12		min	-.01	6	-.007	6	0	2	1.66e-04	2	-1.394e-03	2	-3.646e-03	2
13	N7	max	.034	2	-.002	2	0	4	-2.241e-04	2	2.841e-04	6	8.63e-05	6
14		min	-.002	6	-.004	6	0	2	-5.675e-04	6	-5.327e-03	2	-1.376e-03	2
15	N8	max	0	6	0	6	0	6	-2.947e-04	2	-4.394e-06	5	8.615e-05	6
16		min	0	1	0	1	0	1	-7.394e-04	6	-3.798e-04	1	-1.394e-03	2
17	N9	max	.012	1	0	5	0	2	1.869e-03	6	3.422e-03	2	4.683e-04	6
18		min	0	6	-.002	1	0	4	3.262e-04	2	-5.556e-05	6	-1.782e-03	2
19	N10	max	.001	4	.008	6	0	2	1.461e-03	6	3.462e-03	2	6.353e-04	6
20		min	-.009	2	0	2	0	4	1.836e-04	2	-9.608e-05	6	-1.61e-03	2
21	N11	max	.002	1	-.003	2	0	5	3.495e-04	6	5.798e-04	1	2.728e-04	6
22		min	0	5	-.007	6	0	3	1.411e-04	2	7.127e-06	5	-3.55e-03	2
23	N12	max	.002	1	-.002	2	0	6	-2.22e-04	2	2.103e-06	5	8.615e-05	6
24		min	0	5	-.004	6	0	2	-5.587e-04	6	-5.576e-04	1	-1.394e-03	2
25	N13	max	.036	2	.011	5	.03	5	1.984e-04	5	5.027e-03	1	4.884e-04	4
26		min	-.019	6	-.036	1	-.108	1	-7.707e-04	1	-2.269e-03	5	-1.739e-03	2
27	N14	max	.001	4	.011	5	.029	5	-1.286e-04	6	4.617e-03	1	4.666e-04	4
28		min	-.008	2	-.036	1	-.081	1	-7.706e-04	1	-2.296e-03	5	-1.018e-03	2
29	N15	max	.036	2	.017	2	.098	2	8.483e-04	1	4.964e-03	1	8.987e-04	6
30		min	-.019	6	-.037	6	-.005	6	2.239e-04	3	7.675e-04	6	-1.242e-03	2
31	N16	max	.001	6	.017	2	.068	2	8.477e-04	1	4.604e-03	1	8.085e-04	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
32		min	-.008	2	-.037	6	-.013	6	2.233e-04	3	6.311e-04	6	-1.308e-03	2
33	N17	max	.072	2	.011	5	.034	5	2.905e-04	5	5.027e-03	1	4.884e-04	4
34		min	-.025	4	-.036	1	-.122	1	-7.707e-04	1	-2.269e-03	5	-2.03e-03	2
35	N18	max	.062	2	.017	2	.113	2	9.089e-04	4	4.964e-03	1	8.991e-04	6
36		min	-.035	6	-.037	6	0	6	2.24e-04	3	7.675e-04	6	-1.502e-03	2
37	N19	max	.009	4	.011	5	.033	5	-1.409e-04	6	4.617e-03	1	4.666e-04	4
38		min	-.025	2	-.036	1	-.067	1	-7.705e-04	1	-2.296e-03	5	-9.253e-04	2
39	N20	max	.016	6	.017	2	.053	2	8.477e-04	1	4.604e-03	1	8.084e-04	6
40		min	-.032	2	-.037	6	-.017	6	2.233e-04	3	6.311e-04	6	-1.281e-03	2
41	N21	max	.01	6	0	2	.021	4	9.615e-04	5	-1.052e-03	3	-2.549e-04	2
42		min	-.026	2	-.003	4	-.054	2	-7.527e-04	3	-7.04e-03	5	-2.253e-03	6
43	N22	max	.006	6	.01	3	.011	6	9.82e-04	4	-1.062e-03	3	-4.02e-05	2
44		min	-.045	2	0	5	-.087	2	-4.436e-04	2	-6.783e-03	5	-1.938e-03	6
45	N23	max	.051	4	-.002	5	.09	4	1.911e-03	4	4.45e-04	4	-3.491e-04	2
46		min	.009	3	-.007	3	.015	3	1.124e-04	3	-8.073e-04	2	-1.368e-03	4
47	N24	max	.013	4	-.001	5	.023	4	9.146e-04	4	4.187e-03	4	4.234e-04	3
48		min	.002	3	-.004	3	.004	3	3.343e-04	2	7.059e-04	3	-2.768e-04	5
49	N25	max	0	6	0	6	0	6	9.745e-04	4	1.318e-03	2	5.73e-04	3
50		min	0	1	0	1	0	1	3.759e-04	2	1.694e-04	6	-2.255e-04	5
51	N26	max	-.001	6	0	2	-.002	6	6.861e-04	4	-8.01e-04	6	-1.552e-04	2
52		min	-.014	1	-.003	4	-.023	1	-9.256e-04	2	-4.442e-03	1	-1.863e-03	6
53	N27	max	-.003	6	.008	3	-.006	6	8.089e-04	4	-8.117e-04	6	-2.826e-05	2
54		min	-.028	1	-.001	5	-.048	1	-9.608e-04	2	-5.085e-03	1	-1.581e-03	6
55	N28	max	.011	2	-.002	5	.019	1	1.873e-03	4	-1.145e-04	3	-3.448e-04	2
56		min	.001	6	-.007	3	.002	6	1.263e-04	3	-6.722e-04	5	-1.272e-03	4
57	N29	max	.004	2	-.001	5	.007	2	9.358e-04	4	1.283e-03	2	4.148e-04	3
58		min	0	6	-.004	3	0	6	3.228e-04	2	2.034e-04	6	-2.716e-04	5
59	N30	max	.097	2	0	5	.014	6	2.791e-04	6	-3.016e-04	6	-1.555e-04	6
60		min	.002	6	-.01	3	-.169	2	-1.388e-03	2	-9.807e-03	2	-6.102e-04	4
61	N31	max	.1	2	0	5	-.002	6	2.129e-04	6	-2.722e-04	6	4.848e-04	2
62		min	-.009	6	-.01	3	-.122	2	-1.126e-03	2	-9.487e-03	2	-7.439e-04	4
63	N32	max	-.027	3	.011	2	.062	4	1.207e-03	4	-6.31e-04	3	9.12e-04	5
64		min	-.143	5	-.043	6	-.044	2	-1.019e-03	2	-7.484e-03	5	-4.274e-04	3
65	N33	max	-.036	3	.011	2	.028	4	1.324e-03	4	-7.144e-04	3	7.394e-04	5
66		min	-.112	4	-.043	6	-.006	2	-9.898e-04	2	-6.796e-03	5	-3.792e-04	3
67	N34	max	.111	1	0	5	.019	6	3.139e-04	6	-3.016e-04	6	-1.556e-04	6
68		min	.004	6	-.01	3	-.194	2	-1.388e-03	2	-9.807e-03	2	-8.388e-04	1
69	N35	max	-.019	3	.011	2	.088	4	1.44e-03	4	-6.31e-04	3	9.122e-04	5
70		min	-.159	5	-.043	6	-.062	2	-1.019e-03	2	-7.484e-03	5	-4.555e-04	3
71	N36	max	.109	2	0	5	-.006	6	2.005e-04	6	-2.722e-04	6	5.507e-04	2
72		min	-.013	6	-.01	3	-.102	1	-1.126e-03	2	-9.487e-03	2	-7.438e-04	4
73	N37	max	-.043	3	.011	2	.012	2	1.324e-03	4	-7.144e-04	3	7.394e-04	5
74		min	-.1	4	-.043	6	-.001	6	-9.898e-04	2	-6.796e-03	5	-3.792e-04	3
75	N38	max	.008	6	-.002	6	.054	2	4.85e-04	5	7.13e-03	4	1.798e-03	6
76		min	-.027	2	-.004	1	-.013	6	-1.434e-03	3	-6.48e-03	2	5.882e-04	2
77	N39	max	.024	4	.009	6	.088	2	3.276e-04	5	6.704e-03	4	1.331e-03	6
78		min	-.047	2	0	2	-.038	4	-1.306e-03	3	-6.881e-03	2	6.232e-04	2
79	N40	max	.02	1	-.002	2	.076	5	1.586e-03	5	2.108e-04	6	1.139e-03	4
80		min	-.043	5	-.006	6	-.03	1	-5.122e-04	3	-6.47e-04	2	-4.163e-05	2
81	N41	max	.006	1	-.001	2	.02	5	7.882e-04	4	1.771e-03	1	2.201e-04	5
82		min	-.012	5	-.004	6	-.009	1	-9.019e-05	2	-3.683e-03	5	-5.41e-04	3
83	N42	max	0	6	0	6	0	6	8.468e-04	4	1.086e-03	2	1.68e-04	5

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
84		min	0	1	0	1	0	1	-1.327e-05	2	-9.267e-04	4	-6.782e-04	3
85	N43	max	.003	5	-.002	6	.023	1	4.935e-04	2	3.648e-03	5	1.374e-03	6
86		min	-.014	1	-.003	1	-.005	5	-1.203e-03	6	-4.264e-03	1	3.687e-04	5
87	N44	max	.014	5	.007	6	.046	1	6.041e-04	2	3.889e-03	5	9.274e-04	3
88		min	-.027	1	-.003	2	-.025	5	-1.166e-03	6	-4.645e-03	1	1.177e-04	5
89	N45	max	.01	1	-.002	2	.011	4	1.535e-03	5	6.589e-04	4	1.037e-03	4
90		min	-.006	4	-.007	6	-.017	2	-4.518e-04	3	-4.96e-04	2	-3.862e-05	2
91	N46	max	.003	2	-.001	2	.005	4	8.08e-04	4	1.065e-03	2	2.142e-04	5
92		min	-.003	4	-.004	6	-.006	2	-3.982e-05	2	-9.84e-04	4	-5.307e-04	3
93	N47	max	.149	4	-.014	6	.044	2	1.06e-03	2	7.585e-03	4	9.189e-04	2
94		min	-.123	2	-.029	1	.004	6	8.437e-07	6	-4.256e-03	2	-9.599e-04	4
95	N48	max	.116	4	-.014	6	.034	4	8.832e-04	2	7.16e-03	4	1.109e-03	2
96		min	-.087	2	-.029	1	.011	2	-2.153e-04	6	-4.046e-03	2	-7.293e-04	4
97	N49	max	.116	1	-.009	2	.18	2	1.825e-03	2	3.344e-03	4	9.986e-05	5
98		min	-.04	5	-.04	6	-.072	4	-8.16e-04	6	-9.603e-03	2	-9.233e-04	1
99	N50	max	.091	1	-.009	2	.115	1	1.498e-03	2	3.216e-03	4	1.884e-04	5
100		min	-.032	5	-.04	6	-.051	5	-7.719e-04	6	-8.685e-03	2	-9.337e-04	1
101	N51	max	.166	4	-.014	6	.063	2	1.06e-03	2	7.585e-03	4	8.539e-04	2
102		min	-.139	2	-.029	1	.005	6	3.811e-05	3	-4.256e-03	2	-9.6e-04	4
103	N52	max	.136	1	-.009	2	.213	2	1.825e-03	2	3.344e-03	4	9.987e-05	5
104		min	-.041	5	-.04	6	-.084	4	-7.837e-04	6	-9.603e-03	2	-1.156e-03	1
105	N53	max	.103	4	-.014	6	.039	4	8.832e-04	2	7.16e-03	4	1.125e-03	2
106		min	-.067	2	-.029	1	-.005	2	-2.45e-04	4	-4.046e-03	2	-7.292e-04	4
107	N54	max	.074	1	-.009	2	.09	1	1.498e-03	2	3.216e-03	4	1.884e-04	5
108		min	-.029	5	-.04	6	-.04	5	-7.767e-04	6	-8.685e-03	2	-9.337e-04	1
109	N55	max	0	6	0	6	0	6	-2.434e-04	5	8.578e-04	2	2.002e-04	6
110		min	0	1	0	1	0	1	-3.245e-04	1	-2.002e-04	6	-8.578e-04	2
111	N56	max	0	6	0	6	0	6	2.404e-06	5	-6.711e-06	6	3.937e-04	6
112		min	0	1	0	1	0	1	-1.403e-04	3	-1.557e-03	1	-3.272e-03	2
113	N57	max	0	6	0	6	0	6	1.066e-03	4	-3.144e-04	3	1.238e-04	3
114		min	0	1	0	1	0	1	4.345e-04	3	-1.044e-03	4	-2.92e-04	5
115	N58	max	0	6	0	6	0	6	1.778e-03	4	-1.628e-05	6	6.152e-05	2
116		min	0	1	0	1	0	1	-9.063e-05	2	-1.492e-03	1	-8.995e-04	4
117	N59	max	0	6	0	6	0	6	7.016e-04	4	6.606e-04	5	1.195e-04	5
118		min	0	1	0	1	0	1	-4.438e-04	2	-6.906e-04	1	-6.263e-04	1
119	N60	max	0	6	0	6	0	6	1.243e-03	5	-1.203e-05	6	6.12e-04	5
120		min	0	1	0	1	0	1	-2.342e-04	3	-1.435e-03	1	-3.099e-04	3
121	N61	max	.009	6	-.164	2	.891	5	6.756e-03	5	2.074e-03	1	-1.101e-04	5
122		min	-.026	2	-.679	6	-.01	3	-6.423e-04	3	1.213e-04	5	-8.589e-04	1
123	N62	max	.714	2	-.156	5	.148	5	1.745e-03	5	-1.062e-04	3	1.159e-03	4
124		min	-.258	4	-.678	3	-.371	1	-1.373e-03	1	-1.496e-03	5	-6.172e-03	2
125	N63	max	.704	1	-.149	2	.366	1	2.028e-03	4	1.633e-03	4	-7.092e-04	6
126		min	.062	6	-.674	6	.047	6	6.848e-04	3	-1.045e-03	2	-5.404e-03	1
127	N64	max	0	6	-.164	2	.796	4	-1.877e-04	2	1.854e-03	1	1.337e-03	2
128		min	-.013	1	-.679	6	.004	2	-1.684e-03	4	5.202e-05	6	-1.648e-04	6
129	N65	max	.623	1	-.156	5	.129	5	1.647e-04	3	-5.717e-05	3	1.57e-03	1
130		min	-.225	5	-.678	3	-.348	1	-7.198e-04	4	-1.1e-03	5	5.885e-04	5
131	N66	max	.644	2	-.149	2	.36	2	4.108e-04	3	1.168e-03	4	2.356e-03	2
132		min	.041	6	-.674	6	.023	6	-4.756e-04	5	-4.372e-04	2	-6.068e-04	4
133	N67	max	.03	1	-.164	2	1.168	5	1.008e-02	5	2.074e-03	1	-1.101e-04	5
134		min	.008	5	-.679	6	-.029	3	-6.44e-04	3	1.213e-04	5	-2.163e-03	1
135	N68	max	.974	2	-.156	5	.23	5	3.049e-03	5	-1.062e-04	3	1.159e-03	4

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
136		min	-.293	4	-.679	3	-.413	1	-1.374e-03	1	-1.496e-03	5	-9.492e-03	2
137	N69	max	.94	1	-.15	2	.395	1	3.333e-03	4	1.633e-03	4	-7.112e-04	6
138		min	.083	6	-.674	6	.082	6	6.867e-04	3	-1.045e-03	2	-8.725e-03	1
139	N70	max	.056	2	-.164	2	.92	4	-1.876e-04	2	1.854e-03	1	2.638e-03	2
140		min	-.005	6	-.679	6	.01	2	-4.996e-03	4	5.202e-05	6	-1.644e-04	6
141	N71	max	.744	1	-.156	5	.179	5	1.643e-04	3	-5.717e-05	3	4.882e-03	1
142		min	-.208	5	-.679	3	-.344	1	-2.022e-03	4	-1.1e-03	5	5.882e-04	5
143	N72	max	.789	2	-.15	2	.37	2	4.097e-04	3	1.168e-03	4	5.668e-03	2
144		min	.024	6	-.674	6	.023	6	-1.778e-03	5	-4.372e-04	2	-6.063e-04	4
145	N73	max	.173	2	-.005	2	.003	5	8.118e-05	5	2.406e-04	6	1.717e-04	6
146		min	-.01	6	-.012	6	-.001	3	-4.877e-05	3	-3.327e-03	2	-2.887e-03	2
147	N74	max	.002	6	-.005	2	0	6	-1.688e-05	2	3.115e-05	6	1.711e-04	6
148		min	-.024	2	-.012	6	0	2	-4.041e-05	6	-3.659e-04	2	-2.588e-03	2
149	N75	max	.241	2	0	2	.006	5	1.085e-04	5	1.496e-03	1	3.75e-04	6
150		min	-.023	6	-.002	6	-.006	3	-2.766e-04	3	1.616e-04	5	-4.057e-03	2
151	N76	max	.005	6	0	2	-.001	2	2.524e-04	6	1.539e-05	6	3.751e-04	6
152		min	-.047	2	0	6	-.003	6	8.807e-05	2	-5.268e-04	2	-3.636e-03	2
153	N77	max	.104	2	-.005	2	.001	4	3.918e-05	5	2.406e-04	6	1.714e-04	6
154		min	-.006	6	-.012	6	0	2	-4.868e-05	3	-3.327e-03	2	-2.78e-03	2
155	N78	max	.144	2	0	2	.003	4	7.08e-05	5	1.496e-03	1	3.748e-04	6
156		min	-.014	6	-.002	6	0	2	-2.764e-04	3	1.616e-04	5	-3.954e-03	2
157	N79	max	.007	1	-.005	2	0	4	-1.688e-05	2	3.115e-05	6	1.711e-04	6
158		min	0	5	-.012	6	0	2	-4.041e-05	6	-3.659e-04	2	-2.596e-03	2
159	N80	max	0	6	0	2	0	5	2.524e-04	6	1.539e-05	6	3.751e-04	6
160		min	-.003	2	0	6	0	3	8.807e-05	2	-5.268e-04	2	-3.644e-03	2
161	N81	max	.06	4	-.004	5	.111	4	1.737e-03	4	2.442e-03	4	-1.368e-04	3
162		min	.01	3	-.012	3	.018	3	2.582e-04	3	4.259e-04	3	-8.635e-04	4
163	N82	max	.009	2	-.004	5	.015	2	1.461e-03	4	5.946e-04	1	-8.96e-05	3
164		min	-.001	4	-.011	3	-.003	4	2.393e-04	3	1.406e-04	6	-8.244e-04	4
165	N83	max	.07	4	0	5	.136	4	2.355e-03	4	-2.862e-04	6	-2.995e-05	3
166		min	.009	3	-.002	3	.013	2	1.86e-04	2	-3.004e-03	2	-1.085e-03	4
167	N84	max	0	2	0	5	.004	2	1.882e-03	4	-1.174e-04	6	-1.208e-04	2
168		min	-.014	4	0	3	-.021	4	-2.308e-05	2	-1.611e-03	2	-1.191e-03	4
169	N85	max	.04	4	-.004	5	.07	4	1.629e-03	4	2.442e-03	4	-1.133e-04	3
170		min	.007	3	-.012	3	.012	3	2.577e-04	3	4.259e-04	3	-8.628e-04	4
171	N86	max	.044	4	0	5	.08	4	2.253e-03	4	-2.862e-04	6	-7.818e-06	3
172		min	.009	2	-.002	3	.008	2	1.86e-04	2	-3.004e-03	2	-1.085e-03	4
173	N87	max	.011	2	-.004	5	.019	2	1.469e-03	4	5.946e-04	1	-9.103e-05	3
174		min	.002	6	-.011	3	.003	6	2.393e-04	3	1.406e-04	6	-8.244e-04	4
175	N88	max	.002	2	0	5	.004	2	1.89e-03	4	-1.174e-04	6	-1.288e-04	2
176		min	0	6	0	3	0	6	-2.308e-05	2	-1.611e-03	2	-1.191e-03	4
177	N89	max	.025	1	-.004	2	.097	5	1.509e-03	5	8.751e-04	1	7.398e-04	5
178		min	-.052	5	-.012	6	-.036	1	-3.29e-04	1	-2.036e-03	5	-3.233e-04	1
179	N90	max	.008	2	-.004	2	.001	6	1.232e-03	5	5.423e-04	1	6.991e-04	5
180		min	-.001	6	-.011	6	-.013	2	-2.691e-04	1	-4.681e-04	5	-1.817e-04	1
181	N91	max	.019	3	0	5	.107	5	1.867e-03	5	2.474e-03	4	8.297e-04	5
182		min	-.054	5	-.002	3	-.017	3	-1.954e-04	3	-2.768e-03	2	-4.821e-04	3
183	N92	max	.01	5	0	2	.005	3	1.396e-03	5	5.635e-04	4	8.784e-04	5
184		min	0	3	0	6	-.016	5	-4.361e-04	3	-1.49e-03	2	1.965e-05	3
185	N93	max	.017	1	-.004	2	.061	5	1.402e-03	5	8.751e-04	1	7.393e-04	5
186		min	-.034	5	-.011	6	-.028	1	-3.287e-04	1	-2.036e-03	5	-2.811e-04	1
187	N94	max	.008	1	0	5	.062	5	1.765e-03	5	2.474e-03	4	8.295e-04	5

Envelope Joint Displacements (Continued)

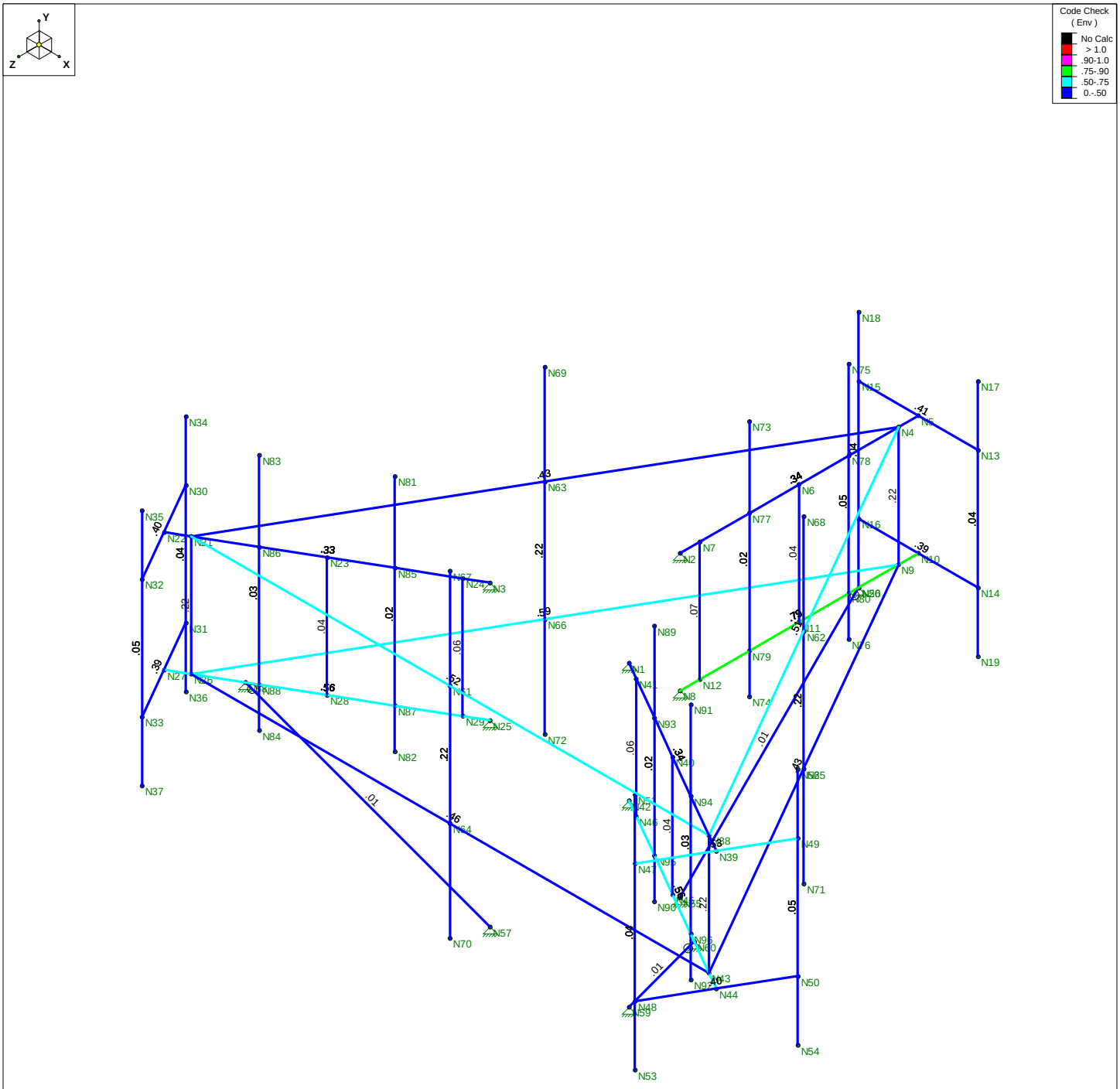
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
188		min	-.034	5	-.002	3	-.013	3	-1.952e-04	3	-2.768e-03	2	-4.71e-04	3
189	N95	max	.009	2	-.004	2	.014	4	1.24e-03	5	5.423e-04	1	6.991e-04	5
190		min	-.008	4	-.011	6	-.016	2	-2.691e-04	1	-4.681e-04	5	-1.817e-04	1
191	N96	max	.002	2	0	2	0	4	1.404e-03	5	5.635e-04	4	8.784e-04	5
192		min	0	4	0	6	-.004	2	-4.361e-04	3	-1.49e-03	2	1.965e-05	3

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

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	Dir	...	phi*...	phi*...	phi*...	phi*...	Cb	Eqn
1	M2	PIPE_2.0	.793	5.5	1	.291	4.5		1	20.867	32.13	1.872	1.872	2.4..	H1-...
2	M33	PIPE_2.0	.594	6....	1	.062	0		2	5.797	32.13	1.872	1.872	1.7..	H1-...
3	M20	PIPE_2.0	.565	5.5	4	.206	4.5		4	20.867	32.13	1.872	1.872	2.39	H1-...
4	M11	PIPE_2.0	.557	5.5	4	.194	4.5		4	20.867	32.13	1.872	1.872	2.4..	H1-...
5	M26	L2x2x2	.533	1.5	1	.048	1.5	y	6	9.655	15.908	.403	.782	1.41	H2-1
6	M28	PIPE_2.0	.519	6....	4	.085	13...		4	5.797	32.13	1.872	1.872	1.7..	H1-...
7	M29	PIPE_2.0	.506	6....	1	.085	0		1	5.797	32.13	1.872	1.872	1.8..	H1-...
8	M31	PIPE_2.0	.465	6....	4	.051	0		4	5.797	32.13	1.872	1.872	1.8..	H1-...
9	M30	PIPE_2.0	.435	6....	1	.070	13...		2	5.797	32.13	1.872	1.872	1.8..	H1-...
10	M32	PIPE_2.0	.433	6....	1	.050	13...		2	5.797	32.13	1.872	1.872	1.7..	H1-...
11	M8	L2x2x2	.409	1.5	3	.048	1.5	y	3	9.655	15.908	.403	.825	1.8..	H2-1
12	M17	L2x2x2	.402	0	6	.046	1.5	y	3	9.655	15.908	.396	.832	1.9..	H2-1
13	M27	L2x2x2	.402	0	3	.046	1.5	y	3	9.655	15.908	.396	.843	2.1..	H2-1
14	M18	L2x2x2	.394	0	6	.045	1.5	y	6	9.655	15.908	.396	.84	2.08	H2-1
15	M9	L2x2x2	.386	1.5	3	.044	1.5	y	3	9.655	15.908	.403	.818	1.7..	H2-1
16	M19	PIPE_2.0	.336	5.5	3	.091	5.5		6	20.867	32.13	1.872	1.872	3.6..	H1-...
17	M1	PIPE_2.0	.335	5.5	3	.121	5.5		1	20.867	32.13	1.872	1.872	3.5..	H1-...
18	M10	PIPE_2.0	.333	5.5	3	.083	5.5		6	20.867	32.13	1.872	1.872	3.5..	H1-...
19	M38	PIPE_2.5	.223	2.5	1	.040	2.5		2	30.038	50.715	3.596	3.596	1.2..	H1-...
20	M23	PIPE_2.0	.222	0	3	.078	0		4	28.843	32.13	1.872	1.872	2.2..	H1-...
21	M39	PIPE_2.5	.221	2.5	1	.039	2.5		2	30.038	50.715	3.596	3.596	1.2..	H1-...
22	M14	PIPE_2.0	.221	0	6	.071	0		4	28.843	32.13	1.872	1.872	2.2..	H1-...
23	M5	PIPE_2.0	.221	0	3	.090	0		1	28.843	32.13	1.872	1.872	2.3..	H1-...
24	M37	PIPE_2.5	.218	2.5	4	.027	2.5		4	30.038	50.715	3.596	3.596	4.8..	H1-...
25	M3	PIPE_2.0	.066	0	1	.102	0		2	28.843	32.13	1.872	1.872	2.2..	H1-...
26	M12	PIPE_2.0	.061	3	3	.069	0		4	28.843	32.13	1.872	1.872	2.27	H1-...
27	M21	PIPE_2.0	.058	0	6	.059	0		5	28.843	32.13	1.872	1.872	2.2..	H1-...
28	M41	PIPE_2.5	.050	5	1	.054	5		1	37.774	50.715	3.596	3.596	2.3..	H1-...
29	M15	PIPE_2.5	.049	1.5	6	.026	1.5		4	37.774	50.715	3.596	3.596	1.4..	H1-...
30	M24	PIPE_2.5	.048	1.5	3	.031	1.5		1	37.774	50.715	3.596	3.596	1.54	H1-...
31	M25	PIPE_2.5	.043	1.5	4	.018	1.5		4	37.774	50.715	3.596	3.596	1.5..	H1-...
32	M22	PIPE_2.0	.043	0	3	.020	3		5	28.843	32.13	1.872	1.872	2.2..	H1-...
33	M13	PIPE_2.0	.042	0	6	.027	3		4	28.843	32.13	1.872	1.872	2.2..	H1-...
34	M4	PIPE_2.0	.042	0	3	.044	3		2	28.843	32.13	1.872	1.872	2.4..	H1-...
35	M6	PIPE_2.5	.041	1.5	6	.017	1.5		1	37.774	50.715	3.596	3.596	1.4..	H1-...
36	M7	PIPE_2.5	.039	1.5	1	.019	1.5		1	37.774	50.715	3.596	3.596	1.4..	H1-...
37	M16	PIPE_2.5	.035	1.5	2	.016	1.5		2	37.774	50.715	3.596	3.596	1.3..	H1-...
38	M43	PIPE_2.5	.034	5	4	.044	2		5	37.774	50.715	3.596	3.596	2.3..	H1-...
39	M45	PIPE_2.5	.033	5	4	.051	2		4	37.774	50.715	3.596	3.596	2.3..	H1-...
40	M40	PIPE_2.5	.020	2	1	.076	2		2	37.774	50.715	3.596	3.596	2.6..	H1-...
41	M44	PIPE_2.5	.020	2	4	.044	2		5	37.774	50.715	3.596	3.596	2.5..	H1-...
42	M42	PIPE_2.5	.020	2	4	.051	2		4	37.774	50.715	3.596	3.596	2.5..	H1-...

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

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	Dir	...	phi*...	phi*...	phi*...	phi*...	Cb	Eqn
43	M34	LL2.5x2.5x3x3	.010	3....	6	.001	6....	y	6	34.504	58.32	3.954	2.55	1	H1-...
44	M36	LL2.5x2.5x3x3	.010	3....	6	.001	6....	y	6	34.504	58.32	3.954	2.55	1	H1-...
45	M35	LL2.5x2.5x3x3	.010	3....	6	.001	6....	y	6	34.504	58.32	3.954	2.55	1	H1-...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
TJL	CTHA813A - Mount	May 4, 2021 at 11:54 AM
21005.21	Unity Check	Existing Mount.r3d

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

150-ft Existing Guyed Lattice Tower

Proposed T-Mobile
Antenna Upgrade

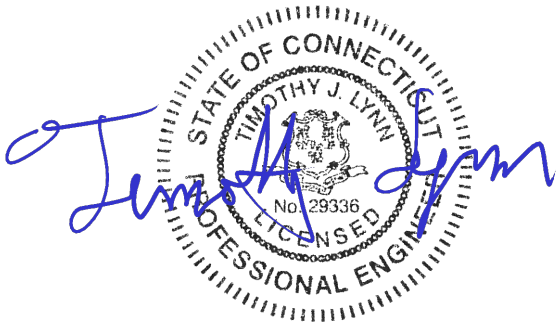
T-Mobile Site Ref: CTHA813A

497 Old Post Road
Tolland, CT

Centek Project No. 21005.21

Date: May 4, 2021

Max Stress Ratio = 82%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

Table of Contents

Introduction

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

The host tower is a 150-ft, three legged, guyed steel lattice tower. The original tower designer and manufacturer are unknown. The tower geometry, structure member sizes and foundation information were obtained from a previous structural analysis report prepared by Raymaker & Associates dated December 7, 2017.

Antenna and appurtenance inventory were obtained from the aforementioned structural analysis report, a previous structural analysis report prepared by Fullerton Engineering dated February 12, 2018 and a RF data sheet.

The tower consists of nine (9) 20-ft long vertical sections constructed of solid round legs. Diagonal and horizontal lateral support bracing consists of solid rounds. The vertical tower sections are connected by sleeve bolts. Diagonal and horizontal bracing connections to the legs consist of fully welded connections. The width of the tower face is 1.5-ft throughout its length with a 5'-3" tapered base.

Antenna and Appurtenance Summary

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

- UNKNOWN (Existing):
  Antennas: One (1) 6-ft omni-directional whip and one (1) 20-ft omni-directional whip antenna leg mounted to the top of the tower.
  Coax Cables: Two (2) 7/8" ∅ coaxial cables running on a face of the tower.
- AT&T (Existing):
  Antennas: Two (2) CCI HPA-65R-BUU-H6 panel antennas, four (4) CCI HPA-65R-BUU-H8 panel antennas, two (2) Commcope SBNH-1D6565C panel antennas, two (2) CCI DTMABP7819VG12A TMAs, three (3) Ericsson RRUS-11 remote radio heads, six (6) Ericsson RRUS-32 remote radio heads, two (2) Ericsson 4478-B14 remote radio heads and two (2) surge arrestors mounted on three (3) 12-ft V-Frames with a RAD center elevation of 126-ft above the existing tower base.
  Coax Cables: Nine (9) 7/8" ∅ coaxial cables, one (1) Fiber trunk and two (2) DC trunks running on a face of the tower.
- UNKNOWN (Existing):
  Antennas: One 8-ft dipole antenna leg mounted to the tower with an elevation of 95-ft AGL.
  Coax Cables: One (1) 7/8" ∅ coaxial cable running on a face of the tower.
- UNKNOWN (Existing):
  Antennas: One (1) GPS antenna leg mounted to the tower with an elevation of 50-ft AGL.
  Coax Cables: One (1) 1/2" ∅ coaxial cable running on a face of the tower.

- Sprint (Existing to Remove):
  Antenna: Three (3) RFS APXVSPP18 panel antennas, three (3) DT465B-2XR panel antennas, three (3) 1900MHz 4X45W RRHs, six (6) 800MHz 2X50W RRHs and three (3) TD-RRR8x20 RRHs mounted to the tower with a RAD center elevation of ±147-ft above grade level.
  Coax Cable: Four (4) fiber cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **T-MOBILE (Proposed Final Configuration):**
  Antennas: Three (3) Ericsson AIR6449 panel antennas, three (3) RFS APX16DWV-16DWVS panel antennas, three (3) RFS APXVAALL24_43 panel antennas, three (3) Ericsson 4449 remote radio heads, three (3) Ericsson 4415 remote radio heads and three (3) Ericsson 4424 remote radio heads mounted to the tower with a RAD center elevation of ±147-ft above grade level.
  Coax Cables: Three (3) 6x24 ∅ fiber cable running on a face of the existing tower as specified in Section 3 of this report.

Primary Assumptions Used in the Analysis

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

Analysis

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

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 1.00" radial ice on the tower structure and its components.

Basic Wind Speed:	Tolland; v = 105 mph (Vasd – Risk Cat III)	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 105 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; 40 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

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

Tower Capacity

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

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

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T8)	5'-3" - 20'-0"	82.2%	**PASS**
Diagonal (T2)	120'-0" - 140'-0"	76.5%	**PASS**
Guy C @ 47-ft radius (T2)	136'-0"	65.4%	**PASS**

Foundation and Anchors

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Original Design Reactions[1]	Modified Original Reactions[2]	Proposed Reactions	Result
Tower Base	Compression	115.3 kips	155.7 kips	155.2 kips	**PASS**
	Shear	2.6 kips	3.5 kips	0.8 kips	**PASS**
Guy Anchor	Uplift	69.6 kips	94.0 kips	48.7 kips	**PASS**
	Shear	36.6 kips	49.4 kips	21.1 kips	**PASS**

Note 1: Original design reactions taken from aforementioned structural report prepared by Raymaker.
Note 2: Original design reactions multiplied by 1.35 for comparison to proposed reactions per section 15.5 of TIA-222-G

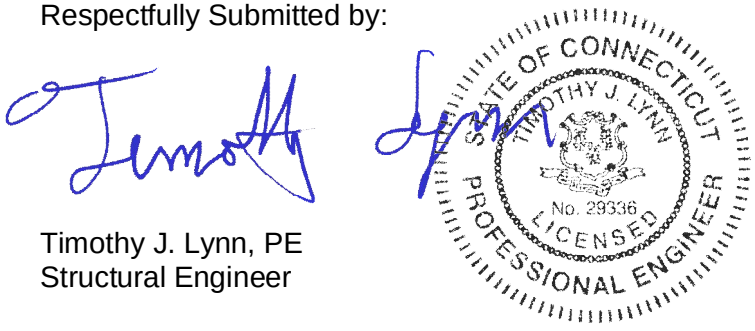
C o n c l u s i o n

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

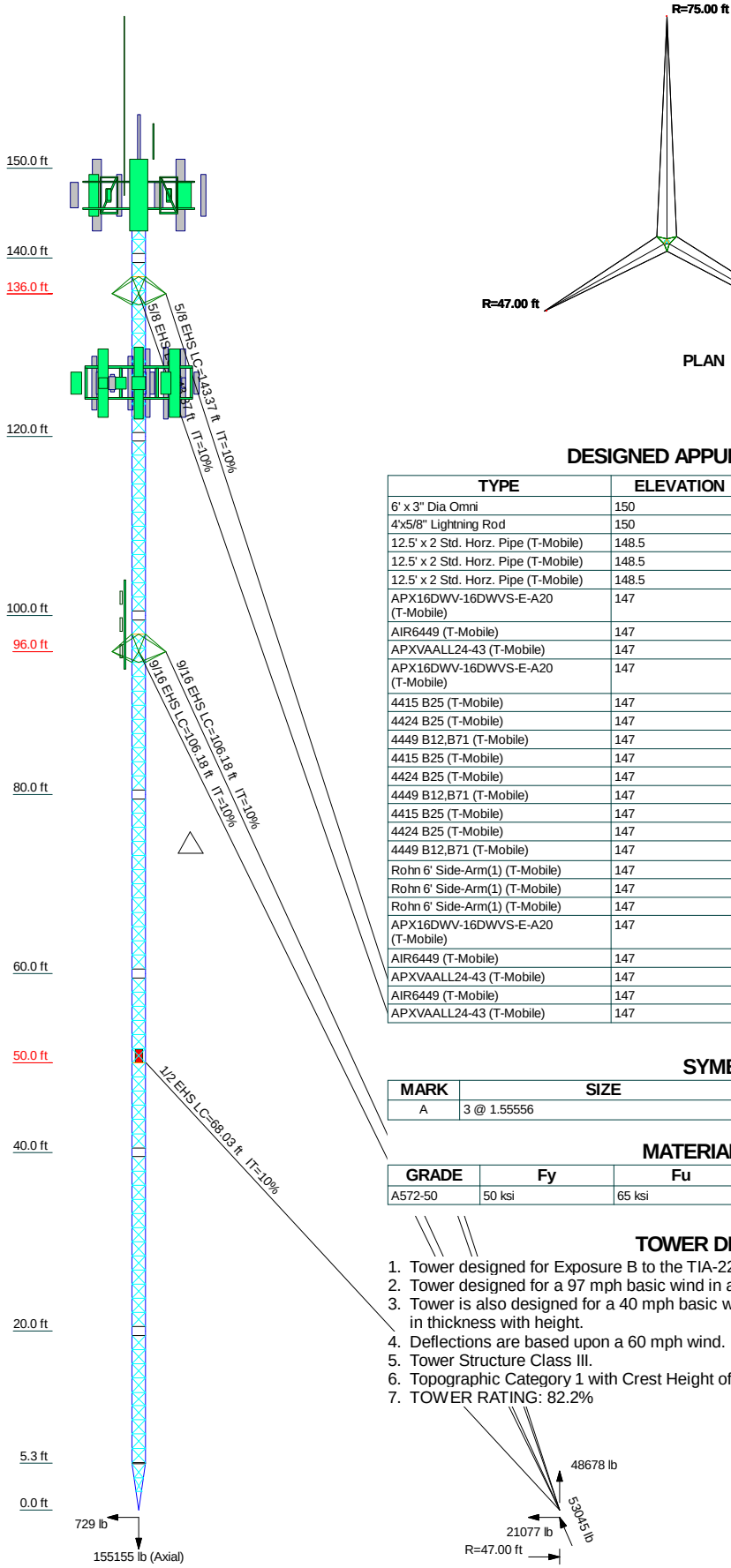
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

TnxTower Features:

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

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9
Legs					SR 1 3/4				
Leg Grade					A572-50				
Diagonals					SR 5/8				
Diagonal Grade					A36				
Top Girts					SR 3/4				
Bottom Girts					SR 3/4				N.A.
Horizontals					SR 3/4				
Top Guy Pull-Offs	N.A.	SR 5/8	N.A.	SR 5/8	N.A.	SR 5/8	N.A.	N.A.	
Face Width (ft)	1.5								
# Panels @ (ft)	84 @ 1.58333							9 @ 1.57407	A
Weight (lb)	352.3	940.3	693.4	940.3	693.4	695.8	693.4	516.3	166.2



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
6' x 3" Dia Omni	150	20' x 3" Dia Omni	147
4'x5/8" Lightning Rod	150	12.5' x 2 Std. Horz. Pipe (T-Mobile)	145.5
12.5' x 2 Std. Horz. Pipe (T-Mobile)	148.5	12.5' x 2 Std. Horz. Pipe (T-Mobile)	145.5
12.5' x 2 Std. Horz. Pipe (T-Mobile)	148.5	12.5' x 2 Std. Horz. Pipe (T-Mobile)	145.5
12.5' x 2 Std. Horz. Pipe (T-Mobile)	148.5	SBNH-1D6565C (ATI)	126
APX16DWV-16DWVS-E-A20 (T-Mobile)	147	HPA-65R-BUU-H8 (ATI)	126
		HPA-65R-BUU-H8 (ATI)	126
AIR6449 (T-Mobile)	147	SBNH-1D6565C (ATI)	126
APXVAALL24-43 (T-Mobile)	147	HPA-65R-BUU-H8 (ATI)	126
APX16DWV-16DWVS-E-A20 (T-Mobile)	147	DTMABP7819VG12A TMA (ATI)	126
		DTMABP7819VG12A TMA (ATI)	126
4415 B25 (T-Mobile)	147	RRUS-11 (ATI)	126
4424 B25 (T-Mobile)	147	RRUS-11 (ATI)	126
4449 B12,B71 (T-Mobile)	147	RRUS-11 (ATI)	126
4415 B25 (T-Mobile)	147	(2) RRUS-32 (ATI)	126
4424 B25 (T-Mobile)	147	(2) RRUS-32 (ATI)	126
4449 B12,B71 (T-Mobile)	147	(2) RRUS-32 (ATI)	126
4415 B25 (T-Mobile)	147	4478 B14 (ATI)	126
4424 B25 (T-Mobile)	147	4478 B14 (ATI)	126
4449 B12,B71 (T-Mobile)	147	DC6-48-60-18-8F Surge Arrestor (ATI)	126
Rohn 6' Side-Arm(1) (T-Mobile)	147	DC6-48-60-18-8F Surge Arrestor (ATI)	126
Rohn 6' Side-Arm(1) (T-Mobile)	147	12' V-Frame (ATI)	126
Rohn 6' Side-Arm(1) (T-Mobile)	147	12' V-Frame (ATI)	126
APX16DWV-16DWVS-E-A20 (T-Mobile)	147	12' V-Frame (ATI)	126
AIR6449 (T-Mobile)	147	HPA-65R-BUU-H6 (ATI)	126
APXVAALL24-43 (T-Mobile)	147	HPA-65R-BUU-H6 (ATI)	126
AIR6449 (T-Mobile)	147	HPA-65R-BUU-H8 (ATI)	126
APXVAALL24-43 (T-Mobile)	147	8' dipole antenna	95
		GPS	50

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	3 @ 1.55556		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 82.2%

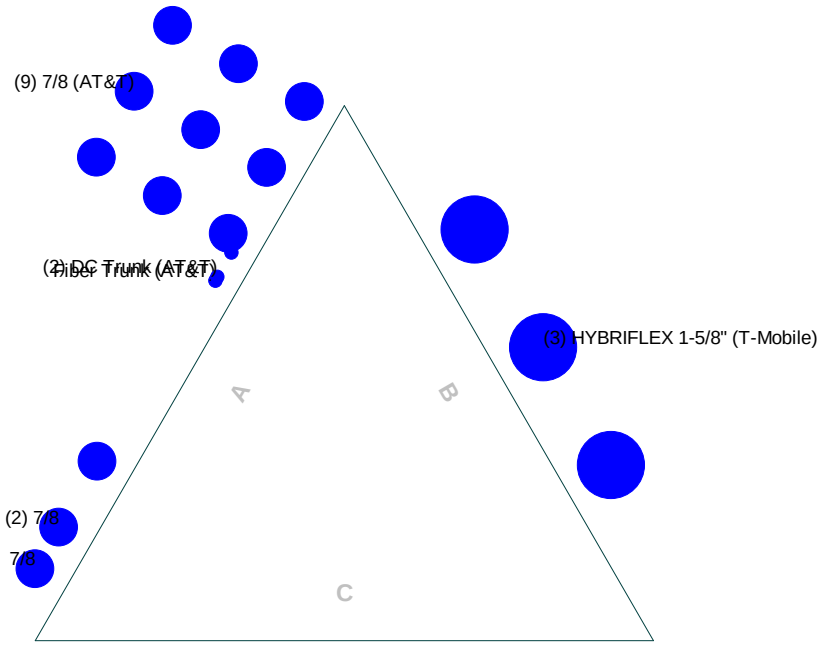
ALL REACTIONS ARE FACTORED

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

Job: **21005.21 - CTHA813A**			
Project: **150' Guyed Tower - Tolland, CT**			
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 05/04/21	Scale: NTS	
Path: J:\Jobs\21005\00.W\21_CTHA813A_CT33XC212\05_Structural\Structural Analysis\Backup Documentation\Calcs\ERI\150' Guyed Tower.eri		Dwg No. E-1	

Feed Line Plan

Round Flat App In Face App Out Face



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Code: TIA-222-G	Date: 05/04/21	Scale: NTS
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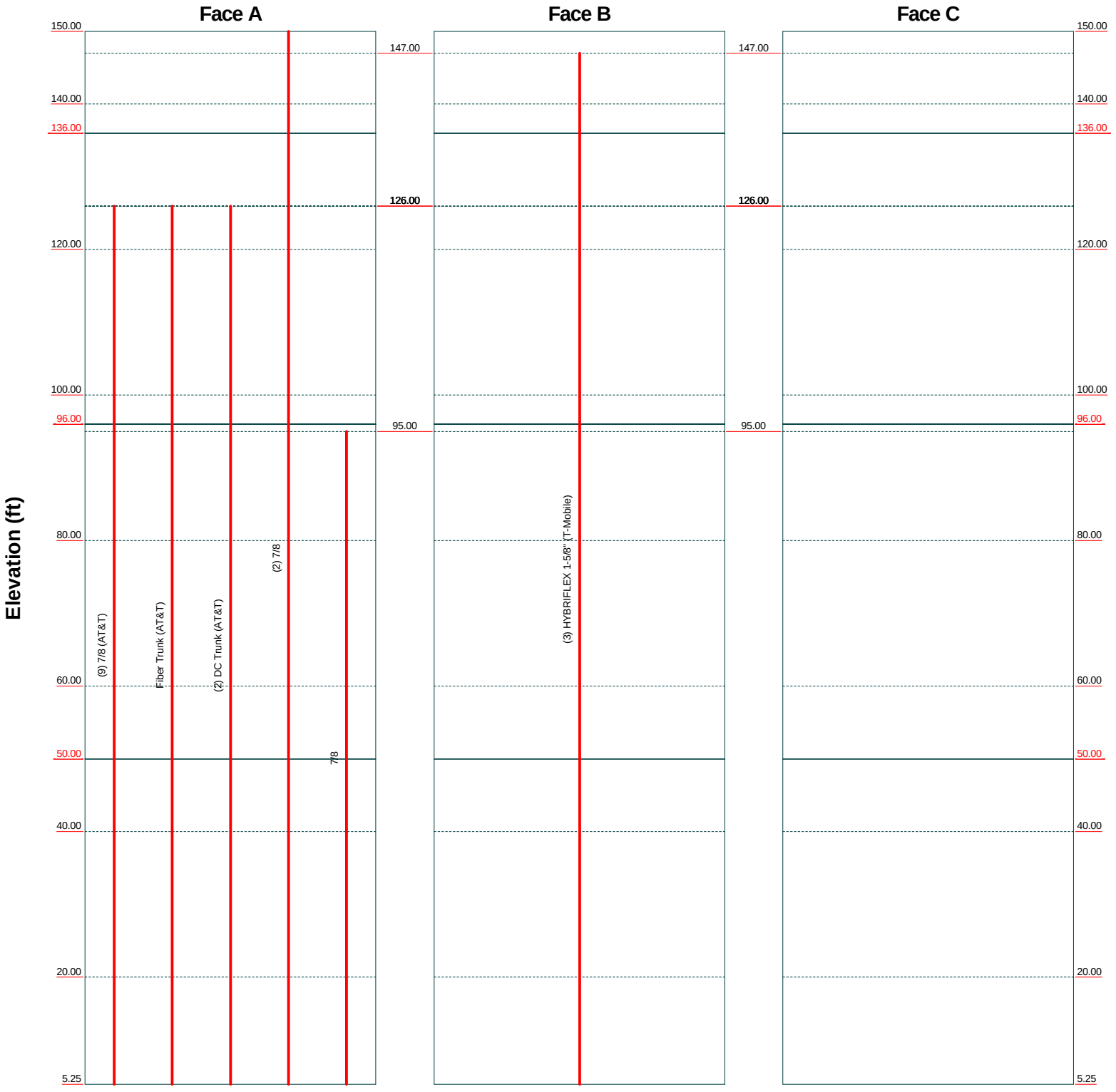
Feed Line Distribution Chart
5'3" - 150'

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



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Code: TIA-222-G	Date: 05/04/21	Scale: NTS
Path: J:\Jobs\2100500.W\21_CTHA813A_CT33XC212\05_Structural\Structural Analysis\Backup Documentation\Calcs\ERI\150' Guyed Tower.eri		Dwg No. E-7

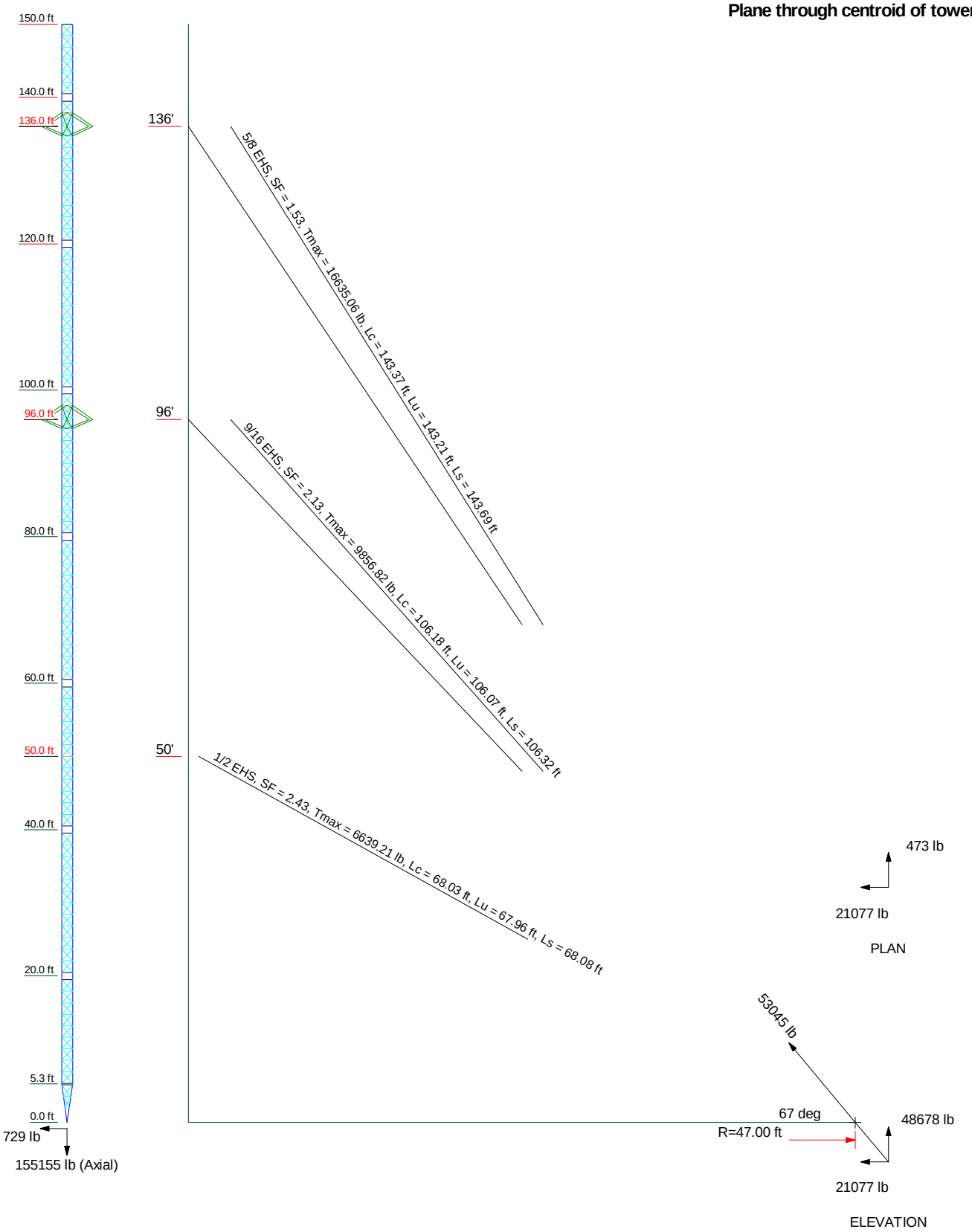
Guy Tensions and Tower Reactions

TIA-222-G - 97 mph/40 mph 1.0000 in Ice Exposure B

Maximum Values

Anchor 'C'@47 ft Azimuth 240 deg Elev 0 ft

Plane through centroid of tower



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Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 05/04/21	Scale: NTS
Path: J:\Jobs\21000\500.W\21_CTHA813A_CT33XC212\05_Structural\Structural Analysis\Backup Documentation\Calcs\ERI\150' Guyed Tower.eri		Dwg No. E-6

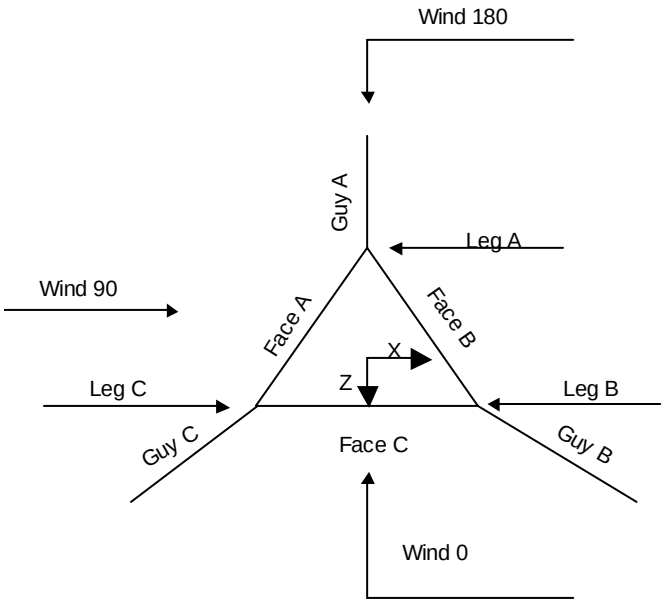
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 150.00 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 1.50 ft at the top and tapered at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

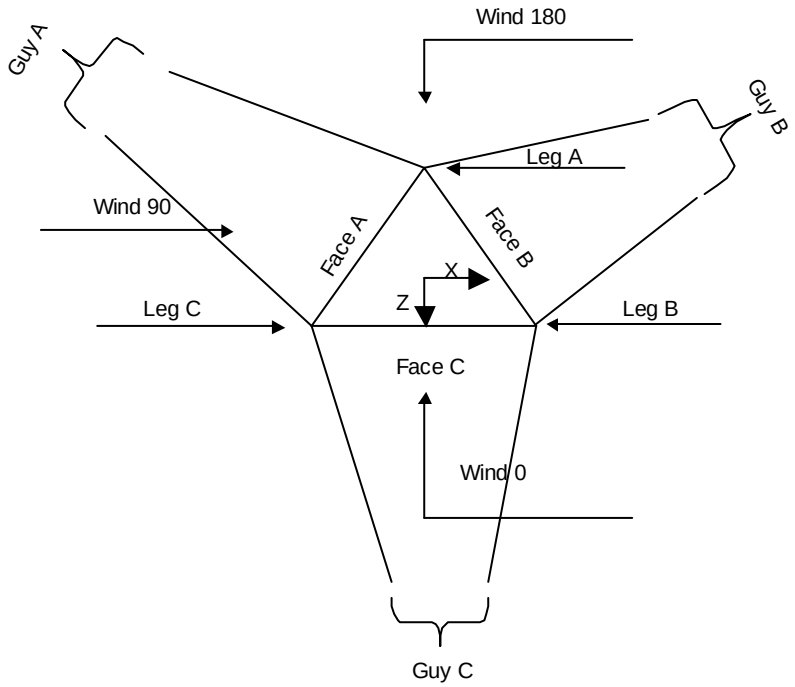
Basic wind speed of 97 mph.
Structure Class III.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Safety factor used in guy design is 1.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r	√	All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys	√	Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice		Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz		Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity	√	Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
√	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		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	150.00-140.00			1.50	1	10.00
T2	140.00-120.00			1.50	1	20.00
T3	120.00-100.00			1.50	1	20.00
T4	100.00-80.00			1.50	1	20.00
T5	80.00-60.00			1.50	1	20.00
T6	60.00-40.00			1.50	1	20.00
T7	40.00-20.00			1.50	1	20.00
T8	20.00-5.25			1.50	1	14.75
T9	5.25-0.00			1.50	1	5.25

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	150.00-140.00	1.58	X Brace	No	Steps	0.0000	6.0000
T2	140.00-120.00	1.58	X Brace	No	Steps	6.0000	6.0000
T3	120.00-100.00	1.58	X Brace	No	Steps	6.0000	6.0000
T4	100.00-80.00	1.58	X Brace	No	Steps	6.0000	6.0000
T5	80.00-60.00	1.58	X Brace	No	Steps	6.0000	6.0000
T6	60.00-40.00	1.58	X Brace	No	Steps	6.0000	6.0000
T7	40.00-20.00	1.58	X Brace	No	Steps	6.0000	6.0000
T8	20.00-5.25	1.57	X Brace	No	Steps	6.0000	1.0000
T9	5.25-0.00	1.56	X Brace	No	Yes	1.0000	6.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 150.00-140.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T2 140.00-120.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T3 120.00-100.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T4 100.00-80.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T5 80.00-60.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T6 60.00-40.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T7 40.00-20.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T8 20.00-5.25	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T9 5.25-0.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 150.00-140.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 140.00-120.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 120.00-100.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T4 100.00-80.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T5 80.00-60.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T6 60.00-40.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T7 40.00-20.00	Solid Round	3/4	A572-50	Solid Round	3/4	A572-50

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T8 20.00-5.25	Solid Round	3/4	(50 ksi) A572-50 (50 ksi)	Solid Round	3/4	(50 ksi) A572-50 (50 ksi)
T9 5.25-0.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 150.00-140.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 140.00-120.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 120.00-100.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T4 100.00-80.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T5 80.00-60.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T6 60.00-40.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T7 40.00-20.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T8 20.00-5.25	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T9 5.25-0.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 150.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 40.00-20.00	0.00	0.0000	A36	1	1	1	36.0000	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft²	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
T8 20.00-5.25	0.00	0.0000	(36 ksi) A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 5.25-0.00	0.00	0.0000	(36 ksi) 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	Yes	Yes	1	1	1	1	1	1	1	1
150.00-140.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T8 20.00-5.25	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T9 5.25-0.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
150.00-140.00														
T2	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
140.00-120.00														
T3	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
120.00-100.00														

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
T4 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 20.00-5.25	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 5.25-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 150.00-140.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 140.00-120.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 120.00-100.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 100.00-80.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 80.00-60.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 60.00-40.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 40.00-20.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 20.00-5.25	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 5.25-0.00	Sleeve DS	0.6250 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	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 %
136	EHS	A	5/8	4240.00	10%	21000	0.813	145.66	75.00	0.0000	10.00	100%
		B	5/8	4240.00	10%	21000	0.813	154.38	75.00	0.0000	0.00	100%
		C	5/8	4240.00	10%	21000	0.813	143.24	47.00	0.0000	0.00	100%
96	EHS	A	9/16	3500.00	10%	21000	0.671	112.92	75.00	0.0000	10.00	100%
		B	9/16	3500.00	10%	21000	0.671	120.70	75.00	0.0000	0.00	100%
		C	9/16	3500.00	10%	21000	0.671	106.09	47.00	0.0000	0.00	100%

50	EHS	A	1/2	2690.00	10%	21000	0.517	84.17	75.00	0.0000	10.00	100%
		B	1/2	2690.00	10%	21000	0.517	89.34	75.00	0.0000	0.00	100%
		C	1/2	2690.00	10%	21000	0.517	67.97	47.00	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*
136	Torque Arm	6.00	20.0000	Wing	A53-B-35 (35 ksi)	Pipe	P2.5x.203
96	Torque Arm	6.00	20.0000	Wing	A53-B-35 (35 ksi)	Pipe	P2.5x.203
50	Corner						

Guy Data *(cont'd)*

Guy Elevation *ft*	*Diagonal Grade*	*Diagonal Type*	*Upper Diagonal Size*	*Lower Diagonal Size*	*Is Strap.*	*Pull-Off Grade*	*Pull-Off Type*	*Pull-Off Size*
136.00	A53-B-42 (42 ksi)	Pipe			No	A36 (36 ksi)	Solid Round	5/8
96.00	A53-B-42 (42 ksi)	Pipe			No	A36 (36 ksi)	Solid Round	5/8
50.00	A53-B-42 (42 ksi)	Pipe			No	A36 (36 ksi)	Solid Round	5/8

Guy Data *(cont'd)*

Guy Elevation *ft*	*Cable Weight A* *lb*	*Cable Weight B* *lb*	*Cable Weight C* *lb*	*Cable Weight D* *lb*	*Tower Intercept A* *ft*	*Tower Intercept B* *ft*	*Tower Intercept C* *ft*	*Tower Intercept D* *ft*
136	118.42	125.51	116.46		2.01 2.4 sec/pulse	2.26 2.6 sec/pulse	1.94 2.4 sec/pulse	
96	75.77	80.99	71.19		1.21 1.9 sec/pulse	1.38 2.0 sec/pulse	1.07 1.8 sec/pulse	
50	43.51	46.19	35.14		0.68 1.4 sec/pulse	0.76 1.5 sec/pulse	0.44 1.1 sec/pulse	

Guy Data *(cont'd)*

	Torque Arm	*Pull Off*	*Diagonal*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K_x	K_y	K_x	K_y	K_x	K_y
136	No	No	1	1	1	1	1	1
96	No	No	1	1	1	1	1	1
50	No	No			1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm				Pull Off				Diagonal			
	Bolt Size in	Number	Net Width Deduct in	U	Bolt Size in	Number	Net Width Deduct in	U	Bolt Size in	Number	Net Width Deduct in	U
136	0.0000 A325N	0	0.0000	1	0.0000 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
96	0.0000 A325N	0	0.0000	1	0.0000 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
50	0.6250 A325N	0	0.0000	0.75	0.0000 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
136	A	73.00	21	3	2.7066
	B	68.00	21	3	2.6874
	C	68.00	21	3	2.6874
96	A	53.00	19	3	2.6213
	B	48.00	19	3	2.5955
	C	48.00	19	3	2.5955
50	A	30.00	16	2	2.4763
	B	25.00	16	2	2.4315
	C	25.00	16	2	2.4315

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom lb	F_x lb	F_y lb	F_z lb	M_x kip-ft	M_y kip-ft	M_z kip-ft
136	A	59.8015	4342.35 4240.00	-88.30	3767.98	-2156.50	-6.53	6.62	-11.30
	A	59.8015	4342.35 4240.00	88.30	3767.98	-2156.50	-6.53	-6.62	11.30
	B	61.6671	4350.47 4240.00	1805.47	3843.41	946.10	13.31	6.25	0.00
	B	61.6671	4350.47 4240.00	1722.08	3843.41	1090.53	-6.66	-6.25	-11.53
	C	71.5522	4350.47 4240.00	-1129.50	4132.73	755.90	-7.16	4.22	12.40

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	kip-ft	kip-ft	kip-ft
	C	71.5522	4350.47 4240.00	-1219.38	4132.73	600.23	14.32	-4.22	0.00
			Sum:	**1178.67**	23488.24	**-920.24**	**0.76**	0.00	**0.87**
96	A	49.5469	3557.66 3500.00	-93.67	2723.08	-2287.57	-4.72	7.02	-8.17
	A	49.5469	3557.66 3500.00	93.67	2723.08	-2287.57	-4.72	-7.02	8.17
	B	52.6257	3564.36 3500.00	1899.05	2847.45	995.14	9.86	6.58	0.00
	B	52.6257	3564.36 3500.00	1811.34	2847.45	1147.06	-4.93	-6.58	-8.54
	C	64.7057	3564.36 3500.00	-1254.19	3229.12	839.34	-5.59	4.69	9.69
	C	64.7057	3564.36 3500.00	-1353.98	3229.12	666.49	11.19	-4.69	0.00
			Sum:	**1102.22**	17599.29	**-927.12**	**1.09**	0.00	**1.14**
50	A	28.3497	2710.66 2690.00	0.00	1303.99	-2376.40	-1.13	0.00	0.00
	B	33.9979	2715.83 2690.00	1940.59	1534.44	1120.40	0.66	0.00	-1.15
	C	47.3029	2715.83 2690.00	-1587.32	2004.07	916.44	0.87	0.00	1.50
			Sum:	**353.28**	4842.50	**-339.57**	**0.40**	0.00	**0.35**

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	kip-ft	kip-ft	kip-ft
136	A	59.8015	8933.86 7445.33	-167.83	7936.33	-4098.83	-13.75	12.59	-23.81
	A	59.8015	8933.86 7445.33	167.83	7936.33	-4098.83	-13.75	-12.59	23.81
	B	61.6671	8955.49 7367.92	3415.43	8082.86	1789.74	28.00	11.83	0.00
	B	61.6671	8955.49 7367.92	3257.67	8082.86	2062.98	-14.00	-11.83	-24.25
	C	71.5522	7860.32 6272.39	-1849.18	7538.82	1237.53	-13.06	6.92	22.62
	C	71.5522	7860.32 6272.39	-1996.32	7538.82	982.68	26.12	-6.92	0.00
			Sum:	**2827.60**	47116.00	**-2124.74**	**-0.43**	-0.00	**-1.63**
96	A	49.5469	7494.64 6561.37	-185.98	5958.55	-4542.11	-10.32	13.95	-17.88
	A	49.5469	7494.64 6561.37	185.98	5958.55	-4542.11	-10.32	-13.95	17.88
	B	52.6257	7497.83 6473.52	3743.35	6193.31	1961.58	21.45	12.97	0.00
	B	52.6257	7497.83 6473.52	3570.45	6193.31	2261.04	-10.73	-12.97	-18.58
	C	64.7057	6488.68 5464.12	-2115.19	5968.68	1415.55	-10.34	7.91	17.91

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	kip-ft	kip-ft	kip-ft
	C	64.7057	6488.68 5464.12	-2283.50	5968.68	1124.04	20.68	-7.91	0.00
			Sum:	**2915.10**	36241.09	**-2322.01**	**0.42**	-0.00	**-0.67**
50	A	28.3497	5895.11 5514.83	0.00	3107.93	-5009.30	-2.69	0.00	0.00
	B	33.9979	5866.37 5405.76	4036.92	3561.64	2330.72	1.54	0.00	-2.67
	C	47.3029	4993.94 4533.20	-2792.55	3813.34	1612.28	1.65	0.00	2.86
			Sum:	**1244.37**	10482.91	**-1066.30**	**0.50**	0.00	**0.19**

Guy-Mast Forces (Excluding Wind) - Service

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	kip-ft	kip-ft	kip-ft
136	A	59.8015	4342.35 4240.00	-88.30	3767.98	-2156.50	-6.53	6.62	-11.30
	A	59.8015	4342.35 4240.00	88.30	3767.98	-2156.50	-6.53	-6.62	11.30
	B	61.6671	4350.47 4240.00	1805.47	3843.41	946.10	13.31	6.25	0.00
	B	61.6671	4350.47 4240.00	1722.08	3843.41	1090.53	-6.66	-6.25	-11.53
	C	71.5522	4350.47 4240.00	-1129.50	4132.73	755.90	-7.16	4.22	12.40
	C	71.5522	4350.47 4240.00	-1219.38	4132.73	600.23	14.32	-4.22	0.00
			Sum:	**1178.67**	23488.24	**-920.24**	**0.76**	0.00	**0.87**
96	A	49.5469	3557.66 3500.00	-93.67	2723.08	-2287.57	-4.72	7.02	-8.17
	A	49.5469	3557.66 3500.00	93.67	2723.08	-2287.57	-4.72	-7.02	8.17
	B	52.6257	3564.36 3500.00	1899.05	2847.45	995.14	9.86	6.58	0.00
	B	52.6257	3564.36 3500.00	1811.34	2847.45	1147.06	-4.93	-6.58	-8.54
	C	64.7057	3564.36 3500.00	-1254.19	3229.12	839.34	-5.59	4.69	9.69
	C	64.7057	3564.36 3500.00	-1353.98	3229.12	666.49	11.19	-4.69	0.00
			Sum:	**1102.22**	17599.29	**-927.12**	**1.09**	0.00	**1.14**
50	A	28.3497	2710.66 2690.00	0.00	1303.99	-2376.40	-1.13	0.00	0.00
	B	33.9979	2715.83 2690.00	1940.59	1534.44	1120.40	0.66	0.00	-1.15
	C	47.3029	2715.83 2690.00	-1587.32	2004.07	916.44	0.87	0.00	1.50
			Sum:	**353.28**	4842.50	**-339.57**	**0.40**	0.00	**0.35**

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
136	A	73.33	126.00	4721	1.81	4561	1.87	4400	1.94	4240	2.01	4080	2.09	3921	2.17	3762	2.26
	B	73.33	136.00	4668	2.05	4525	2.12	4383	2.18	4240	2.26	4098	2.34	3956	2.42	3814	2.51
	C	45.37	136.00	4432	1.86	4368	1.89	4304	1.91	4240	1.94	4176	1.97	4112	2.00	4048	2.04
96	A	73.33	86.00	4161	1.02	3940	1.08	3720	1.14	3500	1.21	3281	1.29	3063	1.39	2847	1.49
	B	73.33	96.00	4079	1.19	3885	1.25	3692	1.31	3500	1.38	3308	1.46	3117	1.55	2927	1.65
	C	45.37	96.00	3789	0.99	3693	1.01	3596	1.04	3500	1.07	3404	1.10	3308	1.13	3212	1.17
50	A	74.13	40.00	3629	0.50	3315	0.55	3002	0.61	2690	0.68	2380	0.77	2074	0.88	1774	1.03
	B	74.13	50.00	3523	0.58	3244	0.63	2967	0.69	2690	0.76	2415	0.85	2143	0.96	1874	1.09
	C	46.13	50.00	3251	0.37	3064	0.39	2877	0.41	2690	0.44	2503	0.48	2317	0.51	2132	0.56

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
HYBRIFLEX 1-5/8" (T-Mobile)	B	No	No	Ar (CaAa)	147.00 - 3.00	0.5000	0	3	3	1.9800	1.9800		1.90
7/8 (AT&T)	A	No	No	Ar (CaAa)	126.00 - 3.00	0.5000	0.35	9	3	1.1100	1.1100		0.54
Fiber Trunk (AT&T)	A	No	No	Ar (CaAa)	126.00 - 3.00	0.5000	0.15	1	1	0.4000	0.4000		1.00
DC Trunk (AT&T)	A	No	No	Ar (CaAa)	126.00 - 3.00	0.5000	0.18	2	2	0.4000	0.4000		0.11
7/8	A	No	No	Ar (CaAa)	150.00 - 3.00	0.5000	-0.26	2	2	1.1100	1.1100		0.54
7/8	A	No	No	Ar (CaAa)	95.00 - 3.00	0.5000	-0.4	1	1	1.1100	1.1100		0.54

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	150.00-140.00	A	0.000	0.000	2.220	0.000	10.80
		B	0.000	0.000	4.158	0.000	39.90
		C	0.000	0.000	0.000	0.000	0.00
T2	140.00-120.00	A	0.000	0.000	11.154	0.000	58.08
		B	0.000	0.000	11.880	0.000	114.00
		C	0.000	0.000	0.000	0.000	0.00
T3	120.00-100.00	A	0.000	0.000	26.820	0.000	143.20
		B	0.000	0.000	11.880	0.000	114.00
		C	0.000	0.000	0.000	0.000	0.00
T4	100.00-80.00	A	0.000	0.000	28.485	0.000	151.30
		B	0.000	0.000	11.880	0.000	114.00
		C	0.000	0.000	0.000	0.000	0.00
T5	80.00-60.00	A	0.000	0.000	29.040	0.000	154.00
		B	0.000	0.000	11.880	0.000	114.00
		C	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T6	60.00-40.00	A	0.000	0.000	29.040	0.000	154.00
		B	0.000	0.000	11.880	0.000	114.00
		C	0.000	0.000	0.000	0.000	0.00
T7	40.00-20.00	A	0.000	0.000	29.040	0.000	154.00
		B	0.000	0.000	11.880	0.000	114.00
		C	0.000	0.000	0.000	0.000	0.00
T8	20.00-5.25	A	0.000	0.000	21.417	0.000	113.58
		B	0.000	0.000	8.761	0.000	84.08
		C	0.000	0.000	0.000	0.000	0.00
T9	5.25-0.00	A	0.000	0.000	3.267	0.000	17.32
		B	0.000	0.000	1.337	0.000	12.82
		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	150.00-140.00	A	2.899	0.000	0.000	14.309	0.000	208.65
		B		0.000	0.000	15.329	0.000	311.78
		C		0.000	0.000	0.000	0.000	0.00
T2	140.00-120.00	A	2.867	0.000	0.000	50.991	0.000	849.27
		B		0.000	0.000	43.586	0.000	880.95
		C		0.000	0.000	0.000	0.000	0.00
T3	120.00-100.00	A	2.820	0.000	0.000	102.517	0.000	1833.38
		B		0.000	0.000	43.268	0.000	866.20
		C		0.000	0.000	0.000	0.000	0.00
T4	100.00-80.00	A	2.764	0.000	0.000	111.066	0.000	1992.61
		B		0.000	0.000	42.894	0.000	848.94
		C		0.000	0.000	0.000	0.000	0.00
T5	80.00-60.00	A	2.695	0.000	0.000	112.387	0.000	1995.35
		B		0.000	0.000	42.435	0.000	828.02
		C		0.000	0.000	0.000	0.000	0.00
T6	60.00-40.00	A	2.606	0.000	0.000	109.790	0.000	1912.08
		B		0.000	0.000	41.841	0.000	801.17
		C		0.000	0.000	0.000	0.000	0.00
T7	40.00-20.00	A	2.476	0.000	0.000	106.011	0.000	1794.38
		B		0.000	0.000	40.977	0.000	762.79
		C		0.000	0.000	0.000	0.000	0.00
T8	20.00-5.25	A	2.271	0.000	0.000	73.776	0.000	1192.22
		B		0.000	0.000	29.217	0.000	519.01
		C		0.000	0.000	0.000	0.000	0.00
T9	5.25-0.00	A	1.941	0.000	0.000	10.174	0.000	152.13
		B		0.000	0.000	4.212	0.000	68.98
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	150.00-140.00	0.3961	-0.6834	0.0000	0.0000
T2	140.00-120.00	0.1496	-2.1837	0.0000	0.0000
T3	120.00-100.00	-0.9573	-4.0150	0.0000	0.0000

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T4	100.00-80.00	-1.1738	-3.8256	0.0000	0.0000
T5	80.00-60.00	-1.2427	-3.7625	0.0000	0.0000
T6	60.00-40.00	-1.2432	-3.7641	0.0000	0.0000
T7	40.00-20.00	-1.2427	-3.7625	0.0000	0.0000
T8	20.00-5.25	-1.2397	-3.7535	0.0000	0.0000
T9	5.25-0.00	-0.8626	-2.3483	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	HYBRIFLEX 1-5/8"	140.00 - 147.00	0.6000	0.0000
T1	5	7/8	140.00 - 150.00	0.6000	0.0000
T2	1	HYBRIFLEX 1-5/8"	120.00 - 140.00	0.6000	0.0000
T2	2	7/8	120.00 - 126.00	0.6000	0.0000
T2	3	Fiber Trunk	120.00 - 126.00	0.6000	0.0000
T2	4	DC Trunk	120.00 - 126.00	0.6000	0.0000
T2	5	7/8	120.00 - 140.00	0.6000	0.0000
T3	1	HYBRIFLEX 1-5/8"	100.00 - 120.00	0.6000	0.0000
T3	2	7/8	100.00 - 120.00	0.6000	0.0000
T3	3	Fiber Trunk	100.00 - 120.00	0.6000	0.0000
T3	4	DC Trunk	100.00 - 120.00	0.6000	0.0000
T3	5	7/8	100.00 - 120.00	0.6000	0.0000
T4	1	HYBRIFLEX 1-5/8"	80.00 - 100.00	0.6000	0.0000
T4	2	7/8	80.00 - 100.00	0.6000	0.0000
T4	3	Fiber Trunk	80.00 - 100.00	0.6000	0.0000
T4	4	DC Trunk	80.00 - 100.00	0.6000	0.0000
T4	5	7/8	80.00 - 100.00	0.6000	0.0000
T4	6	7/8	80.00 - 95.00	0.6000	0.0000
T5	1	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.0000
T5	2	7/8	60.00 - 80.00	0.6000	0.0000
T5	3	Fiber Trunk	60.00 - 80.00	0.6000	0.0000
T5	4	DC Trunk	60.00 - 80.00	0.6000	0.0000
T5	5	7/8	60.00 - 80.00	0.6000	0.0000
T5	6	7/8	60.00 - 80.00	0.6000	0.0000
T6	1	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.0000
T6	2	7/8	40.00 - 60.00	0.6000	0.0000
T6	3	Fiber Trunk	40.00 - 60.00	0.6000	0.0000
T6	4	DC Trunk	40.00 - 60.00	0.6000	0.0000
T6	5	7/8	40.00 - 60.00	0.6000	0.0000
T6	6	7/8	40.00 - 60.00	0.6000	0.0000
T7	1	HYBRIFLEX 1-5/8"	20.00 - 40.00	0.6000	0.0000
T7	2	7/8	20.00 - 40.00	0.6000	0.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	3	Fiber Trunk	20.00 - 40.00	0.6000	0.0000
T7	4	DC Trunk	20.00 - 40.00	0.6000	0.0000
T7	5	7/8	20.00 - 40.00	0.6000	0.0000
T7	6	7/8	20.00 - 40.00	0.6000	0.0000
T8	1	HYBRIFLEX 1-5/8"	5.25 - 20.00	0.6000	0.0000
T8	2	7/8	5.25 - 20.00	0.6000	0.0000
T8	3	Fiber Trunk	5.25 - 20.00	0.6000	0.0000
T8	4	DC Trunk	5.25 - 20.00	0.6000	0.0000
T8	5	7/8	5.25 - 20.00	0.6000	0.0000
T8	6	7/8	5.25 - 20.00	0.6000	0.0000
T9	1	HYBRIFLEX 1-5/8"	3.00 - 5.25	0.5642	0.0000
T9	2	7/8	3.00 - 5.25	0.5642	0.0000
T9	3	Fiber Trunk	3.00 - 5.25	0.5642	0.0000
T9	4	DC Trunk	3.00 - 5.25	0.5642	0.0000
T9	5	7/8	3.00 - 5.25	0.5642	0.0000
T9	6	7/8	3.00 - 5.25	0.5642	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
AIR6449	A	From Face	5.00	0.0000	147.00	No Ice	5.65	2.42	103.00
(T-Mobile)			-5.00			1/2" Ice	5.96	2.64	141.45
			0.00			1" Ice	6.26	2.87	184.10
APXVAALL24-43	A	From Face	5.00	0.0000	147.00	No Ice	20.24	8.89	153.00
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	265.59
			0.00			1" Ice	21.54	10.09	386.72
APX16DWV-16DWVS-E-A20	A	From Face	5.00	0.0000	147.00	No Ice	6.46	2.15	41.00
			5.00			1/2" Ice	6.83	2.49	73.95
(T-Mobile)			0.00			1" Ice	7.21	2.84	111.77
AIR6449	B	From Face	5.00	0.0000	147.00	No Ice	5.65	2.42	103.00
(T-Mobile)			-5.00			1/2" Ice	5.96	2.64	141.45
			0.00			1" Ice	6.26	2.87	184.10
APXVAALL24-43	B	From Face	5.00	0.0000	147.00	No Ice	20.24	8.89	153.00
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	265.59
			0.00			1" Ice	21.54	10.09	386.72
APX16DWV-16DWVS-E-A20	B	From Face	5.00	0.0000	147.00	No Ice	6.46	2.15	41.00
			5.00			1/2" Ice	6.83	2.49	73.95
(T-Mobile)			0.00			1" Ice	7.21	2.84	111.77
AIR6449	C	From Face	5.00	0.0000	147.00	No Ice	5.65	2.42	103.00
(T-Mobile)			-5.00			1/2" Ice	5.96	2.64	141.45
			0.00			1" Ice	6.26	2.87	184.10
APXVAALL24-43	C	From Face	5.00	0.0000	147.00	No Ice	20.24	8.89	153.00
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	265.59
			0.00			1" Ice	21.54	10.09	386.72
APX16DWV-16DWVS-E-A20	C	From Face	5.00	0.0000	147.00	No Ice	6.46	2.15	41.00
			5.00			1/2" Ice	6.83	2.49	73.95
(T-Mobile)			0.00			1" Ice	7.21	2.84	111.77
4415 B25	A	From Leg	3.00	0.0000	147.00	No Ice	1.84	0.82	46.00
(T-Mobile)			0.00			1/2" Ice	2.01	0.94	60.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1" Ice	2.19	1.07	76.66
4424 B25	A	From Leg	3.00	0.0000	147.00	No Ice	2.05	1.61	86.00
(T-Mobile)			0.00			1/2" Ice	2.23	1.77	106.93
			0.00			1" Ice	2.42	1.94	130.84
4449 B12,B71	A	From Leg	3.00	0.0000	147.00	No Ice	1.65	1.16	80.00
(T-Mobile)			0.00			1/2" Ice	1.81	1.29	96.12
			0.00			1" Ice	1.98	1.44	114.85
4415 B25	B	From Leg	3.00	0.0000	147.00	No Ice	1.84	0.82	46.00
(T-Mobile)			0.00			1/2" Ice	2.01	0.94	60.07
			0.00			1" Ice	2.19	1.07	76.66
4424 B25	B	From Leg	3.00	0.0000	147.00	No Ice	2.05	1.61	86.00
(T-Mobile)			0.00			1/2" Ice	2.23	1.77	106.93
			0.00			1" Ice	2.42	1.94	130.84
4449 B12,B71	B	From Leg	3.00	0.0000	147.00	No Ice	1.65	1.16	80.00
(T-Mobile)			0.00			1/2" Ice	1.81	1.29	96.12
			0.00			1" Ice	1.98	1.44	114.85
4415 B25	C	From Leg	3.00	0.0000	147.00	No Ice	1.84	0.82	46.00
(T-Mobile)			0.00			1/2" Ice	2.01	0.94	60.07
			0.00			1" Ice	2.19	1.07	76.66
4424 B25	C	From Leg	3.00	0.0000	147.00	No Ice	2.05	1.61	86.00
(T-Mobile)			0.00			1/2" Ice	2.23	1.77	106.93
			0.00			1" Ice	2.42	1.94	130.84
4449 B12,B71	C	From Leg	3.00	0.0000	147.00	No Ice	1.65	1.16	80.00
(T-Mobile)			0.00			1/2" Ice	1.81	1.29	96.12
			0.00			1" Ice	1.98	1.44	114.85
Rohn 6' Side-Arm(1)	A	From Leg	3.00	0.0000	147.00	No Ice	6.00	6.00	140.00
(T-Mobile)			0.00			1/2" Ice	8.50	8.50	212.00
			0.00			1" Ice	11.00	11.00	284.00
Rohn 6' Side-Arm(1)	B	From Leg	3.00	0.0000	147.00	No Ice	6.00	6.00	140.00
(T-Mobile)			0.00			1/2" Ice	8.50	8.50	212.00
			0.00			1" Ice	11.00	11.00	284.00
Rohn 6' Side-Arm(1)	C	From Leg	3.00	0.0000	147.00	No Ice	6.00	6.00	140.00
(T-Mobile)			0.00			1/2" Ice	8.50	8.50	212.00
			0.00			1" Ice	11.00	11.00	284.00
12.5' x 2 Std. Horz. Pipe	A	From Face	3.00	0.0000	148.50	No Ice	2.97	0.05	45.00
(T-Mobile)			0.00			1/2" Ice	3.82	0.08	73.32
			0.00			1" Ice	4.68	0.11	111.87
12.5' x 2 Std. Horz. Pipe	A	From Face	3.00	0.0000	145.50	No Ice	2.97	0.05	45.00
(T-Mobile)			0.00			1/2" Ice	3.82	0.08	73.32
			0.00			1" Ice	4.68	0.11	111.87
12.5' x 2 Std. Horz. Pipe	B	From Face	3.00	0.0000	148.50	No Ice	2.97	0.05	45.00
(T-Mobile)			0.00			1/2" Ice	3.82	0.08	73.32
			0.00			1" Ice	4.68	0.11	111.87
12.5' x 2 Std. Horz. Pipe	B	From Face	3.00	0.0000	145.50	No Ice	2.97	0.05	45.00
(T-Mobile)			0.00			1/2" Ice	3.82	0.08	73.32
			0.00			1" Ice	4.68	0.11	111.87
12.5' x 2 Std. Horz. Pipe	C	From Face	3.00	0.0000	148.50	No Ice	2.97	0.05	45.00
(T-Mobile)			0.00			1/2" Ice	3.82	0.08	73.32
			0.00			1" Ice	4.68	0.11	111.87
12.5' x 2 Std. Horz. Pipe	C	From Face	3.00	0.0000	145.50	No Ice	2.97	0.05	45.00
(T-Mobile)			0.00			1/2" Ice	3.82	0.08	73.32
			0.00			1" Ice	4.68	0.11	111.87
HPA-65R-BUU-H6	A	From Face	3.00	0.0000	126.00	No Ice	9.66	6.45	51.00
(AT&T)			-4.00			1/2" Ice	10.13	6.91	113.99
			0.00			1" Ice	10.61	7.38	183.38
HPA-65R-BUU-H6	A	From Face	3.00	0.0000	126.00	No Ice	9.66	6.45	51.00
(AT&T)			4.00			1/2" Ice	10.13	6.91	113.99

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1" Ice	10.61	7.38	183.38
HPA-65R-BUU-H8	B	From Face	3.00	0.0000	126.00	No Ice	12.98	7.52	68.00
(AT&T)			-4.00			1/2" Ice	13.56	8.09	141.77
			0.00			1" Ice	14.15	8.67	223.17
SBNH-1D6565C	B	From Face	3.00	0.0000	126.00	No Ice	11.41	7.70	60.85
(AT&T)			0.00			1/2" Ice	12.03	8.29	126.56
			0.00			1" Ice	12.65	8.89	199.94
HPA-65R-BUU-H8	B	From Face	3.00	0.0000	126.00	No Ice	12.98	7.52	68.00
(AT&T)			4.00			1/2" Ice	13.56	8.09	141.77
			0.00			1" Ice	14.15	8.67	223.17
HPA-65R-BUU-H8	C	From Face	3.00	0.0000	126.00	No Ice	12.98	7.52	68.00
(AT&T)			-4.00			1/2" Ice	13.56	8.09	141.77
			0.00			1" Ice	14.15	8.67	223.17
SBNH-1D6565C	C	From Face	3.00	0.0000	126.00	No Ice	11.41	7.70	60.85
(AT&T)			0.00			1/2" Ice	12.03	8.29	126.56
			0.00			1" Ice	12.65	8.89	199.94
HPA-65R-BUU-H8	C	From Face	3.00	0.0000	126.00	No Ice	12.98	7.52	68.00
(AT&T)			4.00			1/2" Ice	13.56	8.09	141.77
			0.00			1" Ice	14.15	8.67	223.17
DTMABP7819VG12A TMA	B	From Face	3.00	0.0000	126.00	No Ice	1.36	0.51	20.00
(AT&T)			4.00			1/2" Ice	1.51	0.61	29.77
			0.00			1" Ice	1.66	0.72	41.67
DTMABP7819VG12A TMA	C	From Face	3.00	0.0000	126.00	No Ice	1.36	0.51	20.00
(AT&T)			4.00			1/2" Ice	1.51	0.61	29.77
			0.00			1" Ice	1.66	0.72	41.67
RRUS-11	A	From Face	3.00	0.0000	126.00	No Ice	2.57	1.07	50.00
(AT&T)			0.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
RRUS-11	B	From Face	3.00	0.0000	126.00	No Ice	2.57	1.07	50.00
(AT&T)			0.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
RRUS-11	C	From Face	3.00	0.0000	126.00	No Ice	2.57	1.07	50.00
(AT&T)			0.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
(2) RRUS-32	A	From Face	3.00	0.0000	126.00	No Ice	3.31	2.42	77.00
(AT&T)			2.00			1/2" Ice	3.56	2.64	104.93
			0.00			1" Ice	3.81	2.86	136.47
(2) RRUS-32	B	From Face	3.00	0.0000	126.00	No Ice	3.31	2.42	77.00
(AT&T)			2.00			1/2" Ice	3.56	2.64	104.93
			0.00			1" Ice	3.81	2.86	136.47
(2) RRUS-32	C	From Face	3.00	0.0000	126.00	No Ice	3.31	2.42	77.00
(AT&T)			2.00			1/2" Ice	3.56	2.64	104.93
			0.00			1" Ice	3.81	2.86	136.47
4478 B14	B	From Face	3.00	0.0000	126.00	No Ice	1.84	1.06	60.00
(AT&T)			2.00			1/2" Ice	2.01	1.20	75.88
			0.00			1" Ice	2.19	1.34	94.39
4478 B14	C	From Face	3.00	0.0000	126.00	No Ice	1.84	1.06	60.00
(AT&T)			2.00			1/2" Ice	2.01	1.20	75.88
			0.00			1" Ice	2.19	1.34	94.39
DC6-48-60-18-8F Surge	A	From Face	3.00	0.0000	126.00	No Ice	1.91	1.91	20.00
Arrestor			0.00			1/2" Ice	2.10	2.10	39.36
(AT&T)			0.00			1" Ice	2.29	2.29	61.70
DC6-48-60-18-8F Surge	B	From Face	3.00	0.0000	126.00	No Ice	1.91	1.91	20.00
Arrestor			0.00			1/2" Ice	2.10	2.10	39.36
(AT&T)			0.00			1" Ice	2.29	2.29	61.70
12' V-Frame	A	From Face	3.00	0.0000	126.00	No Ice	9.22	12.97	300.00
(AT&T)			0.00			1/2" Ice	9.22	12.97	400.00

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" Ice	9.22	12.97	500.00
12' V-Frame	B	From Face	3.00	0.0000	126.00	No Ice	9.22	12.97	300.00
(AT&T)			0.00			1/2" Ice	9.22	12.97	400.00
			0.00			1" Ice	9.22	12.97	500.00
12' V-Frame	C	From Face	3.00	0.0000	126.00	No Ice	9.22	12.97	300.00
(AT&T)			0.00			1/2" Ice	9.22	12.97	400.00
			0.00			1" Ice	9.22	12.97	500.00
6' x 3" Dia Omni	A	From Leg	1.00	0.0000	150.00	No Ice	1.77	1.77	20.00
			0.00			1/2" Ice	2.13	2.13	33.24
			3.00			1" Ice	2.50	2.50	50.59
4'x5/8" Lightning Rod	B	From Leg	1.00	0.0000	150.00	No Ice	0.25	0.25	10.00
			0.00			1/2" Ice	0.66	0.66	12.82
			3.00			1" Ice	0.97	0.97	18.29
20' x 3" Dia Omni	C	From Leg	1.00	0.0000	147.00	No Ice	6.00	6.00	50.00
			0.00			1/2" Ice	8.03	8.03	93.17
			10.00			1" Ice	10.08	10.08	149.01
8' dipole antenna	C	From Leg	1.00	0.0000	95.00	No Ice	2.00	2.00	10.00
			0.00			1/2" Ice	3.00	3.00	20.00
			4.00			1" Ice	4.00	4.00	30.00
GPS	A	From Leg	1.00	0.0000	50.00	No Ice	1.00	1.00	10.00
			0.00			1/2" Ice	1.50	1.50	15.00
			0.00			1" Ice	2.00	2.00	20.00

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	145.00	1.099	26	16.458	A	0.000	4.317	2.917	67.57	2.220	0.000
150.00-140.00					B	0.000	4.317		67.57	4.158	0.000
					C	0.000	4.740		61.54	0.000	0.000
T2	130.00	1.065	25	32.917	A	0.000	8.534	5.833	68.35	11.154	0.000
140.00-120.00					B	0.000	8.534		68.35	11.880	0.000
					C	0.000	9.381		62.18	0.000	0.000
T3	110.00	1.016	24	32.917	A	0.000	8.464	5.833	68.92	26.820	0.000
120.00-100.00					B	0.000	8.464		68.92	11.880	0.000
					C	0.000	9.395		62.09	0.000	0.000
T4	90.00	0.959	23	32.917	A	0.000	8.534	5.833	68.35	28.485	0.000
100.00-80.00					B	0.000	8.534		68.35	11.880	0.000
					C	0.000	9.381		62.18	0.000	0.000
T5 80.00-60.00	70.00	0.892	21	32.917	A	0.000	8.464	5.833	68.92	29.040	0.000
					B	0.000	8.464		68.92	11.880	0.000
					C	0.000	9.395		62.09	0.000	0.000
T6 60.00-40.00	50.00	0.811	19	32.917	A	0.000	8.534	5.833	68.35	29.040	0.000
					B	0.000	8.534		68.35	11.880	0.000
					C	0.000	9.381		62.18	0.000	0.000
T7 40.00-20.00	30.00	0.701	16	32.917	A	0.000	8.464	5.833	68.92	29.040	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	8.464		68.92	11.880	0.000
					C	0.000	9.395		62.09	0.000	0.000
T8 20.00-5.25	12.63	0.7	16	24.276	A	0.000	6.312	4.302	68.16	21.417	0.000
					B	0.000	6.312		68.16	8.761	0.000
					C	0.000	6.989		61.56	0.000	0.000
T9 5.25-0.00	2.63	0.7	16	4.711	A	0.000	2.053	1.552	75.59	3.267	0.000
					B	0.000	2.053		75.59	1.337	0.000
					C	0.000	2.053		75.59	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	145.00	1.099	4	2.8988	21.290	A	0.000	26.704	12.579	47.11	14.309	0.000
150.00-140.00						B	0.000	26.704		47.11	15.329	0.000
						C	0.000	30.398		41.38	0.000	0.000
T2	130.00	1.065	4	2.8674	42.475	A	0.000	52.175	24.949	47.82	50.991	0.000
140.00-120.00						B	0.000	52.175		47.82	43.586	0.000
						C	0.000	59.493		41.94	0.000	0.000
T3	110.00	1.016	4	2.8199	42.316	A	0.000	50.745	24.632	48.54	102.517	0.000
120.00-100.00						B	0.000	50.745		48.54	43.268	0.000
						C	0.000	58.677		41.98	0.000	0.000
T4 100.00-80.00	90.00	0.959	3	2.7638	42.129	A	0.000	50.599	24.259	47.94	111.066	0.000
						B	0.000	50.599		47.94	42.894	0.000
						C	0.000	57.683		42.06	0.000	0.000
T5 80.00-60.00	70.00	0.892	3	2.6952	41.901	A	0.000	48.876	23.802	48.70	112.387	0.000
						B	0.000	48.876		48.70	42.435	0.000
						C	0.000	56.499		42.13	0.000	0.000
T6 60.00-40.00	50.00	0.811	3	2.6061	41.604	A	0.000	48.198	23.207	48.15	109.790	0.000
						B	0.000	48.198		48.15	41.841	0.000
						C	0.000	54.926		42.25	0.000	0.000
T7 40.00-20.00	30.00	0.701	2	2.4763	41.171	A	0.000	45.593	22.342	49.00	106.011	0.000
						B	0.000	45.593		49.00	40.977	0.000
						C	0.000	52.672		42.42	0.000	0.000
T8 20.00-5.25	12.63	0.7	2	2.2710	29.859	A	0.000	31.876	15.468	48.53	73.776	0.000
						B	0.000	31.876		48.53	29.217	0.000
						C	0.000	36.653		42.20	0.000	0.000
T9 5.25-0.00	2.63	0.7	2	1.9409	6.426	A	0.000	8.436	4.994	59.20	10.174	0.000
						B	0.000	8.436		59.20	4.212	0.000
						C	0.000	8.436		59.20	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	145.00	1.099	9	16.458	A	0.000	4.317	2.917	67.57	2.220	0.000
150.00-140.00					B	0.000	4.317		67.57	4.158	0.000
					C	0.000	4.740		61.54	0.000	0.000
T2	130.00	1.065	8	32.917	A	0.000	8.534	5.833	68.35	11.154	0.000
140.00-120.00					B	0.000	8.534		68.35	11.880	0.000
					C	0.000	9.381		62.18	0.000	0.000
T3	110.00	1.016	8	32.917	A	0.000	8.464	5.833	68.92	26.820	0.000
120.00-100.00					B	0.000	8.464		68.92	11.880	0.000
					C	0.000	9.395		62.09	0.000	0.000
T4	90.00	0.959	8	32.917	A	0.000	8.534	5.833	68.35	28.485	0.000
100.00-80.00					B	0.000	8.534		68.35	11.880	0.000
					C	0.000	9.381		62.18	0.000	0.000
T5 80.00-60.00	70.00	0.892	7	32.917	A	0.000	8.464	5.833	68.92	29.040	0.000
					B	0.000	8.464		68.92	11.880	0.000
					C	0.000	9.395		62.09	0.000	0.000
T6 60.00-40.00	50.00	0.811	6	32.917	A	0.000	8.534	5.833	68.35	29.040	0.000
					B	0.000	8.534		68.35	11.880	0.000
					C	0.000	9.381		62.18	0.000	0.000
T7 40.00-20.00	30.00	0.701	5	32.917	A	0.000	8.464	5.833	68.92	29.040	0.000
					B	0.000	8.464		68.92	11.880	0.000
					C	0.000	9.395		62.09	0.000	0.000
T8 20.00-5.25	12.63	0.7	5	24.276	A	0.000	6.312	4.302	68.16	21.417	0.000
					B	0.000	6.312		68.16	8.761	0.000
					C	0.000	6.989		61.56	0.000	0.000
T9 5.25-0.00	2.63	0.7	5	4.711	A	0.000	2.053	1.552	75.59	3.267	0.000
					B	0.000	2.053		75.59	1.337	0.000
					C	0.000	2.053		75.59	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	50.70	352.31	A	0.262	2.401	26	1	1	2.539	228.65	22.86	C
150.00-140.00			B	0.262	2.401		1	1	2.539			
			C	0.288	2.328		1	1	2.821			
T2	172.08	695.80	A	0.259	2.41	25	1	1	5.012	572.36	28.62	C
140.00-120.00		TA 244.49	B	0.259	2.41		1	1	5.012			
			C	0.285	2.337		1	1	5.576			
T3	257.20	693.35	A	0.257	2.416	24	1	1	4.966	737.04	36.85	C
120.00-100.00			B	0.257	2.416		1	1	4.966			
			C	0.285	2.336		1	1	5.585			
T4	265.30	695.80	A	0.259	2.41	23	1	1	5.012	714.84	35.74	C
100.00-80.00		TA 244.49	B	0.259	2.41		1	1	5.012			
			C	0.285	2.337		1	1	5.576			
T5	268.00	693.35	A	0.257	2.416	21	1	1	4.966	671.54	33.58	C
80.00-60.00			B	0.257	2.416		1	1	4.966			
			C	0.285	2.336		1	1	5.585			
T6	268.00	695.80	A	0.259	2.41	19	1	1	5.012	609.73	30.49	C
60.00-40.00			B	0.259	2.41		1	1	5.012			
			C	0.285	2.337		1	1	5.576			
T7	268.00	693.35	A	0.257	2.416	16	1	1	4.966	527.15	26.36	C
40.00-20.00			B	0.257	2.416		1	1	4.966			
			C	0.285	2.336		1	1	5.585			
T8 20.00-5.25	197.65	516.32	A	0.26	2.408	16	1	1	3.708	389.38	26.40	C
			B	0.26	2.408		1	1	3.708			

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
			C	0.288	2.329		1	1	4.160			
T9 5.25-0.00	30.15	168.16	A	0.436	1.997	16	1	1	1.340	73.87	14.07	C
			B	0.436	1.997		1	1	1.340			
			C	0.436	1.997		1	1	1.340			
Sum Weight:	1777.08	5693.21								4524.56		

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 ft^2	F lb	w plf	Ctrl. Face
T1	50.70	352.31	A	0.262	2.401	26	0.8	1	2.539	228.65	22.86	C
150.00-140.00			B	0.262	2.401		0.8	1	2.539			
			C	0.288	2.328		0.8	1	2.821			
T2	172.08	695.80	A	0.259	2.41	25	0.8	1	5.012	572.36	28.62	C
140.00-120.00		TA 244.49	B	0.259	2.41		0.8	1	5.012			
			C	0.285	2.337		0.8	1	5.576			
T3	257.20	693.35	A	0.257	2.416	24	0.8	1	4.966	737.04	36.85	C
120.00-100.00			B	0.257	2.416		0.8	1	4.966			
			C	0.285	2.336		0.8	1	5.585			
T4	265.30	695.80	A	0.259	2.41	23	0.8	1	5.012	714.84	35.74	C
100.00-80.00		TA 244.49	B	0.259	2.41		0.8	1	5.012			
			C	0.285	2.337		0.8	1	5.576			
T5	268.00	693.35	A	0.257	2.416	21	0.8	1	4.966	671.54	33.58	C
80.00-60.00			B	0.257	2.416		0.8	1	4.966			
			C	0.285	2.336		0.8	1	5.585			
T6	268.00	695.80	A	0.259	2.41	19	0.8	1	5.012	609.73	30.49	C
60.00-40.00			B	0.259	2.41		0.8	1	5.012			
			C	0.285	2.337		0.8	1	5.576			
T7	268.00	693.35	A	0.257	2.416	16	0.8	1	4.966	527.15	26.36	C
40.00-20.00			B	0.257	2.416		0.8	1	4.966			
			C	0.285	2.336		0.8	1	5.585			
T8 20.00-5.25	197.65	516.32	A	0.26	2.408	16	0.8	1	3.708	389.38	26.40	C
			B	0.26	2.408		0.8	1	3.708			
			C	0.288	2.329		0.8	1	4.160			
T9 5.25-0.00	30.15	168.16	A	0.436	1.997	16	0.8	1	1.340	73.87	14.07	C
			B	0.436	1.997		0.8	1	1.340			
			C	0.436	1.997		0.8	1	1.340			
Sum Weight:	1777.08	5693.21								4524.56		

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 ft^2	F lb	w plf	Ctrl. Face
T1	50.70	352.31	A	0.262	2.401	26	0.85	1	2.539	228.65	22.86	C
150.00-140.00			B	0.262	2.401		0.85	1	2.539			

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
			C	0.288	2.328		0.85	1	2.821			
T2	172.08	695.80	A	0.259	2.41	25	0.85	1	5.012	572.36	28.62	C
140.00-120.00		TA 244.49	B	0.259	2.41		0.85	1	5.012			
			C	0.285	2.337		0.85	1	5.576			
T3	257.20	693.35	A	0.257	2.416	24	0.85	1	4.966	737.04	36.85	C
120.00-100.00			B	0.257	2.416		0.85	1	4.966			
			C	0.285	2.336		0.85	1	5.585			
T4	265.30	695.80	A	0.259	2.41	23	0.85	1	5.012	714.84	35.74	C
100.00-80.00		TA 244.49	B	0.259	2.41		0.85	1	5.012			
			C	0.285	2.337		0.85	1	5.576			
T5	268.00	693.35	A	0.257	2.416	21	0.85	1	4.966	671.54	33.58	C
80.00-60.00			B	0.257	2.416		0.85	1	4.966			
			C	0.285	2.336		0.85	1	5.585			
T6	268.00	695.80	A	0.259	2.41	19	0.85	1	5.012	609.73	30.49	C
60.00-40.00			B	0.259	2.41		0.85	1	5.012			
			C	0.285	2.337		0.85	1	5.576			
T7	268.00	693.35	A	0.257	2.416	16	0.85	1	4.966	527.15	26.36	C
40.00-20.00			B	0.257	2.416		0.85	1	4.966			
			C	0.285	2.336		0.85	1	5.585			
T8 20.00-5.25	197.65	516.32	A	0.26	2.408	16	0.85	1	3.708	389.38	26.40	C
			B	0.26	2.408		0.85	1	3.708			
			C	0.288	2.329		0.85	1	4.160			
T9 5.25-0.00	30.15	168.16	A	0.436	1.997	16	0.85	1	1.340	73.87	14.07	C
			B	0.436	1.997		0.85	1	1.340			
			C	0.436	1.997		0.85	1	1.340			
Sum Weight:	1777.08	5693.21								4524.56		

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	520.43	2039.38	A	1	2.1	4	1	1	26.704	145.40*	14.54	C
150.00-140.00			B	1	2.1		1	1	26.704			
			C	1	2.1		1	1	30.398			
T2	1730.22	3946.71	A	1	2.1	4	1	1	52.175	281.16*	14.06	C
140.00-120.00		TA	B	1	2.1		1	1	52.175			
		1092.66	C	1	2.1		1	1	59.493			
T3	2699.58	3815.27	A	1	2.1	4	1	1	50.745	267.06*	13.35	C
120.00-100.00			B	1	2.1		1	1	50.745			
			C	1	2.1		1	1	58.677			
T4	2841.56	3743.50	A	1	2.1	3	1	1	50.599	251.07*	12.55	C
100.00-80.00		TA	B	1	2.1		1	1	50.599			
		1047.30	C	1	2.1		1	1	57.683			
T5	2823.37	3577.78	A	1	2.1	3	1	1	48.876	232.40*	11.62	C
80.00-60.00			B	1	2.1		1	1	48.876			
			C	1	2.1		1	1	56.499			
T6	2713.25	3446.19	A	1	2.1	3	1	1	48.198	209.60*	10.48	C
60.00-40.00			B	1	2.1		1	1	48.198			
			C	1	2.1		1	1	54.926			
T7	2557.16	3182.79	A	1	2.1	2	1	1	45.593	179.26*	8.96	C
40.00-20.00			B	1	2.1		1	1	45.593			
			C	1	2.1		1	1	52.672			

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
T8 20.00-5.25	1711.23	2129.41	A	1	2.1	2	1	1	31.876	129.89*	8.81	C
			B	1	2.1		1	1	31.876			
			C	1	2.1		1	1	36.653			
T9 5.25-0.00	221.11	504.40	A	1	2.1	2	1	1	8.436	27.96*	5.33	C
			B	1	2.1		1	1	8.436			
			C	1	2.1		1	1	8.436			
Sum Weight:	17817.93	28525.38			*2.1A_g limit					1723.80		

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	520.43	2039.38	A	1	2.1	4	0.8	1	26.704	145.40*	14.54	C
150.00-140.00			B	1	2.1		0.8	1	26.704			
			C	1	2.1		0.8	1	30.398			
T2	1730.22	3946.71	A	1	2.1	4	0.8	1	52.175	281.16*	14.06	C
140.00-120.00		TA	B	1	2.1		0.8	1	52.175			
		1092.66	C	1	2.1		0.8	1	59.493			
T3	2699.58	3815.27	A	1	2.1	4	0.8	1	50.745	267.06*	13.35	C
120.00-100.00			B	1	2.1		0.8	1	50.745			
			C	1	2.1		0.8	1	58.677			
T4	2841.56	3743.50	A	1	2.1	3	0.8	1	50.599	251.07*	12.55	C
100.00-80.00		TA	B	1	2.1		0.8	1	50.599			
		1047.30	C	1	2.1		0.8	1	57.683			
T5	2823.37	3577.78	A	1	2.1	3	0.8	1	48.876	232.40*	11.62	C
80.00-60.00			B	1	2.1		0.8	1	48.876			
			C	1	2.1		0.8	1	56.499			
T6	2713.25	3446.19	A	1	2.1	3	0.8	1	48.198	209.60*	10.48	C
60.00-40.00			B	1	2.1		0.8	1	48.198			
			C	1	2.1		0.8	1	54.926			
T7	2557.16	3182.79	A	1	2.1	2	0.8	1	45.593	179.26*	8.96	C
40.00-20.00			B	1	2.1		0.8	1	45.593			
			C	1	2.1		0.8	1	52.672			
T8 20.00-5.25	1711.23	2129.41	A	1	2.1	2	0.8	1	31.876	129.89*	8.81	C
			B	1	2.1		0.8	1	31.876			
			C	1	2.1		0.8	1	36.653			
T9 5.25-0.00	221.11	504.40	A	1	2.1	2	0.8	1	8.436	27.96*	5.33	C
			B	1	2.1		0.8	1	8.436			
			C	1	2.1		0.8	1	8.436			
Sum Weight:	17817.93	28525.38			*2.1A_g limit					1723.80		

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	520.43	2039.38	A	1	2.1	4	0.85	1	26.704	145.40*	14.54	C
150.00-140.00			B	1	2.1		0.85	1	26.704			
			C	1	2.1		0.85	1	30.398			
T2	1730.22	3946.71	A	1	2.1	4	0.85	1	52.175	281.16*	14.06	C
140.00-120.00		TA	B	1	2.1		0.85	1	52.175			
		1092.66	C	1	2.1		0.85	1	59.493			
T3	2699.58	3815.27	A	1	2.1	4	0.85	1	50.745	267.06*	13.35	C
120.00-100.00			B	1	2.1		0.85	1	50.745			
			C	1	2.1		0.85	1	58.677			
T4	2841.56	3743.50	A	1	2.1	3	0.85	1	50.599	251.07*	12.55	C
100.00-80.00		TA	B	1	2.1		0.85	1	50.599			
		1047.30	C	1	2.1		0.85	1	57.683			
T5	2823.37	3577.78	A	1	2.1	3	0.85	1	48.876	232.40*	11.62	C
80.00-60.00			B	1	2.1		0.85	1	48.876			
			C	1	2.1		0.85	1	56.499			
T6	2713.25	3446.19	A	1	2.1	3	0.85	1	48.198	209.60*	10.48	C
60.00-40.00			B	1	2.1		0.85	1	48.198			
			C	1	2.1		0.85	1	54.926			
T7	2557.16	3182.79	A	1	2.1	2	0.85	1	45.593	179.26*	8.96	C
40.00-20.00			B	1	2.1		0.85	1	45.593			
			C	1	2.1		0.85	1	52.672			
T8 20.00-5.25	1711.23	2129.41	A	1	2.1	2	0.85	1	31.876	129.89*	8.81	C
			B	1	2.1		0.85	1	31.876			
			C	1	2.1		0.85	1	36.653			
T9 5.25-0.00	221.11	504.40	A	1	2.1	2	0.85	1	8.436	27.96*	5.33	C
			B	1	2.1		0.85	1	8.436			
			C	1	2.1		0.85	1	8.436			
Sum Weight:	17817.93	28525.38			*2.1A_g limit					1723.80		

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	50.70	352.31	A	0.262	2.401	9	1	1	2.539	76.07	7.61	C
150.00-140.00			B	0.262	2.401		1	1	2.539			
			C	0.288	2.328		1	1	2.821			
T2	172.08	695.80	A	0.259	2.41	8	1	1	5.012	190.43	9.52	C
140.00-120.00		TA 244.49	B	0.259	2.41		1	1	5.012			
			C	0.285	2.337		1	1	5.576			
T3	257.20	693.35	A	0.257	2.416	8	1	1	4.966	245.22	12.26	C
120.00-100.00			B	0.257	2.416		1	1	4.966			
			C	0.285	2.336		1	1	5.585			
T4	265.30	695.80	A	0.259	2.41	8	1	1	5.012	237.83	11.89	C
100.00-80.00		TA 244.49	B	0.259	2.41		1	1	5.012			
			C	0.285	2.337		1	1	5.576			
T5	268.00	693.35	A	0.257	2.416	7	1	1	4.966	223.43	11.17	C
80.00-60.00			B	0.257	2.416		1	1	4.966			
			C	0.285	2.336		1	1	5.585			
T6	268.00	695.80	A	0.259	2.41	6	1	1	5.012	202.86	10.14	C
60.00-40.00			B	0.259	2.41		1	1	5.012			
			C	0.285	2.337		1	1	5.576			

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
T7	268.00	693.35	A	0.257	2.416	5	1	1	4.966	175.39	8.77	C
40.00-20.00			B	0.257	2.416		1	1	4.966			
			C	0.285	2.336		1	1	5.585			
T8 20.00-5.25	197.65	516.32	A	0.26	2.408	5	1	1	3.708	129.55	8.78	C
			B	0.26	2.408		1	1	3.708			
			C	0.288	2.329		1	1	4.160			
T9 5.25-0.00	30.15	168.16	A	0.436	1.997	5	1	1	1.340	24.58	4.68	C
			B	0.436	1.997		1	1	1.340			
			C	0.436	1.997		1	1	1.340			
Sum Weight:	1777.08	5693.21								1505.35		

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 ft^2	F lb	w plf	Ctrl. Face
T1	50.70	352.31	A	0.262	2.401	9	0.8	1	2.539	76.07	7.61	C
150.00-140.00			B	0.262	2.401		0.8	1	2.539			
			C	0.288	2.328		0.8	1	2.821			
T2	172.08	695.80	A	0.259	2.41	8	0.8	1	5.012	190.43	9.52	C
140.00-120.00		TA 244.49	B	0.259	2.41		0.8	1	5.012			
			C	0.285	2.337		0.8	1	5.576			
T3	257.20	693.35	A	0.257	2.416	8	0.8	1	4.966	245.22	12.26	C
120.00-100.00			B	0.257	2.416		0.8	1	4.966			
			C	0.285	2.336		0.8	1	5.585			
T4	265.30	695.80	A	0.259	2.41	8	0.8	1	5.012	237.83	11.89	C
100.00-80.00		TA 244.49	B	0.259	2.41		0.8	1	5.012			
			C	0.285	2.337		0.8	1	5.576			
T5	268.00	693.35	A	0.257	2.416	7	0.8	1	4.966	223.43	11.17	C
80.00-60.00			B	0.257	2.416		0.8	1	4.966			
			C	0.285	2.336		0.8	1	5.585			
T6	268.00	695.80	A	0.259	2.41	6	0.8	1	5.012	202.86	10.14	C
60.00-40.00			B	0.259	2.41		0.8	1	5.012			
			C	0.285	2.337		0.8	1	5.576			
T7	268.00	693.35	A	0.257	2.416	5	0.8	1	4.966	175.39	8.77	C
40.00-20.00			B	0.257	2.416		0.8	1	4.966			
			C	0.285	2.336		0.8	1	5.585			
T8 20.00-5.25	197.65	516.32	A	0.26	2.408	5	0.8	1	3.708	129.55	8.78	C
			B	0.26	2.408		0.8	1	3.708			
			C	0.288	2.329		0.8	1	4.160			
T9 5.25-0.00	30.15	168.16	A	0.436	1.997	5	0.8	1	1.340	24.58	4.68	C
			B	0.436	1.997		0.8	1	1.340			
			C	0.436	1.997		0.8	1	1.340			
Sum Weight:	1777.08	5693.21								1505.35		

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	50.70	352.31	A	0.262	2.401	9	0.85	1	2.539	76.07	7.61	C
150.00-140.00			B	0.262	2.401		0.85	1	2.539			
			C	0.288	2.328		0.85	1	2.821			
T2	172.08	695.80	A	0.259	2.41	8	0.85	1	5.012	190.43	9.52	C
140.00-120.00		TA 244.49	B	0.259	2.41		0.85	1	5.012			
			C	0.285	2.337		0.85	1	5.576			
T3	257.20	693.35	A	0.257	2.416	8	0.85	1	4.966	245.22	12.26	C
120.00-100.00			B	0.257	2.416		0.85	1	4.966			
			C	0.285	2.336		0.85	1	5.585			
T4	265.30	695.80	A	0.259	2.41	8	0.85	1	5.012	237.83	11.89	C
100.00-80.00		TA 244.49	B	0.259	2.41		0.85	1	5.012			
			C	0.285	2.337		0.85	1	5.576			
T5	268.00	693.35	A	0.257	2.416	7	0.85	1	4.966	223.43	11.17	C
80.00-60.00			B	0.257	2.416		0.85	1	4.966			
			C	0.285	2.336		0.85	1	5.585			
T6	268.00	695.80	A	0.259	2.41	6	0.85	1	5.012	202.86	10.14	C
60.00-40.00			B	0.259	2.41		0.85	1	5.012			
			C	0.285	2.337		0.85	1	5.576			
T7	268.00	693.35	A	0.257	2.416	5	0.85	1	4.966	175.39	8.77	C
40.00-20.00			B	0.257	2.416		0.85	1	4.966			
			C	0.285	2.336		0.85	1	5.585			
T8 20.00-5.25	197.65	516.32	A	0.26	2.408	5	0.85	1	3.708	129.55	8.78	C
			B	0.26	2.408		0.85	1	3.708			
			C	0.288	2.329		0.85	1	4.160			
T9 5.25-0.00	30.15	168.16	A	0.436	1.997	5	0.85	1	1.340	24.58	4.68	C
			B	0.436	1.997		0.85	1	1.340			
			C	0.436	1.997		0.85	1	1.340			
Sum Weight:	1777.08	5693.21								1505.35		

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 kip-ft
Leg Weight	3684.84			
Bracing Weight	2008.37			
Total Member Self-Weight	5693.21			
Guy Weight	1301.51			
Total Weight	13296.50			
Wind 0 deg - No Ice		72.07	-9654.42	-0.12
Wind 30 deg - No Ice		4848.01	-8397.01	-0.55
Wind 60 deg - No Ice		8324.94	-4889.63	-0.82
Wind 90 deg - No Ice		9571.20	-72.07	-0.88
Wind 120 deg - No Ice		8140.77	4700.08	-0.70
Wind 150 deg - No Ice		4658.47	8212.84	-0.33
Wind 180 deg - No Ice		-72.07	9524.99	0.12
Wind 210 deg - No Ice		-4783.30	8284.92	0.55
Wind 240 deg - No Ice		-8212.84	4824.91	0.82
Wind 270 deg - No Ice		-9441.77	72.07	0.88
Wind 300 deg - No Ice		-8140.77	-4700.08	0.70
Wind 330 deg - No Ice		-4658.47	-8212.84	0.33
Member Ice	22832.17			
Guy Ice	18655.66			

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Torques kip-ft
Total Weight Ice	88663.46			
Wind 0 deg - Ice		11.07	-3004.52	-0.01
Wind 30 deg - Ice		1505.46	-2607.53	0.06
Wind 60 deg - Ice		2596.46	-1511.84	0.10
Wind 90 deg - Ice		2991.75	-11.07	0.12
Wind 120 deg - Ice		2585.39	1492.68	0.11
Wind 150 deg - Ice		1486.29	2596.46	0.07
Wind 180 deg - Ice		-11.07	3004.52	0.01
Wind 210 deg - Ice		-1505.46	2607.53	-0.06
Wind 240 deg - Ice		-2596.46	1511.84	-0.10
Wind 270 deg - Ice		-2991.75	11.07	-0.12
Wind 300 deg - Ice		-2585.39	-1492.68	-0.11
Wind 330 deg - Ice		-1486.29	-2596.46	-0.07
Total Weight	13296.50			
Wind 0 deg - Service		23.98	-3212.09	-0.04
Wind 30 deg - Service		1612.97	-2793.74	-0.18
Wind 60 deg - Service		2769.76	-1626.81	-0.27
Wind 90 deg - Service		3184.40	-23.98	-0.29
Wind 120 deg - Service		2708.49	1563.75	-0.23
Wind 150 deg - Service		1549.90	2732.47	-0.11
Wind 180 deg - Service		-23.98	3169.02	0.04
Wind 210 deg - Service		-1591.43	2756.45	0.18
Wind 240 deg - Service		-2732.47	1605.28	0.27
Wind 270 deg - Service		-3141.34	23.98	0.29
Wind 300 deg - Service		-2708.49	-1563.75	0.23
Wind 330 deg - Service		-1549.90	-2732.47	0.11

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy
3	1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy
4	1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy
5	1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy
6	1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy
7	1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy
8	1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy
9	1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy
10	1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy
11	1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy
12	1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy
13	1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy
14	1.2 Dead+1.0 Ice+1.0 Temp+Guy
15	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy
16	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy
17	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy
18	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy
19	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy
20	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy
21	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy
22	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy
23	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy

Comb. No.	Description
24	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy
25	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy
26	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy
27	Dead+Wind 0 deg - Service+Guy
28	Dead+Wind 30 deg - Service+Guy
29	Dead+Wind 60 deg - Service+Guy
30	Dead+Wind 90 deg - Service+Guy
31	Dead+Wind 120 deg - Service+Guy
32	Dead+Wind 150 deg - Service+Guy
33	Dead+Wind 180 deg - Service+Guy
34	Dead+Wind 210 deg - Service+Guy
35	Dead+Wind 240 deg - Service+Guy
36	Dead+Wind 270 deg - Service+Guy
37	Dead+Wind 300 deg - Service+Guy
38	Dead+Wind 330 deg - Service+Guy

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	150 - 140	Leg	Max Tension	4	21890.61	0.58	-0.38
			Max. Compression	2	-24103.15	0.00	0.04
			Max. Mx	5	-20997.74	0.70	0.01
			Max. My	2	-24097.83	0.07	-0.70
			Max. Vy	5	1470.72	-0.03	-0.02
			Max. Vx	2	-1493.75	0.00	0.04
		Diagonal	Max Tension	3	2892.68	0.00	0.00
			Max. Compression	3	-2897.57	0.00	0.00
			Max. Mx	23	384.90	-0.00	0.00
			Max. My	12	-1605.49	0.00	-0.00
			Max. Vy	23	7.10	-0.00	0.00
			Max. Vx	12	-0.71	0.00	0.00
		Horizontal	Max Tension	8	499.25	0.00	0.00
			Max. Compression	2	-382.70	0.00	0.00
			Max. Mx	26	36.52	0.00	0.00
			Max. My	19	125.00	0.00	0.00
			Max. Vy	26	-11.05	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Top Girt	Max Tension	9	48.71	0.00	0.00
			Max. Compression	4	-47.85	0.00	0.00
			Max. Mx	24	-7.31	0.00	0.00
			Max. My	19	-6.99	0.00	0.00
			Max. Vy	24	11.05	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Bottom Girt	Max Tension	8	1130.55	0.00	0.00
			Max. Compression	2	-1202.01	0.00	0.00
			Max. Mx	24	281.53	0.00	0.00
			Max. My	3	102.60	0.00	-0.00
			Max. Vy	24	11.05	0.00	0.00
			Max. Vx	3	0.00	0.00	0.00
T2	140 - 120	Leg	Max Tension	8	24885.05	0.07	-0.79
			Max. Compression	10	-35162.13	0.10	0.01
			Max. Mx	5	-21007.88	-0.77	-0.06
			Max. My	8	21740.32	0.07	-0.79
			Max. Vy	5	1468.75	-0.77	-0.06
			Max. Vx	2	-1490.65	-0.06	0.79
		Diagonal	Max Tension	3	4592.81	0.00	0.00
			Max. Compression	5	-5281.17	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	9	-3408.66	-0.01	-0.00
			Max. My	7	-4478.26	-0.00	-0.00
			Max. Vy	20	9.40	-0.00	0.00
			Max. Vx	7	-4.43	0.00	0.00
		Horizontal	Max Tension	8	2198.83	0.00	0.00
			Max. Compression	2	-3833.54	0.00	0.00
			Max. Mx	24	1167.05	0.00	0.00
			Max. My	6	989.77	0.00	-0.00
			Max. Vy	24	10.86	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	10	671.80	0.00	0.00
			Max. Compression	4	-961.93	0.00	0.00
			Max. Mx	24	-229.81	0.00	0.00
			Max. My	3	-259.15	0.00	-0.00
			Max. Vy	24	-10.86	0.00	0.00
			Max. Vx	3	0.00	0.00	0.00
		Bottom Girt	Max Tension	21	842.20	0.00	0.00
			Max. Compression	6	-401.52	0.00	0.00
			Max. Mx	22	253.29	0.00	0.00
			Max. My	2	401.99	0.00	-0.00
			Max. Vy	22	-10.86	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Guy A	Bottom Tension	9	11489.62		
			Top Tension	9	11591.09		
			Top Cable Vert	9	10063.43		
			Top Cable Norm	9	5751.49		
			Top Cable Tan	9	34.51		
			Bot Cable Vert	9	-9857.50		
			Bot Cable Norm	9	5901.88		
			Bot Cable Tan	9	92.99		
		Guy B	Bottom Tension	11	11821.10		
			Top Tension	11	11930.60		
			Top Cable Vert	11	10545.16		
			Top Cable Norm	11	5580.09		
			Top Cable Tan	11	38.25		
			Bot Cable Vert	11	-10331.27		
			Bot Cable Norm	11	5744.04		
			Bot Cable Tan	11	95.76		
		Guy C	Bottom Tension	3	16526.81		
			Top Tension	3	16635.06		
			Top Cable Vert	3	15782.65		
			Top Cable Norm	3	5256.70		
			Top Cable Tan	3	17.91		
			Bot Cable Vert	3	-15605.15		
			Bot Cable Norm	3	5439.75		
			Bot Cable Tan	3	154.04		
		Top Guy Pull-Off	Max Tension	12	6995.03	0.00	0.00
			Max. Compression	10	-4130.91	0.00	0.00
			Max. Mx	20	677.44	0.00	0.00
			Max. My	3	1233.45	0.00	-0.00
			Max. Vy	20	10.12	0.00	0.00
			Max. Vx	3	-0.00	0.00	0.00
		Torque Arm Top	Max Tension	6	16230.61	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	18	7806.33	0.04	0.00
			Max. My	3	6787.99	0.00	0.00
			Max. Vy	18	-42.37	0.00	0.00
			Max. Vx	3	-0.10	0.00	0.00
		Torque Arm Bottom	Max Tension	2	4131.04	0.00	0.00
			Max. Compression	3	-16959.26	0.00	0.00
			Max. Mx	17	-3790.45	0.04	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	19	-4242.69	0.00	-0.00
			Max. Vy	17	-42.36	0.00	0.00
			Max. Vx	19	0.05	0.00	0.00
T3	120 - 100	Leg	Max Tension	4	21500.79	0.51	-0.29
			Max. Compression	2	-60316.48	-0.00	0.09
			Max. Mx	5	-54865.43	0.60	-0.06
			Max. My	2	-2173.97	0.09	-0.63
			Max. Vy	5	1350.18	-0.07	-0.04
			Max. Vx	2	-1307.42	-0.00	0.02
		Diagonal	Max Tension	3	2079.26	0.00	0.00
			Max. Compression	5	-3335.79	0.00	0.00
			Max. Mx	19	-267.07	-0.00	-0.00
			Max. My	3	-1413.24	0.00	0.00
			Max. Vy	19	8.89	-0.00	-0.00
			Max. Vx	3	1.07	0.00	0.00
		Horizontal	Max Tension	21	1846.53	0.00	0.00
			Max. Compression	2	-73.69	0.00	0.00
			Max. Mx	24	1666.12	0.00	0.00
			Max. My	5	1102.02	0.00	-0.00
			Max. Vy	24	-10.58	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	2	1164.94	0.00	0.00
			Max. Compression	4	-484.00	0.00	0.00
			Max. Mx	22	298.44	0.00	0.00
			Max. My	5	633.06	0.00	-0.00
			Max. Vy	22	10.58	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	3	1331.44	0.00	0.00
			Max. Compression	2	-971.97	0.00	0.00
			Max. Mx	23	318.58	0.00	0.00
			Max. My	5	612.11	0.00	-0.00
			Max. Vy	23	10.58	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T4	100 - 80	Leg	Max Tension	4	24656.22	-0.59	0.35
			Max. Compression	2	-66409.79	0.00	0.10
			Max. Mx	5	-54872.83	-0.74	-0.01
			Max. My	2	-60324.68	-0.04	0.72
			Max. Vy	5	1330.65	-0.74	-0.01
			Max. Vx	2	-1308.38	-0.09	0.67
		Diagonal	Max Tension	3	2211.56	0.00	0.00
			Max. Compression	5	-3442.09	-0.00	0.00
			Max. Mx	20	-963.58	-0.01	-0.00
			Max. My	10	-1362.54	0.00	-0.00
			Max. Vy	20	9.92	-0.01	-0.00
			Max. Vx	10	-2.67	0.00	0.00
		Horizontal	Max Tension	20	2832.15	0.00	0.00
			Max. Compression	2	-2390.59	0.00	0.00
			Max. Mx	24	2187.76	0.00	0.00
			Max. My	5	283.31	0.00	-0.00
			Max. Vy	24	-10.25	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	15	780.05	0.00	0.00
			Max. Compression	4	-97.14	0.00	0.00
			Max. Mx	23	596.10	0.00	0.00
			Max. My	5	337.34	0.00	-0.00
			Max. Vy	23	-10.25	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	15	1316.25	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	20	505.37	0.00	0.00
			Max. My	5	797.36	0.00	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	20	-10.25	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Guy A	Bottom Tension	9	5877.09		
			Top Tension	9	5934.61		
			Top Cable Vert	9	4558.61		
			Top Cable Norm	9	3799.68		
			Top Cable Tan	9	34.15		
			Bot Cable Vert	9	-4424.37		
			Bot Cable Norm	9	3868.27		
			Bot Cable Tan	9	40.86		
		Guy B	Bottom Tension	11	6523.10		
			Top Tension	11	6587.29		
			Top Cable Vert	11	5276.67		
			Top Cable Norm	11	3943.06		
			Top Cable Tan	11	37.03		
			Bot Cable Vert	11	-5134.76		
			Bot Cable Norm	11	4022.84		
			Bot Cable Tan	11	42.97		
		Guy C	Bottom Tension	5	9792.96		
			Top Tension	5	9856.82		
			Top Cable Vert	5	8930.11		
			Top Cable Norm	5	4172.46		
			Top Cable Tan	5	24.96		
			Bot Cable Vert	5	-8813.00		
			Bot Cable Norm	5	4269.68		
			Bot Cable Tan	5	54.63		
		Top Guy Pull-Off	Max Tension	4	5939.30	0.00	0.00
			Max. Compression	6	-2687.80	0.00	0.00
			Max. Mx	23	1988.78	0.00	0.00
			Max. My	5	1932.08	0.00	-0.00
			Max. Vy	23	-9.52	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Torque Arm Top	Max Tension	15	9113.06	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	18	6662.48	0.04	0.00
			Max. My	5	5665.15	0.00	-0.00
			Max. Vy	18	-40.68	0.00	0.00
			Max. Vx	5	0.09	0.00	0.00
		Torque Arm Bottom	Max Tension	2	2830.47	0.00	0.00
			Max. Compression	3	-10020.23	0.00	0.00
			Max. Mx	17	-2934.70	0.03	0.00
			Max. My	5	1230.58	0.00	0.00
			Max. Vy	17	-40.68	0.00	0.00
			Max. Vx	5	-0.03	0.00	0.00
T5	80 - 60	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-45356.17	0.03	-0.09
			Max. Mx	5	-20825.13	0.37	0.06
			Max. My	3	-8721.12	-0.03	-0.32
			Max. Vy	5	-755.49	-0.01	0.04
			Max. Vx	3	605.91	-0.01	-0.01
		Diagonal	Max Tension	4	1122.96	0.00	0.00
			Max. Compression	23	-2205.32	0.00	0.00
			Max. Mx	17	-668.15	-0.01	-0.00
			Max. My	10	-1791.20	0.00	-0.00
			Max. Vy	17	9.65	-0.01	-0.00
			Max. Vx	10	-1.71	0.00	0.00
		Horizontal	Max Tension	19	2788.41	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	2667.61	0.00	0.00
			Max. My	5	1653.60	0.00	-0.00
			Max. Vy	24	-9.86	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	20	1384.80	0.00	0.00
			Max. Compression	6	-105.19	0.00	0.00
			Max. Mx	21	357.65	0.00	0.00
			Max. My	5	829.52	0.00	-0.00
			Max. Vy	21	-9.86	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	20	1344.04	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	15	561.19	0.00	0.00
			Max. My	5	771.14	0.00	-0.00
			Max. Vy	15	-9.86	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T6	60 - 40	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	15	-50865.79	-0.00	-0.03
			Max. Mx	5	-25753.83	-0.27	0.05
			Max. My	9	-20154.71	0.05	-0.24
			Max. Vy	5	-547.76	-0.27	0.05
			Max. Vx	3	461.90	-0.05	0.19
		Diagonal	Max Tension	10	997.24	0.00	0.00
			Max. Compression	24	-2483.30	0.00	0.00
			Max. Mx	15	-544.22	-0.01	-0.00
			Max. My	5	-1140.99	0.00	0.00
			Max. Vy	18	9.90	-0.01	-0.00
			Max. Vx	5	1.15	0.00	0.00
		Horizontal	Max Tension	16	3141.85	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	18	3119.13	0.00	0.00
			Max. My	5	1615.08	0.00	-0.00
			Max. Vy	18	-9.37	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	19	1370.27	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	15	442.88	0.00	0.00
			Max. My	5	814.33	0.00	-0.00
			Max. Vy	15	-9.37	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	15	1609.79	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	26	573.87	0.00	0.00
			Max. Vy	26	-9.37	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00
		Guy A	Bottom Tension	21	4693.08		
			Top Tension	21	5072.96		
			Top Cable Vert	21	2724.95		
			Top Cable Norm	21	4278.97		
			Top Cable Tan	21	4.04		
			Bot Cable Vert	21	-1904.77		
			Bot Cable Norm	21	4289.16		
			Bot Cable Tan	21	4.04		
		Guy B	Bottom Tension	25	4934.66		
			Top Tension	25	5394.85		
			Top Cable Vert	25	3308.61		
			Top Cable Norm	25	4261.16		
			Top Cable Tan	25	4.76		
			Bot Cable Vert	25	-2458.69		
			Bot Cable Norm	25	4278.51		
			Bot Cable Tan	25	4.76		
		Guy C	Bottom Tension	17	6179.22		
			Top Tension	17	6639.21		
			Top Cable Vert	17	5029.63		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Top Cable Norm	17	4333.81		
			Top Cable Tan	17	1.23		
			Bot Cable Vert	17	-4374.95		
			Bot Cable Norm	17	4363.78		
			Bot Cable Tan	17	1.23		
		Top Guy Pull-Off	Max Tension	15	4273.87	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	26	3033.60	0.00	0.00
			Max. Vy	26	8.66	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T7	40 - 20	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	20	-54103.31	0.00	-0.12
			Max. Mx	5	-25778.43	0.27	0.04
			Max. My	3	-26231.74	0.06	-0.27
			Max. Vy	5	-543.25	0.00	0.05
			Max. Vx	3	452.36	0.00	-0.04
		Diagonal	Max Tension	3	760.63	0.00	0.00
			Max. Compression	15	-2517.39	0.00	0.00
			Max. Mx	21	-695.89	-0.01	-0.00
			Max. My	10	-1239.19	0.00	-0.00
			Max. Vy	21	9.77	-0.01	-0.00
			Max. Vx	10	-1.12	0.00	0.00
		Horizontal	Max Tension	15	3341.54	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	3183.70	0.00	0.00
			Max. Vy	24	-8.67	0.00	0.00
			Max. Vx	4	0.00	0.00	0.00
		Top Girt	Max Tension	20	1537.98	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	26	539.93	0.00	0.00
			Max. Vy	26	-8.67	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00
		Bottom Girt	Max Tension	15	1648.98	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	18	545.48	0.00	0.00
			Max. My	4	318.40	0.00	0.00
			Max. Vy	18	-8.67	0.00	0.00
			Max. Vx	4	-0.00	0.00	0.00
T8	20 - 5.25	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	20	-54230.29	-0.00	0.09
			Max. Mx	26	-52253.56	0.30	0.12
			Max. My	20	-52481.86	-0.00	-0.29
			Max. Vy	26	-3929.71	0.30	0.12
			Max. Vx	20	5286.38	-0.00	-0.29
		Diagonal	Max Tension	22	514.68	0.00	0.00
			Max. Compression	15	-2514.95	0.00	0.00
			Max. Mx	20	400.23	-0.01	0.00
			Max. My	19	-805.09	-0.00	0.00
			Max. Vy	20	8.67	-0.01	0.00
			Max. Vx	19	-0.81	0.00	0.00
		Horizontal	Max Tension	15	3349.44	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	23	3045.66	0.00	0.00
			Max. My	5	1676.16	0.00	-0.00
			Max. Vy	23	-7.64	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	15	1627.08	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	18	577.14	0.00	0.00
			Max. My	4	310.09	0.00	0.00
			Max. Vy	18	-7.64	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	4	-0.00	0.00	0.00
		Bottom Girt	Max Tension	16	3813.95	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	3406.81	0.00	0.00
			Max. My	5	2000.50	0.00	-0.00
			Max. Vy	14	-7.64	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T9	5.25 - 0	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	20	-53524.34	-0.03	-0.00
			Max. Mx	26	-52322.28	0.32	-0.04
			Max. My	19	-51046.49	0.31	0.04
			Max. Vy	15	3884.73	0.32	-0.04
			Max. Vx	15	315.48	-0.01	0.02
		Diagonal	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-4230.73	0.00	0.00
			Max. Mx	5	-2197.18	0.00	-0.00
			Max. My	18	-2861.47	-0.00	0.00
			Max. Vy	21	5.12	0.00	0.00
			Max. Vx	18	-1.09	0.00	0.00
		Horizontal	Max Tension	18	3541.73	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	3486.44	0.00	0.00
			Max. My	5	1842.21	0.00	-0.00
			Max. Vy	14	4.22	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	15	4017.89	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	3411.67	0.00	0.00
			Max. My	5	2106.62	0.00	-0.00
			Max. Vy	14	-6.04	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Mast	Max. Vert	16	155154.53	188.36	-107.44
	Max. H_x	11	71013.33	723.99	-15.43
	Max. H_z	2	84494.87	66.28	646.44
	Max. M_x	1	0.00	36.71	-16.29
	Max. M_z	1	0.00	36.71	-16.29
	Max. Torsion	1	0.00	36.71	-16.29
	Min. Vert	28	56701.36	-33.95	114.79
	Min. H_x	5	81833.73	-600.96	-24.37
	Min. H_z	8	67664.80	36.56	-720.84
	Min. M_x	1	0.00	36.71	-16.29
	Min. M_z	1	0.00	36.71	-16.29
	Min. Torsion	1	0.00	36.71	-16.29
Guy C @ 47 ft Elev 0 ft Azimuth 240 deg	Max. Vert	10	-5860.25	-2254.82	1297.33
	Max. H_x	10	-5860.25	-2254.82	1297.33
	Max. H_z	3	-48678.01	-18099.53	10804.04
	Min. Vert	3	-48678.01	-18099.53	10804.04
	Min. H_x	5	-48522.17	-18362.78	10278.26
	Min. H_z	10	-5860.25	-2254.82	1297.33

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Guy B @ 75 ft Elev 0 ft Azimuth 120 deg	Max. Vert	6	-2326.91	1533.18	887.12
	Max. H_x	11	-31475.75	18976.52	10692.20
	Max. H_z	12	-31234.73	18884.08	10923.56
	Min. Vert	11	-31475.75	18976.52	10692.20
	Min. H_x	6	-2326.91	1533.18	887.12
	Min. H_z	6	-2326.91	1533.18	887.12
Guy A @ 75 ft Elev 10 ft Azimuth 0 deg	Max. Vert	2	-1686.96	-2.11	-1492.97
	Max. H_x	11	-16557.04	498.31	-12667.52
	Max. H_z	2	-1686.96	-2.11	-1492.97
	Min. Vert	8	-29283.67	-12.52	-22452.82
	Min. H_x	5	-14817.28	-540.22	-11388.35
	Min. H_z	8	-29283.67	-12.52	-22452.82

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	57205.64	-36.71	16.29	0.00	0.00	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy	84494.87	-66.28	-646.44	0.00	0.00	0.00
1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy	83003.25	264.70	-545.68	0.00	0.00	0.00
1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy	74299.80	527.21	-323.61	0.00	0.00	0.00
1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy	81833.73	600.96	24.37	0.00	0.00	0.00
1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy	82331.37	518.98	367.40	0.00	0.00	0.00
1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy	74414.72	303.72	629.96	0.00	0.00	0.00
1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy	67664.80	-36.56	720.84	0.00	0.00	0.00
1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy	71009.22	-382.54	620.99	0.00	0.00	0.00
1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy	73795.43	-631.30	362.94	0.00	0.00	0.00
1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy	71013.33	-723.99	15.43	0.00	0.00	0.00
1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy	67148.28	-636.09	-337.94	0.00	0.00	0.00
1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy	75417.63	-391.15	-584.43	0.00	0.00	0.00
1.2 Dead+1.0 Ice+1.0 Temp+Guy	152879.99	-237.19	202.63	0.00	0.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy	154807.53	-244.19	93.37	0.00	0.00	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy	155154.53	-188.36	107.44	0.00	0.00	0.00
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy	155031.33	-144.02	150.56	0.00	0.00	0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	154822.30	-127.89	210.33	0.00	0.00	0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy	154259.64	-142.82	264.92	0.00	0.00	0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy	153162.35	-179.19	301.41	0.00	0.00	0.00
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	152266.13	-234.39	310.76	0.00	0.00	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy	152017.01	-293.13	295.26	0.00	0.00	0.00
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy	152071.65	-333.94	257.62	0.00	0.00	0.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	152210.22	-346.66	203.55	0.00	0.00	0.00
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy	152654.14	-331.34	145.58	0.00	0.00	0.00
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy	153700.55	-295.13	104.62	0.00	0.00	0.00
Dead+Wind 0 deg - Service+Guy	56847.71	-39.76	-136.49	0.00	0.00	0.00
Dead+Wind 30 deg - Service+Guy	56701.36	33.95	-114.79	0.00	0.00	0.00
Dead+Wind 60 deg - Service+Guy	56712.43	88.97	-57.63	0.00	0.00	0.00
Dead+Wind 90 deg - Service+Guy	56833.69	110.22	19.38	0.00	0.00	0.00
Dead+Wind 120 deg - Service+Guy	57083.57	89.02	93.47	0.00	0.00	0.00
Dead+Wind 150 deg - Service+Guy	57431.18	37.29	146.75	0.00	0.00	0.00
Dead+Wind 180 deg - Service+Guy	57771.79	-34.50	165.16	0.00	0.00	0.00
Dead+Wind 210 deg - Service+Guy	57989.94	-106.89	143.96	0.00	0.00	0.00
Dead+Wind 240 deg - Service+Guy	58015.54	-160.32	88.81	0.00	0.00	0.00
Dead+Wind 270 deg - Service+Guy	57845.74	-180.65	14.19	0.00	0.00	0.00
Dead+Wind 300 deg - Service+Guy	57525.34	-162.60	-60.19	0.00	0.00	0.00
Dead+Wind 330 deg - Service+Guy	57152.53	-111.07	-114.20	0.00	0.00	0.00

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	-0.00	-13296.28	0.00	0.88	13296.43	-0.42	0.007%
2	187.59	-15715.22	-17660.22	-187.29	15715.14	17658.78	0.006%
3	8980.95	-15624.54	-15421.19	-8980.57	15624.44	15419.26	0.008%
4	15401.10	-15555.77	-9013.28	-15400.96	15555.74	9012.27	0.004%
5	17669.78	-15611.55	-176.12	-17668.58	15611.48	176.45	0.005%
6	14999.38	-15691.82	8564.73	-14998.15	15691.76	-8564.40	0.005%
7	8534.81	-15682.29	15000.72	-8534.09	15682.26	-15000.54	0.003%
8	-187.59	-15675.34	17453.13	188.80	15675.33	-17453.17	0.005%
9	-8877.41	-15766.02	15241.85	8876.69	15765.98	-15241.50	0.003%
10	-15221.76	-15834.79	8909.73	15220.99	15834.74	-8909.35	0.004%
11	-17462.69	-15779.01	176.12	17461.84	15778.96	-175.69	0.004%
12	-14999.38	-15698.73	-8564.73	14999.93	15698.73	8563.87	0.004%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
13	-8534.81	-15708.27	-15000.72	8535.02	15708.23	14999.82	0.004%
14	-0.00	-91059.08	0.00	-0.17	91059.07	0.06	0.000%
15	78.23	-91077.06	-5029.55	-78.32	91077.04	5029.47	0.000%
16	2628.07	-90993.04	-4425.75	-2628.21	90993.02	4425.53	0.000%
17	4505.66	-90929.61	-2601.78	-4505.72	90929.59	2601.77	0.000%
18	5152.98	-90982.99	-67.34	-5152.91	90982.97	67.50	0.000%
19	4395.51	-91058.74	2447.85	-4395.38	91058.72	-2447.65	0.000%
20	2476.44	-91049.03	4297.79	-2476.40	91049.01	-4297.63	0.000%
21	-78.23	-91041.11	5029.55	78.21	91041.10	-5029.31	0.000%
22	-2628.07	-91125.12	4425.75	2627.87	91125.11	-4425.43	0.000%
23	-4505.66	-91188.56	2601.78	4505.25	91188.54	-2601.63	0.000%
24	-5152.98	-91135.18	67.34	5152.54	91135.16	-67.45	0.001%
25	-4395.51	-91059.43	-2447.85	4395.25	91059.42	2447.68	0.000%
26	-2476.44	-91069.14	-4297.79	2476.30	91069.12	4297.63	0.000%
27	39.01	-13300.42	-3672.29	-38.53	13300.43	3671.74	0.005%
28	1867.51	-13281.57	-3206.71	-1867.04	13281.57	3206.43	0.004%
29	3202.53	-13267.27	-1874.23	-3201.87	13267.27	1873.91	0.005%
30	3674.28	-13278.87	-36.62	-3673.78	13278.87	36.41	0.004%
31	3118.99	-13295.56	1780.96	-3118.68	13295.56	-1781.02	0.002%
32	1774.74	-13293.58	3119.27	-1774.48	13293.58	-3119.25	0.002%
33	-39.01	-13292.13	3629.23	39.17	13292.13	-3629.16	0.001%
34	-1845.98	-13310.99	3169.41	1846.01	13310.99	-3169.33	0.001%
35	-3165.23	-13325.29	1852.70	3165.17	13325.29	-1852.66	0.001%
36	-3631.22	-13313.69	36.62	3631.14	13313.69	-36.67	0.001%
37	-3118.99	-13297.00	-1780.96	3118.99	13297.00	1780.82	0.001%
38	-1774.74	-13298.98	-3119.27	1774.84	13298.98	3119.08	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	13	0.00000001	0.00007419
2	Yes	27	0.00007642	0.00006421
3	Yes	26	0.00009936	0.00008706
4	Yes	20	0.00007025	0.00006234
5	Yes	26	0.00006444	0.00005918
6	Yes	26	0.00007075	0.00006054
7	Yes	24	0.00000001	0.00004484
8	Yes	16	0.00000001	0.00007382
9	Yes	18	0.00000001	0.00006453
10	Yes	19	0.00000001	0.00006441
11	Yes	18	0.00000001	0.00007508
12	Yes	17	0.00000001	0.00006720
13	Yes	25	0.00000001	0.00005007
14	Yes	19	0.00000001	0.00005949
15	Yes	21	0.00000001	0.00003580
16	Yes	20	0.00000001	0.00005234
17	Yes	20	0.00000001	0.00004478
18	Yes	20	0.00000001	0.00005073
19	Yes	20	0.00000001	0.00005340
20	Yes	20	0.00000001	0.00004518
21	Yes	19	0.00000001	0.00006104
22	Yes	18	0.00000001	0.00009218
23	Yes	18	0.00000001	0.00009560
24	Yes	18	0.00000001	0.00009542
25	Yes	19	0.00000001	0.00006499

26	Yes	20	0.00000001	0.00004924
27	Yes	11	0.00000001	0.00009360
28	Yes	12	0.00000001	0.00005493
29	Yes	12	0.00000001	0.00006837
30	Yes	12	0.00000001	0.00005673
31	Yes	12	0.00000001	0.00004397
32	Yes	12	0.00000001	0.00004524
33	Yes	12	0.00000001	0.00005256
34	Yes	12	0.00000001	0.00006295
35	Yes	12	0.00000001	0.00006965
36	Yes	12	0.00000001	0.00006657
37	Yes	12	0.00000001	0.00005680
38	Yes	12	0.00000001	0.00004626

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	2.795	29	0.1341	0.0126
T2	140 - 120	2.510	29	0.1171	0.0103
T3	120 - 100	1.972	29	0.1698	0.0223
T4	100 - 80	1.222	29	0.1402	0.0300
T5	80 - 60	0.794	29	0.0859	0.1056
T6	60 - 40	0.473	29	0.0639	0.1925
T7	40 - 20	0.297	29	0.0337	0.2513
T8	20 - 5.25	0.186	29	0.0350	0.2855
T9	5.25 - 0	0.056	30	0.0476	0.2948

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	6' x 3" Dia Omni	29	2.795	0.1341	0.0126	19044
148.50	12.5' x 2 Std. Horz. Pipe	29	2.751	0.1305	0.0104	19044
147.00	AIR6449	29	2.707	0.1280	0.0082	19044
145.50	12.5' x 2 Std. Horz. Pipe	29	2.663	0.1255	0.0063	19044
136.00	Guy	29	2.408	0.1221	0.0132	10741
126.00	HPA-65R-BUU-H6	29	2.154	0.1540	0.0212	8934
96.00	Guy	29	1.108	0.1276	0.0406	9704
95.00	8' dipole antenna	29	1.082	0.1245	0.0438	10413
50.00	Guy	29	0.367	0.0439	0.2255	26875

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	18.736	3	1.4101	0.1341
T2	140 - 120	15.825	3	1.3269	0.1782

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T3	120 - 100	10.493	3	1.3657	0.2208
T4	100 - 80	5.025	3	1.0291	0.3080
T5	80 - 60	2.635	17	0.4445	0.6762
T6	60 - 40	1.637	17	0.2083	1.0917
T7	40 - 20	0.945	16	0.1526	1.3715
T8	20 - 5.25	0.726	4	0.1107	1.5328
T9	5.25 - 0	0.233	4	0.1945	1.5761

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	6' x 3" Dia Omni	3	18.736	1.4101	0.1341	4629
148.50	12.5' x 2 Std. Horz. Pipe	3	18.290	1.3938	0.1411	4629
147.00	AIR6449	3	17.846	1.3780	0.1480	4629
145.50	12.5' x 2 Std. Horz. Pipe	3	17.404	1.3633	0.1548	4629
136.00	Guy	3	14.736	1.3251	0.1921	3417
126.00	HPA-65R-BUU-H6	3	12.118	1.3625	0.2058	6623
96.00	Guy	3	4.221	0.9110	0.3614	1393
95.00	8' dipole antenna	3	4.042	0.8801	0.3769	1449
50.00	Guy	16	1.253	0.1790	1.2488	8364

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	150	Leg	A325N	0.6250	4	5472.65	24850.50	0.220 ✔	1	Bolt DS
T2	140	Leg	A325N	0.6250	4	0.00	24850.50	0.000 ✔	1	Bolt DS
T3	120	Leg	A325N	0.6250	4	5375.20	24850.50	0.216 ✔	1	Bolt DS
T4	100	Leg	A325N	0.6250	4	0.00	24850.50	0.000 ✔	1	Bolt DS
T5	80	Leg	A325N	0.6250	4	0.00	24850.50	0.000 ✔	1	Bolt DS
T6	60	Leg	A325N	0.6250	4	0.00	24850.50	0.000 ✔	1	Bolt DS
T7	40	Leg	A325N	0.6250	4	0.00	24850.50	0.000 ✔	1	Bolt DS
T8	20	Leg	A325N	0.6250	4	0.00	24850.50	0.000 ✔	1	Bolt DS

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.

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.
T2	136.00 (A) (712)	5/8 EHS	4240.00	42399.99	11591.10	25440.00	1.000	2.195 ✔
	136.00 (A) (713)	5/8 EHS	4240.00	42399.99	11139.90	25440.00	1.000	2.284 ✔
	136.00 (B) (706)	5/8 EHS	4240.00	42399.99	11573.60	25440.00	1.000	2.198 ✔
	136.00 (B) (707)	5/8 EHS	4240.00	42399.99	11930.60	25440.00	1.000	2.132 ✔
	136.00 (C) (698)	5/8 EHS	4240.00	42399.99	16506.40	25440.00	1.000	1.541 ✔
	136.00 (C) (699)	5/8 EHS	4240.00	42399.99	16635.10	25440.00	1.000	1.529 ✔
T4	96.00 (A) (732)	9/16 EHS	3500.00	35000.04	5934.61	21000.00	1.000	3.539 ✔
	96.00 (A) (733)	9/16 EHS	3500.00	35000.04	5778.58	21000.00	1.000	3.634 ✔
	96.00 (B) (726)	9/16 EHS	3500.00	35000.04	6258.97	21000.00	1.000	3.355 ✔
	96.00 (B) (727)	9/16 EHS	3500.00	35000.04	6587.29	21000.00	1.000	3.188 ✔
	96.00 (C) (718)	9/16 EHS	3500.00	35000.04	9856.82	21000.00	1.000	2.131 ✔
	96.00 (C) (719)	9/16 EHS	3500.00	35000.04	9634.64	21000.00	1.000	2.180 ✔
T6	50.00 (A) (742)	1/2 EHS	2690.00	26900.04	5072.96	16140.00	1.000	3.182 ✔
	50.00 (B) (741)	1/2 EHS	2690.00	26900.04	5394.85	16140.00	1.000	2.992 ✔
	50.00 (C) (738)	1/2 EHS	2690.00	26900.04	6639.21	16140.00	1.000	2.431 ✔

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	150 - 140	1 3/4	10.00	1.58	43.4 K=1.00	2.4053	1.00	-24103.20	94294.90	0.256 [1] ✔
T2	140 - 120	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	0.95	-35162.10	89139.30	0.394 [1] ✔
T3	120 - 100	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	0.96	-60316.50	90201.50	0.669 [1] ✔
T4	100 - 80	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	0.92	-66409.80	86561.80	0.767 [1] ✔
T5	80 - 60	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	0.75	-45356.20	70872.00	0.640 [1] ✔
T6	60 - 40	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	0.70	-50865.80	65610.50	0.775 [1] ✔
T7	40 - 20	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	0.70	-54103.30	66055.90	0.819 [1] ✔
T8	20 - 5.25	1 3/4	14.75	1.57	43.2 K=1.00	2.4053	0.70	-54230.30	65966.70	0.822 [1]

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 $\frac{P_u}{\phi P_n}$
T9	5.25 - 0	1 3/4	5.32	2.08	57.1 K=1.00	2.4053	0.77	-53524.30	65276.10	0.820 [1]

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	5/8	2.18	0.98	83.2 K=1.10	0.3068	-2897.57	6906.26	0.420 [1]
T2	140 - 120	5/8	2.18	0.98	83.2 K=1.10	0.3068	-5281.17	6906.26	0.765 [1]
T3	120 - 100	5/8	2.18	0.98	83.2 K=1.10	0.3068	-3335.79	6906.26	0.483 [1]
T4	100 - 80	5/8	2.18	0.98	83.2 K=1.10	0.3068	-3442.09	6906.26	0.498 [1]
T5	80 - 60	5/8	2.18	0.98	83.2 K=1.10	0.3068	-2205.32	6906.26	0.319 [1]
T6	60 - 40	5/8	2.18	0.98	83.2 K=1.10	0.3068	-2483.30	6906.26	0.360 [1]
T7	40 - 20	5/8	2.18	0.98	83.2 K=1.10	0.3068	-2517.39	6906.26	0.365 [1]
T8	20 - 5.25	5/8	2.17	0.98	82.9 K=1.10	0.3068	-2514.95	6921.74	0.363 [1]
T9	5.25 - 0	5/8	1.76	0.96	81.4 K=1.10	0.3068	-4230.73	7010.43	0.603 [1]

[1] $P_u / \phi P_n$ controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	1.50	1.35	82.3 K=0.95	0.4418	-382.70	12110.70	0.032 [1]
T2	140 - 120	3/4	1.50	1.35	82.3 K=0.95	0.4418	-3833.54	12110.70	0.317 [1]
T3	120 - 100	3/4	1.50	1.35	82.3 K=0.95	0.4418	-73.69	12110.70	0.006 [1]
T4	100 - 80	3/4	1.50	1.35	82.3 K=0.95	0.4418	-2390.59	12110.70	0.197 [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	150 - 140	3/4	1.50	1.35	82.3 K=0.95	0.4418	-47.85	12110.70	0.004 [1] ✔
T2	140 - 120	3/4	1.50	1.35	82.3 K=0.95	0.4418	-961.93	12110.70	0.079 [1] ✔
T3	120 - 100	3/4	1.50	1.35	82.3 K=0.95	0.4418	-484.00	12110.70	0.040 [1] ✔
T4	100 - 80	3/4	1.50	1.35	82.3 K=0.95	0.4418	-97.14	12110.70	0.008 [1] ✔
T5	80 - 60	3/4	1.50	1.35	82.3 K=0.95	0.4418	-105.19	12110.70	0.009 [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	150 - 140	3/4	1.50	1.35	82.3 K=0.95	0.4418	-1202.01	12110.70	0.099 [1] ✔
T2	140 - 120	3/4	1.50	1.35	82.3 K=0.95	0.4418	-401.52	12110.70	0.033 [1] ✔
T3	120 - 100	3/4	1.50	1.35	82.3 K=0.95	0.4418	-971.97	12110.70	0.080 [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 $\frac{P_u}{\phi P_n}$
T2	140 - 120	5/8	1.50	1.35	104.0 K=1.00	0.3068	-4130.91	5624.79	0.734 [1] ✔
T4	100 - 80	5/8	1.50	1.35	104.0 K=1.00	0.3068	-2687.80	5624.79	0.478 [1] ✔

[1] P_u / ϕP_n controls

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120 (704)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-16959.30	49126.40	0.345 [1] ✔
T2	140 - 120 (705)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-11538.60	49126.40	0.235 [1] ✔
T2	140 - 120 (710)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-11631.10	49126.40	0.237 [1] ✔
T2	140 - 120 (711)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-15678.80	49126.40	0.319 [1] ✔
T2	140 - 120 (716)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-12688.80	49126.40	0.258 [1] ✔
T2	140 - 120 (717)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-11554.10	49126.40	0.235 [1] ✔
T4	100 - 80 (724)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-10020.20	49126.40	0.204 [1] ✔
T4	100 - 80 (725)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-5939.35	49126.40	0.121 [1] ✔
T4	100 - 80 (730)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-5500.98	49126.40	0.112 [1] ✔
T4	100 - 80 (731)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-8505.44	49126.40	0.173 [1] ✔
T4	100 - 80 (736)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-6330.12	49126.40	0.129 [1] ✔
T4	100 - 80 (737)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-5512.12	49126.40	0.112 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	1 3/4	10.00	1.58	43.4	1.2339	21890.60	60150.90	0.364 [1 #] ✔
T2	140 - 120	1 3/4	20.00	1.58	43.4	2.4053	24885.00	108238.00	0.230 [1 #] ✔
T3	120 - 100	1 3/4	20.00	1.58	43.4	1.2339	21500.80	60150.90	0.357 [1 #] ✔
T4	100 - 80	1 3/4	20.00	1.58	43.4	2.4053	24656.20	108238.00	0.228 [1 #] ✔

[1] P_u / ϕP_n controls
[#] Based on net area of leg in section below

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	150 - 140	5/8	2.18	0.98	75.6	0.3068	2892.68	9940.20	0.291 [1] ✔
T2	140 - 120	5/8	2.18	0.98	75.6	0.3068	4592.81	9940.20	0.462 [1] ✔
T3	120 - 100	5/8	2.18	0.98	75.6	0.3068	2079.26	9940.20	0.209 [1] ✔
T4	100 - 80	5/8	2.18	0.98	75.6	0.3068	2211.56	9940.20	0.222 [1] ✔
T5	80 - 60	5/8	2.18	0.98	75.6	0.3068	1122.96	9940.20	0.113 [1] ✔
T6	60 - 40	5/8	2.18	0.98	75.6	0.3068	997.24	9940.20	0.100 [1] ✔
T7	40 - 20	5/8	2.18	0.98	75.6	0.3068	760.63	9940.20	0.077 [1] ✔
T8	20 - 5.25	5/8	2.17	0.98	75.4	0.3068	514.68	9940.20	0.052 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	1.50	1.35	86.7	0.4418	499.25	19880.40	0.025 [1] ✔
T2	140 - 120	3/4	1.50	1.35	86.7	0.4418	2198.83	19880.40	0.111 [1] ✔
T3	120 - 100	3/4	1.50	1.35	86.7	0.4418	1846.53	19880.40	0.093 [1] ✔
T4	100 - 80	3/4	1.50	1.35	86.7	0.4418	2832.15	19880.40	0.142 [1] ✔
T5	80 - 60	3/4	1.50	1.35	86.7	0.4418	2788.41	19880.40	0.140 [1] ✔
T6	60 - 40	3/4	1.50	1.35	86.7	0.4418	3141.85	19880.40	0.158 [1] ✔
T7	40 - 20	3/4	1.50	1.35	86.7	0.4418	3341.54	19880.40	0.168 [1] ✔
T8	20 - 5.25	3/4	1.50	1.35	86.7	0.4418	3349.44	19880.40	0.168 [1] ✔
T9	5.25 - 0	3/4	1.03	0.89	56.7	0.4418	3541.73	19880.40	0.178 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
									✔

[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	150 - 140	3/4	1.50	1.35	86.7	0.4418	48.71	19880.40	0.002 [1] ✔
T2	140 - 120	3/4	1.50	1.35	86.7	0.4418	671.80	19880.40	0.034 [1] ✔
T3	120 - 100	3/4	1.50	1.35	86.7	0.4418	1164.94	19880.40	0.059 [1] ✔
T4	100 - 80	3/4	1.50	1.35	86.7	0.4418	780.05	19880.40	0.039 [1] ✔
T5	80 - 60	3/4	1.50	1.35	86.7	0.4418	1384.80	19880.40	0.070 [1] ✔
T6	60 - 40	3/4	1.50	1.35	86.7	0.4418	1370.27	19880.40	0.069 [1] ✔
T7	40 - 20	3/4	1.50	1.35	86.7	0.4418	1537.98	19880.40	0.077 [1] ✔
T8	20 - 5.25	3/4	1.50	1.35	86.7	0.4418	1627.08	19880.40	0.082 [1] ✔
T9	5.25 - 0	3/4	1.48	1.33	85.1	0.4418	4017.89	19880.40	0.202 [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	150 - 140	3/4	1.50	1.35	86.7	0.4418	1130.55	19880.40	0.057 [1] ✔
T2	140 - 120	3/4	1.50	1.35	86.7	0.4418	842.20	19880.40	0.042 [1] ✔
T3	120 - 100	3/4	1.50	1.35	86.7	0.4418	1331.44	19880.40	0.067 [1] ✔
T4	100 - 80	3/4	1.50	1.35	86.7	0.4418	1316.25	19880.40	0.066 [1] ✔
T5	80 - 60	3/4	1.50	1.35	86.7	0.4418	1344.04	19880.40	0.068 [1] ✔
T6	60 - 40	3/4	1.50	1.35	86.7	0.4418	1609.79	19880.40	0.081 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T7	40 - 20	3/4	1.50	1.35	86.7	0.4418	1648.98	19880.40	0.083 [1]
T8	20 - 5.25	3/4	1.50	1.35	86.7	0.4418	3813.95	19880.40	0.192 [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 $\frac{P_u}{\phi P_n}$
T2	140 - 120	5/8	1.50	1.35	104.0	0.3068	6995.03	9940.20	0.704 [1]
T4	100 - 80	5/8	1.50	1.35	104.0	0.3068	5939.30	9940.20	0.598 [1]
T6	60 - 40	5/8	1.50	1.35	104.0	0.3068	4273.87	9940.20	0.430 [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 $\frac{P_u}{\phi P_n}$
T2	140 - 120 (700)	P2.5x.203	3.66	3.58	45.3	1.7040	16230.60	53677.60	0.302 [1]
T2	140 - 120 (701)	P2.5x.203	3.66	3.58	45.3	1.7040	11135.10	53677.60	0.207 [1]
T2	140 - 120 (708)	P2.5x.203	3.66	3.58	45.3	1.7040	12262.60	53677.60	0.228 [1]
T2	140 - 120 (709)	P2.5x.203	3.66	3.58	45.3	1.7040	16214.10	53677.60	0.302 [1]
T2	140 - 120 (714)	P2.5x.203	3.66	3.58	45.3	1.7040	11938.10	53677.60	0.222 [1]
T2	140 - 120 (715)	P2.5x.203	3.66	3.58	45.3	1.7040	11039.50	53677.60	0.206 [1]
T4	100 - 80 (720)	P2.5x.203	3.66	3.58	45.3	1.7040	9108.98	53677.60	0.170 [1]
T4	100 - 80 (721)	P2.5x.203	3.66	3.58	45.3	1.7040	7661.34	53677.60	0.143 [1]
T4	100 - 80 (728)	P2.5x.203	3.66	3.58	45.3	1.7040	7943.52	53677.60	0.148 [1]
T4	100 - 80 (729)	P2.5x.203	3.66	3.58	45.3	1.7040	9113.06	53677.60	0.170 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	100 - 80 (734)	P2.5x.203	3.66	3.58	45.3	1.7040	6692.43	53677.60	0.125 [1]
T4	100 - 80 (735)	P2.5x.203	3.66	3.58	45.3	1.7040	6381.42	53677.60	0.119 [1]

[1] P_u / ϕP_n controls

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120 (704)	P2.5x.203	3.36	3.28	41.6	1.7040	1777.49	53677.60	0.033 [1]
T2	140 - 120 (705)	P2.5x.203	3.36	3.28	41.6	1.7040	3169.07	53677.60	0.059 [1]
T2	140 - 120 (710)	P2.5x.203	3.36	3.28	41.6	1.7040	1596.42	53677.60	0.030 [1]
T2	140 - 120 (711)	P2.5x.203	3.36	3.28	41.6	1.7040	1589.77	53677.60	0.030 [1]
T2	140 - 120 (716)	P2.5x.203	3.36	3.28	41.6	1.7040	2668.80	53677.60	0.050 [1]
T2	140 - 120 (717)	P2.5x.203	3.36	3.28	41.6	1.7040	4131.04	53677.60	0.077 [1]
T4	100 - 80 (724)	P2.5x.203	3.36	3.28	41.6	1.7040	1155.70	53677.60	0.022 [1]
T4	100 - 80 (725)	P2.5x.203	3.36	3.28	41.6	1.7040	2830.47	53677.60	0.053 [1]
T4	100 - 80 (730)	P2.5x.203	3.36	3.28	41.6	1.7040	1473.02	53677.60	0.027 [1]
T4	100 - 80 (731)	P2.5x.203	3.36	3.28	41.6	1.7040	351.45	53677.60	0.007 [1]
T4	100 - 80 (736)	P2.5x.203	3.36	3.28	41.6	1.7040	2146.22	53677.60	0.040 [1]
T4	100 - 80 (737)	P2.5x.203	3.36	3.28	41.6	1.7040	2817.13	53677.60	0.052 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	150 - 140	Leg	1 3/4	1	21890.60	60150.90	36.4	Pass
T2	140 - 120	Leg	1 3/4	51	-35162.10	89139.30	39.4	Pass
T3	120 - 100	Leg	1 3/4	145	-60316.50	90201.50	66.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T4	100 - 80	Leg	1 3/4	237	-66409.80	86561.80	76.7	Pass
T5	80 - 60	Leg	1 3/4	328	-45356.20	70872.00	64.0	Pass
T6	60 - 40	Leg	1 3/4	420	-50865.80	65610.50	77.5	Pass
T7	40 - 20	Leg	1 3/4	513	-54103.30	66055.90	81.9	Pass
T8	20 - 5.25	Leg	1 3/4	605	-54230.30	65966.70	82.2	Pass
T9	5.25 - 0	Leg	1 3/4	676	-53524.30	65276.10	82.0	Pass
T1	150 - 140	Diagonal	5/8	14	-2897.57	6906.26	42.0	Pass
T2	140 - 120	Diagonal	5/8	123	-5281.17	6906.26	76.5	Pass
T3	120 - 100	Diagonal	5/8	153	-3335.79	6906.26	48.3	Pass
T4	100 - 80	Diagonal	5/8	307	-3442.09	6906.26	49.8	Pass
T5	80 - 60	Diagonal	5/8	414	-2205.32	6906.26	31.9	Pass
T6	60 - 40	Diagonal	5/8	429	-2483.30	6906.26	36.0	Pass
T7	40 - 20	Diagonal	5/8	520	-2517.39	6906.26	36.5	Pass
T8	20 - 5.25	Diagonal	5/8	668	-2514.95	6921.74	36.3	Pass
T9	5.25 - 0	Diagonal	5/8	688	-4230.73	7010.43	60.3	Pass
T1	150 - 140	Horizontal	3/4	23	-382.70	12110.70	3.2	Pass
T2	140 - 120	Horizontal	3/4	122	-3833.54	12110.70	31.7	Pass
T3	120 - 100	Horizontal	3/4	158	1846.53	19880.40	9.3	Pass
T4	100 - 80	Horizontal	3/4	306	-2390.59	12110.70	19.7	Pass
T5	80 - 60	Horizontal	3/4	342	2788.41	19880.40	14.0	Pass
T6	60 - 40	Horizontal	3/4	434	3141.85	19880.40	15.8	Pass
T7	40 - 20	Horizontal	3/4	526	3341.54	19880.40	16.8	Pass
T8	20 - 5.25	Horizontal	3/4	667	3349.44	19880.40	16.8	Pass
T9	5.25 - 0	Horizontal	3/4	691	3541.73	19880.40	17.8	Pass
T1	150 - 140	Top Girt	3/4	5	-47.85	12110.70	0.4	Pass
T2	140 - 120	Top Girt	3/4	55	-961.93	12110.70	7.9	Pass
T3	120 - 100	Top Girt	3/4	146	1164.94	19880.40	5.9	Pass
T4	100 - 80	Top Girt	3/4	238	780.05	19880.40	3.9	Pass
T5	80 - 60	Top Girt	3/4	330	1384.80	19880.40	7.0	Pass
T6	60 - 40	Top Girt	3/4	422	1370.27	19880.40	6.9	Pass
T7	40 - 20	Top Girt	3/4	514	1537.98	19880.40	7.7	Pass
T8	20 - 5.25	Top Girt	3/4	606	1627.08	19880.40	8.2	Pass
T9	5.25 - 0	Top Girt	3/4	677	4017.89	19880.40	20.2	Pass
T1	150 - 140	Bottom Girt	3/4	7	-1202.01	12110.70	9.9	Pass
T2	140 - 120	Bottom Girt	3/4	57	842.20	19880.40	4.2	Pass
T3	120 - 100	Bottom Girt	3/4	149	-971.97	12110.70	8.0	Pass
T4	100 - 80	Bottom Girt	3/4	241	1316.25	19880.40	6.6	Pass
T5	80 - 60	Bottom Girt	3/4	333	1344.04	19880.40	6.8	Pass
T6	60 - 40	Bottom Girt	3/4	425	1609.79	19880.40	8.1	Pass
T7	40 - 20	Bottom Girt	3/4	517	1648.98	19880.40	8.3	Pass
T8	20 - 5.25	Bottom Girt	3/4	609	3813.95	19880.40	19.2	Pass
T2	140 - 120	Guy A@136	5/8	712	11591.10	25440.00	45.6	Pass
T4	100 - 80	Guy A@96	9/16	732	5934.61	21000.00	28.3	Pass
T6	60 - 40	Guy A@50	1/2	742	5072.96	16140.00	31.4	Pass
T2	140 - 120	Guy B@136	5/8	707	11930.60	25440.00	46.9	Pass
T4	100 - 80	Guy B@96	9/16	727	6587.29	21000.00	31.4	Pass
T6	60 - 40	Guy B@50	1/2	741	5394.85	16140.00	33.4	Pass
T2	140 - 120	Guy C@136	5/8	699	16635.10	25440.00	65.4	Pass
T4	100 - 80	Guy C@96	9/16	718	9856.82	21000.00	46.9	Pass
T6	60 - 40	Guy C@50	1/2	738	6639.21	16140.00	41.1	Pass
T2	140 - 120	Top Guy Pull-Off@136	5/8	702	-4130.91	5624.79	73.4	Pass
T4	100 - 80	Top Guy Pull-Off@96	5/8	722	5939.30	9940.20	59.8	Pass
T6	60 - 40	Top Guy Pull-Off@50	5/8	469	4273.87	9940.20	43.0	Pass
T2	140 - 120	Torque Arm Top@136	P2.5x.203	700	16230.60	53677.60	30.2	Pass
T4	100 - 80	Torque Arm Top@96	P2.5x.203	729	9113.06	53677.60	17.0	Pass
T2	140 - 120	Torque Arm Bottom@136	P2.5x.203	704	-16959.30	49126.40	34.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T4	100 - 80	Torque Arm Bottom@96	P2.5x.203	724	-10020.20	49126.40	20.4	Pass
							Summary	
						Leg (T8)	82.2	Pass
						Diagonal (T2)	76.5	Pass
						Horizontal (T2)	31.7	Pass
						Top Girt (T9)	20.2	Pass
						Bottom Girt (T8)	19.2	Pass
						Guy A (T2)	45.6	Pass
						Guy B (T2)	46.9	Pass
						Guy C (T2)	65.4	Pass
						Top Guy Pull-Off (T2)	73.4	Pass
						Torque Arm Top (T2)	30.2	Pass
						Torque Arm Bottom (T2)	34.5	Pass
						Bolt Checks	22.0	Pass
						RATING =	**82.2**	**Pass**

RAN Template:	A&L Template:
67D5A998C 6160 (GSM only)	67D5998C_1xAIR+1QP+1OP (GSM only)

CTHA813A_Sprint Retain_1_draft

Print Name: Standard
PORs: New Build_Sprint Keep

Section 1 - Site Information

Site ID: CTHA813A
Status: Draft
Version: 1
Project Type: Sprint Retain
Approved: Not Approved
Approved By: Not Approved
Last Modified: 3/30/2021 12:36:05 PM
Last Modified By: venu.jaini@t-mobile.com

Site Name: CTHA813A
Site Class: Guyed Tower
Site Type: Structure Non Building
Plan Year: 2021
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Not Specified

Latitude: 41.86070000
Longitude: -72.40341388
Address: 497 Old Post Rd
City, State: Tolland, CT
Region: NORTHEAST

RAN Template: 67D5A998C 6160 (GSM only)			**AL Template:** 67D5998C_1xAIR+1QP+1OP (GSM only)	
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 0	**TMA Count:** 0	**RRU Count:** 9

Section 2 - Existing Template Images

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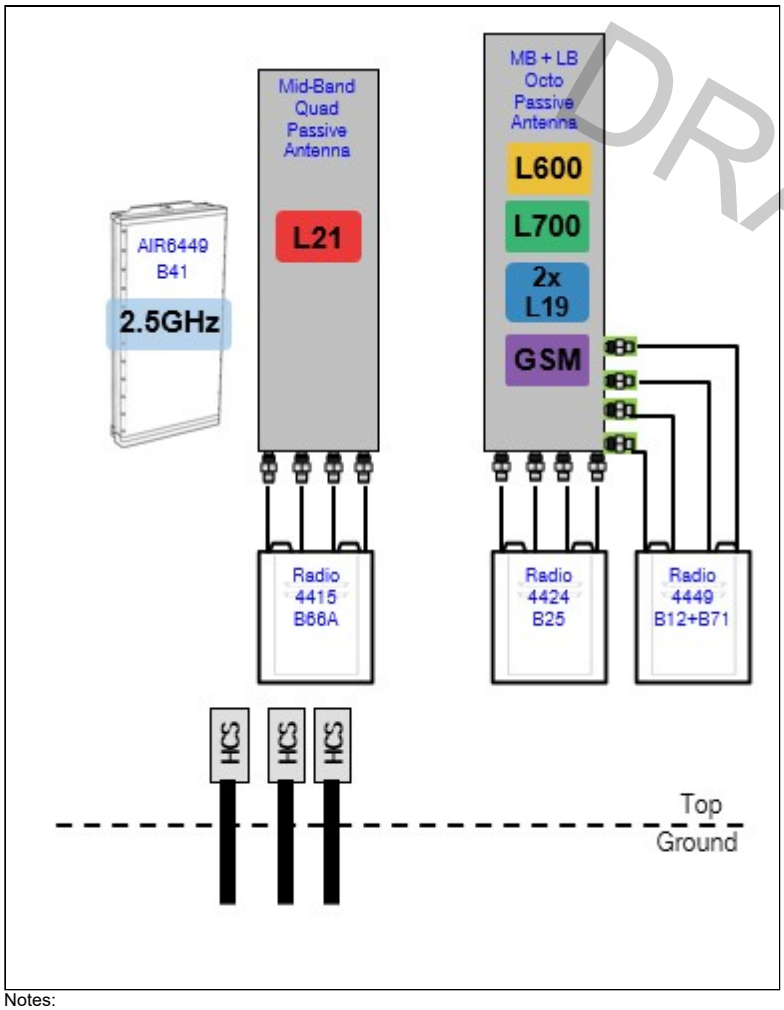
Section 3 - Proposed Template Images

67D5A998C_1xAIR+1xQP+1xOP.jpg



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Notes:

Section 4 - Siteplan Images

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RAN Template:	A&L Template:
67D5A998C 6160 (GSM only)	67D5998C_1xAIR+1QP+1OP (GSM only)

CTHA813A_Sprint Retain_1_draft

Print Name: Standard
PORs: New Build_Sprint Keep

Section 5 - RAN Equipment

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Existing RAN Equipment

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Proposed RAN Equipment

Template: 67D5A998C 6160 (GSM only)

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

RAN Scope of Work:

CT03XC212

RAN Template:	A&L Template:
67D5A998C 6160 (GSM only)	67D5998C_1xAIR+1QP+1OP (GSM only)

CTHA813A_Sprint Retain_1_draft

Print Name: Standard
PORs: New Build_Sprint Keep

Section 6 - A&L Equipment

DRAFT

Existing Template: Custom
Proposed Template: 67D5998C_1xAIR+1QP+1OP (GSM only)

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2				3	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	0		0				0	
M. Tilt								
Height	147		147				147	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100	L2100	L700 L600 N600	L700 L600 N600	L1900 G1900	L1900 G1900	L2500 N2500	L2500 N2500
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt								
Cables	Coax Jumper **(x4)**	SHARED Coax Jumper **(x4)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs								
Diplexers / Combiners								
Radio	Radio 4415 B66A (At Antenna)	SHARED Radio 4415 B66A (At Antenna)	Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4424 B25 (At Antenna)	SHARED Radio 4424 B25 (At Antenna)		
Sector Equipment								

Unconnected Equipment:

Scope of Work:

Reuse antennas if possible.

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

RAN Template:	A&L Template:
67D5A998C 6160 (GSM only)	67D5998C_1xAIR+1QP+1OP (GSM only)

CTHA813A_Sprint Retain_1_draft

Print Name: Standard
PORs: New Build_Sprint Keep

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2				3	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	120		120				120	
M. Tilt								
Height	147		147				147	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100	L2100	L700 L600 N600	L700 L600 N600	L1900 G1900	L1900 G1900	L2500 N2500	L2500 N2500
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt								
Cables	Coax Jumper **(x4)**	SHARED Coax Jumper **(x4)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs								
Diplexers / Combiners								
Radio	Radio 4415 B66A (At Antenna)	SHARED Radio 4415 B66A (At Antenna)	Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4424 B25 (At Antenna)	SHARED Radio 4424 B25 (At Antenna)		
Sector Equipment								

Unconnected Equipment:

Scope of Work:

Reuse antennas if possible.

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

RAN Template:	A&L Template:
67D5A998C 6160 (GSM only)	67D5998C_1xAIR+1QP+1OP (GSM only)

CTHA813A_Sprint Retain_1_draft

Print Name: Standard
PORs: New Build_Sprint Keep

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2				3	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	275		275				275	
M. Tilt								
Height	147		147				147	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100	L2100	L700 L600 N600	L700 L600 N600	L1900 G1900	L1900 G1900	L2500 N2500	L2500 N2500
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt								
Cables	Coax Jumper **(x4)**	SHARED Coax Jumper **(x4)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**		
TMAs								
Diplexers / Combiners								
Radio	Radio 4415 B66A (At Antenna)	SHARED Radio 4415 B66A (At Antenna)	Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4424 B25 (At Antenna)	SHARED Radio 4424 B25 (At Antenna)		
Sector Equipment								

Unconnected Equipment:

Scope of Work:

Reuse antennas if possible.

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

RAN Template:	A&L Template:
67D5A998C 6160 (GSM only)	67D5998C_1xAIR+1QP+1OP (GSM only)

CTHA813A_Sprint Retain_1_draft

Print Name: Standard
PORs: New Build_Sprint Keep

Section 7 - Power Systems Equipment

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Existing Power Systems Equipment

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Proposed Power Systems Equipment

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: CTHA813A

497 Old Post Road
Tolland, Connecticut 06084

June 10, 2021

EBI Project Number: 6221002934

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**21.86%**

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

June 10, 2021

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

Emissions Analysis for Site: CTHA813A

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **497 Old Post Road** in **Tolland, 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 497 Old Post Road in Tolland, 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 APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector A, the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector B, the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 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 147 feet above ground level (AGL).

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20
Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	147 feet	Height (AGL):	147 feet	Height (AGL):	147 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE %:	**0.84%**	Antenna B1 MPE %:	**0.84%**	Antenna C1 MPE %:	**0.84%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
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	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd
Height (AGL):	147 feet	Height (AGL):	147 feet	Height (AGL):	147 feet
Channel Count:	11	Channel Count:	11	Channel Count:	11
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	12,569.87	ERP (W):	12,569.87	ERP (W):	12,569.87
Antenna A2 MPE %:	**3.31%**	Antenna B2 MPE %:	**3.31%**	Antenna C2 MPE %:	**3.31%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
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):	147 feet	Height (AGL):	147 feet	Height (AGL):	147 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 A3 MPE %:	**6.57%**	Antenna B3 MPE %:	**6.57%**	Antenna C3 MPE %:	**6.57%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	10.73%
NE Paging	0.06%
Hamden Cmmcns	0.36%
Conn Radio Rocky Hill	0.53%
Airtouch	0.07%
Verizon	4.58%
AT&T	5.53%
Site Total MPE % :	21.86%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	10.73%
T-Mobile Sector B Total:	10.73%
T-Mobile Sector C Total:	10.73%
Site Total MPE % :	21.86%

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 2100 MHz LTE	2	2334.27	147.0	8.44	2100 MHz LTE	1000	0.84%
T-Mobile 600 MHz LTE	2	591.73	147.0	2.14	600 MHz LTE	400	0.54%
T-Mobile 600 MHz NR	1	1577.94	147.0	2.85	600 MHz NR	400	0.71%
T-Mobile 700 MHz LTE	2	695.22	147.0	2.51	700 MHz LTE	467	0.54%
T-Mobile 1900 MHz GSM	4	1052.26	147.0	7.61	1900 MHz GSM	1000	0.76%
T-Mobile 1900 MHz LTE	2	2104.51	147.0	7.61	1900 MHz LTE	1000	0.76%
T-Mobile 2500 MHz LTE 1C & 2C Traffic	1	11044.63	147.0	19.97	2500 MHz LTE 1C & 2C Traffic	1000	2.00%
T-Mobile 2500 MHz LTE 1C & 2C Broadcast	1	1074.06	147.0	1.94	2500 MHz LTE 1C & 2C Broadcast	1000	0.19%
T-Mobile 2500 MHz NR Traffic	1	22089.26	147.0	39.94	2500 MHz NR Traffic	1000	3.99%
T-Mobile 2500 MHz NR Broadcast	1	2148.13	147.0	3.88	2500 MHz NR Broadcast	1000	0.39%
						Total:	**10.73%**

• 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:	10.73%
Sector B:	10.73%
Sector C:	10.73%
T-Mobile Maximum MPE % (Sector A):	10.73%
Site Total:	21.86%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **21.86%** 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.