Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

July 9, 2019

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

RE: Notice of Exempt Modification
100' W of 50 South Street (6-6 Parcel 73, Pole 23571), Middlebury, CT 06762
Latitude: 41.51352000000
Longitude: -73.12426000000
T-Mobile Site#: CT11052E – L600

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 120-foot level of the existing 160-foot lattice tower off South Street in Middlebury, CT. The 160-foot lattice tower and property are owned by the State of Connecticut State Police. T-Mobile now intends to remove the six (6) existing antennas and add three (3) new 600/700/1900/2100 MHz antennas. The new antennas will be installed at the same 120-foot level of the tower. The modification includes mount modifications to accommodate the proposed equipment, as detailed on the enclosed mount analysis.

Planned Modifications:
Tower:
Remove
(3) LNX-6515DS-A1M Antennas
(3) TMAs
(12) 1-5/8" coax

Remove and Replace:
(3) EMS RR90-17-00DP (REMOVE) - (3) RFS APXVAARR24_43 Antenna 600/700/1900/2100 (REPLACE)

Install New:
(3) Radio 4449 B71+B12 RRHs
(3) Radio 4415 B25 RRHs
(3) Radio 4415 B66a RRHs
(2) 1-3/8" Hybrid Cables
Site Pro Sliding Pipe / RRU Dual Swivel Mounts

Existing to Remain: N/A

Ground:
Install New: Equipment inside existing 6201 cabinet

This tower facility was approved by the Siting Council on April 1, 1991 through an exemption modification by the State Police. T-Mobile has been approved for subsequent exempt modifications by the Council. This proposed modification does not violate any previous approvals.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to First Selectman -Edward B. St. John, Elected Official, and Curtis S. Bosco, Zoning Enforcement Officer for the Town of Middlebury.

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,

Kyle Richers
Transcend Wireless
Cell: 908-447-4716
Email: krichers@transcendwireless.com

Attachments
cc: Edward B. St. John - Town of Middlebury First Selectman
Curtis S. Bosco – Town of Middlebury Zoning Enforcement Officer
Connecticut State Police (Brian Benito) – Tower and Property Owner

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Tuesday, July 9, 2019 3:40 PM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CT11052E CSC EO

You have a package coming.

Scheduled Delivery Date: Wednesday, 07/10/2019

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424292212232
Ship To:	Edward B. St. John Town of Middlebury 1212 Whittemore Road MIDDLEBURY, CT 067622425 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	07/10/2019
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CT11052E CSC EO

Download the UPS mobile app

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Tuesday, July 9, 2019 3:44 PM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CT11052E CSC ZO

You have a package coming.

Scheduled Delivery Date: Wednesday, 07/10/2019

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424292110244
Ship To:	Curt Bosco Town of Middlebury 1212 Whittemore Road MIDDLEBURY, CT 067622425 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	07/10/2019
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CT11052E CSC ZO

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Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Tuesday, July 9, 2019 3:47 PM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CT11052E CSC Owner

You have a package coming.

Scheduled Delivery Date: Wednesday, 07/10/2019

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424291212252
Ship To:	Brian Benito Connecticut State Police 1111 Country Club Road MIDDLETOWN, CT 064572389 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	07/10/2019
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CT11052E CSC Owner

Download the UPS mobile app

84 I

Location	84 I	**Mblu**	6-06/ / 073/ /
Acct#	I8400000	**Owner**	CONN STATE OF
Assessment	$264,600	**Appraisal**	$378,000
PID	3713	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$378,000	$0	$378,000
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$264,600	$0	$264,600

Owner of Record

Owner	CONN STATE OF	**Sale Price**	$0
Co-Owner	DEPT OF PUBLIC SAFETY	**Certificate**	
Address	PO BOX 2794 MIDDLETOWN, CT 06457	**Book & Page**	
		Sale Date	
		Instrument	XX

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
CONN STATE OF	$0			XX	

Building Information

Building 1 : Section 1

Year Built:	
Living Area:	0
Replacement Cost:	$0
Building Percent Good:	
Replacement Cost Less Depreciation:	$0

Building Attributes	
Field	**Description**

Style	Vacant Land
Model	
Grade	
Stories	
Occupancy	
Exterior Wall A	
Exterior Wall B	
Roof Structure	
Roof Cover	
Interior Wall A	
Interior Wall B	
Interior Flr A	
Interior Flr B	
Heat Fuel	
Heat Type	
AC Type	
Total Bedrooms	
Full Bathrooms	
Half Bathrooms	
Total Xtra Fixtrs	
Total Rooms	
Bath Style	
Kitchen Style	
Fireplaces	
Whirlpool	
Fin Basement	
Fin Bsmt Quality	
Bsmt Garages	

Building Photo

(http://images.vgsi.com/photos/MiddleburyCTPhotos//default.jpg

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	913
Description	State Land Res
Zone	
Neighborhood	

Land Line Valuation

Size (Acres)	0
Frontage	0
Depth	0
Assessed Value	$0

Alt Land Appr Category No

Appraised Value $0

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
TWR	Cell Tower			1 Units	$378,000	1

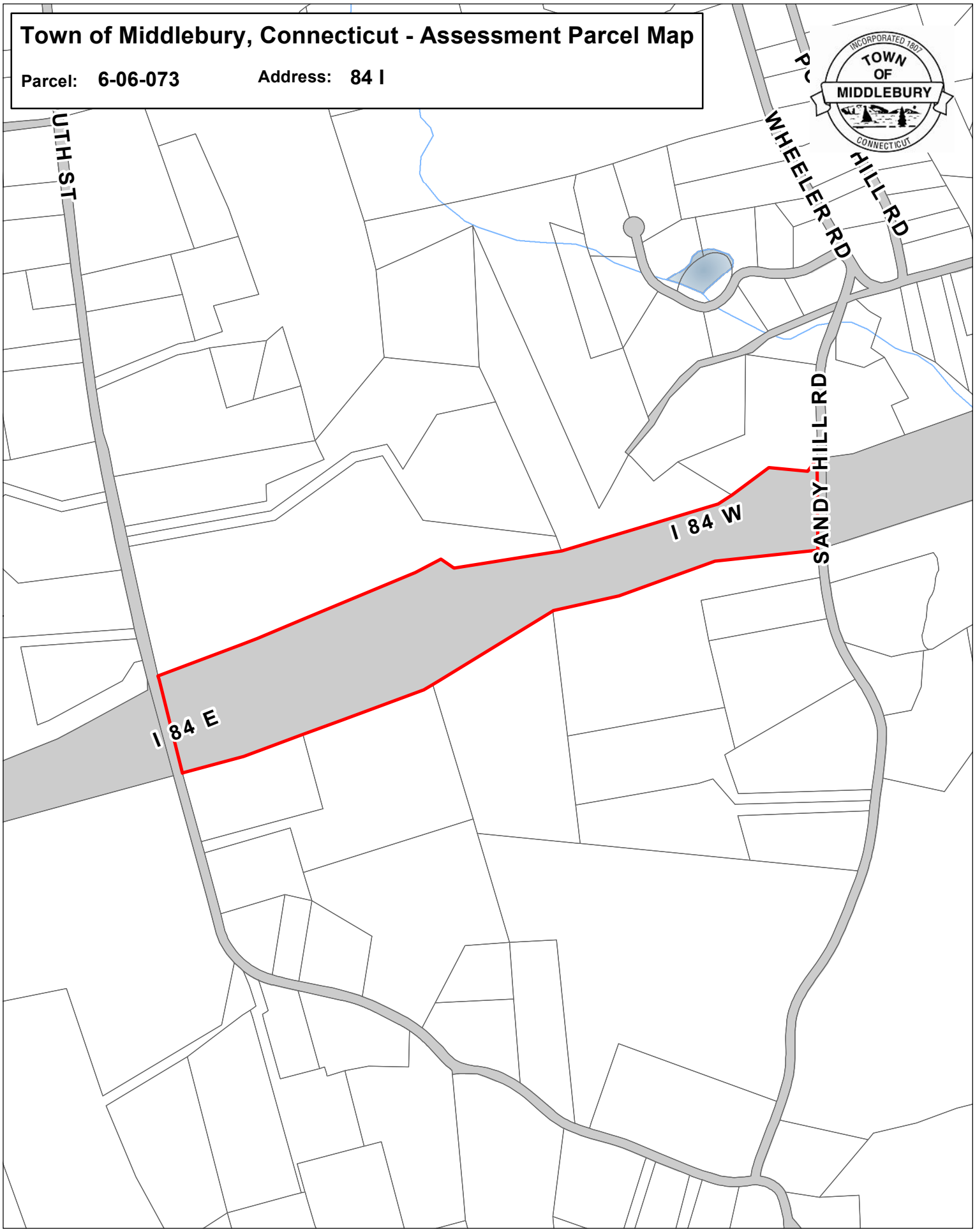
Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$0	$0	$0
2013	$0	$0	$0
2012	$0	$0	$0

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$0	$0	$0
2013	$0	$0	$0
2012	$0	$0	$0

Town of Middlebury, Connecticut - Assessment Parcel Map

Parcel: 6-06-073 **Address:** 84 I



Map Produced December 2014

Approximate Scale: 1 inch = 600 feet

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

MIDDLEBURY I84 X16&17_1

SITE ID: CT11052E

100' W OF 50 SOUTH ST, MAP 6-6 PARCEL 73, POLE 23571

MIDDLEBURY, CT 06762

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." 2018 CONNECTICUT FIRE SAFETY CODE, 2017 NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER 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 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 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.
19. CONTRACTOR SHALL COMPLY WITH OWNERS 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

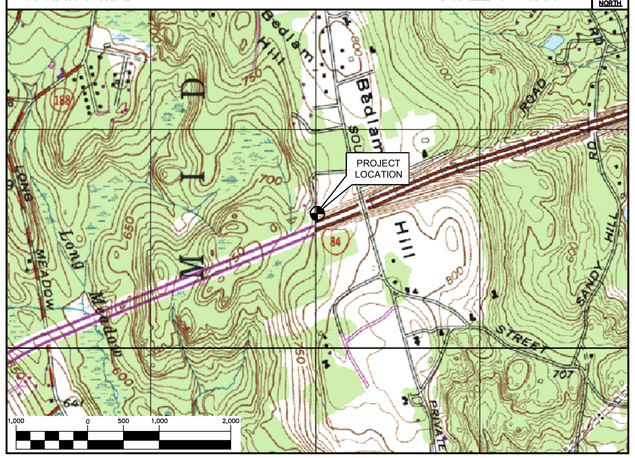
FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

TO: 100' W OF 50 SOUTH ST, MAP 6-6
PARCEL 73, POLE 23571
MIDDLEBURY, CT 06762

1.	HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD.	0.30 MI.
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	0.14 MI.
3.	TAKE THE 1ST RIGHT ONTO BLUE HILLS AVENUE EXT/CT-187. CONTINUE TO FOLLOW CT-187.	1.89 MI.
4.	TURN LEFT ONTO CT-305/OLD WINDSOR RD. CONTINUE TO FOLLOW CT-305.	2.33 MI.
5.	MERGE ONTO I-91 S TOWARD HARTFORD.	5.66 MI.
6.	MERGE ONTO I-84 W VIA EXIT 32A TOWARD WATERBURY.	13.29 MI.
7.	KEEP LEFT TO TAKE I-84 W TOWARD WATERBURY.	22.36 MI.
8.	FOLLOW THE HIGHWAY UNTIL YOU SEE THE SITE ON YOUR RIGHT.	

VICINITY MAP

SCALE: 1" = 1000'



T-MOBILE RF CONFIGURATION

67D95F_1OP

PROJECT SUMMARY

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

A. REMOVE (6) EXISTING ANTENNAS, TYP. (2) PER SECTOR
B. INSTALL (3) NEW RFS ANTENNAS, TYP. (1) PER SECTOR
C. INSTALL (9) NEW RRUS, TYP. (3) PER SECTOR
D. REMOVE EXISTING COAX CABLES
E. REMOVE (3) EXISTING RRUS, TYP. (1) PER SECTOR
F. INSTALL (6) DUAL SWIVEL MOUNTS, TYP. (2) PER SECTOR
G. INSTALL (3) STIFF ARM KITS, TYP. (1) PER SECTOR
H. REPLACE (1) DUS41 WITH (1) BB6630 FOR LTE
I. INSTALL (1) BB6630 FOR FUTURE 5G N600
J. INSTALL (2) 6x12 HCS
K. REMOVE (3) TMAS, TYP. (1) PER SECTOR

PROJECT INFORMATION

SITE NAME:	MIDDLEBURY i84 X16&17_1
SITE ID:	CT11052E
SITE ADDRESS:	100' W OF 50 SOUTH ST, MAP 6-6 PARCEL 73, POLE 23571 MIDDLEBURY, CT 06762
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592-8291
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-30'-48.67" N LONGITUDE: 73°-07'-27.52" W GROUND ELEVATION: 756'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS AND SITE NOTES	0
C-1	SITE LOCATION PLAN	0
C-2	COMPOUND PLAN AND TOWER ELEVATION	0
C-3	ANTENNA CONFIG. & ELEVATION	0
E-1	TYPICAL ELECTRICAL DETAILS	0
E-2	DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/03/19	RTS	CAG	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT · DANIEL J. LAU · 29167 · REGISTERED PROFESSIONAL ENGINEER

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
WIRELESS COMMUNICATIONS FACILITY
MIDDLEBURY i84 X16&17_1
SITE ID: CT11052E
100' W OF 50 SOUTH ST, MAP 6-6 PARCEL 73, POLE 23571
MIDDLEBURY, CT 06762

DATE: 04/09/19
SCALE: AS NOTED
JOB NO. 19027.03

TITLE SHEET

T-1

Sheet No. 1 of 7

DESIGN BASIS:

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

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 95-115 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC APPENDIX N)
- NOMINAL DESIGN SPEED (TOWER): 93 MPH (Vasd) (EXPOSURE C/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10) PER 2015 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. 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.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. 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. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. 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.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

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.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

MIDDLEBURY i84 X16&17_1

SITE ID: CT11052E

100' W OF 50 SOUTH ST, MAP 6-6 PARCEL 73, POLE 23571

MIDDLEBURY, CT 06762

DATE:	04/09/19
SCALE:	AS NOTED
JOB NO.	19027.03

DESIGN BASIS AND SITE NOTES

N-1

1 / C-1 SITE LOCATION PLAN
SCALE: 1" = 300'

APPROX. NORTH

GRAPHIC SCALE
300 0 150 300 600 1200
(IN FEET)
1 inch = 300 ft.

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MIDDLEBURY, CT 06762

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JOB NO. 19027.03

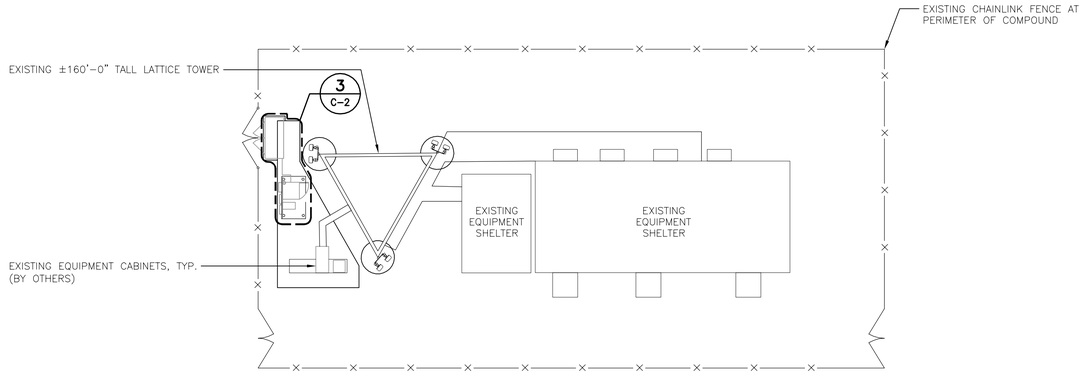
SITE LOCATION PLAN

C-1

Sheet No. 3 of 7

T–MOBILE RAN TEMPLATE:
67D95F

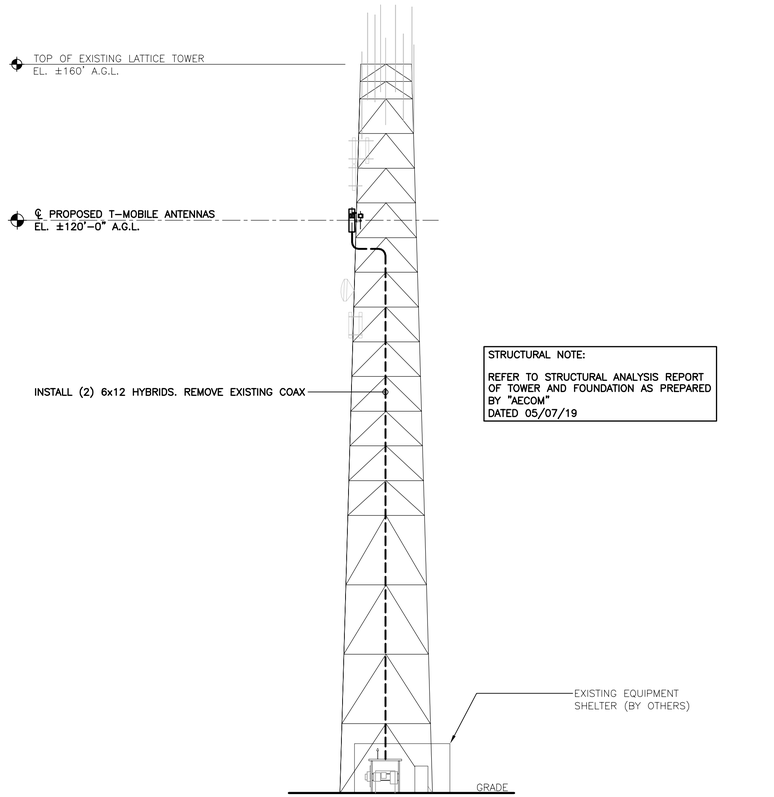
T–MOBILE RF CONFIGURATION:
67D95F_10P



1 C–2 **COMPOUND PLAN**
SCALE: 1" = 12'

TRUE NORTH

GRAPHIC SCALE
12 0 6 12 24 48
(IN FEET)
1 inch = 12 ft.



2 C–2 **TOWER ELEVATION – PROPOSED**
SCALE: 1" = 30'–0"

GRAPHIC SCALE
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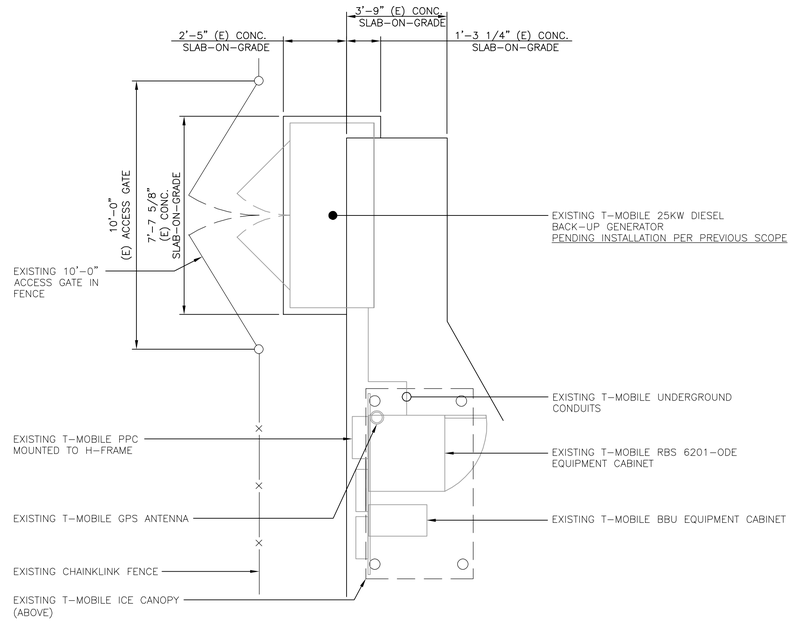
(IN FEET)
1 inch = 30 ft.



3 C–2 **EQUIPMENT PLAN – PROPOSED**
SCALE: 3/8" = 1'

APPROXIMATE NORTH

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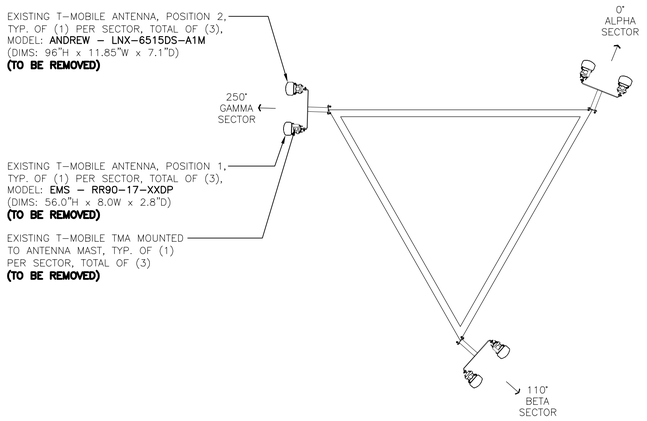
MIDDLEBURY i84 X16&17_1
SITE ID: CT11052E
100' W OF 50 SOUTH ST, MAP 6–6 PARCEL 73, POLE 23571
MIDDLEBURY, CT 06762

DATE: 04/09/19
SCALE: AS NOTED
JOB NO. 19027.03

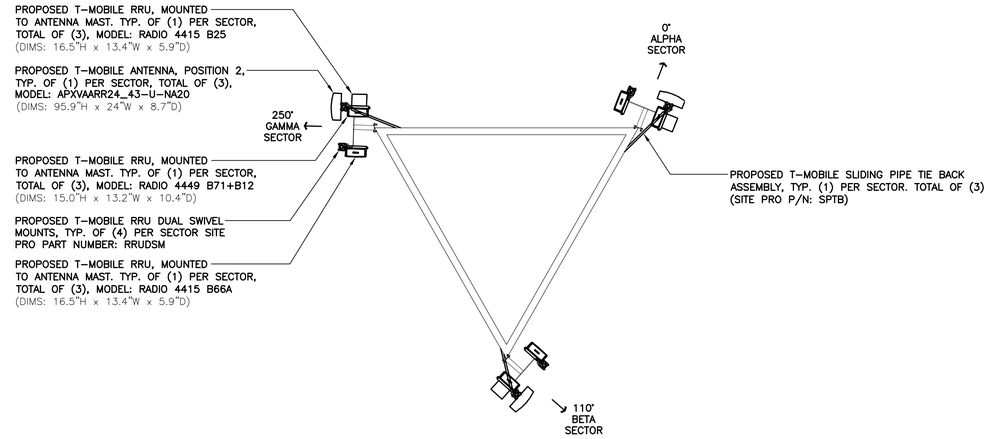
COMPOUND PLAN & TOWER ELEVATION

C-2

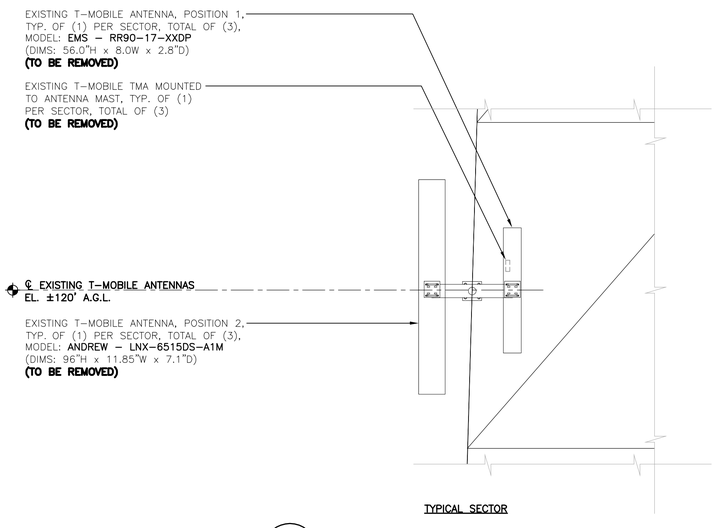
Sheet No. 4 of 7



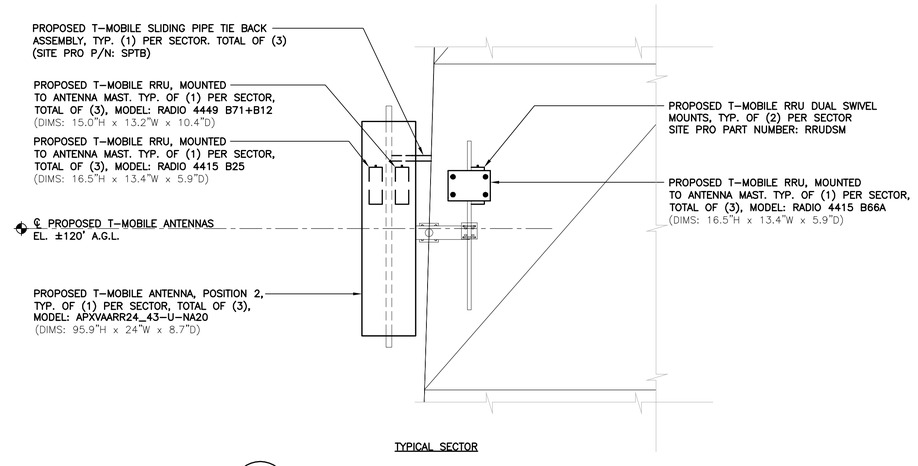
1 / C-3 **EXISTING ANTENNA MOUNTING CONFIGURATION**
SCALE: 3/16" = 1' — 120'-0" ELEVATION



2 / C-3 **PROPOSED ANTENNA MOUNTING CONFIGURATION**
SCALE: 3/16" = 1' — 120'-0" ELEVATION



3 / C-3 **ANTENNA ELEVATION - EXISTING**
SCALE: 3/8" = 1'



4 / C-3 **ANTENNA ELEVATION - PROPOSED**
SCALE: 3/8" = 1'

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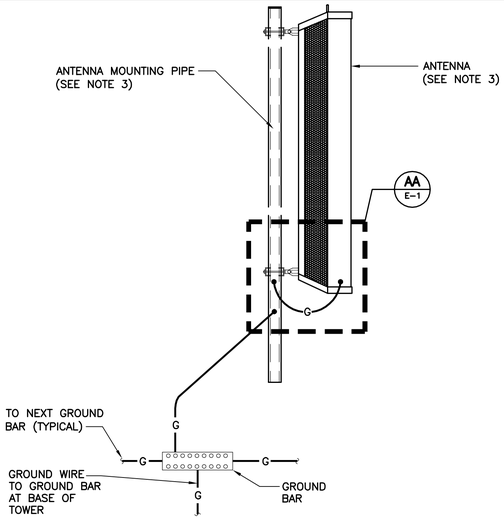
DATE: 04/09/19
SCALE: AS NOTED
JOB NO. 19027.03

ANTENNA CONFIG. & ELEVATION

C-3

Sheet No. 4 of 7

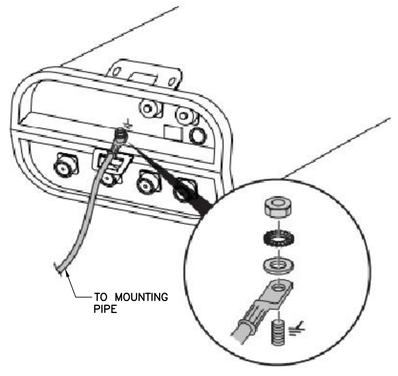


NOTES:

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.

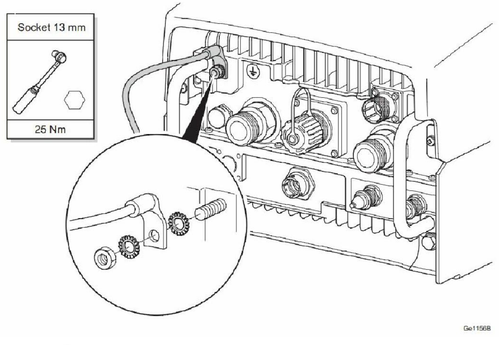
1 / E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE



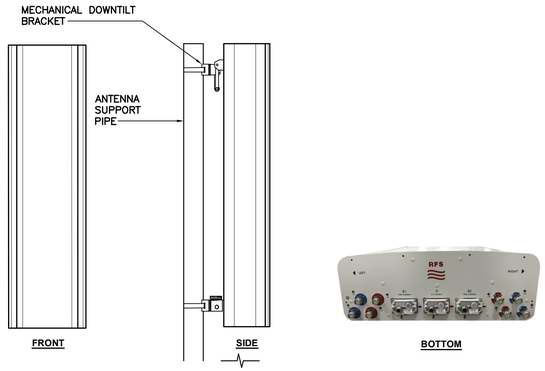
AA / E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE



2 / E-1 TYPICAL RRU GROUNDING DETAIL

SCALE: NOT TO SCALE



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APXVAARR24_43-U-NA20	96.0"H x 24"W x 8.7"D	118-LBS

3 / E-1 PROPOSED ANTENNAS DETAIL

SCALE: NOT TO SCALE

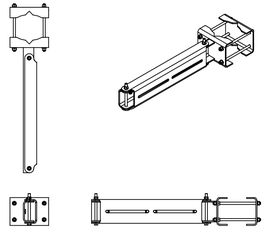
ISOMETRIC VIEW

RRH (REMOTE RADIO HEAD)		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: RRU 4449 B71+B12	14.9"H x 13.2"W x 9.3"D	±74 LBS
MAKE: ERICSSON MODEL: RRU 4415 B25	16.5"H x 13.4"W x 5.9"D	±46 LBS
MAKE: ERICSSON MODEL: RRU 4415 B66A	16.5"H x 13.4"W x 5.9"D	±46 LBS

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. REFER TO RRU MANUFACTURER FOR REQUIRED INSTALLATION CLEARANCE REQUIREMENTS.

4 / E-1 REMOTE RADIO HEAD (RRH) DETAIL (TYP)

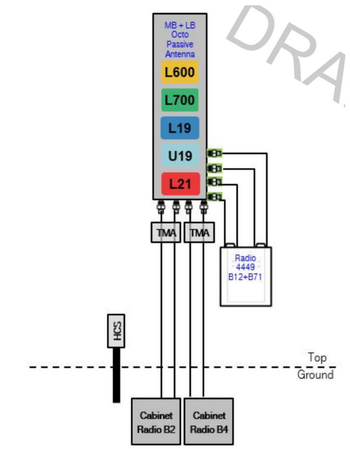
SCALE: NOT TO SCALE



RRU DUAL SWIVEL MOUNT		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: SITE PRO 1 PART NO.: RRUDSM	27.75"L x 6.5"W x 4.7"D	39.4 LBS.

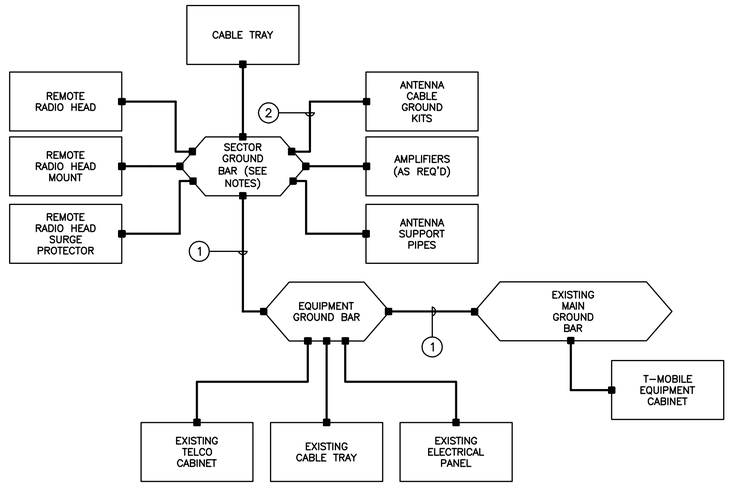
5 / E-1 RRH DUAL SWIVEL MOUNT DETAIL

SCALE: NOT TO SCALE



6 / E-1 PROPOSED PLUMBING DIAGRAM

SCALE: NONE



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.

7 / E-1 TYPICAL GROUNDING SCHEMATIC DETAIL

SCALE: NOT TO SCALE

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T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

MIDDLEBURY I84 X16&17_1

SITE ID: CT11052E

100' W OF 50 SOUTH ST, MAP 6-6 PARCEL 73, POLE 23571

MIDDLEBURY, CT 06762

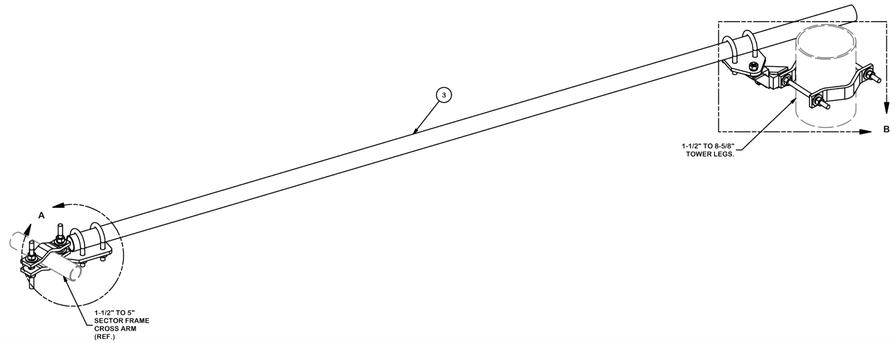
DATE:	04/09/19
SCALE:	AS NOTED
JOB NO.	19027.03

TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 6 of 7

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	2	X-SPTB	SLIDING PIPE TIE BACK PLATE	5 1/2 in	5.87	11.74
2	2	X-TBCA	TIE BACK CLIP ANGLE		2.08	4.16
3	1	P2126	2-3/8" OD X 126" SCH 40 GALVANIZED PIPE	126 in	40.75	40.75
4	2	MCP	CLAMP HALF 1/2" THICK, 11-5/8" LONG	12 1/16 in	3.59	7.19
5	4	DCP	1/2" THICK, 5-3/4" CNTER TO CENTER CLAMP HALF	8 1/8 in	2.42	9.68
6	2	GS8R-12	5/8" x 12" THREADED ROD (HDG.)		1.05	2.09
7	4	GS8R-8	5/8" x 8" THREADED ROD (HDG.)		0.70	2.79
8	4	X-UBS258	5/8" X 2-5/8" X 4-1/2" X 2" U-BOLT (HDG.)		1.00	4.00
9	4	GS804	5/8" x 4" HDG HEX BOLT GR5		0.44	1.78
10	2	GS802	5/8" x 2" HDG HEX BOLT GR5		0.27	0.54
11	10	GS8FW	5/8" HDG USS FLATWASHER	1/8 in	0.07	0.70
12	18	GS8LW	5/8" HDG LOCKWASHER		0.03	0.47
13	20	GS8NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	2.60
					TOTAL WT. #	88.49



TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION: SLIDING PIPE TIE BACK ASSEMBLY

SITE PRO 1 — Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Rancho Cucamonga, CA; Plymouth, IN; Salem, OR; Dallas, TX
A valmont COMPANY

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	
	CEK 10/19/2016		SPTB	1 OF 3 SHEETS

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 11/17/2016	SPTB

2 / E-2 **SITE PRO DETAIL**
SCALE: NOT TO SCALE

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T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

MIDDLEBURY i84 X16 &17_1

SITE ID: CT11052E

100' W OF 50 SOUTH ST, MAP 6-6 PARCEL 73, POLE 23571
MIDDLEBURY, CT 06762

DATE: 04/09/19
SCALE: AS NOTED
JOB NO. 19027.03

TYPICAL ELECTRICAL DETAILS

E-2

Sheet No. 7 of 7

AECOM

Submitted to
Transcend Wireless
35 Griffin Road South
Bloomfield, CT 06002

Submitted by
AECOM
500 Enterprise Drive,
Suite 3B
Rocky Hill, CT 06067
May 7, 2019

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 160' SELF SUPPORTING LATTICE TOWER AND FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT

T-Mobile

T-Mobile Site ID : CT11052E
T-Mobile Site Name: Middlebury I84 x 16&17_1
Site Address: Intersection of I-84 and South Street
Middlebury, Connecticut

60604310
TWM-014

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 160' self-supporting lattice tower located west of the intersection of I-84 and South Street in Middlebury, Connecticut.

The structural analysis was conducted in accordance with the 2018 Connecticut State Building Code which includes the TIA-222-G[1] Standard, 2015 International Building Code, the 2018 Connecticut State Building Code Amendments, the AISC[2] Load Resistance Factor Design (LRFD), the ASCE 7[3] design Code, and the Connecticut State Police Requirements which include the TIA/EIA-222-F[4].

The antenna loading considered in the analysis consists of all the existing and proposed antennas, transmission lines and ancillary items as outlined in the Introduction Section of this Report.

The proposed T-Mobile antenna installation is listed below:

Proposed Appurtenances	Carrier	Antenna Center Elevation
Remove: **(3) EMS RR90-17-XXDP Panel Antennas** **(3) Andrew LNX-6515DS-A1M Panel Antennas** **(3) Smart Bias-T Units** **(3) Generic TMA Units** **(12) 1-5/8" Coaxial Cables**	**T-Mobile (existing)**	**@ 120'**
Install: **(3) RFS APXVAARR24_43-U-NA20 Panel Antennas** **(3) Ericsson Radio 4449 B71 + B12 RRH Units** **(3) Ericsson Radio 4415 B25 RRH Units** **(3) Ericsson Radio 4449 B66A RRH Units** **(2) Ericsson 6x12 HCS Hybrid Cables (analysis applied 4 Gage cables (AWG))**	**T-Mobile (Proposed)**	**@ 120'**

The results of an initial analysis indicate that:

1. The existing steel tower structure IS considered structurally adequate for the proposed antenna loading with the wind classification specified herein.
2. The existing tower anchor bolts ARE considered structurally adequate for the proposed antenna loading with the wind classification specified herein.
3. The existing foundation IS considered structurally adequate for the proposed antenna loading with the wind classification specified herein.
4. **The existing tower's sway (deflection) is 0.5285 degrees, and the existing tower's twist (rotation) is 0.2498 degrees. These figures combined ARE NOT within the Connecticut State Police requirement of 0.75 degrees for combined twist (rotation) and sway (deflection) with the load classification specified herein.**
5. The controlling structural capacity for all tower and foundation components for the proposed antenna loading is **92.7%**

1. TIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version G)

2. AISC = American Institute of Steel Construction (14th Edition)

3. ASCE 7 = American Society of Civil Engineers Standard 7 (2010 Edition)

4. TIA/EIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version F)

1. EXECUTIVE SUMMARY *(continued)*

This analysis is based on:

1) The tower structure's theoretical capacity not including any assessment of the condition of the tower.

2) Tower geometry, member sizes and foundation taken from Tower and Foundation reports prepared by Stainless, Inc. project number 358807 dated December 14, 1993.

3) Soil information taken from geotechnical report prepared by Dr. Clarence Welti, P.E., P.C., dated December 17, 2012.

4) Previous structural analysis and modification performed by AECOM on behalf of Verizon Wireless, project number 60404004, signed and sealed on July 10, 2015.

5) Previous structural analysis performed by AECOM on behalf of Northwest CT Public Safety Communication Center, project number 60492507, signed and sealed on April 26, 2016.

6) Tower Mapping and Inventory of tower performed by D & K Nationwide Communications, Inc., dated March 27, 2016.

7) Previous structural analysis and evaluation performed by AECOM on behalf of Pyramid Network Services, LLC, project number 60509756.21, signed and sealed on February 19, 2017.

8) Previous structural analysis and modification performed by AECOM on behalf of AT&T and Sprint project number (60567641 / EMP-006; 60567639 / ASM-006), signed and sealed on April 9, 2018.

9) Previous structural analysis and evaluation performed by AECOM on behalf of Sprint, project number 60558618 / ASM-001, signed and sealed on February 9, 2018.

10) Proposed T-Mobile antenna inventory from Radio Frequency Data Sheet (RFDS), dated April 25, 2019, obtained via e-mail dated May 1, 2019.

11) Antenna Mount frame capacity analysis performed by Centek Engineering, on behalf of T-Mobile, project 19027.03, signed and sealed on May 1, 2019.

12) Coax cable orientation as specified in section 6 of this report.

13) Antenna inventory as specified in Sections 2 and 6 of this report

1. EXECUTIVE SUMMARY *(continued)*

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the antenna, cabling and mount configuration used, as well as the physical condition of the tower members, connections and foundations. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

AECOM,

Richard A. Sambor, P.E.
Senior Structural Engineer

RAS/mcd
cc: IA, CF/Book – AECOM

2. INTRODUCTION

The subject tower is located west of the intersection of I-84 and South Street in Middlebury, Connecticut. The structure is a self-supporting three-legged 160' steel tapered lattice tower manufactured by Stainless Incorporated.

The structural analysis was conducted in accordance with the following:

- TIA-222-G Standard for Standard for a wind velocity of range of 95 mph to 115 mph (3-second gust) and 50 mph (3-second gust) concurrent with 0.75" ice thickness, considered to increase in thickness with height
- 2015 International Building Code with 2018 Connecticut State Building Code Amendments for a wind speed of 101 mph (3-second gust)
- 2010 AISC Load Resistance Factor Design (LRFD)
- 2010 ASCE 7 Minimum Design Loads for Buildings and Other Structures for the ice thickness referenced in the TIA-222-G Standard
- Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) and 90 mph (fastest mile) concurrent with 0.5" ice. Twist (rotation) and sway (deflection) were determined in accordance with Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) concurrent with 0.5" ice, analyzed under the TIA/EIA-222-F design Standard.

The inventory together with the proposed T-Mobile antenna arrangement is summarized in the table below:

Antenna Type	***Carrier***	***Mount***	***Centerline Elevation***	***Cable***
4' Lightning Rod	D&K – 33 (existing)	Pipe mount above	177'	---
16' Lightning Rod Mounting Pipe	(existing)	None	168'	---
Tower Light	(existing)	None	160'-6"	---
(1) Sinclair SC479-HF1LDF(D00-E6085) Omni Antenna	CSP (Existing)	*Shared with Below Mount*	160'	(1) 1-5/8" AVA Cable
(1) Bird 432E-83I-01 TTA Junction Box (Mounted to Leg)	CSP (Existing)	(1) 6' Side-arm Mount attached to Leg (PSA6)	160'	(1) 1-5/8" AVA Cable (1) 1/2" Coax Cable
(1) Sinclair SC479-HF1LDF(D00I-E6085) (Inverted) Omni Antenna	CSP (Existing)	*Shared with Above Mount*	160'	(1) Jumper Cable from above TTA Unit
(1) 12' Omni Antenna	D&K – 29 (existing)	*Mount Shared with D&K – 21 (below)*	159'	(1) 1-5/8" coax cable
(1) Junction Box	D&K – 30 CSP (existing)	Face Mounted	158'	(1) 1/2" coax cable
(1) Junction Box	D&K – 25 CSP (existing)	*Mount shared with D&K – 18 (below)*	158'	(2) 3/8" coax cables (1) 1/2" coax cable
(1) Sinclair SC479-HF1LDF(D00I-E6085) (Inverted) Omni Antenna	CSP (Existing)	*Mount Shared with 6' Side-arm (PSA6) (above)*	157.5'	(1) 1/2" Jumper from TTA from Above CSP TTA unit @ 160'
(1) 8-Bay 20' Dipole Antenna	D&K – 28 FBI – 3 (existing)	*Mount Shared with D&K – 30 (above)*	157'	(1) 7/8" coax cable

Antenna Type	*Carrier*	*Mount*	*Centerline Elevation*	*Cable*
(1) OGT9-806 Omni*	D&K – 26 CSP-8 (existing)	*Mount Shared with D&K – 19 (below)*	157’	(1) 1-5/8” coax cable*
(1) 4-Bay 20’ Dipole Antenna	D&K – 27 ATF – 2 (existing)	*Mount Shared with D&K – 22 (below)*	155’	(1) 7/8” coax cable
(1) Raycap Distribution Unit (Squid)	D&K – 23 (existing)	1’ Standoff Mounted to Leg	145’	(1) 1-1/4” coax cable
(1) (Inverted) OGT9-806 Omni Antenna *	D&K – 21 CSP-11 (existing)	(2) 8’ Stiff-Arm Mounts	141.3333’	(1) 1-5/8” coax cable
(1) (inverted) Omni	D&K – 22 (existing)	(2) 8’ Stiff-Arm Mounts	141’	(1) 1-5/8” coax cable
(1) (inverted) Omni	D&K – 18 (existing)	(2) 8’ Stiff-Arm Mounts	141’	(1) 1-5/8” coax cable
(1) Radiowaves HD2-4.7 (2 foot dish)	Northwest CT Public Safety (existing)	Mounted to Face	140’	(2) 7/8” AVA5-50FX Heliax Andrew Virtual Air Coaxial Cables
(1) (inverted) Omni	D&K – 20 (existing)	*Shared with below Mount*	139.5’	(1) 1-5/8” coax cable
(1) (inverted) Omni	D&K – 19 (existing)	(1) 10’ Stand-off Arm	139.5’	(1) 1-5/8” coax cable
(3) Powerwave 7770 (2) SBNH-1D6565C (1 A, 1 B) (1) KMW AM-X-CD-16-65-00T (1 C) (2) CCI TPA-65R-LCUUUU-H8 Panels (1 A, 1 B) (1) Quintel QS66512-3 Panel (1 C) (3) A2 Module Units (3) TT19-08BP111-001 Twin TMA Units (3) LGP21401 Diplexers (3) RRUS-32 RRH Units (3) RRUS-12 RRH Units (3) RRUS-11 RRH Units (2) Surge Suppressor	AT&T (existing)	(3) T-Frames	140’	(12) 1 1/4” coax cable (1) Fiber Optic Cable (2) DC cables ((1) 3” Flex Conduit with 1 Fiber & 2 DC Cables)
(1) Celwave PD1142	D&K – 11 DOT – 4 (existing)	(2) 8’ Stiff-Arm Mounts	120’	(1) 7/8” coax cable
(3) RFS APXVAARR24_43-U-NA20 Panels (3) Ericsson Radio 4449 B71 + B12 RRH Units (3) Ericsson Radio 4415 B25 RRH Units (3) Ericsson Radio 4449 B66A RRH Units	**T-Mobile (Proposed)**	***Shared with Below Mount***	**120’**	**(2) Ericsson 6x12 HCS Hybrid Cables (analysis applied 4 Gage cables (AWG))**

Antenna Type	*Carrier*	*Mount*	*Centerline Elevation*	*Cable*
------	T-Mobile (existing)	(3) Dual Standoff Arm for 2 antenna pipes (SitePro1 # DSM2) w/ (3) Horizontal Sector Stabilizer units (SitePro1 # SFS-H)	120’	-----
(2) 6’ Dishes w/ Ice Shields	D&K – 5 & 6 CSP – 6 & 7 (existing)	(2) Dish Mounts	107’	(2) WEP65 coax cable
(3) RFS APXVSPP-C-20 Antennas (3) DT465B-2XR Panel Antennas (3) 2x50W 800 MHz RRH Units (3) TD-RRH8x20-25 RRH Units (3) Andrew RRH 800 MHz 2x40W (3) Panasonic RRH 1900 MHz 2x40W	Sprint (existing)	(3) Pipe Mounts attached to Tower Existing Pipe Mounts w/ (3) Commscope PM-SU35-48 Mounts	97’	(4) Hybriflex cable (1-1/4” OD)
(1) PD10054	D&K-1 CSP – 5 (existing)	1’ Standoff Mounted to Leg	82’	(1) 7/8” coax cable
(2) SBNHH-1D65B (1A & 1B) 700 MHz and shared with 2100 MHz (AWS)) (2) 700 MHz RRH Units (1A & 1B) 700 MHz and shared with 2100 MHz (AWS) (2) 2100 MHz (AWS) Units (1A & 1B) 700 MHz and shared with 2100 MHz (AWS) (2) SBNHH-1D65B (1A, 1B) 850 MHz and shared with 1900 MHz (PCS) (1) DB-T1-6Z-8AB-0Z Distribution Box	Verizon (existing)	(2) Antenna Mount Frames (Alpha & Beta Sectors)	75’	(1) 1-5/8” Fiber Optic Cable (HB158-1-08U8-S8J18)

NOTES: Antenna ID Numbering and elevations obtained from Tower Mapping and Existing inventory via tower climb performed by D&K Nationwide Communications, Inc. on March 27, 2016.

“*” indicates future decommissioning of CSP antennas

This structural analysis of the communications tower was performed by AECOM for T-Mobile. The purpose of this analysis was to investigate the structural integrity of the existing tower and foundation for existing and proposed antenna loads in compliance with the 2018 Connecticut State Building Code. This analysis was conducted to evaluate stress on the tower and the effect forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with, the TIA-222-G–Structural Standard for Antenna Towers and Antenna Supporting Structures and Antennas, the 2015 International Building Code with 2018 Connecticut State Building Code Amendments and the American Institute of Steel Construction (AISC) Manual of Steel Construction – Load Resistance Factor Design (LRFD)

The structural analysis was conducted using TNX Tower version 8.0.5.0 and used the following conditions for this tower review (following the TIA/EIA-222-G Standard):

- Structure Class 3 – (Essential Communications)
  - NOTE: ASCE 7 and CT State Building Code Applied Risk Category 4 for design wind loads (see below)
- Topographic Category 3 – (Tower location on top of hill – rolling wind conditions considered)
  - Crest Height used for analysis: (approximate elevations listed below)
    - Tower Base Elevation = 770 feet
    - High point (2 mile Radius) = 800 feet (Ref. Bedlam Hill)
    - Low Point (2 mile Radius) = 389 feet (Ref. Johnson School Building)
    - "H" = (Avg. of High/Low) – Base Elevation = 176 feet
- Exposure Class C – (Open Terrain with scattered obstructions)
- Load Conditions:
  - Two load conditions were evaluated as shown which were compared to design stresses according to AISC and TIA-222-G Standard.

Basic Wind Speed:

- TIA-222-G:
  - New Haven County (Wind Speed Range): V = 95 mph - 115 mph (3-second gust) [Annex of TIA/EIA-222-G 2006]
- IBC 2015 w/ 2018 CT State Building Code Amendment:
  - (2015) IBC Section 1609.1.1 – Determination of Wind Loads – Exception 5 "Designs using TIA-222" applies for determination of Design Wind Load obtained as "V.ult" are to be converted to "V.asd" when applying the TIA-222-G design Standard (under Section 1609.3) for Basic Wind Speed.
  - (2018) CT State Building Code Amendment to the IBC Section 1609.3 wind loads are obtained from Appendix N of the State Building Code.
    - **V.asd = 101 mph** (3-Second Gust) Wind Design Parameter for the Town of Middlebury, Connecticut for Risk Category four (IV) for essential communications (Connecticut State Police).

LOAD CONDITION 1 = 101 MPH (3-SECOND GUST) WIND LOAD (WITHOUT ICE) + TOWER DEAD LOAD
Load Condition 2 = 50 mph (3-second gust) Wind Load (with ice) + Ice Load + Tower Dead Load

Ice thickness used for this analysis is **0.75 inch** (assumed to start at the base of the tower) and is considered to increase in thickness with height. The initial ice thickness for design is referenced in the Annex of TIA-222-G and follows the same design criteria as the ASCE 7 Standard.

The below load condition implements the design requirements of the Connecticut State Police for the tower structures deflection limits with the allowable deflection limit of the combination of the tower's sway (deflection) and twist (rotation) under the TIA-222-F design Standard. This design limit required the design combined value of sway (deflection) and twist (rotation) to be under 0.75 degrees following the TIA-222-F design Standard.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS (cont.)

Load Condition 3 = 90 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

Seismic event consideration factors/values for design:

- S.s = 0.191 (2018 CT State Building Code – Location Specific Value)
- S.1 = 0.064 (2018 CT State Building Code – Location Specific Value)
- Site Classification = "D" – from Geotechnical Report
- Seismic Design Category = "C" – (2015 International Building Code)
- F.a = 1.6 (Obtained from TIA-222-G Table 2-12 Considering above conditions)
- F.v = 2.4 (Obtained from TIA-222-G Table 2-13 Considering above conditions)

Strength Limit State Load Combinations (TIA-222-G Section 2.3.2):

The structural analysis herein has considered the following load combinations within the analysis:

1. ***1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.6 Wind load without ice***
2. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Dead weight of ice due to factored ice thickness + 1.0 Concurrent wind load with factored ice thickness + 1.0 Load effects due to temperature
3. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Earthquake Load

NOTE 1: The above **bolded** load combination is considered to create the governing design loads per the results of the analysis.

NOTE 2: The above "Dead Load Guy Assemblies" are not considered as part of the analysis and are considered as a value of zero.

NOTE 3: The "Load effects due to temperature" do not apply for structures that are self-sustaining (from the TIA-222-G Standard)

4. FINDINGS AND EVALUATION

Combined axial and bending stresses on the existing tower structure were evaluated to compare with strength design in accordance with AISC (LRFD). The calculated stresses for the tower structure, anchor bolts and foundation were within the required design strength under the proposed configuration and loading (stated herein). Detailed analysis calculations for the proposed load condition are provided in Section 6 of this report.

The tower sway (deflection) is 0.5285 degrees and the tower twist (rotation) is 0.2498 degrees. These figures ARE NOT within the Connecticut State Police specification of combined 0.75 degrees for sway and twist.

Tower Base Reactions:

Description	Factored Loads (TIA-222-G)
Axial Load (kips)	59
Pier Compression (kips)	428
Pier Uplift (kips)	374
Overall Overturning (kip-ft)	8140
Overall Shear (kips)	101
Shear per Leg (kips)	56

Tower Component Stress vs. Capacity Summary:

Component / (Section No.)	Critical Component Size	Controlling Elevation	Stress (% capacity)	Pass/Fail
Tower Leg (T8)	HSS 6.8750x0.40"	37.5' – 50'	83.8	Pass
Diagonal (T10)	(2)L4x3x3/8 Back to Back Angles	0' – 25'	92.7	Pass
Horizontal (T10)	L4x4x1/2	0' – 25'	86.6	Pass
Top Girt (T8)	L4x4x1/4	37.5' – 50'	87.2	Pass
Redundant Horizontal Bracing (T9)	L2x2x5/16	25' – 37.5'	41.2	Pass
Redundant Diagonal Bracing (T9)	L2x2x5/16	25' – 37.5'	79.2	Pass
Inner Bracing (T7)	L2-1/2x2x3/16	50' – 58.333'	12.6	Pass
Tower connection Bolts	(2) A325X 5/8" Bolts (Horizontal)	25'	86.7	Pass

Foundation Summary:

Component	Required	Computed	% Capacity	Pass/Fail
Anchor Rod Capacity (TIA-222-G – 4.9.9)	Ratio < 1.0	0.899	89.9 %	Pass
Overturning Moment Factor of Safety TIA-222-G Conditions	Resist OT * (0.75) Reduction Factor (TIA-222-G – Section 9.4.1) 11745 Kip*ft	8745 kip*ft	74.5 %	Pass
Bearing Pressure (TIA-222-G Conditions)	6.750 ksf max	2.1024 ksf	32.0 %	Pass
Footing Pad Flexure (Steel Reinforcement)	Required < 53.04 in^2	48.5 in^2	91.4 %	Pass

Structure Rating (Maximum from all components) =	92.7 %	Pass

4. FINDINGS AND EVALUATION (cont.)

Maximum Deformations – Proposed Condition

ANSI/TIA-222-G Section 2.8.2 - Limit State Deformations

1. A rotation of 4 degrees about the vertical axis (twist) or any horizontal axis (sway) of the structure
2. A horizontal displacement (in feet) of 3% of the height of the structure.

Load Case Description	Current		Allowable	
	Sway (degree)	Displacement (Feet)	Sway (degree)	Displacement (Feet)
Service Wind Load	0.1142	0.2143	4.0	4.8

Tower Twist & Sway at Top (Connecticut State Police Requirements - TIA-222-F):

Description	Current	Total	Allowable
Tower Twist (degrees)	0.2498	**0.7783**	0.750
Tower Sway (degrees)	0.5285		

5. CONCLUSIONS

The results of an initial analysis indicate that:

1. The existing steel tower structure IS considered structurally adequate for the proposed antenna loading with the wind classification specified herein.
2. The existing tower anchor bolts ARE considered structurally adequate for the proposed antenna loading with the wind classification specified herein.
3. The existing foundation IS considered structurally adequate for the proposed antenna loading with the wind classification specified herein.
4. **The existing tower's sway (deflection) is 0.5285 degrees, and the existing tower's twist (rotation) is 0.2498 degrees. These figures combined ARE NOT within the Connecticut State Police requirement of 0.75 degrees for combined twist (rotation) and sway (deflection) with the load classification specified herein.**
5. The controlling structural capacity for all tower and foundation components for the proposed antenna loading is **92.7%**

Limitations/Assumptions:

This report is based on the following:

1) Tower inventory as listed in this report.

2) Tower is properly installed and maintained.

3) All members are as specified in the original design documents and are in good condition.

4) All required members are in place.

5) All bolts are in place and are properly tightened.

6) Tower is in plumb condition.

7) All member protective coatings are in good condition.

8) All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.

9) Foundations are in good condition without defects and were properly constructed to support original design loads as specified in the original design documents.

AECOM is not responsible for any modifications completed prior to or hereafter in which AECOM is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

AECOM hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact AECOM. AECOM disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The tower owner shall refer to TIA-222-G Section 14.2 for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. It is also recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

6. DRAWINGS AND DATA

SEISMIC BASE SHEAR ANALYSIS

AECOM

Seismic (Vs) Base Shear Implementing TIA–222-G, IBC 2015 & Connecticut State Building Code of 2018

Calculation of Seismic Base Shear Implementing TIA-222-G, IBC 2015 & & CT State Building Code 2018.

Location: Middlebury, CT -Site Class "D"

$S_{DS} = \frac{2}{3} F_A S_S$, where $S_S = 0.191$ and $F_A = 1.6$ $S_{DS} = \frac{2}{3} F_A S_S = \frac{2}{3} * 1.6 * 0.191 = 0.204$

$S_{D1} = \frac{2}{3} F_V S_1$, where $S_1 = 0.064$ and $F_V = 2.4$ $S_{D1} = \frac{2}{3} F_V S_1 = \frac{2}{3} * 2.4 * 0.064 = 0.102$

TIA-222-G SECTION 2.7 EARTHQUAKE LOADS (PROCEDURES):

1. Importance Factor "I" (tables 2-3 TIA-222-G) = 1.5 (Structure Class 3)

ANSI/TIA-222-G 2.7.7.1 (TOTAL BASE SEISMIC SHEAR (Vs)

W=DL TOWER	=	34.109	Kips
W=Antennas/Mounts	=	10.580	Kips
W=Cables	=	4.852	Kips
		49.541	Kips = WT Total = "W"

$$V_s = \frac{S_{DS} * W * I}{R} = \frac{0.204 * 49.541 kips * 1.5}{3.0} = 5.0532\ kips,$$ where R = 3.0 for Lattice Tower

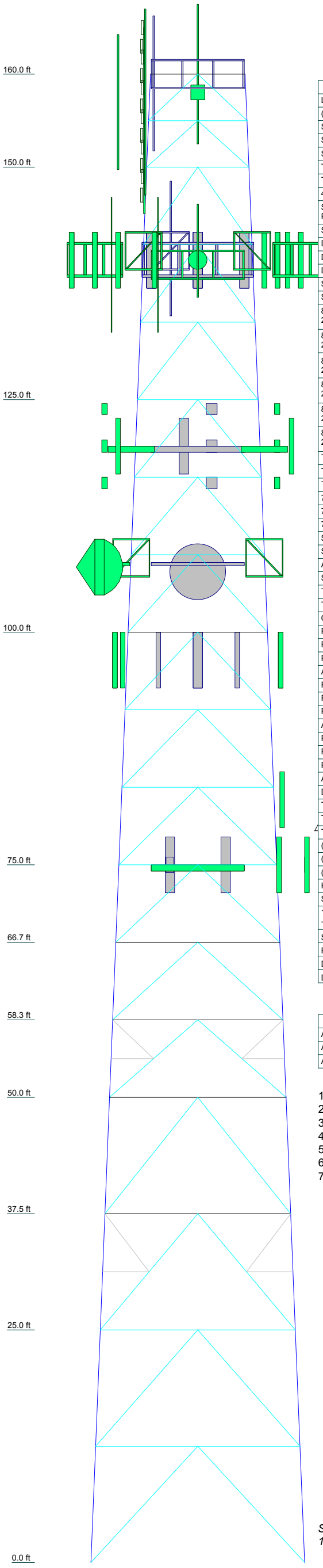
$$V_{S.min} = \frac{0.5 * S_{D1} * W * I}{R} = \frac{0.5 * 0.102 * 49.541 kips * 1.5}{3.0} = 1.263 \quad kips$$

*By visual inspection, the above "Base Shear" value when considering the following Load Combination is less that the base shear of wind on structure.

$1.2 * DL + 1.0\ E < 1.2\ DL + 1.6\ W$, (101 Kips), therefore seismic effect on structure Does NOT control Design.

TNX TOWER INPUT / OUTPUT SUMMARY

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10		
Legs	P.5x.250			P5x0.3 w/ (3) 1.5x5/8 Plates		P5x0.4 w/ (3) 1.5x5/8 Plates	HSS5x.4	HSS6.875x.4		HSS6.875x0.5 w/ (3) 2x5/8 Bars		
Leg Grade	A500-50			A500-50		A572-50		A514-60		A500-50		
Diagonals	2L2 1/2x2 1/2x5/16	2L2 1/2x2x3/16	2L2 1/2x2 1/2x5/16	2L3x2 1/2x1/4	2L3x2 1/2x5/16	2L3x2 1/2x5/16	2L3x3x5/16	2L3 1/2x3x3/8	2L3 1/2x3 1/2x5/16	2L4x3x3/8		
Diagonal Grade	A36			A529-50		A529-50		A36		A529-50		
Top Girts	L3x3x5/16	L3x3x1/4		L3x3x1/4	N.A.		L3x3x1/2	L4x4x1/4	L4x4x5/16	N.A.		
Horizontals	L3x3x5/16	L3x3x1/4		L3x3x1/2			L4x4x1/2			L4x4x1/2		
Red. Horizontals	N.A.			N.A.			L2x2x5/16	N.A.	L2x2x5/16	N.A.		
Red. Diagonals	N.A.			L2 1/2x2x3/16			L2x2x5/16	N.A.	L2x2x5/16	N.A.		
Inner Bracing	N.A.	N.A.								L2 1/2x2 1/2x3/16		
Face Width (ft)	10.2	11	13	15	17	17.6667	18.3333	19	20	21	23	
# Panels @ (ft)	2 @ 5			12 @ 8.33333						4 @ 12.5		
Weight (lb)	1181.7	2323.9	3860.0	5084.2	2103.3	2141.0	2316.3	3003.5	3416.1	8678.7	34108.8	



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 2"x21' (DNK-33)	160	DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	120
(PSA6) 6' Side-Arm (CSP)	160	RFS APXVAARR24_43-U-NA20 Panel Antenna (T-Mobile - Proposed)	120
SC479-HF1LDF(D00-E6085) (CSP)	160	RFS APXVAARR24_43-U-NA20 Panel Antenna (T-Mobile - Proposed)	120
SC479-HF1LDF(D00l-E6085) (Inverted) (CSP)	160 - 145	RFS APXVAARR24_43-U-NA20 Panel Antenna (T-Mobile - Proposed)	120
SC479-HF1LDF (DNK-29)	159	Ericsson Radio 4449 B66A RRH (T-Mobile - Proposed)	120
TMA 432-83H-01T (DNK-25)	158	Ericsson Radio 4449 B66A RRH (T-Mobile - Proposed)	120
TMA 432-83H-01T (DNK-30)	158	Ericsson Radio 4449 B66A RRH (T-Mobile - Proposed)	120
432E-83l-01T TTA Unit (CSP)	158	Ericsson 4449 B71 + B12 Radio Unit (T-Mobile - Proposed)	120
SC479-HF1LDF(D00l-E6085) (DNK-32 - Troop L RX (PNS-Proposed 01272017))	157.5	Ericsson 4449 B71 + B12 Radio Unit (T-Mobile - Proposed)	120
SC479-HF1LDF (DNK-26)	157	Ericsson 4449 B71 + B12 Radio Unit (T-Mobile - Proposed)	120
DB228-A (DNK-28)	157	Ericsson Radio 4415 B25 RRH Unit (T-Mobile - Proposed)	120
DB304-A (DNK-27)	155	Ericsson Radio 4415 B25 RRH Unit (T-Mobile - Proposed)	120
DC6-48-60-18-8F (Squid) Suppressor (DNK-23)	145	Ericsson Radio 4415 B25 RRH Unit (T-Mobile - Proposed)	120
SC479-HF1LDF (DNK-21)	141.25	8' Stiff-Arm (DNK-7)	108
SC479-HF1LDF (DNK-18)	141	8' Stiff-Arm (DNK-7)	108
8' Stiff-Arm (DNK-18 (4 antennas Attached - 18, 24, 25, Sinclair))	141	4"x96"x72" Ice Canopy (DNK-5)	107.5
8' Stiff-Arm (DNK-18 (4 antennas Attached - 18, 24, 25, Sinclair))	141	4"x96"x72" Ice Canopy (DNK-6)	107.5
8' Stiff-Arm (DNK-21 (2 antennas Attached - 21,29))	141	6' w/ Radome (DNK-6 / CSP-7)	107
8' Stiff-Arm (DNK-21 (2 antennas Attached - 21,29))	141	6' w/ Radome (DNK-5 / CSP-6)	106.5
8' Stiff-Arm (DNK-22 (5 antennas Attached - 22,27,31,32,33))	141	APXVSPP18-C-A20 (Sprint DNK 2-4)	97
8' Stiff-Arm (DNK-22 (5 antennas Attached - 22,27,31,32,33))	141	APXVSPP18-C-A20 (Sprint DNK 2-4)	97
T-Frame (ATT DNK 12-17)	140	APXVSPP18-C-A20 (Sprint DNK 2-4)	97
T-Frame (ATT DNK 12-17)	140	DT465B-2XR-V2 Panels (Commscope) (Sprint)	97
T-Frame (ATT DNK 12-17)	140	DT465B-2XR-V2 Panels (Commscope) (Sprint)	97
7770.00 (ATT DNK 12-17)	140	DT465B-2XR-V2 Panels (Commscope) (Sprint)	97
7770.00 (ATT DNK 12-17)	140	RRH 800MHz 2x50W (Sprint)	97
7770.00 (ATT DNK 12-17)	140	RRH 800MHz 2x50W (Sprint)	97
SBNH-1D6565C (ATT DNK 12-17)	140	RRH 800MHz 2x50W (Sprint)	97
SBNH-1D6565C (ATT DNK 12-17)	140	RRH 800MHz 2x50W (Sprint DNK 2-4)	97
SBNH-1D6565C (ATT DNK 12-17)	140	RRH 800MHz 2x50W (Sprint DNK 2-4)	97
AM-X-CD-16-65-00T-RET (6') (ATT DNK 12-17)	140	PM-SU35-48 - Pipe Mount 48" (Sprint)	97
Surge Suppressor (ATT DNK 12-17)	140	PM-SU35-48 - Pipe Mount 48" (Sprint)	97
TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	140	PM-SU35-48 - Pipe Mount 48" (Sprint)	97
TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	140	RRH 1900 MHz 2x40W (Sprint DNK 2-4)	97
QS66512-3 Quintel Panel (ATT)	140	RRH 1900 MHz 2x40W (Sprint DNK 2-4)	97
RRUS-32 (ATT)	140	PM-SU35-48 - Pipe Mount 48" (Sprint DNK 2-4)	97
RRUS-12 (ATT)	140	PM-SU35-48 - Pipe Mount 48" (Sprint DNK 2-4)	97
RRUS-11 (ATT DNK 12-17)	140	PM-SU35-48 - Pipe Mount 48" (Sprint DNK 2-4)	97
A2 Module Unit (ATT)	140	TD-RRH8x20 (Sprint)	97
RRUS-32 (ATT)	140	TD-RRH8x20 (Sprint)	97
RRUS-12 (ATT)	140	TD-RRH8x20 (Sprint)	97
RRUS-11 (ATT DNK 12-17)	140	RRH 1900 MHz 2x40W (Sprint DNK 2-4)	97
A2 Module Unit (ATT)	140	RRH 800MHz 2x50W (Sprint DNK 2-4)	97
DC6-48-60-18-8F (Squid) Suppressor (ATT)	140	16x16 Panel 19dBi 2.45GHz ISM (DNK-1)	82
TT19-08BP111-001 TMA's (ATT DNK 12-17)	140	1' Side Mount Standoff (DNK-1)	82
TT19-08BP111-001 TMA's (ATT DNK 12-17)	140	SBNHH-1D65B (VZW-850PCS)	75
TT19-08BP111-001 TMA's (ATT DNK 12-17)	140	RRH_2x60-AWS (VZW)	75
(2) LGP21401 Diplexer (ATT DNK 12-17)	140	SBNHH-1D65B (VZW-700AWS)	75
(2) LGP21401 Diplexer (ATT DNK 12-17)	140	5' T-arm (VZW)	75
(2) LGP21401 Diplexer (ATT DNK 12-17)	140	RRH_2x60-AWS (VZW)	75
HPD2-4.7 (NWCT)	140	SBNHH-1D65B (VZW-850PCS)	75
SC479-HF1LDF (DNK-19)	139.5	SBNHH-1D65B (VZW-700AWS)	75
10' PCS Frame (1) (DNK-19 (3 antennas Attached - 19,20,26))	139.5	5' T-arm (VZW)	75
SC479-HF1LDF (DNK-20)	139.5	RH_2x60-07-L (700 MHz) (VZW)	75
PD1142-1 (DNK-11)	120	DC6-48-60-18-8F (VZW)	75
DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	120	RH_2x60-07-L (700 MHz) (VZW)	75
DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	120		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A529-50	50 ksi	65 ksi
A36	36 ksi	58 ksi	A514-60	60 ksi	80 ksi
A572-50	50 ksi	65 ksi			

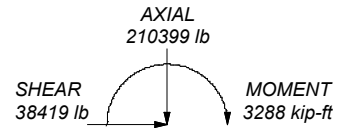
TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 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 3 with Crest Height of 176.00 ft
7. TOWER RATING: 92.7%

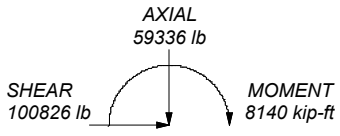
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 428458 lb
SHEAR: 55619 lb

UPLIFT: -374142 lb
SHEAR: 50368 lb



TORQUE 85 kip-ft
50 mph WIND - 0.7500 in ICE

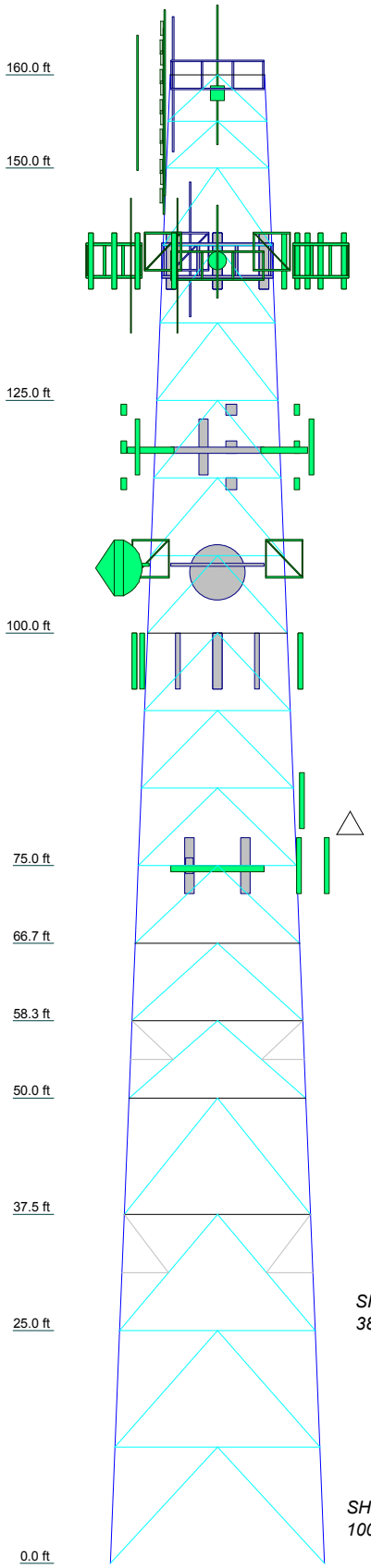


TORQUE 148 kip-ft
REACTIONS - 93 mph WIND

AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT
Phone: 860-529-8882
FAX: 860-529-3991

Job: **160' Self Support Lattice - CSP #20**			
Project: **Middlebury, CT / S. Analysis**			
Client: Transcend Wireless / T-Mobile / TWM-014	Drawn by: MCD	App'd:	
Code: TIA-222-G	Date: 05/07/19	Scale: NTS	
Path: P:\Projects\Telcom\StructuralsByLocation\Connecticut\MiddleburyCSP#20\26_60604310-TWM-014\TIA-G\TWM-014_Middlebury_CT_CSP.eri		Dwg No. E-1	

Section		T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs		HSS6.875x0.5 w/ (3) 2x5/8 Bars	HSS6.875x.4		HSS5x.4	A		P5x0.3 w/ (3) 1.5x5/8 Plates	A500-50	P.5x.250	
Leg Grade		A500-50	A514-60		A572-50						
Diagonals		2L4x3x3/8	B	2L3 1/2x3x3/8	2L3x3x5/16	2L3x2 1/2x5/16		2L3x2 1/2x1/4	2L2 1/2x2 1/2x5/16	2L2 1/2x2x3/16	
Diagonal Grade		A529-50		A36		A529-50			A36		
Top Girts		N.A.	L4x4x5/16	L4x4x1/4	L3x3x1/2		N.A.	L3x3x1/4	N.A.		L3x3x1/4
Horizontals		L4x4x1/2		N.A.				L3x3x1/2	L3x3x5/16	L2 1/2x2 1/2x3/16	L3x3x1/4
Red. Horizontals		N.A.	L2x2x5/16	N.A.	L2x2x5/16				N.A.		
Red. Diagonals		N.A.	L2x2x5/16	N.A.	L2x2x5/16				N.A.		
Inner Bracing		L2 1/2x2 1/2x3/16						L2 1/2x2x3/16		N.A.	
Face Width (ft)	23	21	20	19	18.3333	17.6667	17	15	13	11	10.2
# Panels @ (ft)		4 @ 12.5				12 @ 8.33333					2 @ 5
Weight (lb)	34108.8	8678.7	3416.1	3003.5	2316.3	2141.0	2103.3	5084.2	3860.0	2323.9	1181.7



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	P5x0.4 w/ (3) 1.5x5/8 Plates	B	2L3 1/2x3 1/2x5/16

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A529-50	50 ksi	65 ksi
A36	36 ksi	58 ksi	A514-60	60 ksi	80 ksi
A572-50	50 ksi	65 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
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5. Tower Structure Class III.
6. Topographic Category 3 with Crest Height of 176.00 ft
7. TOWER RATING: 92.7%

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MAX. CORNER REACTIONS AT BASE:
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SHEAR: 55619 lb

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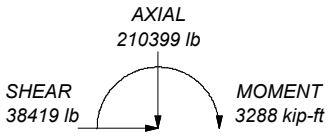
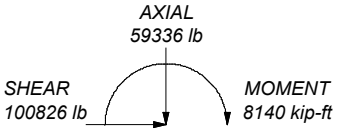
SHEAR: 50368 lb



TORQUE 85 kip-ft
50 mph WIND - 0.7500 in ICE



TORQUE 148 kip-ft
REACTIONS - 93 mph WIND

AECOM
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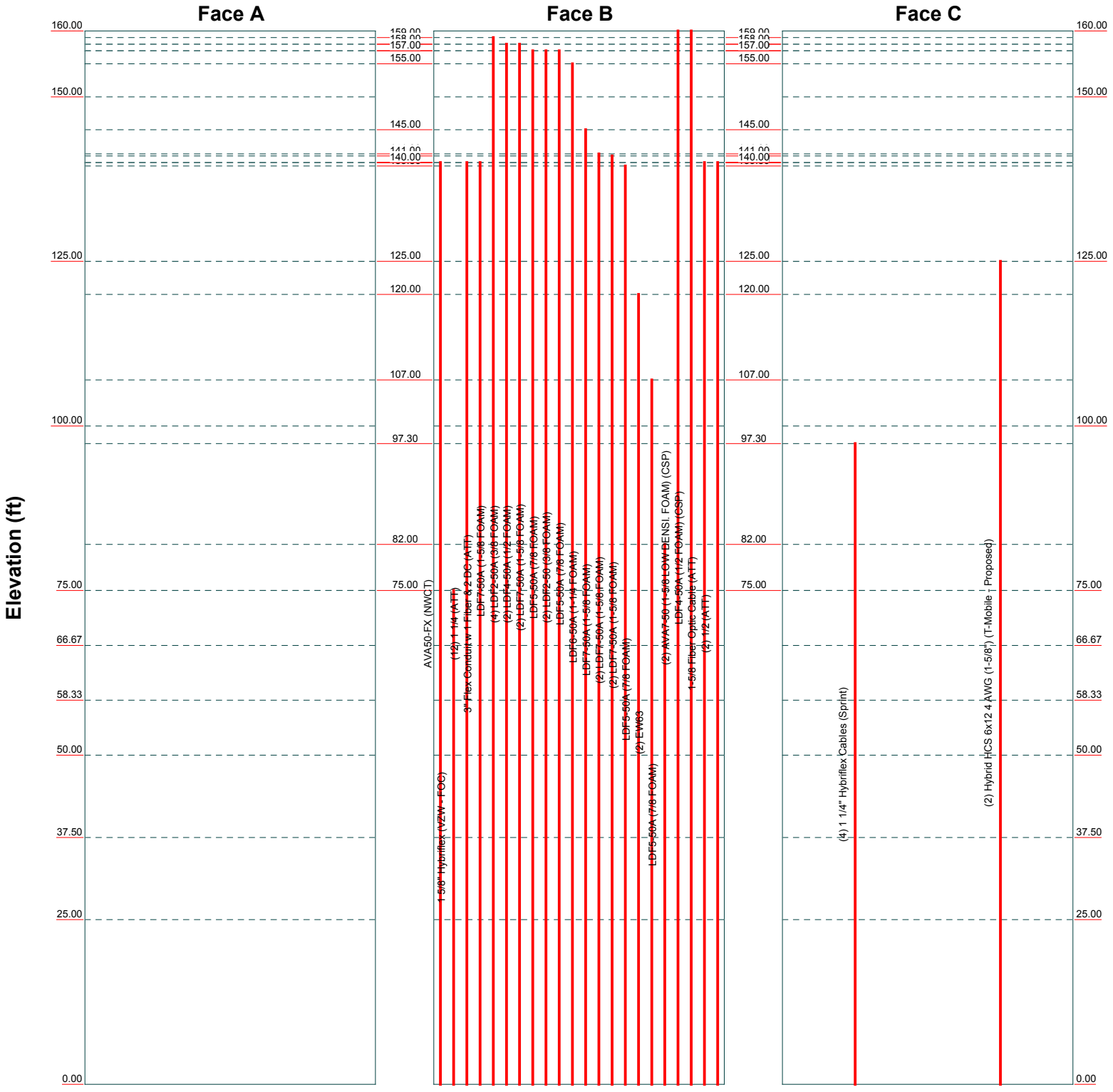
FAX: 860-529-3991

Job: ***160' Self Support Lattice - CSP #20***			
Project: ***Middlebury, CT / S. Analysis***			
Client: Transcend Wireless / T-Mobile / TWM-014	Drawn by: MCD	App'd:	
Code: TIA-222-G	Date: 05/07/19	Scale: NTS	
Path: P:\Projects\Telcom\StructuralsByLocation\Connecticut\MiddleburyCSP#2026_60604310-TWM-014\TIA-G\TWM-014_Middlebury_CT_CSP.eri		Dwg No. E-1	

TNX TOWER FEEDLINE DISTRIBUTION

Feed Line Distribution Chart
0' - 160'

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



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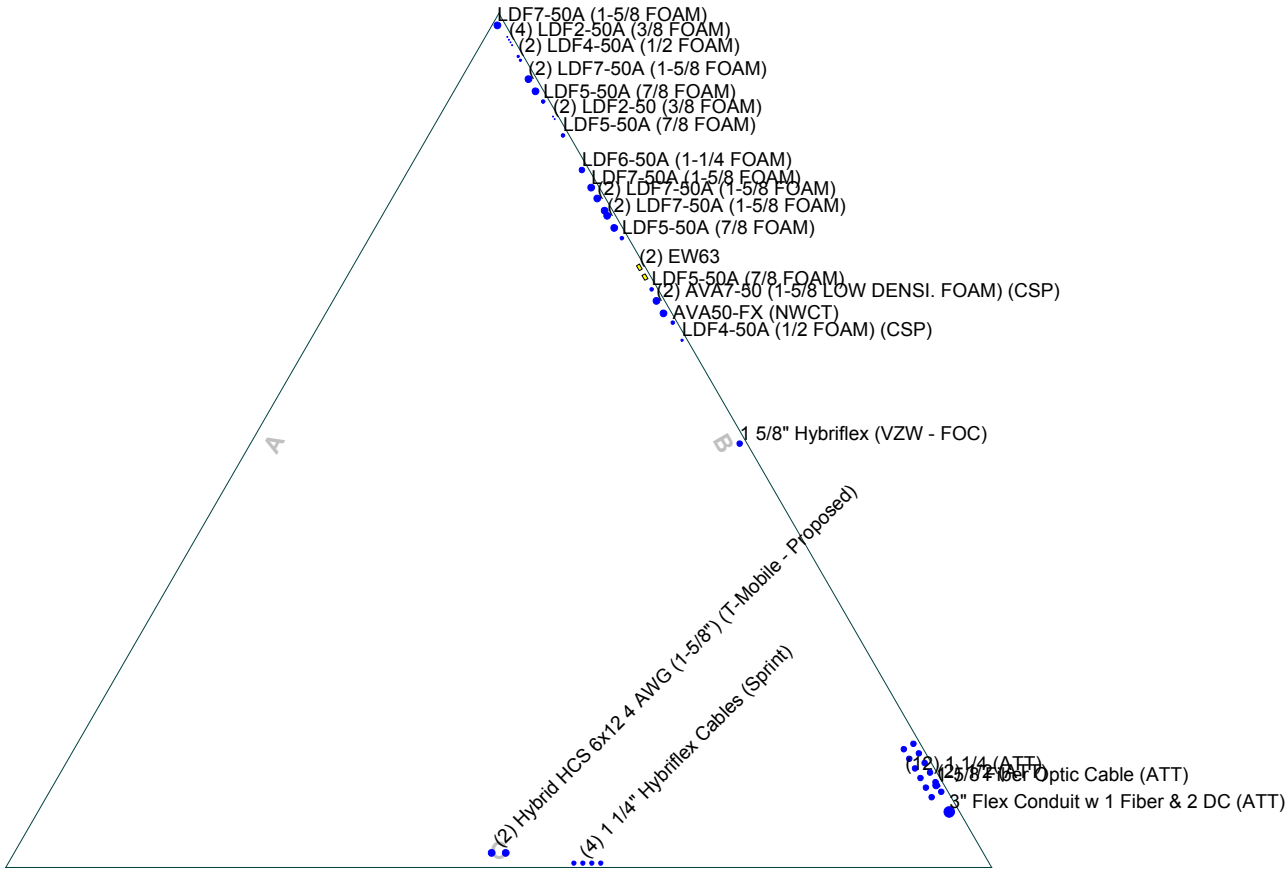
TNX TOWER FEEDLINE PLAN

Feed Line Plan

Round Flat App In Face App Out Face



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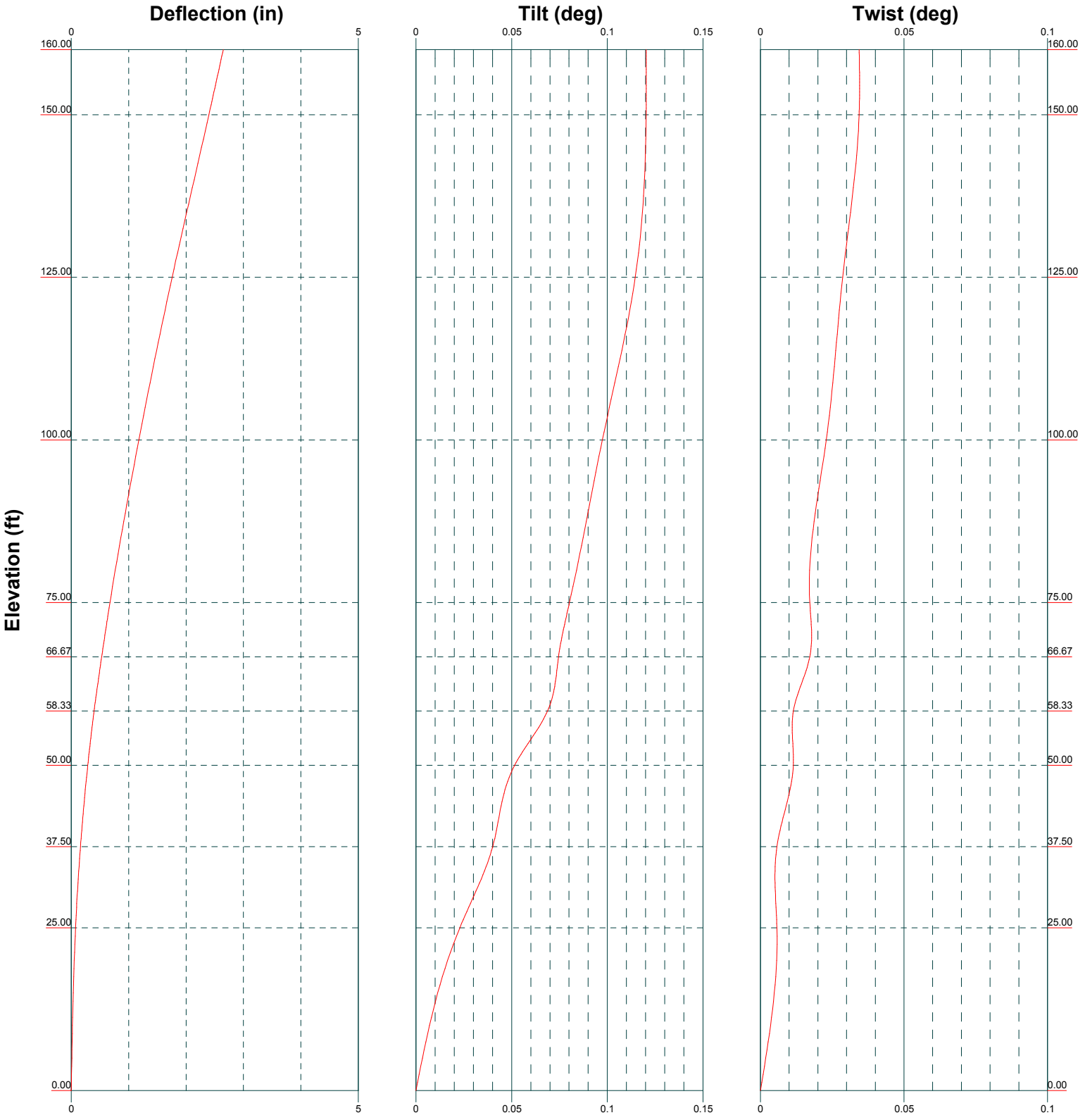
Path: P:\Projects\Telcom\StructuralsByLocation\Connecticut\MiddleburyCSP#2026_60604310-TWM-014\TIA-G\TWM-014_Middlebury_CT_CSP.eri			Dwg No. E-7

TNX TOWER DEFLECTION, TILT, AND TWIST

TIA-222-G - Service - 60 mph

Maximum Values



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Job: ***160' Self Support Lattice - CSP #20***			
Project: ***Middlebury, CT / S. Analysis***			
Client: Transcend Wireless / T-Mobile / TWM-014	Drawn by: MCD	App'd:	
Code: TIA-222-G	Date: 05/07/19	Scale: NTS	
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TNX TOWER DETAILED OUTPUT

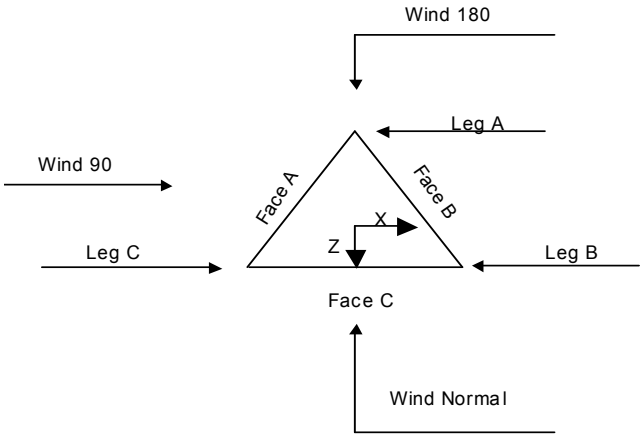
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 160.00 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 10.20 ft at the top and 23.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Basic wind speed of 93 mph.
Structure Class III.
Exposure Category C.
Topographic Category 3.
Crest Height 176.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	160.00-150.00			10.20	1	10.00
T2	150.00-125.00			11.00	1	25.00
T3	125.00-100.00			13.00	1	25.00
T4	100.00-75.00			15.00	1	25.00
T5	75.00-66.67			17.00	1	8.33
T6	66.67-58.33			17.67	1	8.33
T7	58.33-50.00			18.33	1	8.33
T8	50.00-37.50			19.00	1	12.50
T9	37.50-25.00			20.00	1	12.50
T10	25.00-0.00			21.00	1	25.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	160.00-150.00	5.00	K Brace Down	No	Yes	0.0000	0.0000
T2	150.00-125.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T3	125.00-100.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T4	100.00-75.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T5	75.00-66.67	8.33	K Brace Down	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	66.67-58.33	8.33	K Brace Down	No	Yes	0.0000	0.0000
T7	58.33-50.00	8.33	K1 Down	No	Yes	0.0000	0.0000
T8	50.00-37.50	12.50	K Brace Down	No	Yes	0.0000	0.0000
T9	37.50-25.00	12.50	K1 Down	No	Yes	0.0000	0.0000
T10	25.00-0.00	12.50	K Brace Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 160.00-150.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T2 150.00-125.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T3 125.00-100.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2 1/2x5/16	A36 (36 ksi)
T4 100.00-75.00	Arbitrary Shape	P5x0.3 w/ (3) 1.5x5/8 Plates	A500-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4	A36 (36 ksi)
T5 75.00-66.67	Arbitrary Shape	P5x0.4 w/ (3) 1.5x5/8 Plates	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x5/16	A529-50 (50 ksi)
T6 66.67-58.33	Arbitrary Shape	P5x0.4 w/ (3) 1.5x5/8 Plates	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x5/16	A529-50 (50 ksi)
T7 58.33-50.00	Pipe	HSS5x.4	A514-60 (60 ksi)	Double Angle	2L3x3x5/16	A36 (36 ksi)
T8 50.00-37.50	Pipe	HSS6.875x.4	A514-60 (60 ksi)	Double Angle	2L3 1/2x3x3/8	A36 (36 ksi)
T9 37.50-25.00	Pipe	HSS6.875x.4	A514-60 (60 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A529-50 (50 ksi)
T10 25.00-0.00	Arbitrary Shape	HSS6.875x0.5 w/ (3) 2x5/8 Bars	A500-50 (50 ksi)	Double Angle	2L4x3x3/8	A529-50 (50 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 160.00-150.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36M-50 (50 ksi)
T4 100.00-75.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T6 66.67-58.33	Single Angle	L3x3x1/2	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T7 58.33-50.00	Single Angle	L3x3x1/2	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T8 50.00-37.50	Single Angle	L4x4x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T9 37.50-25.00	Single Angle	L4x4x5/16	A529-50 (50 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 160.00-150.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T2 150.00-125.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 125.00-100.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T4 100.00-75.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T5 75.00-66.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T6 66.67-58.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T7 58.33-50.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T8 50.00-37.50	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T9 37.50-25.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T10 25.00-0.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/2	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T3 125.00-100.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T4 100.00-75.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T5 75.00-66.67	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T6 66.67-58.33	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T7 58.33-50.00	Equal Angle		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T8 50.00-37.50	Equal Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T9 37.50-25.00	Equal Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T10 25.00-0.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T7	A36	Horizontal (1)	Equal Angle	L2x2x5/16	1
58.33-50.00	(36 ksi)	Diagonal (1)	Equal Angle	L2x2x5/16	1
T9	A36	Horizontal (1)	Equal Angle	L2x2x5/16	1
37.50-25.00	(36 ksi)	Diagonal (1)	Single Angle	L2x2x5/16	1

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 160.00-150.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T2 150.00-125.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T3 125.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T4 100.00-75.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T5 75.00-66.67	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T6 66.67-58.33	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T7 58.33-50.00	0.00	0.0000	A36 (36 ksi)	1	1	1.03	0.0000	36.0000	36.0000
T8 50.00-37.50	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000
T9 37.50-25.00	0.00	0.0000	A36 (36 ksi)	1	1	1.03	0.0000	36.0000	36.0000
T10 25.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	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	0.65	0.65	1
160.00-150.00				1	1	1	1	0.65	0.65	1
T2	Yes	Yes	1	1	1	1	1	0.65	0.65	1
150.00-125.00				1	1	1	1	0.65	0.65	1
T3	Yes	Yes	1	1	1	1	1	0.65	0.65	1
125.00-100.00				1	1	1	1	0.65	0.65	1
T4	Yes	Yes	1	1	1	1	1	0.65	0.65	1
100.00-75.00				1	1	1	1	0.65	0.65	1
T5	Yes	Yes	1	1	1	1	1	0.65	0.65	1
75.00-66.67				1	1	1	1	0.65	0.65	1
T6	Yes	Yes	1	1	1	1	1	0.65	0.65	1
66.67-58.33				1	1	1	1	0.65	0.65	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T7	Yes	Yes	1	1	1	1	1	0.65	0.65	1
58.33-50.00				1	1	1	1	0.65	0.65	1
T8	Yes	Yes	1	1	1	1	1	0.65	0.65	1
50.00-37.50				1	1	1	1	0.65	0.65	1
T9	Yes	Yes	1	1	1	1	1	0.65	0.65	1
37.50-25.00				1	1	1	1	0.65	0.65	1
T10	Yes	Yes	1	1	1	1	1	0.65	0.65	1
25.00-0.00				1	1	1	1	0.65	0.65	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 Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
160.00-150.00														
T2	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
150.00-125.00														
T3	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
125.00-100.00														
T4	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
100.00-75.00														
T5 75.00-66.67	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 66.67-58.33	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 58.33-50.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 50.00-37.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 37.50-25.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 25.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation	Connection Offsets: Diagonal Vert. Top	Diagonal Horiz. Top	Diagonal Vert. Bot.	Diagonal Horiz. Bot.	K-Bracing Vert. Top	K-Bracing Horiz. Top	K-Bracing Vert. Bot.	K-Bracing Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
160.00-150.00								
T2	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
150.00-125.00								
T3	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
125.00-100.00								

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T4 100.00-75.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T5 75.00-66.67	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T6 66.67-58.33	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T7 58.33-50.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T8 50.00-37.50	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T9 37.50-25.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T10 25.00-0.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 160.00-150.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T2 150.00-125.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T3 125.00-100.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T4 100.00-75.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T5 75.00-66.67	Flange	0.8750 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T6 66.67-58.33	Flange	0.8750 A325X	6	0.7500 A325N	1	0.6250 A325X	2	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T7 58.33-50.00	Flange	0.8750 A325X	6	0.7500 A325N	1	0.6250 A325X	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T8 50.00-37.50	Flange	1.0000 A325X	8	1.0000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T9 37.50-25.00	Flange	1.0000 A325X	8	1.0000 A325N	1	0.6250 A325X	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T10 25.00-0.00	Flange	1.0000 A325X	8	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
AVA50-FX (NWCT)	B	No	No	Ar (CaAa)	140.00 - 0.00	-0.5000	-0.14	1	1	1.1020	1.1020		0.29
1 5/8" Hybriflex (VZW - FOC)	B	No	No	Ar (CaAa)	75.00 - 0.00	-1.0000	0	1	1	1.6250	1.6250		1.48

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
1 1/4 (ATT)	B	No	No	Ar (CaAa)	140.00 - 0.00	-4.0000	0.38	12	6	1.5500	1.5500		0.66
3" Flex Conduit w 1 Fiber & 2 DC (ATT)	B	No	No	Ar (CaAa)	140.00 - 0.00	-1.0000	0.43	1	1	3.0000	3.0000		3.00
LDF7-50A (1-5/8 FOAM)	B	No	No	Ar (CaAa)	159.00 - 0.00	-1.0000	-0.49	1	1	1.9800	1.9800		0.82
LDF2-50A (3/8 FOAM)	B	No	No	Ar (CaAa)	158.00 - 0.00	-1.0000	-0.47	4	4	0.4400	0.4400		0.08
LDF4-50A (1/2 FOAM)	B	No	No	Ar (CaAa)	158.00 - 0.00	-1.0000	-0.45	2	2	0.6300	0.6300		0.15
LDF7-50A (1-5/8 FOAM)	B	No	No	Ar (CaAa)	157.00 - 0.00	-1.0000	-0.42	2	2	1.9800	1.9800		0.82
LDF5-50A (7/8 FOAM)	B	No	No	Ar (CaAa)	157.00 - 0.00	-1.0000	-0.4	1	1	1.0900	1.0900		0.33
LDF2-50 (3/8 FOAM)	B	No	No	Ar (CaAa)	157.00 - 0.00	-1.0000	-0.38	2	2	0.4400	0.4400		0.08
LDF5-50A (7/8 FOAM)	B	No	No	Ar (CaAa)	155.00 - 0.00	-1.0000	-0.36	1	1	1.0900	1.0900		0.33
LDF6-50A (1-1/4 FOAM)	B	No	No	Ar (CaAa)	145.00 - 0.00	-1.0000	-0.32	1	1	1.5500	1.5500		0.66
LDF7-50A (1-5/8 FOAM)	B	No	No	Ar (CaAa)	141.33 - 0.00	-1.0000	-0.3	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	B	No	No	Ar (CaAa)	141.00 - 0.00	-1.0000	-0.28	2	2	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	B	No	No	Ar (CaAa)	139.50 - 0.00	-1.0000	-0.26	2	2	1.9800	1.9800		0.82
LDF5-50A (7/8 FOAM)	B	No	No	Ar (CaAa)	120.00 - 0.00	-1.0000	-0.24	1	1	1.0900	1.0900		0.33
EW63	B	No	No	Af (CaAa)	107.00 - 0.00	-1.0000	-0.2	2	2	1.5742	1.5742		0.51
LDF5-50A (7/8 FOAM)	B	No	No	Ar (CaAa)	82.00 - 0.00	-1.0000	-0.18	1	1	1.0900	1.0900		0.33
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP)	B	No	No	Ar (CaAa)	160.00 - 0.00	-1.0000	-0.16	2	2	1.9800	1.9800		0.72
LDF4-50A (1/2 FOAM) (CSP)	B	No	No	Ar (CaAa)	160.00 - 0.00	-1.0000	-0.12	1	1	0.6300	0.6300		0.15
1-5/8 Fiber Optic Cable (ATT)	B	No	No	Ar (CaAa)	140.00 - 0.00	-1.0000	0.4	1	1	1.9800	1.9800		1.30
1/2 (ATT)	B	No	No	Ar (CaAa)	140.00 - 0.00	-1.0000	0.4	2	2	0.5800	0.5800		0.25
1 1/4" Hybriflex Cables (Sprint)	C	No	No	Ar (CaAa)	97.30 - 0.00	-0.5000	-0.09	4	4	1.2500	1.2500		1.13
Hybrid HCS 6x12 4 AWG (1-5/8") (T-Mobile - Proposed)	C	No	No	Ar (CaAa)	125.00 - 0.00	-3.0000	0	2	2	1.9900	1.9900		1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	160.00-150.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	13.484	0.000	44.80
		C	0.000	0.000	0.000	0.000	0.00
T2	150.00-125.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	98.660	0.000	409.01
		C	0.000	0.000	0.000	0.000	0.00
T3	125.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	140.472	0.000	595.24
		C	0.000	0.000	9.950	0.000	95.00
T4	100.00-75.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	151.116	0.000	617.56
		C	0.000	0.000	21.100	0.000	195.80
T5	75.00-66.67	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	52.353	0.000	220.14
		C	0.000	0.000	7.483	0.000	69.33
T6	66.67-58.33	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	52.339	0.000	220.14
		C	0.000	0.000	7.483	0.000	69.33
T7	58.33-50.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	52.327	0.000	220.14
		C	0.000	0.000	7.483	0.000	69.33
T8	50.00-37.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	78.472	0.000	330.21
		C	0.000	0.000	11.225	0.000	104.00
T9	37.50-25.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	78.468	0.000	330.21
		C	0.000	0.000	11.225	0.000	104.00
T10	25.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	157.038	0.000	660.43
		C	0.000	0.000	22.450	0.000	208.00

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	160.00-150.00	A	2.326	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	69.238	0.000	973.95
		C		0.000	0.000	0.000	0.000	0.00
T2	150.00-125.00	A	2.328	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	377.244	0.000	6093.04
		C		0.000	0.000	0.000	0.000	0.00
T3	125.00-100.00	A	2.334	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	498.307	0.000	8350.28
		C		0.000	0.000	39.219	0.000	630.66
T4	100.00-75.00	A	2.343	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	531.086	0.000	8872.18
		C		0.000	0.000	80.242	0.000	1317.52
T5	75.00-66.67	A	2.349	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	186.028	0.000	3134.66
		C		0.000	0.000	28.431	0.000	467.93
T6	66.67-58.33	A	2.350	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	186.106	0.000	3137.31
		C		0.000	0.000	28.440	0.000	468.26
T7	58.33-50.00	A	2.350	0.000	0.000	0.000	0.000	0.00

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
		B		0.000	0.000	186.096	0.000	3136.97
		C		0.000	0.000	28.439	0.000	468.22
T8	50.00-37.50	A	2.345	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	278.793	0.000	4693.49
		C		0.000	0.000	42.618	0.000	700.86
T9	37.50-25.00	A	2.326	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	277.413	0.000	4646.60
		C		0.000	0.000	42.459	0.000	695.13
T10	25.00-0.00	A	2.217	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	538.887	0.000	8760.58
		C		0.000	0.000	83.084	0.000	1324.90

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	160.00-150.00	2.0742	-12.4242	4.0358	-24.2302
T2	150.00-125.00	13.4705	-14.1913	13.2711	-28.5369
T3	125.00-100.00	18.9157	-12.1016	18.0160	-26.7624
T4	100.00-75.00	19.8432	-12.0016	19.8141	-26.6423
T5	75.00-66.67	21.3754	-12.9605	21.7333	-28.4086
T6	66.67-58.33	21.9577	-13.3432	22.4323	-29.3046
T7	58.33-50.00	20.8377	-12.8527	21.9837	-28.7939
T8	50.00-37.50	23.9194	-14.5719	24.6920	-32.2010
T9	37.50-25.00	22.8946	-14.0746	24.3960	-31.8201
T10	25.00-0.00	24.4928	-14.8812	26.5161	-34.2168

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	6	LDF7-50A (1-5/8 FOAM)	150.00 - 159.00	0.6000	0.5992
T1	7	LDF2-50A (3/8 FOAM)	150.00 - 158.00	0.6000	0.5992
T1	8	LDF4-50A (1/2 FOAM)	150.00 - 158.00	0.6000	0.5992
T1	9	LDF7-50A (1-5/8 FOAM)	150.00 - 157.00	1.0000	1.0000
T1	10	LDF5-50A (7/8 FOAM)	150.00 - 157.00	0.6000	0.5992
T1	11	LDF2-50 (3/8 FOAM)	150.00 - 157.00	0.6000	0.5992
T1	12	LDF5-50A (7/8 FOAM)	150.00 - 155.00	0.6000	0.5992
T1	20	AVA7-50 (1-5/8 LOW DENSI. FOAM)	150.00 - 160.00	1.0000	1.0000
T1	21	LDF4-50A (1/2 FOAM)	150.00 - 160.00	0.6000	0.5992
T2	1	AVA50-FX	125.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	4	1 1/4	140.00 125.00 - 140.00	0.6000	0.6000
T2	5	3" Flex Conduit w 1 Fiber & 2 DC	125.00 - 140.00	1.0000	0.6000
T2	6	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	7	LDF2-50A (3/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	8	LDF4-50A (1/2 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	9	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	1.0000	1.0000
T2	10	LDF5-50A (7/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	11	LDF2-50 (3/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	12	LDF5-50A (7/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	13	LDF6-50A (1-1/4 FOAM)	125.00 - 145.00	0.6000	0.6000
T2	14	LDF7-50A (1-5/8 FOAM)	125.00 - 141.33	1.0000	1.0000
T2	15	LDF7-50A (1-5/8 FOAM)	125.00 - 141.00	0.6000	0.6000
T2	16	LDF7-50A (1-5/8 FOAM)	125.00 - 139.50	0.6000	0.6000
T2	20	AVA7-50 (1-5/8 LOW DENSI. FOAM)	125.00 - 150.00	1.0000	1.0000
T2	21	LDF4-50A (1/2 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	22	1-5/8 Fiber Optic Cable	125.00 - 140.00	0.6000	0.6000
T2	23	1/2	125.00 - 140.00	0.6000	0.6000
T3	1	AVA50-FX	100.00 - 125.00	0.6000	0.6000
T3	4	1 1/4	100.00 - 125.00	0.6000	0.6000
T3	5	3" Flex Conduit w 1 Fiber & 2 DC	100.00 - 125.00	1.0000	0.6000
T3	6	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	7	LDF2-50A (3/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	8	LDF4-50A (1/2 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	9	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	1.0000	1.0000
T3	10	LDF5-50A (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	11	LDF2-50 (3/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	12	LDF5-50A (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	13	LDF6-50A (1-1/4 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	14	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	1.0000	1.0000
T3	15	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	16	LDF7-50A (1-5/8 FOAM)	100.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			125.00		
T3	17	LDF5-50A (7/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T3	18	EW63	100.00 - 107.00	0.6000	0.6000
T3	20	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 125.00	1.0000	1.0000
T3	21	LDF4-50A (1/2 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	22	1-5/8 Fiber Optic Cable	100.00 - 125.00	0.6000	0.6000
T3	23	1/2	100.00 - 125.00	0.6000	0.6000
T3	25	Hybrid HCS 6x12 4 AWG (1-5/8")	100.00 - 125.00	0.6000	0.6000
T4	1	AVA50-FX	75.00 - 100.00	0.6000	0.6000
T4	4	1 1/4	75.00 - 100.00	0.6000	0.6000
T4	5	3" Flex Conduit w 1 Fiber & 2 DC	75.00 - 100.00	1.0000	0.6000
T4	6	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	7	LDF2-50A (3/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	8	LDF4-50A (1/2 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	9	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	1.0000	1.0000
T4	10	LDF5-50A (7/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	11	LDF2-50 (3/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	12	LDF5-50A (7/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	13	LDF6-50A (1-1/4 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	14	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	1.0000	1.0000
T4	15	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	16	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	17	LDF5-50A (7/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	18	EW63	75.00 - 100.00	0.6000	0.6000
T4	19	LDF5-50A (7/8 FOAM)	75.00 - 82.00	0.6000	0.6000
T4	20	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 100.00	1.0000	1.0000
T4	21	LDF4-50A (1/2 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	22	1-5/8 Fiber Optic Cable	75.00 - 100.00	0.6000	0.6000
T4	23	1/2	75.00 - 100.00	0.6000	0.6000
T4	24	1 1/4" Hybriflex Cables	75.00 - 97.30	0.6000	0.6000
T4	25	Hybrid HCS 6x12 4 AWG (1-5/8")	75.00 - 100.00	0.6000	0.6000
T5	1	AVA50-FX	66.67 - 75.00	0.6000	0.6000
T5	2	1 5/8" Hybriflex	66.67 - 75.00	0.6000	0.6000
T5	4	1 1/4	66.67 - 75.00	0.6000	0.6000
T5	5	3" Flex Conduit w 1 Fiber & 2 DC	66.67 - 75.00	1.0000	0.6000
T5	6	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	7	LDF2-50A (3/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	8	LDF4-50A (1/2 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	9	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	1.0000	1.0000
T5	10	LDF5-50A (7/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	11	LDF2-50 (3/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	12	LDF5-50A (7/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	13	LDF6-50A (1-1/4 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	14	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	1.0000	1.0000
T5	15	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	16	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	17	LDF5-50A (7/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	18	EW63	66.67 - 75.00	0.6000	0.6000
T5	19	LDF5-50A (7/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	20	AVA7-50 (1-5/8 LOW DENSI. FOAM)	66.67 - 75.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	21	LDF4-50A (1/2 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	22	1-5/8 Fiber Optic Cable	66.67 - 75.00	0.6000	0.6000
T5	23	1/2	66.67 - 75.00	0.6000	0.6000
T5	24	1 1/4" Hybriflex Cables	66.67 - 75.00	0.6000	0.6000
T5	25	Hybrid HCS 6x12 4 AWG (1-5/8")	66.67 - 75.00	0.6000	0.6000
T6	1	AVA50-FX	58.33 - 66.67	0.6000	0.6000
T6	2	1 5/8" Hybriflex	58.33 - 66.67	0.6000	0.6000
T6	4	1 1/4	58.33 - 66.67	0.6000	0.6000
T6	5	3" Flex Conduit w 1 Fiber & 2 DC	58.33 - 66.67	1.0000	0.6000
T6	6	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	7	LDF2-50A (3/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	8	LDF4-50A (1/2 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	9	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	1.0000	1.0000
T6	10	LDF5-50A (7/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	11	LDF2-50 (3/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	12	LDF5-50A (7/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	13	LDF6-50A (1-1/4 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	14	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	1.0000	1.0000
T6	15	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	16	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	17	LDF5-50A (7/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	18	EW63	58.33 - 66.67	0.6000	0.6000
T6	19	LDF5-50A (7/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	20	AVA7-50 (1-5/8 LOW DENSI. FOAM)	58.33 - 66.67	1.0000	1.0000
T6	21	LDF4-50A (1/2 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	22	1-5/8 Fiber Optic Cable	58.33 - 66.67	0.6000	0.6000
T6	23	1/2	58.33 - 66.67	0.6000	0.6000
T6	24	1 1/4" Hybriflex Cables	58.33 - 66.67	0.6000	0.6000
T6	25	Hybrid HCS 6x12 4 AWG (1-5/8")	58.33 - 66.67	0.6000	0.6000
T7	1	AVA50-FX	50.00 - 58.33	0.6000	0.6000
T7	2	1 5/8" Hybriflex	50.00 - 58.33	0.6000	0.6000
T7	4	1 1/4	50.00 - 58.33	0.6000	0.6000
T7	5	3" Flex Conduit w 1 Fiber & 2 DC	50.00 - 58.33	1.0000	0.6000
T7	6	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	7	LDF2-50A (3/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	8	LDF4-50A (1/2 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	9	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	1.0000	1.0000
T7	10	LDF5-50A (7/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	11	LDF2-50 (3/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	12	LDF5-50A (7/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	13	LDF6-50A (1-1/4 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	14	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	1.0000	1.0000
T7	15	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	16	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	17	LDF5-50A (7/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	18	EW63	50.00 - 58.33	0.6000	0.6000
T7	19	LDF5-50A (7/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	20	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 58.33	1.0000	1.0000
T7	21	LDF4-50A (1/2 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	22	1-5/8 Fiber Optic Cable	50.00 - 58.33	0.6000	0.6000
T7	23	1/2	50.00 - 58.33	0.6000	0.6000
T7	24	1 1/4" Hybriflex Cables	50.00 - 58.33	0.6000	0.6000
T7	25	Hybrid HCS 6x12 4 AWG (1-5/8")	50.00 - 58.33	0.6000	0.6000
T8	1	AVA50-FX	37.50 - 50.00	0.6000	0.6000
T8	2	1 5/8" Hybriflex	37.50 - 50.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	4	1 1/4	37.50 - 50.00	0.6000	0.6000
T8	5	3" Flex Conduit w 1 Fiber & 2 DC	37.50 - 50.00	1.0000	0.6000
T8	6	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	7	LDF2-50A (3/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	8	LDF4-50A (1/2 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	9	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	1.0000	1.0000
T8	10	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	11	LDF2-50 (3/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	12	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	13	LDF6-50A (1-1/4 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	14	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	1.0000	1.0000
T8	15	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	16	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	17	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	18	EW63	37.50 - 50.00	0.6000	0.6000
T8	19	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	20	AVA7-50 (1-5/8 LOW DENSI. FOAM)	37.50 - 50.00	1.0000	1.0000
T8	21	LDF4-50A (1/2 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	22	1-5/8 Fiber Optic Cable	37.50 - 50.00	0.6000	0.6000
T8	23	1/2	37.50 - 50.00	0.6000	0.6000
T8	24	1 1/4" Hybriflex Cables	37.50 - 50.00	0.6000	0.6000
T8	25	Hybrid HCS 6x12 4 AWG (1-5/8")	37.50 - 50.00	0.6000	0.6000
T9	1	AVA50-FX	25.00 - 37.50	0.6000	0.6000
T9	2	1 5/8" Hybriflex	25.00 - 37.50	0.6000	0.6000
T9	4	1 1/4	25.00 - 37.50	0.6000	0.6000
T9	5	3" Flex Conduit w 1 Fiber & 2 DC	25.00 - 37.50	1.0000	0.6000
T9	6	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	7	LDF2-50A (3/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	8	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	9	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	1.0000	1.0000
T9	10	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	11	LDF2-50 (3/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	12	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	13	LDF6-50A (1-1/4 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	14	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	1.0000	1.0000
T9	15	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	16	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	17	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	18	EW63	25.00 - 37.50	0.6000	0.6000
T9	19	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	20	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 37.50	1.0000	1.0000
T9	21	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	22	1-5/8 Fiber Optic Cable	25.00 - 37.50	0.6000	0.6000
T9	23	1/2	25.00 - 37.50	0.6000	0.6000
T9	24	1 1/4" Hybriflex Cables	25.00 - 37.50	0.6000	0.6000
T9	25	Hybrid HCS 6x12 4 AWG (1-5/8")	25.00 - 37.50	0.6000	0.6000
T10	1	AVA50-FX	0.00 - 25.00	0.6000	0.6000
T10	2	1 5/8" Hybriflex	0.00 - 25.00	0.6000	0.6000
T10	4	1 1/4	0.00 - 25.00	0.6000	0.6000
T10	5	3" Flex Conduit w 1 Fiber & 2 DC	0.00 - 25.00	1.0000	0.6000
T10	6	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	7	LDF2-50A (3/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	8	LDF4-50A (1/2 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	9	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	1.0000	1.0000
T10	10	LDF5-50A (7/8 FOAM)	0.00 - 25.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T10	11	LDF2-50 (3/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	12	LDF5-50A (7/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	13	LDF6-50A (1-1/4 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	14	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	1.0000	1.0000
T10	15	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	16	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	17	LDF5-50A (7/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	18	EW63	0.00 - 25.00	0.6000	0.6000
T10	19	LDF5-50A (7/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	20	AVA7-50 (1-5/8 LOW DENSI. FOAM)	0.00 - 25.00	1.0000	1.0000
T10	21	LDF4-50A (1/2 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	22	1-5/8 Fiber Optic Cable	0.00 - 25.00	0.6000	0.6000
T10	23	1/2	0.00 - 25.00	0.6000	0.6000
T10	24	1 1/4" Hybriflex Cables	0.00 - 25.00	0.6000	0.6000
T10	25	Hybrid HCS 6x12 4 AWG (1-5/8")	0.00 - 25.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
*** Inventory from D&K Climb (3/272016)									
*** Existing Carrier VZW									
SBNHH-1D65B (VZW-700&AWS)	A	From Leg	2.00 -3.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice	8.20 8.66 9.13	5.42 5.88 6.35	40.60 91.24 148.02
SBNHH-1D65B (VZW-850&PCS)	A	From Leg	2.00 3.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice	8.20 8.66 9.13	5.42 5.88 6.35	40.60 91.24 148.02
SBNHH-1D65B (VZW-700&AWS)	B	From Leg	2.00 -3.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice	8.20 8.66 9.13	5.42 5.88 6.35	40.60 91.24 148.02
SBNHH-1D65B (VZW-850&PCS)	B	From Leg	2.00 3.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice	8.20 8.66 9.13	5.42 5.88 6.35	40.60 91.24 148.02
5' T-arm (VZW)	A	None		0.0000	75.00	No Ice 1/2" Ice 1" Ice	4.50 5.50 6.50	2.50 3.20 3.90	250.00 315.00 380.00
5' T-arm (VZW)	A	None		0.0000	75.00	No Ice 1/2" Ice 1" Ice	4.50 5.50 6.50	2.50 3.20 3.90	250.00 315.00 380.00
RH_2x60-07-L (700 MHz) (VZW)	A	From Leg	2.00 -3.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice	1.82 1.99 2.18	1.52 1.69 1.86	60.00 77.37 97.53
RH_2x60-07-L (700 MHz) (VZW)	B	From Leg	2.00 -3.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice	1.82 1.99 2.18	1.52 1.69 1.86	60.00 77.37 97.53
DC6-48-60-18-8F	C	None		0.0000	75.00	No Ice	1.27	1.27	20.00

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
(VZW)						1/2" Ice	1.46	1.46	35.12
						1" Ice	1.66	1.66	52.57
RRH_2x60-AWS	A	From Leg	2.00	0.0000	75.00	No Ice	1.87	1.23	44.00
(VZW)			3.00			1/2" Ice	2.04	1.38	59.92
			0.00			1" Ice	2.23	1.53	78.53
RRH_2x60-AWS	B	From Leg	2.00	0.0000	75.00	No Ice	1.87	1.23	44.00
(VZW)			3.00			1/2" Ice	2.04	1.38	59.92
			0.00			1" Ice	2.23	1.53	78.53
*** Existing Carrier - AT&T @ 135' Climbed by D&K *** D&K Climbed Inventory - Remaining Antennas									
16x16 Panel 19dBi 2.45GHz ISM	B	From Leg	1.00	0.0000	82.00	No Ice	2.34	2.34	10.00
			0.00			1/2" Ice	2.65	2.65	20.00
(DNK-1)			0.00			1" Ice	2.96	2.96	30.00
1' Side Mount Standoff	B	None		0.0000	82.00	No Ice	2.64	2.64	40.00
(DNK-1)						1/2" Ice	3.69	3.69	50.00
						1" Ice	4.74	4.74	60.00
4"x96"x72" Ice Canopy	A	From Leg	3.00	0.0000	107.50	No Ice	3.73	2.80	300.00
(DNK-5)			0.00			1/2" Ice	4.39	3.30	551.38
			0.00			1" Ice	5.05	3.80	814.11
4"x96"x72" Ice Canopy	C	From Leg	3.00	0.0000	107.50	No Ice	3.73	2.80	300.00
(DNK-6)			0.00			1/2" Ice	4.39	3.30	551.38
			0.00			1" Ice	5.05	3.80	814.11
8' Stiff-Arm	B	From Leg	0.00	45.0000	108.00	No Ice	5.00	5.00	250.00
(DNK-7)			0.00			1/2" Ice	10.00	10.00	300.00
			0.00			1" Ice	15.00	15.00	350.00
8' Stiff-Arm	C	From Leg	0.00	-45.0000	108.00	No Ice	5.00	5.00	250.00
(DNK-7)			0.00			1/2" Ice	10.00	10.00	300.00
			0.00			1" Ice	15.00	15.00	350.00
PD1142-1	C	From Face	5.00	0.0000	120.00	No Ice	1.32	1.32	10.00
(DNK-11)			0.00			1/2" Ice	3.21	3.21	23.85
			0.00			1" Ice	5.12	5.12	49.42
*** Mount shared with DNK-7									
SC479-HF1LDF	C	From Face	2.50	0.0000	141.00	No Ice	4.31	4.31	34.00
(DNK-18)			0.00			1/2" Ice	6.54	6.54	69.82
			0.00			1" Ice	8.04	8.04	114.98
8' Stiff-Arm	B	From Leg	0.00	45.0000	141.00	No Ice	5.00	5.00	250.00
(DNK-18 (4 antennas			0.00			1/2" Ice	10.00	10.00	300.00
Attached - 18, 24, 25, Sinclair))			0.00			1" Ice	15.00	15.00	350.00
8' Stiff-Arm	C	From Leg	0.00	-45.0000	141.00	No Ice	5.00	5.00	250.00
(DNK-18 (4 antennas			0.00			1/2" Ice	10.00	10.00	300.00
Attached - 18, 24, 25, Sinclair))			0.00			1" Ice	15.00	15.00	350.00
SC479-HF1LDF	C	From Leg	1.00	0.0000	139.50	No Ice	4.31	4.31	34.00
(DNK-19)			5.00			1/2" Ice	6.54	6.54	69.82
			0.00			1" Ice	8.04	8.04	114.98
10' PCS Frame (1)	C	None		0.0000	139.50	No Ice	9.00	9.00	250.00
(DNK-19 (3 antennas						1/2" Ice	13.20	13.20	350.00
Attached - 19,20,26))						1" Ice	17.40	17.40	450.00
SC479-HF1LDF	C	From Leg	1.00	0.0000	139.50	No Ice	4.31	4.31	34.00
(DNK-20)			-5.00			1/2" Ice	6.54	6.54	69.82
			0.00			1" Ice	8.04	8.04	114.98
SC479-HF1LDF	A	From Face	0.00	0.0000	141.25	No Ice	4.31	4.31	34.00
(DNK-21)			0.00			1/2" Ice	6.54	6.54	69.82

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1" Ice	8.04	8.04	114.98
8' Stiff-Arm	A	From Face	0.00	-30.0000	141.00	No Ice	5.00	5.00	250.00
(DNK-21 (2 antennas			0.00			1/2" Ice	10.00	10.00	300.00
Attached - 21,29))			0.00			1" Ice	15.00	15.00	350.00
8' Stiff-Arm	C	From Leg	0.00	0.0000	141.00	No Ice	5.00	5.00	250.00
(DNK-21 (2 antennas			0.00			1/2" Ice	10.00	10.00	300.00
Attached - 21,29))			0.00			1" Ice	15.00	15.00	350.00
8' Stiff-Arm	A	From Leg	0.00	0.0000	141.00	No Ice	5.00	5.00	250.00
(DNK-22 (5 antennas			0.00			1/2" Ice	10.00	10.00	300.00
Attached - 22,27,31,32,33))			0.00			1" Ice	15.00	15.00	350.00
8' Stiff-Arm	C	From Face	0.00	30.0000	141.00	No Ice	5.00	5.00	250.00
(DNK-22 (5 antennas			0.00			1/2" Ice	10.00	10.00	300.00
Attached - 22,27,31,32,33))			0.00			1" Ice	15.00	15.00	350.00
DC6-48-60-18-8F (Squid)	B	From Leg	1.00	0.0000	145.00	No Ice	0.79	0.79	20.00
Suppressor			0.00			1/2" Ice	1.27	1.27	35.12
(DNK-23)			0.00			1" Ice	1.45	1.45	52.57
*** Appears to be leg mounted from Climb Photos *** Mount Shared with DNK-18									
TMA 432-83H-01T	B	From Leg	1.25	0.0000	158.00	No Ice	1.40	0.82	25.00
(DNK-25)			0.00			1/2" Ice	1.55	0.94	37.44
			0.00			1" Ice	1.70	1.06	52.22
*** Mount Shared with DNK-18									
SC479-HF1LDF	C	From Leg	1.00	0.0000	157.00	No Ice	4.33	4.33	34.00
(DNK-26)			5.00			1/2" Ice	6.54	6.54	69.82
			0.00			1" Ice	8.04	8.04	114.98
*** Mount Shared with DNK-19									
DB304-A	C	From Leg	0.50	0.0000	155.00	No Ice	4.85	4.85	45.00
(DNK-27)			0.00			1/2" Ice	8.73	8.73	58.50
			0.00			1" Ice	12.61	12.61	72.00
*** Mount Shared with DNK-22									
DB228-A	C	From Leg	0.50	0.0000	157.00	No Ice	7.30	7.30	72.00
(DNK-28)			0.00			1/2" Ice	13.14	13.14	93.60
			0.00			1" Ice	18.98	18.98	115.20
*** Mount Shared with DNK-30									
SC479-HF1LDF	A	From Face	2.50	0.0000	159.00	No Ice	4.33	4.33	34.00
(DNK-29)			0.00			1/2" Ice	6.54	6.54	69.82
			0.00			1" Ice	8.04	8.04	114.98
*** Mount Shared with DNK-21									
TMA 432-83H-01T	A	From Face	0.00	0.0000	158.00	No Ice	1.40	0.82	25.00
(DNK-30)			0.00			1/2" Ice	1.55	0.94	37.44
			0.00			1" Ice	1.70	1.06	52.22
*** Mount Shared with DNK-22									
SC479-HF1LDF(D00I-E6085)	A	From Leg	2.50	0.0000	157.50	No Ice	5.06	5.06	30.00
(DNK-32 - Troop L RX			0.00			1/2" Ice	6.54	6.54	69.82
(PNS-Proposed 01272017))			0.00			1" Ice	8.04	8.04	114.98
*** Mount Shared with DNK-22									
Lightning Rod 2"x21'	A	None		0.0000	160.00	No Ice	4.20	4.20	80.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(DNK-33)						1/2" Ice	6.33	6.33	112.30
						1" Ice	8.47	8.47	157.78
*** PNS-621 Proposal Mount/Ant									
(PSA6) 6' Side-Arm	A	From Leg	0.00	45.0000	160.00	No Ice	10.60	10.60	140.00
(CSP)			0.00			1/2" Ice	15.40	15.40	212.00
			0.00			1" Ice	20.20	20.20	284.00
SC479-HF1LDF(D00-E6085)	A	From Leg	0.00	45.0000	160.00	No Ice	5.06	5.06	30.00
(CSP)			6.00			1/2" Ice	6.54	6.54	69.82
			0.00			1" Ice	8.04	8.04	114.98
432E-83I-01T TTA Unit	A	None		0.0000	158.00	No Ice	2.85	0.97	25.00
(CSP)						1/2" Ice	3.06	1.11	44.70
						1" Ice	3.28	1.26	67.39
SC479-HF1LDF(D00I-E6085	A	From Leg	0.00	45.0000	145.00 - 160.00	No Ice	4.33	4.33	34.00
) (Inverted)			6.00			1/2" Ice	6.54	6.54	69.82
(CSP)			0.00			1" Ice	8.04	8.04	114.98
*** AIROSmith Antennas - Sprint (1/12/2018)									
APXVSPP18-C-A20	A	From Face	0.50	0.0000	97.00	No Ice	8.26	6.71	90.00
(Sprint DNK 2-4)			0.00			1/2" Ice	8.81	7.66	149.38
			0.00			1" Ice	9.36	8.49	223.56
APXVSPP18-C-A20	B	From Face	0.50	0.0000	97.00	No Ice	8.26	6.71	90.00
(Sprint DNK 2-4)			0.00			1/2" Ice	8.81	7.66	149.38
			0.00			1" Ice	9.36	8.49	223.56
APXVSPP18-C-A20	C	From Leg	0.50	0.0000	97.00	No Ice	8.26	6.71	90.00
(Sprint DNK 2-4)			0.00			1/2" Ice	8.81	7.66	149.38
			0.00			1" Ice	9.36	8.49	223.56
DT465B-2XR-V2 Panels	A	From Leg	1.50	0.0000	97.00	No Ice	9.10	5.97	58.00
(Commscope)			0.00			1/2" Ice	9.56	6.43	116.01
(Sprint)			0.00			1" Ice	10.04	6.90	180.29
DT465B-2XR-V2 Panels	B	From Leg	1.50	0.0000	97.00	No Ice	9.10	5.97	58.00
(Commscope)			0.00			1/2" Ice	9.56	6.43	116.01
(Sprint)			0.00			1" Ice	10.04	6.90	180.29
DT465B-2XR-V2 Panels	C	From Leg	1.50	0.0000	97.00	No Ice	9.10	5.97	58.00
(Commscope)			0.00			1/2" Ice	9.56	6.43	116.01
(Sprint)			0.00			1" Ice	10.04	6.90	180.29
RRH 800MHz 2x50W	A	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	70.00
(Sprint)			1.00			1/2" Ice	2.71	2.66	95.17
			0.00			1" Ice	2.94	3.02	125.05
RRH 800MHz 2x50W	B	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	70.00
(Sprint)			1.00			1/2" Ice	2.71	2.66	95.17
			0.00			1" Ice	2.94	3.02	125.05
RRH 800MHz 2x50W	C	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	70.00
(Sprint)			-5.00			1/2" Ice	2.71	2.66	95.17
			0.00			1" Ice	2.94	3.02	125.05
RRH 800MHz 2x50W	A	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	70.00
(Sprint DNK 2-4)			1.00			1/2" Ice	2.71	2.66	95.17
			0.00			1" Ice	2.94	3.02	125.05
RRH 800MHz 2x50W	B	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	70.00
(Sprint DNK 2-4)			1.00			1/2" Ice	2.71	2.66	95.17
			0.00			1" Ice	2.94	3.02	125.05
RRH 800MHz 2x50W	C	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	70.00
(Sprint DNK 2-4)			-5.00			1/2" Ice	2.71	2.66	95.17
			0.00			1" Ice	2.94	3.02	125.05
TD-RRH8x20	A	From Face	0.50	0.0000	97.00	No Ice	4.72	1.70	66.13
(Sprint)			0.00			1/2" Ice	5.01	1.92	93.27
			0.00			1" Ice	5.32	2.14	123.93

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
TD-RRH8x20	B	From Face	0.50	0.0000	97.00	No Ice	4.72	1.70	66.13
(Sprint)			0.00			1/2" Ice	5.01	1.92	93.27
			0.00			1" Ice	5.32	2.14	123.93
TD-RRH8x20	C	From Face	0.50	0.0000	97.00	No Ice	4.72	1.70	66.13
(Sprint)			-5.00			1/2" Ice	5.01	1.92	93.27
			0.00			1" Ice	5.32	2.14	123.93
RRH 1900 MHz 2x40W	A	From Face	0.50	0.0000	97.00	No Ice	2.49	3.34	100.00
(Sprint DNK 2-4)			0.00			1/2" Ice	2.71	3.69	126.85
			0.00			1" Ice	2.94	4.08	162.74
RRH 1900 MHz 2x40W	B	From Face	0.50	0.0000	97.00	No Ice	2.49	3.34	100.00
(Sprint DNK 2-4)			0.00			1/2" Ice	2.71	3.69	126.85
			0.00			1" Ice	2.94	4.08	162.74
RRH 1900 MHz 2x40W	C	From Face	0.50	0.0000	97.00	No Ice	2.49	3.34	100.00
(Sprint DNK 2-4)			-5.00			1/2" Ice	2.71	3.69	126.85
			0.00			1" Ice	2.94	4.08	162.74
PM-SU35-48 - Pipe Mount	A	From Leg	1.50	0.0000	97.00	No Ice	5.07	5.07	112.00
48"			0.00			1/2" Ice	5.39	5.39	156.37
(Sprint DNK 2-4)			0.00			1" Ice	5.73	5.73	205.59
PM-SU35-48 - Pipe Mount	B	From Leg	1.50	0.0000	97.00	No Ice	5.07	5.07	112.00
48"			0.00			1/2" Ice	5.39	5.39	156.37
(Sprint DNK 2-4)			0.00			1" Ice	5.73	5.73	205.59
PM-SU35-48 - Pipe Mount	C	From Leg	1.50	0.0000	97.00	No Ice	5.07	5.07	112.00
48"			0.00			1/2" Ice	5.39	5.39	156.37
(Sprint DNK 2-4)			0.00			1" Ice	5.73	5.73	205.59
*** AIROSmith Antennas - Sprint (1/12/2018)									
*** Empire Antennas - 1/16/2018									
T-Frame	A	From Leg	2.00	0.0000	140.00	No Ice	8.90	8.90	224.00
(ATT DNK 12-17)			0.00			1/2" Ice	13.80	13.80	317.00
			0.00			1" Ice	18.80	18.80	410.00
T-Frame	B	From Leg	2.00	0.0000	140.00	No Ice	8.90	8.90	224.00
(ATT DNK 12-17)			0.00			1/2" Ice	13.80	13.80	317.00
			0.00			1" Ice	18.80	18.80	410.00
T-Frame	C	From Leg	2.00	0.0000	140.00	No Ice	8.90	8.90	224.00
(ATT DNK 12-17)			0.00			1/2" Ice	13.80	13.80	317.00
			0.00			1" Ice	18.80	18.80	410.00
7770.00	A	From Leg	1.50	0.0000	140.00	No Ice	5.53	4.01	52.03
(ATT DNK 12-17)			-5.00			1/2" Ice	5.89	4.64	97.08
			0.00			1" Ice	6.26	5.28	148.33
7770.00	B	From Leg	1.50	0.0000	140.00	No Ice	5.53	4.01	52.03
(ATT DNK 12-17)			-5.00			1/2" Ice	5.89	4.64	97.08
			0.00			1" Ice	6.26	5.28	148.33
7770.00	C	From Leg	1.50	0.0000	140.00	No Ice	5.53	4.01	52.03
(ATT DNK 12-17)			-5.00			1/2" Ice	5.89	4.64	97.08
			0.00			1" Ice	6.26	5.28	148.33
SBNH-1D6565C	A	From Leg	1.50	0.0000	140.00	No Ice	11.48	9.64	81.81
(ATT DNK 12-17)			0.00			1/2" Ice	12.11	11.07	169.21
			0.00			1" Ice	12.75	12.39	266.40
SBNH-1D6565C	B	From Leg	1.50	0.0000	140.00	No Ice	11.48	9.64	81.81
(ATT DNK 12-17)			0.00			1/2" Ice	12.11	11.07	169.21
			0.00			1" Ice	12.75	12.39	266.40
AM-X-CD-16-65-00T-RET	B	From Leg	1.50	0.0000	140.00	No Ice	8.26	4.64	50.00
(6')			0.00			1/2" Ice	8.81	5.09	95.50
(ATT DNK 12-17)			0.00			1" Ice	9.36	5.54	148.00
Surge Suppressor	B	From Face	0.50	0.0000	140.00	No Ice	0.80	0.80	30.00
(ATT DNK 12-17)			5.00			1/2" Ice	0.94	0.94	41.94

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	1.09	1.09	55.86
TPA-65R-LCUUUU-H8	A	From Leg	1.50	0.0000	140.00	No Ice	12.86	10.38	104.20
Panel w/ RET			-5.00			1/2" Ice	13.46	11.79	202.42
(ATT)			0.00			1" Ice	14.08	13.05	310.44
TPA-65R-LCUUUU-H8	B	From Leg	1.50	0.0000	140.00	No Ice	12.86	10.38	104.20
Panel w/ RET			-5.00			1/2" Ice	13.46	11.79	202.42
(ATT)			0.00			1" Ice	14.08	13.05	310.44
QS66512-3 Quintel Panel	C	From Leg	1.50	0.0000	140.00	No Ice	8.13	8.22	126.90
(ATT)			-5.00			1/2" Ice	8.59	9.19	199.99
			0.00			1" Ice	9.05	10.02	281.01
RRUS-32	A	From Leg	1.50	0.0000	140.00	No Ice	3.33	2.36	80.00
(ATT)			-5.00			1/2" Ice	3.55	2.56	112.20
			0.00			1" Ice	3.78	2.76	148.06
RRUS-12	A	From Leg	1.50	0.0000	140.00	No Ice	3.15	1.29	58.00
(ATT)			-5.00			1/2" Ice	3.36	1.44	81.22
			0.00			1" Ice	3.59	1.60	107.65
RRUS-11	A	From Leg	1.50	0.0000	140.00	No Ice	2.57	1.07	50.00
(ATT DNK 12-17)			-5.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
A2 Module Unit	A	From Leg	1.50	0.0000	140.00	No Ice	2.08	0.50	22.00
(ATT)			-5.00			1/2" Ice	2.26	0.61	34.73
			0.00			1" Ice	2.44	0.73	49.92
RRUS-32	B	From Leg	1.50	0.0000	140.00	No Ice	3.33	2.36	80.00
(ATT)			-5.00			1/2" Ice	3.55	2.56	112.20
			0.00			1" Ice	3.78	2.76	148.06
RRUS-12	B	From Leg	1.50	0.0000	140.00	No Ice	3.15	1.29	58.00
(ATT)			-5.00			1/2" Ice	3.36	1.44	81.22
			0.00			1" Ice	3.59	1.60	107.65
RRUS-11	B	From Leg	1.50	0.0000	140.00	No Ice	2.57	1.07	50.00
(ATT DNK 12-17)			-5.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
A2 Module Unit	B	From Leg	1.50	0.0000	140.00	No Ice	2.08	0.50	22.00
(ATT)			-5.00			1/2" Ice	2.26	0.61	34.73
			0.00			1" Ice	2.44	0.73	49.92
RRUS-32	C	From Leg	1.50	0.0000	140.00	No Ice	3.33	2.36	80.00
(ATT)			-5.00			1/2" Ice	3.55	2.56	112.20
			0.00			1" Ice	3.78	2.76	148.06
RRUS-12	C	From Leg	1.50	0.0000	140.00	No Ice	3.15	1.29	58.00
(ATT)			-5.00			1/2" Ice	3.36	1.44	81.22
			0.00			1" Ice	3.59	1.60	107.65
RRUS-11	C	From Leg	1.50	0.0000	140.00	No Ice	2.57	1.07	50.00
(ATT DNK 12-17)			-5.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
A2 Module Unit	C	From Leg	1.50	0.0000	140.00	No Ice	2.08	0.50	22.00
(ATT)			-5.00			1/2" Ice	2.26	0.61	34.73
			0.00			1" Ice	2.44	0.73	49.92
DC6-48-60-18-8F (Squid)	A	From Leg	0.50	0.0000	140.00	No Ice	0.79	0.79	20.00
Suppressor			0.00			1/2" Ice	1.27	1.27	35.12
(ATT)			0.00			1" Ice	1.45	1.45	52.57
TT19-08BP111-001 TMA's	A	From Leg	1.50	0.0000	140.00	No Ice	0.55	0.45	16.00
(ATT DNK 12-17)			0.00			1/2" Ice	0.65	0.53	21.80
			0.00			1" Ice	0.75	0.63	29.22
TT19-08BP111-001 TMA's	B	From Leg	1.50	0.0000	140.00	No Ice	0.55	0.45	16.00
(ATT DNK 12-17)			0.00			1/2" Ice	0.65	0.53	21.80
			0.00			1" Ice	0.75	0.63	29.22
TT19-08BP111-001 TMA's	C	From Leg	1.50	0.0000	140.00	No Ice	0.55	0.45	16.00
(ATT DNK 12-17)			0.00			1/2" Ice	0.65	0.53	21.80

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1" Ice	0.75	0.63	29.22
(2) LGP21401 Diplexer	A	From Leg	1.50	0.0000	140.00	No Ice	1.10	0.21	14.10
(ATT DNK 12-17)			0.00			1/2" Ice	1.24	0.27	21.26
			0.00			1" Ice	1.38	0.35	30.32
(2) LGP21401 Diplexer	B	From Leg	1.50	0.0000	140.00	No Ice	1.10	0.21	14.10
(ATT DNK 12-17)			0.00			1/2" Ice	1.24	0.27	21.26
			0.00			1" Ice	1.38	0.35	30.32
(2) LGP21401 Diplexer	C	From Leg	1.50	0.0000	140.00	No Ice	1.10	0.21	14.10
(ATT DNK 12-17)			0.00			1/2" Ice	1.24	0.27	21.26
			0.00			1" Ice	1.38	0.35	30.32
PM-SU35-48 - Pipe Mount	A	From Leg	1.50	0.0000	97.00	No Ice	5.07	5.07	112.00
48"			0.00			1/2" Ice	5.39	5.39	156.37
(Sprint)			0.00			1" Ice	5.73	5.73	205.59
PM-SU35-48 - Pipe Mount	B	From Leg	1.50	0.0000	97.00	No Ice	5.07	5.07	112.00
48"			0.00			1/2" Ice	5.39	5.39	156.37
(Sprint)			0.00			1" Ice	5.73	5.73	205.59
PM-SU35-48 - Pipe Mount	C	From Leg	1.50	0.0000	97.00	No Ice	5.07	5.07	112.00
48"			0.00			1/2" Ice	5.39	5.39	156.37
(Sprint)			0.00			1" Ice	5.73	5.73	205.59
** Antenna Equipment Upgrade TWM-014									
DSM2 w/ additional SFS-H	A	From Leg	0.50	0.0000	120.00	No Ice	6.65	2.32	156.00
Stabilizer			0.00			1/2" Ice	8.00	2.86	222.51
(T-Mobile)			0.00			1" Ice	9.41	3.42	302.10
DSM2 w/ additional SFS-H	B	From Leg	0.50	0.0000	120.00	No Ice	6.65	2.32	156.00
Stabilizer			0.00			1/2" Ice	8.00	2.86	222.51
(T-Mobile)			0.00			1" Ice	9.41	3.42	302.10
DSM2 w/ additional SFS-H	C	From Leg	0.50	0.0000	120.00	No Ice	6.65	2.32	156.00
Stabilizer			0.00			1/2" Ice	8.00	2.86	222.51
(T-Mobile)			0.00			1" Ice	9.41	3.42	302.10
RFS	A	From Leg	3.00	0.0000	120.00	No Ice	20.24	8.89	153.30
APXVAARR24_43-U-NA20			-1.50			1/2" Ice	20.89	9.49	265.89
Panel Antenna			0.00			1" Ice	21.54	10.09	387.02
(T-Mobile - Proposed)									
RFS	B	From Leg	3.00	0.0000	120.00	No Ice	20.24	8.89	153.30
APXVAARR24_43-U-NA20			-1.50			1/2" Ice	20.89	9.49	265.89
Panel Antenna			0.00			1" Ice	21.54	10.09	387.02
(T-Mobile - Proposed)									
RFS	C	From Leg	3.00	0.0000	120.00	No Ice	20.24	8.89	153.30
APXVAARR24_43-U-NA20			-1.50			1/2" Ice	20.89	9.49	265.89
Panel Antenna			0.00			1" Ice	21.54	10.09	387.02
(T-Mobile - Proposed)									
Ericsson Radio 4449 B66A	A	From Leg	3.00	0.0000	120.00	No Ice	1.64	1.35	72.00
RRH			1.50			1/2" Ice	1.80	1.50	89.60
(T-Mobile - Proposed)			4.00			1" Ice	1.97	1.65	109.91
Ericsson Radio 4449 B66A	B	From Leg	3.00	0.0000	120.00	No Ice	1.64	1.35	72.00
RRH			1.50			1/2" Ice	1.80	1.50	89.60
(T-Mobile - Proposed)			4.00			1" Ice	1.97	1.65	109.91
Ericsson Radio 4449 B66A	C	From Leg	3.00	0.0000	120.00	No Ice	1.64	1.35	72.00
RRH			1.50			1/2" Ice	1.80	1.50	89.60
(T-Mobile - Proposed)			4.00			1" Ice	1.97	1.65	109.91
Ericsson 4449 B71 + B12	A	From Leg	3.00	0.0000	120.00	No Ice	1.66	1.16	80.00
Radio Unit			1.50			1/2" Ice	1.82	1.29	96.16
(T-Mobile - Proposed)			-4.00			1" Ice	1.98	1.44	114.94
Ericsson 4449 B71 + B12	B	From Leg	3.00	0.0000	120.00	No Ice	1.66	1.16	80.00
Radio Unit			1.50			1/2" Ice	1.82	1.29	96.16
(T-Mobile - Proposed)			-4.00			1" Ice	1.98	1.44	114.94

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Ericsson 4449 B71 + B12	C	From Leg	3.00	0.0000	120.00	No Ice	1.66	1.16	80.00
Radio Unit			1.50			1/2" Ice	1.82	1.29	96.16
(T-Mobile - Proposed)			-4.00			1" Ice	1.98	1.44	114.94
Ericsson Radio 4415 B25	A	From Leg	3.00	0.0000	120.00	No Ice	1.86	0.83	50.00
RRH Unit			1.50			1/2" Ice	2.03	0.96	64.25
(T-Mobile - Proposed)			0.00			1" Ice	2.20	1.09	81.03
Ericsson Radio 4415 B25	B	From Leg	3.00	0.0000	120.00	No Ice	1.86	0.83	50.00
RRH Unit			1.50			1/2" Ice	2.03	0.96	64.25
(T-Mobile - Proposed)			0.00			1" Ice	2.20	1.09	81.03
Ericsson Radio 4415 B25	C	From Leg	3.00	0.0000	120.00	No Ice	1.86	0.83	50.00
RRH Unit			1.50			1/2" Ice	2.03	0.96	64.25
(T-Mobile - Proposed)			0.00			1" Ice	2.20	1.09	81.03
** Antenna Equipment Upgrade TWM-014									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
HPD2-4.7	C	Paraboloid	From	0.50	Worst		140.00	2.00	No Ice	3.14	27.00
(NWCT)		w/Shroud (HP)	Face	0.00					1/2" Ice	3.41	44.50
				0.00					1" Ice	3.68	62.00
6' w/ Radome	A	Paraboloid	From	1.00	Worst		106.50	6.00	No Ice	28.27	230.00
(DNK-5 / CSP-6)		w/Radome	Leg	0.00					1/2" Ice	29.07	340.00
				0.00					1" Ice	29.86	450.00
6' w/ Radome	C	Paraboloid	From	1.00	Worst		107.00	6.00	No Ice	28.27	230.00
(DNK-6 / CSP-7)		w/Radome	Leg	0.00					1/2" Ice	29.07	340.00
				0.00					1" Ice	29.86	450.00

222-G Verification Constants

Constant	Value
Wind Importance Factor Without Ice	1.15
Wind Importance Factor With Ice Factor	1
Ice Importance Factor	1.25
K_d	0.85
Z_g	900
α	9.5
K_{zmin}	0.85
K_e	1
K_t	0.53
f	2

222-G Section Verification ArRr By Element

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft^2	A_r w/Ice ft^2	A_rR_r ft^2	A_rR_r w/Ice ft^2
T1 160.00-150.00	1	P.5x.250	53.414	51.698	C	0.175	0.401	4.171	8.053	1.992	5.126
	1	P.5x.250	53.414	51.698	A	0.175	0.401	4.171	8.053	1.992	5.126
	2	P.5x.250	53.414	51.698	C	0.175	0.401	4.171	8.053	1.992	5.126
	2	P.5x.250	53.414	51.698	B	0.175	0.401	4.171	8.053	1.992	5.126
	3	P.5x.250	53.414	51.698	B	0.175	0.401	4.171	8.053	1.992	5.126
	3	P.5x.250	53.414	51.698	A	0.175	0.401	4.171	8.053	1.992	5.126
					A		Sum:	8.342	16.105	3.984	10.252
					B			8.342	16.105	3.984	10.252
					C			8.342	16.105	3.984	10.252
T2 150.00-125.00	22	P.5x.250	53.713	52.006	C	0.13	0.301	10.428	20.139	4.790	12.066
	22	P.5x.250	53.713	52.006	A	0.13	0.301	10.428	20.139	4.790	12.066
	23	P.5x.250	53.713	52.006	C	0.13	0.301	10.428	20.139	4.790	12.066
	23	P.5x.250	53.713	52.006	B	0.13	0.301	10.428	20.139	4.790	12.066
	24	P.5x.250	53.713	52.006	B	0.13	0.301	10.428	20.139	4.790	12.066
	24	P.5x.250	53.713	52.006	A	0.13	0.301	10.428	20.139	4.790	12.066
					A		Sum:	20.856	40.277	9.580	24.131
					B			20.856	40.277	9.580	24.131
					C			20.856	40.277	9.580	24.131
T3 125.00-100.00	52	P.5x.250	54.318	52.657	C	0.122	0.281	10.428	20.164	4.731	11.961
	52	P.5x.250	54.318	52.657	A	0.122	0.281	10.428	20.164	4.731	11.961
	53	P.5x.250	54.318	52.657	C	0.122	0.281	10.428	20.164	4.731	11.961
	53	P.5x.250	54.318	52.657	B	0.122	0.281	10.428	20.164	4.731	11.961
	54	P.5x.250	54.318	52.657	B	0.122	0.281	10.428	20.164	4.731	11.961
	54	P.5x.250	54.318	52.657	A	0.122	0.281	10.428	20.164	4.731	11.961
					A		Sum:	20.856	40.327	9.461	23.923
					B			20.856	40.327	9.461	23.923
					C			20.856	40.327	9.461	23.923
T4 100.00-75.00	91	P5x0.3 w/ (3) 1.5x5/8 Plates	79.844	57.301	C	0.14	0.286	15.101	24.874	6.248	14.793
	91	P5x0.3 w/ (3) 1.5x5/8 Plates	79.844	57.301	A	0.14	0.286	15.101	24.874	6.248	14.793
	92	P5x0.3 w/ (3) 1.5x5/8 Plates	79.844	57.301	C	0.14	0.286	15.101	24.874	6.248	14.793
	92	P5x0.3 w/ (3) 1.5x5/8 Plates	79.844	57.301	B	0.14	0.286	15.101	24.874	6.248	14.793
	93	P5x0.3 w/ (3) 1.5x5/8 Plates	79.844	57.301	B	0.14	0.286	15.101	24.874	6.248	14.793
	93	P5x0.3 w/ (3) 1.5x5/8 Plates	79.844	57.301	A	0.14	0.286	15.101	24.874	6.248	14.793
					A		Sum:	30.202	49.748	12.496	29.586
					B			30.202	49.748	12.496	29.586
					C			30.202	49.748	12.496	29.586
T5 75.00-66.67	130	P5x0.4 w/ (3) 1.5x5/8 Plates	80.757	57.998	C	0.134	0.275	5.034	8.299	2.066	4.910
	130	P5x0.4 w/ (3) 1.5x5/8 Plates	80.757	57.998	A	0.134	0.275	5.034	8.299	2.066	4.910
	131	P5x0.4 w/ (3) 1.5x5/8 Plates	80.757	57.998	C	0.134	0.275	5.034	8.299	2.066	4.910
	131	P5x0.4 w/ (3) 1.5x5/8 Plates	80.757	57.998	B	0.134	0.275	5.034	8.299	2.066	4.910
	132	P5x0.4 w/ (3) 1.5x5/8 Plates	80.757	57.998	B	0.134	0.275	5.034	8.299	2.066	4.910
	132	P5x0.4 w/ (3) 1.5x5/8 Plates	80.757	57.998	A	0.134	0.275	5.034	8.299	2.066	4.910

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft^2	A_r w/Ice ft^2	A_rR_r ft^2	A_rR_r w/Ice ft^2
					A		Sum:	10.067	16.598	4.133	9.819
					B			10.067	16.598	4.133	9.819
					C			10.067	16.598	4.133	9.819
T6 66.67-58.33	145	P5x0.4 w/ (3) 1.5x5/8 Plates	81.216	58.34	C	0.131	0.27	5.034	8.301	2.059	4.900
	145	P5x0.4 w/ (3) 1.5x5/8 Plates	81.216	58.34	A	0.131	0.27	5.034	8.301	2.059	4.900
	146	P5x0.4 w/ (3) 1.5x5/8 Plates	81.216	58.34	C	0.131	0.27	5.034	8.301	2.059	4.900
	146	P5x0.4 w/ (3) 1.5x5/8 Plates	81.216	58.34	B	0.131	0.27	5.034	8.301	2.059	4.900
	147	P5x0.4 w/ (3) 1.5x5/8 Plates	81.216	58.34	B	0.131	0.27	5.034	8.301	2.059	4.900
	147	P5x0.4 w/ (3) 1.5x5/8 Plates	81.216	58.34	A	0.131	0.27	5.034	8.301	2.059	4.900
					A		Sum:	10.067	16.603	4.119	9.800
					B			10.067	16.603	4.119	9.800
					C			10.067	16.603	4.119	9.800
T7 58.33-50.00	160	HSS5x.4	56.379	54.836	C	0.131	0.32	3.476	6.743	1.553	4.082
	160	HSS5x.4	56.379	54.836	A	0.131	0.32	3.476	6.743	1.553	4.082
	161	HSS5x.4	56.379	54.836	C	0.131	0.32	3.476	6.743	1.553	4.082
	161	HSS5x.4	56.379	54.836	B	0.131	0.32	3.476	6.743	1.553	4.082
	162	HSS5x.4	56.379	54.836	B	0.131	0.32	3.476	6.743	1.553	4.082
	162	HSS5x.4	56.379	54.836	A	0.131	0.32	3.476	6.743	1.553	4.082
					A		Sum:	6.952	13.487	3.106	8.165
					B			6.952	13.487	3.106	8.165
					C			6.952	13.487	3.106	8.165
T8 50.00-37.50	187	HSS6.875x.4	77.918	65.716	C	0.118	0.23	7.169	12.060	2.890	6.999
	187	HSS6.875x.4	77.918	65.716	A	0.118	0.23	7.169	12.060	2.890	6.999
	188	HSS6.875x.4	77.918	65.716	C	0.118	0.23	7.169	12.060	2.890	6.999
	188	HSS6.875x.4	77.918	65.716	B	0.118	0.23	7.169	12.060	2.890	6.999
	189	HSS6.875x.4	77.918	65.716	B	0.118	0.23	7.169	12.060	2.890	6.999
	189	HSS6.875x.4	77.918	65.716	A	0.118	0.23	7.169	12.060	2.890	6.999
					A		Sum:	14.338	24.121	5.780	13.998
					B			14.338	24.121	5.780	13.998
					C			14.338	24.121	5.780	13.998
T9 37.50-25.00	202	HSS6.875x.4	78.005	65.575	C	0.129	0.272	7.169	12.021	2.929	7.102
	202	HSS6.875x.4	78.005	65.575	A	0.129	0.272	7.169	12.021	2.929	7.102
	203	HSS6.875x.4	78.005	65.575	C	0.129	0.272	7.169	12.021	2.929	7.102
	203	HSS6.875x.4	78.005	65.575	B	0.129	0.272	7.169	12.021	2.929	7.102
	204	HSS6.875x.4	78.005	65.575	B	0.129	0.272	7.169	12.021	2.929	7.102
	204	HSS6.875x.4	78.005	65.575	A	0.129	0.272	7.169	12.021	2.929	7.102
					A		Sum:	14.338	24.042	5.858	14.204
					B			14.338	24.042	5.858	14.204
					C			14.338	24.042	5.858	14.204
T10 25.00-0.00	229	HSS6.875x0.5 w/ (3) 2x5/8 Bars	108.841	71.147	C	0.133	0.23	20.293	29.543	8.324	17.147
	229	HSS6.875x0.5 w/ (3) 2x5/8 Bars	108.841	71.147	A	0.133	0.23	20.293	29.543	8.324	17.147
	230	HSS6.875x0.5 w/ (3) 2x5/8 Bars	108.841	71.147	C	0.133	0.23	20.293	29.543	8.324	17.147
	230	HSS6.875x0.5 w/ (3) 2x5/8 Bars	108.841	71.147	B	0.133	0.23	20.293	29.543	8.324	17.147
	231	HSS6.875x0.5 w/ (3) 2x5/8 Bars	108.841	71.147	B	0.133	0.23	20.293	29.543	8.324	17.147
	231	HSS6.875x0.5 w/ (3) 2x5/8 Bars	108.841	71.147	A	0.133	0.23	20.293	29.543	8.324	17.147
					A		Sum:	40.587	59.085	16.648	34.293
					B			40.587	59.085	16.648	34.293
					C			40.587	59.085	16.648	34.293

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft^2	A_r w/Ice ft^2	A_rR_r ft^2	A_rR_r w/Ice ft^2

222-G Section Verification Tables - No Ice

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft^2
T1 160.00-150.00	155.00		1.388	5.82	1.19		36	A	0.175	3.984
								B	0.175	3.984
								C	0.175	3.984
T2 150.00-125.00	137.50		1.353	4.771	1.235		36	A	0.13	9.580
								B	0.13	9.580
								C	0.13	9.580
T3 125.00-100.00	112.50		1.297	3.591	1.317		37	A	0.122	9.461
								B	0.122	9.461
								C	0.122	9.461
T4 100.00-75.00	87.50		1.231	2.703	1.431		38	A	0.14	12.496
								B	0.14	12.496
								C	0.14	12.496
T5 75.00-66.67	70.83		1.177	2.237	1.53		39	A	0.134	4.133
								B	0.134	4.133
								C	0.134	4.133
T6 66.67-58.33	62.50		1.146	2.034	1.589		39	A	0.131	4.119
								B	0.131	4.119
								C	0.131	4.119
T7 58.33-50.00	54.17		1.112	1.851	1.655		40	A	0.131	3.106
								B	0.131	3.106
								C	0.131	3.106
T8 50.00-37.50	43.75		1.063	1.644	1.749		40	A	0.118	5.780
								B	0.118	5.780
								C	0.118	5.780
T9 37.50-25.00	31.25		0.991	1.426	1.881		40	A	0.129	5.858
								B	0.129	5.858
								C	0.129	5.858
T10 25.00-0.00	12.50		0.85	1.153	2.131		39	A	0.133	16.648
								B	0.133	16.648
								C	0.133	16.648

222-G Section Verification Tables - Ice

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft^2
T1 160.00-150.00	155.00	155.00	1.388	5.82	1.19	2.3264	9	A	0.401	22.167
								B	0.401	22.167
								C	0.401	22.167
T2 150.00-125.00	137.50	137.50	1.353	4.771	1.235	2.3281	9	A	0.301	45.954
								B	0.301	45.954
								C	0.301	45.954

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T3 125.00-100.00	112.50	112.50	1.297	3.591	1.317	2.3341	9	A	0.281	47.877
								B	0.281	47.877
								C	0.281	47.877
T4 100.00-75.00	87.50	87.50	1.231	2.703	1.431	2.3431	10	A	0.286	55.787
								B	0.286	55.787
								C	0.286	55.787
T5 75.00-66.67	70.83	70.83	1.177	2.237	1.53	2.3487	10	A	0.275	19.049
								B	0.275	19.049
								C	0.275	19.049
T6 66.67-58.33	62.50	62.50	1.146	2.034	1.589	2.3503	10	A	0.27	19.286
								B	0.27	19.286
								C	0.27	19.286
T7 58.33-50.00	54.17	54.17	1.112	1.851	1.655	2.3501	10	A	0.32	22.989
								B	0.32	22.989
								C	0.32	22.989
T8 50.00-37.50	43.75	43.75	1.063	1.644	1.749	2.3453	10	A	0.23	25.270
								B	0.23	25.270
								C	0.23	25.270
T9 37.50-25.00	31.25	31.25	0.991	1.426	1.881	2.3264	10	A	0.272	31.470
								B	0.272	31.470
								C	0.272	31.470
T10 25.00-0.00	12.50	12.50	0.85	1.153	2.131	2.2174	10	A	0.23	57.132
								B	0.23	57.132
								C	0.23	57.132

222-G Section Verification Tables - Service

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T1 160.00-150.00	155.00		1.388	5.82	1.19		13	A	0.175	3.984
								B	0.175	3.984
								C	0.175	3.984
T2 150.00-125.00	137.50		1.353	4.771	1.235		13	A	0.13	9.580
								B	0.13	9.580
								C	0.13	9.580
T3 125.00-100.00	112.50		1.297	3.591	1.317		13	A	0.122	9.461
								B	0.122	9.461
								C	0.122	9.461
T4 100.00-75.00	87.50		1.231	2.703	1.431		14	A	0.14	12.496
								B	0.14	12.496
								C	0.14	12.496
T5 75.00-66.67	70.83		1.177	2.237	1.53		14	A	0.134	4.133
								B	0.134	4.133
								C	0.134	4.133
T6 66.67-58.33	62.50		1.146	2.034	1.589		14	A	0.131	4.119
								B	0.131	4.119
								C	0.131	4.119
T7 58.33-50.00	54.17		1.112	1.851	1.655		14	A	0.131	3.106
								B	0.131	3.106
								C	0.131	3.106
T8 50.00-37.50	43.75		1.063	1.644	1.749		15	A	0.118	5.780
								B	0.118	5.780
								C	0.118	5.780
T9 37.50-25.00	31.25		0.991	1.426	1.881		15	A	0.129	5.858
								B	0.129	5.858

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T10 25.00-0.00	12.50		0.85	1.153	2.131		14	C	0.129	5.858
								A	0.133	16.648
								B	0.133	16.648
								C	0.133	16.648

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	155.00	1.388	36	110.170	A	10.889	8.342	8.342	43.38	0.000	0.000
160.00-150.00					B	10.889	8.342		43.38	13.484	0.000
					C	10.889	8.342		43.38	0.000	0.000
T2	137.50	1.353	36	310.425	A	19.557	20.856	20.856	51.61	0.000	0.000
150.00-125.00					B	19.557	20.856		51.61	98.660	0.000
					C	19.557	20.856		51.61	0.000	0.000
T3	112.50	1.297	37	360.425	A	23.281	20.856	20.856	47.25	0.000	0.000
125.00-100.00					B	23.281	20.856		47.25	140.472	0.000
					C	23.281	20.856		47.25	9.950	0.000
T4	87.50	1.231	38	416.680	A	28.204	30.202	30.202	51.71	0.000	0.000
100.00-75.00					B	28.204	30.202		51.71	151.116	0.000
					C	28.204	30.202		51.71	21.100	0.000
T5 75.00-66.67	70.83	1.177	39	150.004	A	9.964	10.067	10.067	50.26	0.000	0.000
					B	9.964	10.067		50.26	52.353	0.000
					C	9.964	10.067		50.26	7.483	0.000
T6 66.67-58.33	62.50	1.146	39	155.560	A	10.257	10.067	10.067	49.53	0.000	0.000
					B	10.257	10.067		49.53	52.339	0.000
					C	10.257	10.067		49.53	7.483	0.000
T7 58.33-50.00	54.17	1.112	40	159.031	A	13.957	6.952	6.952	33.25	0.000	0.000
					B	13.957	6.952		33.25	52.327	0.000
					C	13.957	6.952		33.25	7.483	0.000
T8 50.00-37.50	43.75	1.063	40	250.917	A	15.266	14.338	14.338	48.43	0.000	0.000
					B	15.266	14.338		48.43	78.472	0.000
					C	15.266	14.338		48.43	11.225	0.000
T9 37.50-25.00	31.25	0.991	40	263.417	A	19.771	14.338	14.338	42.04	0.000	0.000
					B	19.771	14.338		42.04	78.468	0.000
					C	19.771	14.338		42.04	11.225	0.000
T10 25.00-0.00	12.50	0.85	39	572.674	A	35.491	40.587	40.587	53.35	0.000	0.000
					B	35.491	40.587		53.35	157.038	0.000
					C	35.491	40.587		53.35	22.450	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	155.00	1.388	9	2.3264	114.050	A	10.889	34.822	16.105	35.23	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
160.00-150.00						B	10.889	34.822		35.23	69.238	0.000
						C	10.889	34.822		35.23	0.000	0.000
T2	137.50	1.353	9	2.3281	320.133	A	19.557	76.701	40.277	41.84	0.000	0.000
150.00-125.00						B	19.557	76.701		41.84	377.244	0.000
						C	19.557	76.701		41.84	0.000	0.000
T3	112.50	1.297	9	2.3341	370.158	A	23.281	80.707	40.327	38.78	0.000	0.000
125.00-100.00						B	23.281	80.707		38.78	498.307	0.000
						C	23.281	80.707		38.78	39.219	0.000
T4 100.00-75.00	87.50	1.231	10	2.3431	426.451	A	28.204	93.804	49.748	40.77	0.000	0.000
						B	28.204	93.804		40.77	531.086	0.000
						C	28.204	93.804		40.77	80.242	0.000
T5 75.00-66.67	70.83	1.177	10	2.3487	153.269	A	9.964	32.201	16.598	39.37	0.000	0.000
						B	9.964	32.201		39.37	186.028	0.000
						C	9.964	32.201		39.37	28.431	0.000
T6 66.67-58.33	62.50	1.146	10	2.3503	158.827	A	10.257	32.674	16.603	38.67	0.000	0.000
						B	10.257	32.674		38.67	186.106	0.000
						C	10.257	32.674		38.67	28.440	0.000
T7 58.33-50.00	54.17	1.112	10	2.3501	162.297	A	13.957	37.974	13.487	25.97	0.000	0.000
						B	13.957	37.974		25.97	186.096	0.000
						C	13.957	37.974		25.97	28.439	0.000
T8 50.00-37.50	43.75	1.063	10	2.3453	255.807	A	15.266	43.542	24.121	41.02	0.000	0.000
						B	15.266	43.542		41.02	278.793	0.000
						C	15.266	43.542		41.02	42.618	0.000
T9 37.50-25.00	31.25	0.991	10	2.3264	268.268	A	19.771	53.268	24.042	32.92	0.000	0.000
						B	19.771	53.268		32.92	277.413	0.000
						C	19.771	53.268		32.92	42.459	0.000
T10 25.00-0.00	12.50	0.85	10	2.2174	581.921	A	35.491	98.435	59.085	44.12	0.000	0.000
						B	35.491	98.435		44.12	538.887	0.000
						C	35.491	98.435		44.12	83.084	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	155.00	1.388	13	110.170	A	10.889	8.342	8.342	43.38	0.000	0.000
160.00-150.00					B	10.889	8.342		43.38	13.484	0.000
					C	10.889	8.342		43.38	0.000	0.000
T2	137.50	1.353	13	310.425	A	19.557	20.856	20.856	51.61	0.000	0.000
150.00-125.00					B	19.557	20.856		51.61	98.660	0.000
					C	19.557	20.856		51.61	0.000	0.000
T3	112.50	1.297	13	360.425	A	23.281	20.856	20.856	47.25	0.000	0.000
125.00-100.00					B	23.281	20.856		47.25	140.472	0.000
					C	23.281	20.856		47.25	9.950	0.000
T4	87.50	1.231	14	416.680	A	28.204	30.202	30.202	51.71	0.000	0.000
100.00-75.00					B	28.204	30.202		51.71	151.116	0.000
					C	28.204	30.202		51.71	21.100	0.000
T5 75.00-66.67	70.83	1.177	14	150.004	A	9.964	10.067	10.067	50.26	0.000	0.000
					B	9.964	10.067		50.26	52.353	0.000
					C	9.964	10.067		50.26	7.483	0.000
T6 66.67-58.33	62.50	1.146	14	155.560	A	10.257	10.067	10.067	49.53	0.000	0.000
					B	10.257	10.067		49.53	52.339	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
					C	10.257	10.067		49.53	7.483	0.000
T7 58.33-50.00	54.17	1.112	14	159.031	A	13.957	6.952	6.952	33.25	0.000	0.000
					B	13.957	6.952		33.25	52.327	0.000
					C	13.957	6.952		33.25	7.483	0.000
T8 50.00-37.50	43.75	1.063	15	250.917	A	15.266	14.338	14.338	48.43	0.000	0.000
					B	15.266	14.338		48.43	78.472	0.000
					C	15.266	14.338		48.43	11.225	0.000
T9 37.50-25.00	31.25	0.991	15	263.417	A	19.771	14.338	14.338	42.04	0.000	0.000
					B	19.771	14.338		42.04	78.468	0.000
					C	19.771	14.338		42.04	11.225	0.000
T10 25.00-0.00	12.50	0.85	14	572.674	A	35.491	40.587	40.587	53.35	0.000	0.000
					B	35.491	40.587		53.35	157.038	0.000
					C	35.491	40.587		53.35	22.450	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	44.80	1181.68	A	0.175	2.683	36	1	1	14.873	1540.72	154.07	C
160.00-150.00			B	0.175	2.683		1	1	14.873			
			C	0.175	2.683		1	1	14.873			
T2	409.01	2323.89	A	0.13	2.846	36	1	1	29.136	4706.11	188.24	C
150.00-125.00			B	0.13	2.846		1	1	29.136			
			C	0.13	2.846		1	1	29.136			
T3	690.24	3860.01	A	0.122	2.875	37	1	1	32.743	6200.17	248.01	C
125.00-100.00			B	0.122	2.875		1	1	32.743			
			C	0.122	2.875		1	1	32.743			
T4	813.36	5084.15	A	0.14	2.808	38	1	1	40.700	7462.40	298.50	C
100.00-75.00			B	0.14	2.808		1	1	40.700			
			C	0.14	2.808		1	1	40.700			
T5	289.47	2103.33	A	0.134	2.833	39	1	1	14.097	2653.66	318.44	C
75.00-66.67			B	0.134	2.833		1	1	14.097			
			C	0.134	2.833		1	1	14.097			
T6	289.47	2140.98	A	0.131	2.844	39	1	1	14.376	2715.22	325.83	C
66.67-58.33			B	0.131	2.844		1	1	14.376			
			C	0.131	2.844		1	1	14.376			
T7	289.47	2316.33	A	0.131	2.841	40	1	1	17.063	3000.51	360.06	C
58.33-50.00			B	0.131	2.841		1	1	17.063			
			C	0.131	2.841		1	1	17.063			
T8	434.21	3003.52	A	0.118	2.893	40	1	1	21.047	4141.78	331.34	C
50.00-37.50			B	0.118	2.893		1	1	21.047			
			C	0.118	2.893		1	1	21.047			
T9	434.21	3416.13	A	0.129	2.848	40	1	1	25.629	4566.38	365.31	C
37.50-25.00			B	0.129	2.848		1	1	25.629			
			C	0.129	2.848		1	1	25.629			
T10	868.43	8678.73	A	0.133	2.836	39	1	1	52.139	8940.88	357.64	C
25.00-0.00			B	0.133	2.836		1	1	52.139			
			C	0.133	2.836		1	1	52.139			
Sum Weight:	4562.68	34108.77						OTM	3192.24 kip-ft	45927.82		

Tower Forces - No Ice - Wind 45 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	44.80	1181.68	A	0.175	2.683	36	0.825	1	12.967	1385.31	138.53	C
160.00-150.00			B	0.175	2.683		0.825	1	12.967			
			C	0.175	2.683		0.825	1	12.967			
T2	409.01	2323.89	A	0.13	2.846	36	0.825	1	25.714	4406.75	176.27	C
150.00-125.00			B	0.13	2.846		0.825	1	25.714			
			C	0.13	2.846		0.825	1	25.714			
T3	690.24	3860.01	A	0.122	2.875	37	0.825	1	28.668	5831.92	233.28	C
125.00-100.00			B	0.122	2.875		0.825	1	28.668			
			C	0.122	2.875		0.825	1	28.668			
T4	813.36	5084.15	A	0.14	2.808	38	0.825	1	35.765	7013.54	280.54	C
100.00-75.00			B	0.14	2.808		0.825	1	35.765			
			C	0.14	2.808		0.825	1	35.765			
T5	289.47	2103.33	A	0.134	2.833	39	0.825	1	12.353	2489.99	298.80	C
75.00-66.67			B	0.134	2.833		0.825	1	12.353			
			C	0.134	2.833		0.825	1	12.353			
T6	289.47	2140.98	A	0.131	2.844	39	0.825	1	12.581	2544.16	305.30	C
66.67-58.33			B	0.131	2.844		0.825	1	12.581			
			C	0.131	2.844		0.825	1	12.581			
T7	289.47	2316.33	A	0.131	2.841	40	0.825	1	14.621	2765.54	331.86	C
58.33-50.00			B	0.131	2.841		0.825	1	14.621			
			C	0.131	2.841		0.825	1	14.621			
T8	434.21	3003.52	A	0.118	2.893	40	0.825	1	18.375	3877.37	310.19	C
50.00-37.50			B	0.118	2.893		0.825	1	18.375			
			C	0.118	2.893		0.825	1	18.375			
T9	434.21	3416.13	A	0.129	2.848	40	0.825	1	22.169	4228.46	338.28	C
37.50-25.00			B	0.129	2.848		0.825	1	22.169			
			C	0.129	2.848		0.825	1	22.169			
T10	868.43	8678.73	A	0.133	2.836	39	0.825	1	45.928	8353.98	334.16	C
25.00-0.00			B	0.133	2.836		0.825	1	45.928			
			C	0.133	2.836		0.825	1	45.928			
Sum Weight:	4562.68	34108.77						OTM	2981.81 kip-ft	42897.03		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	44.80	1181.68	A	0.175	2.683	36	0.8	1	12.695	1363.11	136.31	C
160.00-150.00			B	0.175	2.683		0.8	1	12.695			
			C	0.175	2.683		0.8	1	12.695			
T2	409.01	2323.89	A	0.13	2.846	36	0.8	1	25.225	4363.98	174.56	C
150.00-125.00			B	0.13	2.846		0.8	1	25.225			
			C	0.13	2.846		0.8	1	25.225			
T3	690.24	3860.01	A	0.122	2.875	37	0.8	1	28.086	5779.31	231.17	C
125.00-100.00			B	0.122	2.875		0.8	1	28.086			
			C	0.122	2.875		0.8	1	28.086			
T4	813.36	5084.15	A	0.14	2.808	38	0.8	1	35.060	6949.42	277.98	C
100.00-75.00			B	0.14	2.808		0.8	1	35.060			
			C	0.14	2.808		0.8	1	35.060			

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
T5	289.47	2103.33	A	0.134	2.833	39	0.8	1	12.104	2466.61	295.99	C
75.00-66.67			B	0.134	2.833		0.8	1	12.104			
			C	0.134	2.833		0.8	1	12.104			
T6	289.47	2140.98	A	0.131	2.844	39	0.8	1	12.324	2519.72	302.37	C
66.67-58.33			B	0.131	2.844		0.8	1	12.324			
			C	0.131	2.844		0.8	1	12.324			
T7	289.47	2316.33	A	0.131	2.841	40	0.8	1	14.272	2731.97	327.84	C
58.33-50.00			B	0.131	2.841		0.8	1	14.272			
			C	0.131	2.841		0.8	1	14.272			
T8	434.21	3003.52	A	0.118	2.893	40	0.8	1	17.994	3839.60	307.17	C
50.00-37.50			B	0.118	2.893		0.8	1	17.994			
			C	0.118	2.893		0.8	1	17.994			
T9	434.21	3416.13	A	0.129	2.848	40	0.8	1	21.675	4180.19	334.42	C
37.50-25.00			B	0.129	2.848		0.8	1	21.675			
			C	0.129	2.848		0.8	1	21.675			
T10	868.43	8678.73	A	0.133	2.836	39	0.8	1	45.041	8270.14	330.81	C
25.00-0.00			B	0.133	2.836		0.8	1	45.041			
			C	0.133	2.836		0.8	1	45.041			
Sum Weight:	4562.68	34108.77						OTM	2951.75 kip-ft	42464.06		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	44.80	1181.68	A	0.175	2.683	36	0.85	1	13.239	1407.51	140.75	C
160.00-150.00			B	0.175	2.683		0.85	1	13.239			
			C	0.175	2.683		0.85	1	13.239			
T2	409.01	2323.89	A	0.13	2.846	36	0.85	1	26.203	4449.52	177.98	C
150.00-125.00			B	0.13	2.846		0.85	1	26.203			
			C	0.13	2.846		0.85	1	26.203			
T3	690.24	3860.01	A	0.122	2.875	37	0.85	1	29.250	5884.53	235.38	C
125.00-100.00			B	0.122	2.875		0.85	1	29.250			
			C	0.122	2.875		0.85	1	29.250			
T4	813.36	5084.15	A	0.14	2.808	38	0.85	1	36.470	7077.67	283.11	C
100.00-75.00			B	0.14	2.808		0.85	1	36.470			
			C	0.14	2.808		0.85	1	36.470			
T5	289.47	2103.33	A	0.134	2.833	39	0.85	1	12.603	2513.37	301.60	C
75.00-66.67			B	0.134	2.833		0.85	1	12.603			
			C	0.134	2.833		0.85	1	12.603			
T6	289.47	2140.98	A	0.131	2.844	39	0.85	1	12.837	2568.59	308.23	C
66.67-58.33			B	0.131	2.844		0.85	1	12.837			
			C	0.131	2.844		0.85	1	12.837			
T7	289.47	2316.33	A	0.131	2.841	40	0.85	1	14.970	2799.10	335.89	C
58.33-50.00			B	0.131	2.841		0.85	1	14.970			
			C	0.131	2.841		0.85	1	14.970			
T8	434.21	3003.52	A	0.118	2.893	40	0.85	1	18.757	3915.15	313.21	C
50.00-37.50			B	0.118	2.893		0.85	1	18.757			
			C	0.118	2.893		0.85	1	18.757			
T9	434.21	3416.13	A	0.129	2.848	40	0.85	1	22.663	4276.74	342.14	C
37.50-25.00			B	0.129	2.848		0.85	1	22.663			
			C	0.129	2.848		0.85	1	22.663			

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
T10	868.43	8678.73	A	0.133	2.836	39	0.85	1	46.816	8437.82	337.51	C
25.00-0.00			B	0.133	2.836		0.85	1	46.816			
			C	0.133	2.836		0.85	1	46.816			
Sum Weight:	4562.68	34108.77						OTM	3011.87 kip-ft	43330.00		

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	973.95	4811.28	A	0.401	2.062	9	1	1	33.056	919.14	91.91	C
160.00-150.00			B	0.401	2.062		1	1	33.056			
			C	0.401	2.062		1	1	33.056			
T2	6093.04	9531.09	A	0.301	2.294	9	1	1	65.511	3184.80	127.39	C
150.00-125.00			B	0.301	2.294		1	1	65.511			
			C	0.301	2.294		1	1	65.511			
T3	8980.94	12846.86	A	0.281	2.348	9	1	1	71.158	4167.93	166.72	C
125.00-100.00			B	0.281	2.348		1	1	71.158			
			C	0.281	2.348		1	1	71.158			
T4	10189.70	16522.28	A	0.286	2.334	10	1	1	83.991	4890.87	195.63	C
100.00-75.00			B	0.286	2.334		1	1	83.991			
			C	0.286	2.334		1	1	83.991			
T5	3602.59	6088.78	A	0.275	2.364	10	1	1	29.014	1748.48	209.82	C
75.00-66.67			B	0.275	2.364		1	1	29.014			
			C	0.275	2.364		1	1	29.014			
T6	3605.57	6218.81	A	0.27	2.378	10	1	1	29.543	1782.85	213.94	C
66.67-58.33			B	0.27	2.378		1	1	29.543			
			C	0.27	2.378		1	1	29.543			
T7	3605.19	7092.54	A	0.32	2.244	10	1	1	36.947	1909.42	229.13	C
58.33-50.00			B	0.32	2.244		1	1	36.947			
			C	0.32	2.244		1	1	36.947			
T8	5394.36	8354.74	A	0.23	2.499	10	1	1	40.536	2693.01	215.44	C
50.00-37.50			B	0.23	2.499		1	1	40.536			
			C	0.23	2.499		1	1	40.536			
T9	5341.73	9985.80	A	0.272	2.372	10	1	1	51.241	2864.91	229.19	C
37.50-25.00			B	0.272	2.372		1	1	51.241			
			C	0.272	2.372		1	1	51.241			
T10	10085.47	21412.84	A	0.23	2.498	10	1	1	92.623	5373.20	214.93	C
25.00-0.00			B	0.23	2.498		1	1	92.623			
			C	0.23	2.498		1	1	92.623			
Sum Weight:	57872.54	102865.02						OTM	2090.44 kip-ft	29534.62		

Tower Forces - With Ice - Wind 45 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	973.95	4811.28	A	0.401	2.062	9	0.825	1	31.150	889.11	88.91	C
160.00-150.00			B	0.401	2.062		0.825	1	31.150			
			C	0.401	2.062		0.825	1	31.150			
T2	6093.04	9531.09	A	0.301	2.294	9	0.825	1	62.089	3124.14	124.97	C
150.00-125.00			B	0.301	2.294		0.825	1	62.089			
			C	0.301	2.294		0.825	1	62.089			
T3	8980.94	12846.86	A	0.281	2.348	9	0.825	1	67.084	4092.35	163.69	C
125.00-100.00			B	0.281	2.348		0.825	1	67.084			
			C	0.281	2.348		0.825	1	67.084			
T4	10189.70	16522.28	A	0.286	2.334	10	0.825	1	79.055	4797.11	191.88	C
100.00-75.00			B	0.286	2.334		0.825	1	79.055			
			C	0.286	2.334		0.825	1	79.055			
T5	3602.59	6088.78	A	0.275	2.364	10	0.825	1	27.270	1714.15	205.70	C
75.00-66.67			B	0.275	2.364		0.825	1	27.270			
			C	0.275	2.364		0.825	1	27.270			
T6	3605.57	6218.81	A	0.27	2.378	10	0.825	1	27.748	1746.90	209.63	C
66.67-58.33			B	0.27	2.378		0.825	1	27.748			
			C	0.27	2.378		0.825	1	27.748			
T7	3605.19	7092.54	A	0.32	2.244	10	0.825	1	34.504	1862.77	223.53	C
58.33-50.00			B	0.32	2.244		0.825	1	34.504			
			C	0.32	2.244		0.825	1	34.504			
T8	5394.36	8354.74	A	0.23	2.499	10	0.825	1	37.865	2635.59	210.85	C
50.00-37.50			B	0.23	2.499		0.825	1	37.865			
			C	0.23	2.499		0.825	1	37.865			
T9	5341.73	9985.80	A	0.272	2.372	10	0.825	1	47.781	2794.17	223.53	C
37.50-25.00			B	0.272	2.372		0.825	1	47.781			
			C	0.272	2.372		0.825	1	47.781			
T10	10085.47	21412.84	A	0.23	2.498	10	0.825	1	86.412	5243.22	209.73	C
25.00-0.00			B	0.23	2.498		0.825	1	86.412			
			C	0.23	2.498		0.825	1	86.412			
Sum Weight:	57872.54	102865.02						OTM	2047.18 kip-ft	28899.52		

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	973.95	4811.28	A	0.401	2.062	9	0.8	1	30.878	884.82	88.48	C
160.00-150.00			B	0.401	2.062		0.8	1	30.878			
			C	0.401	2.062		0.8	1	30.878			
T2	6093.04	9531.09	A	0.301	2.294	9	0.8	1	61.600	3115.48	124.62	C
150.00-125.00			B	0.301	2.294		0.8	1	61.600			
			C	0.301	2.294		0.8	1	61.600			
T3	8980.94	12846.86	A	0.281	2.348	9	0.8	1	66.502	4081.56	163.26	C
125.00-100.00			B	0.281	2.348		0.8	1	66.502			
			C	0.281	2.348		0.8	1	66.502			
T4	10189.70	16522.28	A	0.286	2.334	10	0.8	1	78.350	4783.72	191.35	C
100.00-75.00			B	0.286	2.334		0.8	1	78.350			
			C	0.286	2.334		0.8	1	78.350			
T5	3602.59	6088.78	A	0.275	2.364	10	0.8	1	27.021	1709.24	205.11	C
75.00-66.67			B	0.275	2.364		0.8	1	27.021			
			C	0.275	2.364		0.8	1	27.021			

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
T6	3605.57	6218.81	A	0.27	2.378	10	0.8	1	27.491	1741.77	209.01	C
66.67-58.33			B	0.27	2.378		0.8	1	27.491			
			C	0.27	2.378		0.8	1	27.491			
T7	3605.19	7092.54	A	0.32	2.244	10	0.8	1	34.155	1856.10	222.73	C
58.33-50.00			B	0.32	2.244		0.8	1	34.155			
			C	0.32	2.244		0.8	1	34.155			
T8	5394.36	8354.74	A	0.23	2.499	10	0.8	1	37.483	2627.39	210.19	C
50.00-37.50			B	0.23	2.499		0.8	1	37.483			
			C	0.23	2.499		0.8	1	37.483			
T9	5341.73	9985.80	A	0.272	2.372	10	0.8	1	47.287	2784.06	222.73	C
37.50-25.00			B	0.272	2.372		0.8	1	47.287			
			C	0.272	2.372		0.8	1	47.287			
T10	10085.47	21412.84	A	0.23	2.498	10	0.8	1	85.525	5224.66	208.99	C
25.00-0.00			B	0.23	2.498		0.8	1	85.525			
			C	0.23	2.498		0.8	1	85.525			
Sum Weight:	57872.54	102865.02						OTM	2041.00 kip-ft	28808.79		

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	973.95	4811.28	A	0.401	2.062	9	0.85	1	31.423	893.40	89.34	C
160.00-150.00			B	0.401	2.062		0.85	1	31.423			
			C	0.401	2.062		0.85	1	31.423			
T2	6093.04	9531.09	A	0.301	2.294	9	0.85	1	62.578	3132.81	125.31	C
150.00-125.00			B	0.301	2.294		0.85	1	62.578			
			C	0.301	2.294		0.85	1	62.578			
T3	8980.94	12846.86	A	0.281	2.348	9	0.85	1	67.666	4103.15	164.13	C
125.00-100.00			B	0.281	2.348		0.85	1	67.666			
			C	0.281	2.348		0.85	1	67.666			
T4	10189.70	16522.28	A	0.286	2.334	10	0.85	1	79.760	4810.50	192.42	C
100.00-75.00			B	0.286	2.334		0.85	1	79.760			
			C	0.286	2.334		0.85	1	79.760			
T5	3602.59	6088.78	A	0.275	2.364	10	0.85	1	27.519	1719.05	206.29	C
75.00-66.67			B	0.275	2.364		0.85	1	27.519			
			C	0.275	2.364		0.85	1	27.519			
T6	3605.57	6218.81	A	0.27	2.378	10	0.85	1	28.004	1752.04	210.24	C
66.67-58.33			B	0.27	2.378		0.85	1	28.004			
			C	0.27	2.378		0.85	1	28.004			
T7	3605.19	7092.54	A	0.32	2.244	10	0.85	1	34.853	1869.43	224.33	C
58.33-50.00			B	0.32	2.244		0.85	1	34.853			
			C	0.32	2.244		0.85	1	34.853			
T8	5394.36	8354.74	A	0.23	2.499	10	0.85	1	38.246	2643.79	211.50	C
50.00-37.50			B	0.23	2.499		0.85	1	38.246			
			C	0.23	2.499		0.85	1	38.246			
T9	5341.73	9985.80	A	0.272	2.372	10	0.85	1	48.275	2804.28	224.34	C
37.50-25.00			B	0.272	2.372		0.85	1	48.275			
			C	0.272	2.372		0.85	1	48.275			
T10	10085.47	21412.84	A	0.23	2.498	10	0.85	1	87.300	5261.79	210.47	C
25.00-0.00			B	0.23	2.498		0.85	1	87.300			
			C	0.23	2.498		0.85	1	87.300			

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
Sum Weight:	57872.54	102865.02						OTM	2053.36 kip-ft	28990.25		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	44.80	1181.68	A	0.175	2.683	13	1	1	14.873	557.65	55.77	C
160.00-150.00			B	0.175	2.683		1	1	14.873			
			C	0.175	2.683		1	1	14.873			
T2	409.01	2323.89	A	0.13	2.846	13	1	1	29.136	1703.34	68.13	C
150.00-125.00			B	0.13	2.846		1	1	29.136			
			C	0.13	2.846		1	1	29.136			
T3	690.24	3860.01	A	0.122	2.875	13	1	1	32.743	2244.10	89.76	C
125.00-100.00			B	0.122	2.875		1	1	32.743			
			C	0.122	2.875		1	1	32.743			
T4	813.36	5084.15	A	0.14	2.808	14	1	1	40.700	2700.95	108.04	C
100.00-75.00			B	0.14	2.808		1	1	40.700			
			C	0.14	2.808		1	1	40.700			
T5	289.47	2103.33	A	0.134	2.833	14	1	1	14.097	960.47	115.26	C
75.00-66.67			B	0.134	2.833		1	1	14.097			
			C	0.134	2.833		1	1	14.097			
T6	289.47	2140.98	A	0.131	2.844	14	1	1	14.376	982.75	117.93	C
66.67-58.33			B	0.131	2.844		1	1	14.376			
			C	0.131	2.844		1	1	14.376			
T7	289.47	2316.33	A	0.131	2.841	14	1	1	17.063	1086.01	130.32	C
58.33-50.00			B	0.131	2.841		1	1	17.063			
			C	0.131	2.841		1	1	17.063			
T8	434.21	3003.52	A	0.118	2.893	15	1	1	21.047	1499.08	119.93	C
50.00-37.50			B	0.118	2.893		1	1	21.047			
			C	0.118	2.893		1	1	21.047			
T9	434.21	3416.13	A	0.129	2.848	15	1	1	25.629	1652.76	132.22	C
37.50-25.00			B	0.129	2.848		1	1	25.629			
			C	0.129	2.848		1	1	25.629			
T10	868.43	8678.73	A	0.133	2.836	14	1	1	52.139	3236.08	129.44	C
25.00-0.00			B	0.133	2.836		1	1	52.139			
			C	0.133	2.836		1	1	52.139			
Sum Weight:	4562.68	34108.77						OTM	1155.41 kip-ft	16623.20		

Tower Forces - Service - Wind 45 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	44.80	1181.68	A	0.175	2.683	13	0.825	1	12.967	501.40	50.14	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
160.00-150.00			B	0.175	2.683		0.825	1	12.967			
			C	0.175	2.683		0.825	1	12.967			
T2	409.01	2323.89	A	0.13	2.846	13	0.825	1	25.714	1594.99	63.80	C
150.00-125.00			B	0.13	2.846		0.825	1	25.714			
			C	0.13	2.846		0.825	1	25.714			
T3	690.24	3860.01	A	0.122	2.875	13	0.825	1	28.668	2110.82	84.43	C
125.00-100.00			B	0.122	2.875		0.825	1	28.668			
			C	0.122	2.875		0.825	1	28.668			
T4	813.36	5084.15	A	0.14	2.808	14	0.825	1	35.765	2538.50	101.54	C
100.00-75.00			B	0.14	2.808		0.825	1	35.765			
			C	0.14	2.808		0.825	1	35.765			
T5	289.47	2103.33	A	0.134	2.833	14	0.825	1	12.353	901.23	108.15	C
75.00-66.67			B	0.134	2.833		0.825	1	12.353			
			C	0.134	2.833		0.825	1	12.353			
T6	289.47	2140.98	A	0.131	2.844	14	0.825	1	12.581	920.84	110.50	C
66.67-58.33			B	0.131	2.844		0.825	1	12.581			
			C	0.131	2.844		0.825	1	12.581			
T7	289.47	2316.33	A	0.131	2.841	14	0.825	1	14.621	1000.96	120.12	C
58.33-50.00			B	0.131	2.841		0.825	1	14.621			
			C	0.131	2.841		0.825	1	14.621			
T8	434.21	3003.52	A	0.118	2.893	15	0.825	1	18.375	1403.38	112.27	C
50.00-37.50			B	0.118	2.893		0.825	1	18.375			
			C	0.118	2.893		0.825	1	18.375			
T9	434.21	3416.13	A	0.129	2.848	15	0.825	1	22.169	1530.46	122.44	C
37.50-25.00			B	0.129	2.848		0.825	1	22.169			
			C	0.129	2.848		0.825	1	22.169			
T10	868.43	8678.73	A	0.133	2.836	14	0.825	1	45.928	3023.65	120.95	C
25.00-0.00			B	0.133	2.836		0.825	1	45.928			
			C	0.133	2.836		0.825	1	45.928			
Sum Weight:	4562.68	34108.77						OTM	1079.24 kip-ft	15526.23		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	44.80	1181.68	A	0.175	2.683	13	0.8	1	12.695	493.37	49.34	C
160.00-150.00			B	0.175	2.683		0.8	1	12.695			
			C	0.175	2.683		0.8	1	12.695			
T2	409.01	2323.89	A	0.13	2.846	13	0.8	1	25.225	1579.51	63.18	C
150.00-125.00			B	0.13	2.846		0.8	1	25.225			
			C	0.13	2.846		0.8	1	25.225			
T3	690.24	3860.01	A	0.122	2.875	13	0.8	1	28.086	2091.78	83.67	C
125.00-100.00			B	0.122	2.875		0.8	1	28.086			
			C	0.122	2.875		0.8	1	28.086			
T4	813.36	5084.15	A	0.14	2.808	14	0.8	1	35.060	2515.29	100.61	C
100.00-75.00			B	0.14	2.808		0.8	1	35.060			
			C	0.14	2.808		0.8	1	35.060			
T5	289.47	2103.33	A	0.134	2.833	14	0.8	1	12.104	892.77	107.13	C
75.00-66.67			B	0.134	2.833		0.8	1	12.104			
			C	0.134	2.833		0.8	1	12.104			
T6	289.47	2140.98	A	0.131	2.844	14	0.8	1	12.324	911.99	109.44	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
66.67-58.33			B	0.131	2.844		0.8	1	12.324			
			C	0.131	2.844		0.8	1	12.324			
T7	289.47	2316.33	A	0.131	2.841	14	0.8	1	14.272	988.81	118.66	C
58.33-50.00			B	0.131	2.841		0.8	1	14.272			
			C	0.131	2.841		0.8	1	14.272			
T8	434.21	3003.52	A	0.118	2.893	15	0.8	1	17.994	1389.71	111.18	C
50.00-37.50			B	0.118	2.893		0.8	1	17.994			
			C	0.118	2.893		0.8	1	17.994			
T9	434.21	3416.13	A	0.129	2.848	15	0.8	1	21.675	1512.99	121.04	C
37.50-25.00			B	0.129	2.848		0.8	1	21.675			
			C	0.129	2.848		0.8	1	21.675			
T10	868.43	8678.73	A	0.133	2.836	14	0.8	1	45.041	2993.31	119.73	C
25.00-0.00			B	0.133	2.836		0.8	1	45.041			
			C	0.133	2.836		0.8	1	45.041			
Sum Weight:	4562.68	34108.77						OTM	1068.36 kip-ft	15369.52		

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 ft²	F lb	w plf	Ctrl. Face
T1	44.80	1181.68	A	0.175	2.683	13	0.85	1	13.239	509.44	50.94	C
160.00-150.00			B	0.175	2.683		0.85	1	13.239			
			C	0.175	2.683		0.85	1	13.239			
T2	409.01	2323.89	A	0.13	2.846	13	0.85	1	26.203	1610.47	64.42	C
150.00-125.00			B	0.13	2.846		0.85	1	26.203			
			C	0.13	2.846		0.85	1	26.203			
T3	690.24	3860.01	A	0.122	2.875	13	0.85	1	29.250	2129.86	85.19	C
125.00-100.00			B	0.122	2.875		0.85	1	29.250			
			C	0.122	2.875		0.85	1	29.250			
T4	813.36	5084.15	A	0.14	2.808	14	0.85	1	36.470	2561.70	102.47	C
100.00-75.00			B	0.14	2.808		0.85	1	36.470			
			C	0.14	2.808		0.85	1	36.470			
T5	289.47	2103.33	A	0.134	2.833	14	0.85	1	12.603	909.69	109.16	C
75.00-66.67			B	0.134	2.833		0.85	1	12.603			
			C	0.134	2.833		0.85	1	12.603			
T6	289.47	2140.98	A	0.131	2.844	14	0.85	1	12.837	929.68	111.56	C
66.67-58.33			B	0.131	2.844		0.85	1	12.837			
			C	0.131	2.844		0.85	1	12.837			
T7	289.47	2316.33	A	0.131	2.841	14	0.85	1	14.970	1013.11	121.57	C
58.33-50.00			B	0.131	2.841		0.85	1	14.970			
			C	0.131	2.841		0.85	1	14.970			
T8	434.21	3003.52	A	0.118	2.893	15	0.85	1	18.757	1417.05	113.36	C
50.00-37.50			B	0.118	2.893		0.85	1	18.757			
			C	0.118	2.893		0.85	1	18.757			
T9	434.21	3416.13	A	0.129	2.848	15	0.85	1	22.663	1547.93	123.83	C
37.50-25.00			B	0.129	2.848		0.85	1	22.663			
			C	0.129	2.848		0.85	1	22.663			
T10	868.43	8678.73	A	0.133	2.836	14	0.85	1	46.816	3054.00	122.16	C
25.00-0.00			B	0.133	2.836		0.85	1	46.816			
			C	0.133	2.836		0.85	1	46.816			
Sum Weight:	4562.68	34108.77						OTM	1090.12	15682.94		

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
									kip-ft			

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	11767.25					
Bracing Weight	22341.53					
Total Member Self-Weight	34108.77			-2.47	-13.37	
Total Weight	49446.76			-2.47	-13.37	
Wind 0 deg - No Ice		-180.21	-62891.30	-5233.11	7.46	74.33
Wind 30 deg - No Ice		29969.91	-52125.58	-4365.72	-2519.83	36.31
Wind 45 deg - No Ice		42170.98	-42200.34	-3537.57	-3547.57	12.87
Wind 60 deg - No Ice		51339.69	-29557.70	-2479.51	-4323.45	-11.44
Wind 90 deg - No Ice		60251.96	180.21	18.36	-5062.37	-56.13
Wind 120 deg - No Ice		54519.61	31601.72	2630.89	-4552.55	-85.78
Wind 135 deg - No Ice		43650.46	43679.82	3647.11	-3662.05	-92.25
Wind 150 deg - No Ice		30282.04	52305.79	4381.61	-2555.91	-92.44
Wind 180 deg - No Ice		180.21	59427.53	4987.68	-34.20	-74.33
Wind 210 deg - No Ice		-29969.91	52125.58	4360.78	2493.09	-36.31
Wind 225 deg - No Ice		-42170.98	42200.34	3532.63	3520.83	-12.87
Wind 240 deg - No Ice		-54339.40	31289.58	2594.81	4504.98	11.44
Wind 270 deg - No Ice		-60251.96	-180.21	-23.30	5035.63	56.13
Wind 300 deg - No Ice		-51519.90	-29869.83	-2515.58	4317.54	85.78
Wind 315 deg - No Ice		-42425.84	-42455.20	-3567.02	3550.29	92.25
Wind 330 deg - No Ice		-30282.04	-52305.79	-4386.55	2529.17	92.44
Member Ice	68756.24					
Total Weight Ice	200509.99			-170.50	-175.21	
Wind 0 deg - Ice		-38.91	-38396.55	-3381.84	-171.04	46.82
Wind 30 deg - Ice		18884.77	-32761.50	-2917.41	-1758.71	4.88
Wind 45 deg - Ice		26663.09	-26673.87	-2407.73	-2412.40	-17.33
Wind 60 deg - Ice		32591.15	-18801.67	-1747.84	-2911.37	-38.36
Wind 90 deg - Ice		37836.94	38.91	-166.34	-3349.42	-71.33
Wind 120 deg - Ice		33258.65	19231.98	1438.77	-2958.35	-85.19
Wind 135 deg - Ice		26974.74	26985.52	2090.09	-2435.77	-83.55
Wind 150 deg - Ice		18952.17	32800.41	2580.57	-1765.92	-76.22
Wind 180 deg - Ice		38.91	37670.73	2991.39	-179.38	-46.82
Wind 210 deg - Ice		-18884.77	32761.50	2576.40	1408.28	-4.88
Wind 225 deg - Ice		-26663.09	26673.87	2066.72	2061.98	17.33
Wind 240 deg - Ice		-33219.73	19164.58	1431.55	2603.76	38.36
Wind 270 deg - Ice		-37836.94	-38.91	-174.67	2999.00	71.33
Wind 300 deg - Ice		-32630.07	-18869.07	-1755.06	2565.11	85.19
Wind 315 deg - Ice		-26718.12	-26728.90	-2413.62	2067.87	83.55
Wind 330 deg - Ice		-18952.17	-32800.41	-2921.57	1415.50	76.22
Total Weight	49446.76			-2.47	-13.37	
Wind 0 deg - Service		-65.23	-22762.99	-1894.22	11.68	26.90
Wind 30 deg - Service		10847.36	-18866.43	-1580.27	-903.05	13.14
Wind 45 deg - Service		15263.44	-15274.07	-1280.53	-1275.03	4.66
Wind 60 deg - Service		18581.98	-10698.17	-897.57	-1555.86	-4.14
Wind 90 deg - Service		21807.70	65.23	6.51	-1823.30	-20.32
Wind 120 deg - Service		19732.93	11437.98	952.09	-1638.78	-31.05
Wind 135 deg - Service		15798.93	15809.55	1319.91	-1316.47	-33.39

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 150 deg - Service		10960.34	18931.65	1585.75	-916.11	-33.46
Wind 180 deg - Service		65.23	21509.31	1805.12	-3.40	-26.90
Wind 210 deg - Service		-10847.36	18866.43	1578.21	911.34	-13.14
Wind 225 deg - Service		-15263.44	15274.07	1278.47	1283.32	-4.66
Wind 240 deg - Service		-19667.70	11325.01	939.04	1639.52	4.14
Wind 270 deg - Service		-21807.70	-65.23	-8.57	1831.59	20.32
Wind 300 deg - Service		-18647.21	-10811.14	-910.63	1571.68	31.05
Wind 315 deg - Service		-15355.69	-15366.31	-1291.19	1293.98	33.39
Wind 330 deg - Service		-10960.34	-18931.65	-1587.81	924.39	33.46

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice

Comb. No.	Description
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

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	160 - 150	Leg	Max Tension	29	646.62	-0.35	-0.01
			Max. Compression	35	-4053.18	-0.15	-0.05
			Max. Mx	28	495.26	0.45	-0.09
			Max. My	25	-347.50	-0.17	0.50
			Max. Vy	18	-558.00	0.00	0.00
			Max. Vx	10	903.82	0.00	0.00
		Diagonal	Max Tension	21	2413.01	0.00	0.00
			Max. Compression	20	-2532.39	0.00	0.00
			Max. Mx	34	-232.82	0.14	0.00
			Max. My	34	-213.51	0.00	0.00
			Max. Vy	34	-75.43	0.00	0.00
			Max. Vx	34	-2.35	0.00	0.00
		Horizontal	Max Tension	6	1962.08	0.02	0.00
			Max. Compression	25	-1956.38	0.00	0.00
			Max. Mx	48	6.13	0.09	0.02
			Max. My	35	214.40	0.08	0.02
			Max. Vy	48	-81.45	0.09	0.02
			Max. Vx	40	5.36	0.00	0.00
		Top Girt	Max Tension	29	930.91	0.00	0.00
			Max. Compression	12	-958.62	0.02	0.00
			Max. Mx	48	-29.51	0.08	0.02
			Max. My	38	-11.41	0.08	0.02
			Max. Vy	48	78.25	0.08	0.02
			Max. Vx	38	5.20	0.00	0.00
T2	150 - 125	Leg	Max Tension	29	16291.57	-0.75	-0.10
			Max. Compression	35	-22656.57	0.16	-0.04
			Max. Mx	28	5461.59	2.29	-0.15
			Max. My	4	-1016.48	-0.06	2.34
			Max. Vy	28	-2899.87	-1.84	-0.15

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	20	2795.44	-0.02	1.71
		Diagonal	Max Tension	17	10680.64	0.00	0.00
			Max. Compression	16	-10797.92	0.00	0.00
			Max. Mx	34	-226.58	0.24	0.00
			Max. My	34	-202.79	0.00	-0.01
			Max. Vy	34	-89.22	0.00	0.00
			Max. Vx	34	-3.35	0.00	0.00
		Horizontal	Max Tension	30	6666.76	0.00	0.00
			Max. Compression	15	-6742.25	0.02	0.00
			Max. Mx	38	185.33	0.11	0.03
			Max. My	38	-624.89	0.11	0.03
			Max. Vy	38	80.20	0.11	0.03
			Max. Vx	35	-6.25	0.00	0.00
T3	125 - 100	Leg	Max Tension	29	59728.75	-0.37	-0.19
			Max. Compression	12	-71986.83	1.28	0.17
			Max. Mx	18	27442.58	1.69	0.20
			Max. My	20	-4337.26	-0.03	-1.70
			Max. Vy	8	-966.47	-0.38	0.24
			Max. Vx	24	-1125.54	-0.21	-0.61
		Diagonal	Max Tension	17	16023.87	0.00	0.00
			Max. Compression	16	-16303.17	0.00	0.00
			Max. Mx	34	-464.99	0.35	0.00
			Max. My	34	-399.44	0.00	-0.01
			Max. Vy	34	-123.26	0.00	0.00
			Max. Vx	34	4.26	0.00	0.00
		Horizontal	Max Tension	30	10867.05	0.00	0.00
			Max. Compression	15	-10943.85	0.05	0.01
			Max. Mx	38	-749.52	0.22	0.01
			Max. My	12	2168.78	0.00	-0.03
			Max. Vy	38	123.51	0.22	0.01
			Max. Vx	12	-4.54	0.00	-0.03
		Inner Bracing	Max Tension	13	6.49	0.00	0.00
			Max. Compression	43	-13.32	0.00	0.00
			Max. Mx	34	-9.89	-0.12	0.00
			Max. Vy	34	68.40	0.00	0.00
T4	100 - 75	Leg	Max Tension	29	121913.33	-0.28	-0.15
			Max. Compression	12	-142714.52	0.64	0.16
			Max. Mx	8	73993.11	2.51	-0.03
			Max. My	20	-7730.16	-0.05	-2.64
			Max. Vy	8	-1330.84	-1.32	0.16
			Max. Vx	26	-1384.60	-0.04	-1.45
		Diagonal	Max Tension	17	21863.25	0.00	0.00
			Max. Compression	16	-22213.93	0.00	0.00
			Max. Mx	34	-676.85	0.44	0.00
			Max. My	34	-581.00	0.00	-0.01
			Max. Vy	34	-147.10	0.00	0.00
			Max. Vx	34	-4.76	0.00	0.00
		Horizontal	Max Tension	16	15797.67	0.10	-0.00
			Max. Compression	15	-15628.71	0.09	0.01
			Max. Mx	38	-630.47	0.30	0.01
			Max. My	12	-132.40	0.04	-0.03
			Max. Vy	38	-159.31	0.30	0.01
			Max. Vx	12	-5.37	0.04	-0.03
		Top Girt	Max Tension	30	13160.45	0.00	0.00
			Max. Compression	15	-13276.47	0.04	0.01
			Max. Mx	38	-855.89	0.20	0.01
			Max. My	12	2794.35	0.02	-0.03
			Max. Vy	38	118.98	0.20	0.01
			Max. Vx	12	-5.03	0.02	-0.03
		Inner Bracing	Max Tension	15	228.72	0.00	0.00
			Max. Compression	14	-233.44	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	34	-11.69	-0.16	0.00
			Max. Vy	34	78.30	0.00	0.00
T5	75 - 66.6667	Leg	Max Tension	29	145052.92	-0.63	-0.16
			Max. Compression	12	-168992.11	0.99	0.14
			Max. Mx	12	-168992.11	0.99	0.14
			Max. My	12	69556.84	-0.34	0.81
			Max. Vy	28	-950.50	-0.63	-0.16
			Max. Vx	12	1232.91	-0.34	0.81
		Diagonal	Max Tension	17	24350.44	0.00	0.00
			Max. Compression	16	-24759.24	0.00	0.00
			Max. Mx	34	-625.38	0.50	0.00
			Max. My	34	-668.85	0.00	-0.02
			Max. Vy	34	-164.24	0.00	0.00
			Max. Vx	34	5.21	0.00	0.00
		Horizontal	Max Tension	16	17899.40	0.11	-0.00
			Max. Compression	15	-17847.63	0.09	0.01
			Max. Mx	38	-862.84	0.31	0.01
			Max. My	12	3427.90	0.06	-0.04
			Max. Vy	38	165.01	0.31	0.01
			Max. Vx	12	-5.37	0.06	-0.04
		Inner Bracing	Max Tension	13	6.14	0.00	0.00
			Max. Compression	43	-15.87	0.00	0.00
			Max. Mx	34	-12.49	-0.17	0.00
			Max. Vy	34	81.73	0.00	0.00
T6	66.6667 - 58.3333	Leg	Max Tension	29	169483.56	-0.89	-0.15
			Max. Compression	12	-196601.51	-0.81	0.23
			Max. Mx	12	-196211.08	0.99	0.14
			Max. My	10	-10668.25	-0.14	1.65
			Max. Vy	24	388.39	0.98	0.01
			Max. Vx	12	-412.94	0.19	1.58
		Diagonal	Max Tension	17	25250.60	0.00	0.00
			Max. Compression	16	-25678.76	0.00	0.00
			Max. Mx	34	-806.99	0.53	0.00
			Max. My	34	-716.43	0.00	-0.02
			Max. Vy	34	170.53	0.00	0.00
			Max. Vx	34	-5.32	0.00	0.00
		Top Girt	Max Tension	16	18933.35	0.12	-0.00
			Max. Compression	33	-18664.09	0.00	0.00
			Max. Mx	38	980.08	0.34	0.00
			Max. My	12	-1434.61	0.06	-0.03
			Max. Vy	38	171.48	0.34	0.00
			Max. Vx	46	5.24	0.30	-0.02
		Inner Bracing	Max Tension	33	322.10	0.00	0.00
			Max. Compression	32	-329.49	0.00	0.00
			Max. Mx	34	-12.86	-0.19	0.00
			Max. Vy	34	85.00	0.00	0.00
T7	58.3333 - 50	Leg	Max Tension	29	193617.78	0.55	-0.23
			Max. Compression	12	-223704.24	0.01	0.31
			Max. Mx	12	-223612.74	2.72	-0.19
			Max. My	10	-11315.95	-0.14	1.65
			Max. Vy	12	-913.87	2.72	-0.19
			Max. Vx	12	745.46	0.19	1.58
		Diagonal	Max Tension	33	26066.08	0.00	0.00
			Max. Compression	16	-26650.32	0.00	0.00
			Max. Mx	30	12590.07	-0.26	0.01
			Max. My	38	-1744.16	-0.02	-0.03
			Max. Vy	37	120.10	-0.18	-0.03
			Max. Vx	40	6.89	0.00	0.00
		Top Girt	Max Tension	32	19752.04	0.00	0.00
			Max. Compression	15	-19675.02	0.12	0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	38	-1040.71	0.39	0.00
			Max. My	12	3397.21	0.04	-0.04
			Max. Vy	38	-182.03	0.39	0.00
			Max. Vx	46	5.47	0.32	-0.02
		Redund Horz 1 Bracing	Max Tension	12	3878.83	0.00	0.00
			Max. Compression	12	-3878.83	0.00	0.00
			Max. Mx	34	917.02	-0.05	0.00
			Max. My	34	660.02	0.00	0.00
			Max. Vy	34	45.15	0.00	0.00
			Max. Vx	34	-1.04	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	12	2569.62	0.00	0.00
			Max. Compression	12	-2569.62	0.00	0.00
			Max. Mx	34	607.50	-0.07	0.00
			Max. My	34	437.24	0.00	-0.00
			Max. Vy	34	43.50	0.00	0.00
			Max. Vx	34	1.38	0.00	0.00
		Inner Bracing	Max Tension	15	337.77	0.00	0.00
			Max. Compression	14	-346.62	0.00	0.00
			Max. Mx	34	-15.06	-0.20	0.00
			Max. Vy	34	88.65	0.00	0.00
T8	50 - 37.5	Leg	Max Tension	29	219515.50	-0.16	-0.31
			Max. Compression	12	-252920.01	-0.83	0.48
			Max. Mx	12	-252920.01	-1.27	0.48
			Max. My	12	106280.08	0.15	2.47
			Max. Vy	25	327.83	0.05	-0.01
			Max. Vx	12	-503.80	0.15	2.47
		Diagonal	Max Tension	33	33476.52	0.00	0.00
			Max. Compression	32	-33990.67	0.00	0.00
			Max. Mx	34	-660.22	0.91	0.00
			Max. My	34	-780.55	0.00	-0.03
			Max. Vy	34	-227.54	0.00	0.00
			Max. Vx	34	8.41	0.00	0.00
		Top Girt	Max Tension	32	21172.27	0.00	0.00
			Max. Compression	33	-20831.52	0.00	0.00
			Max. Mx	38	1098.79	0.45	0.02
			Max. My	12	-1539.37	-0.03	-0.07
			Max. Vy	38	194.16	0.45	0.02
			Max. Vx	12	-7.95	-0.03	-0.07
		Inner Bracing	Max Tension	33	359.03	0.00	0.00
			Max. Compression	32	-369.03	0.00	0.00
			Max. Mx	34	-17.23	-0.23	0.00
			Max. Vy	34	97.53	0.00	0.00
T9	37.5 - 25	Leg	Max Tension	29	255292.23	0.54	-0.49
			Max. Compression	12	-293305.64	-2.90	0.57
			Max. Mx	12	-293141.91	6.95	-0.40
			Max. My	10	-13915.95	-0.32	3.14
			Max. Vy	12	1707.77	6.95	-0.40
			Max. Vx	12	-1014.44	0.95	3.09
		Diagonal	Max Tension	33	35454.12	-0.28	-0.01
			Max. Compression	32	-36173.68	0.00	0.00
			Max. Mx	30	16293.44	-0.45	0.02
			Max. My	35	-1729.64	-0.23	0.05
			Max. Vy	38	-152.23	-0.30	-0.05
			Max. Vx	48	9.76	0.00	0.00
		Top Girt	Max Tension	32	22634.99	0.00	0.00
			Max. Compression	15	-22597.34	0.15	0.01
			Max. Mx	38	-1230.45	0.54	0.01
			Max. My	12	4127.69	-0.02	-0.07
			Max. Vy	38	-217.66	0.54	0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	12	-8.08	-0.02	-0.07
		Redund Horz 1 Bracing	Max Tension	12	5086.33	0.00	0.00
			Max. Compression	12	-5086.33	0.00	0.00
			Max. Mx	34	997.99	-0.06	0.00
			Max. My	34	782.31	0.00	0.00
			Max. Vy	34	48.71	0.00	0.00
			Max. Vx	34	-1.12	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	12	3993.52	0.00	0.00
			Max. Compression	12	-3993.52	0.00	0.00
			Max. Mx	34	856.27	-0.09	0.00
			Max. My	34	614.23	0.00	-0.00
			Max. Vy	34	46.27	0.00	0.00
			Max. Vx	34	-1.77	0.00	0.00
		Inner Bracing	Max Tension	15	387.31	0.00	0.00
			Max. Compression	14	-398.62	0.00	0.00
			Max. Mx	34	-6.26	-0.26	0.00
			Max. Vy	34	-102.27	0.00	0.00
T10	25 - 0	Leg	Max Tension	29	334388.79	-3.30	-0.42
			Max. Compression	12	-383715.60	0.00	0.00
			Max. Mx	12	-339301.93	3.58	0.41
			Max. My	10	-14814.97	-0.32	3.14
			Max. Vy	2	-849.36	3.57	-0.43
			Max. Vx	2	-676.74	-1.76	-2.27
		Diagonal	Max Tension	33	38315.44	0.00	0.00
			Max. Compression	32	-39061.05	0.00	0.00
			Max. Mx	34	-1144.13	1.17	0.00
			Max. My	34	-450.91	0.00	0.04
			Max. Vy	34	-275.78	0.00	0.00
			Max. Vx	34	-9.41	0.00	0.00
		Horizontal	Max Tension	32	26300.01	0.00	0.00
			Max. Compression	15	-25939.43	0.23	0.01
			Max. Mx	38	-898.91	0.68	0.01
			Max. My	12	4839.99	0.08	-0.07
			Max. Vy	38	-263.03	0.68	0.01
			Max. Vx	12	8.53	0.06	-0.07
		Inner Bracing	Max Tension	13	8.56	0.00	0.00
			Max. Compression	43	-25.65	0.00	0.00
			Max. Mx	34	-20.48	-0.29	0.00
			Max. Vy	34	-105.98	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	24	424164.87	47591.99	-27993.00
	Max. H_x	24	424164.87	47591.99	-27993.00
	Max. H_z	7	-361160.86	-40729.28	26607.47
	Min. Vert	9	-372289.77	-43055.39	25379.70
	Min. H_x	9	-372289.77	-43055.39	25379.70
	Min. H_z	24	424164.87	47591.99	-27993.00
Leg B	Max. Vert	12	428457.92	-46339.25	-30760.27
	Max. H_x	29	-374141.57	41787.20	28120.21
	Max. H_z	33	-326436.39	33193.94	30635.86
	Min. Vert	29	-374141.57	41787.20	28120.21

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg A	Min. H_x	12	428457.92	-46339.25	-30760.27
	Min. H_z	14	408039.60	-42069.86	-32392.85
	Max. Vert	2	426611.17	3022.89	55390.12
	Max. H_x	26	21600.69	14700.77	1493.14
	Max. H_z	2	426611.17	3022.89	55390.12
	Min. Vert	19	-373124.85	-3007.44	-50136.76
	Min. H_x	13	-189845.23	-14722.80	-26174.91
	Min. H_z	19	-373124.85	-3007.44	-50136.76

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	49446.76	-0.00	-0.00	-2.47	-13.37	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	59336.11	-288.34	-100626.08	-8103.53	17.29	118.93
0.9 Dead+1.6 Wind 0 deg - No Ice	44502.08	-288.34	-100626.08	-8102.79	21.30	118.93
1.2 Dead+1.6 Wind 30 deg - No Ice	59336.11	47951.86	-83400.92	-6760.79	-3897.41	58.10
0.9 Dead+1.6 Wind 30 deg - No Ice	44502.08	47951.86	-83400.92	-6760.04	-3893.40	58.10
1.2 Dead+1.6 Wind 45 deg - No Ice	59336.11	67473.57	-67520.54	-5477.97	-5489.61	20.60
0.9 Dead+1.6 Wind 45 deg - No Ice	44502.08	67473.57	-67520.54	-5477.23	-5485.60	20.60
1.2 Dead+1.6 Wind 60 deg - No Ice	59336.11	82143.51	-47292.32	-3839.01	-6691.83	-18.31
0.9 Dead+1.6 Wind 60 deg - No Ice	44502.08	82143.51	-47292.32	-3838.27	-6687.82	-18.31
1.2 Dead+1.6 Wind 90 deg - No Ice	59336.11	96403.13	288.34	30.36	-7836.51	-89.81
0.9 Dead+1.6 Wind 90 deg - No Ice	44502.08	96403.13	288.34	31.10	-7832.50	-89.81
1.2 Dead+1.6 Wind 120 deg - No Ice	59336.11	87231.38	50562.74	4076.18	-7046.24	-137.24
0.9 Dead+1.6 Wind 120 deg - No Ice	44502.08	87231.38	50562.74	4076.92	-7042.23	-137.24
1.2 Dead+1.6 Wind 135 deg - No Ice	59336.11	69840.74	69887.71	5650.26	-5667.82	-147.60
0.9 Dead+1.6 Wind 135 deg - No Ice	44502.08	69840.74	69887.71	5651.00	-5663.81	-147.60
1.2 Dead+1.6 Wind 150 deg - No Ice	59336.11	48451.27	83689.26	6788.18	-3955.14	-147.90
0.9 Dead+1.6 Wind 150 deg - No Ice	44502.08	48451.27	83689.26	6788.93	-3951.13	-147.90
1.2 Dead+1.6 Wind 180 deg - No Ice	59336.11	288.34	95084.05	7726.85	-49.37	-118.93
0.9 Dead+1.6 Wind 180 deg - No Ice	44502.08	288.34	95084.05	7727.59	-45.36	-118.93
1.2 Dead+1.6 Wind 210 deg - No Ice	59336.11	-47951.86	83400.92	6754.86	3865.33	-58.10
0.9 Dead+1.6 Wind 210 deg - No Ice	44502.08	-47951.86	83400.92	6755.60	3869.34	-58.10
1.2 Dead+1.6 Wind 225 deg - No Ice	59336.11	-67473.57	67520.54	5472.04	5457.53	-20.60

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
0.9 Dead+1.6 Wind 225 deg - No Ice	44502.08	-67473.57	67520.54	5472.78	5461.54	-20.60
1.2 Dead+1.6 Wind 240 deg - No Ice	59336.11	-86943.04	50063.33	4018.46	6980.83	18.31
0.9 Dead+1.6 Wind 240 deg - No Ice	44502.08	-86943.04	50063.33	4019.20	6984.84	18.31
1.2 Dead+1.6 Wind 270 deg - No Ice	59336.11	-96403.13	-288.34	-36.29	7804.43	89.81
0.9 Dead+1.6 Wind 270 deg - No Ice	44502.08	-96403.13	-288.34	-35.55	7808.44	89.81
1.2 Dead+1.6 Wind 300 deg - No Ice	59336.11	-82431.84	-47791.73	-3896.73	6693.08	137.24
0.9 Dead+1.6 Wind 300 deg - No Ice	44502.08	-82431.84	-47791.73	-3895.99	6697.09	137.24
1.2 Dead+1.6 Wind 315 deg - No Ice	59336.11	-67881.34	-67928.31	-5525.10	5504.66	147.60
0.9 Dead+1.6 Wind 315 deg - No Ice	44502.08	-67881.34	-67928.31	-5524.36	5508.67	147.60
1.2 Dead+1.6 Wind 330 deg - No Ice	59336.11	-48451.27	-83689.26	-6794.11	3923.05	147.90
0.9 Dead+1.6 Wind 330 deg - No Ice	44502.08	-48451.27	-83689.26	-6793.37	3927.06	147.90
1.2 Dead+1.0 Ice	210399.34	0.00	-0.00	-171.00	-177.89	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice	210399.34	-38.91	-38396.55	-3257.74	-173.72	46.82
1.2 Dead+1.0 Wind 30 deg+1.0 Ice	210399.34	18884.77	-32761.50	-2811.42	-1699.90	4.88
1.2 Dead+1.0 Wind 45 deg+1.0 Ice	210399.34	26663.09	-26673.87	-2321.47	-2328.32	-17.33
1.2 Dead+1.0 Wind 60 deg+1.0 Ice	210399.34	32591.15	-18801.67	-1687.13	-2808.03	-38.36
1.2 Dead+1.0 Wind 90 deg+1.0 Ice	210399.34	37836.94	38.91	-166.83	-3229.14	-71.33
1.2 Dead+1.0 Wind 120 deg+1.0 Ice	210399.34	33258.64	19231.98	1375.98	-2853.12	-85.19
1.2 Dead+1.0 Wind 135 deg+1.0 Ice	210399.34	26974.74	26985.52	2002.08	-2350.92	-83.55
1.2 Dead+1.0 Wind 150 deg+1.0 Ice	210399.34	18952.17	32800.41	2473.59	-1707.12	-76.22
1.2 Dead+1.0 Wind 180 deg+1.0 Ice	210399.34	38.91	37670.73	2868.49	-182.05	-46.82
1.2 Dead+1.0 Wind 210 deg+1.0 Ice	210399.34	-18884.77	32761.50	2469.42	1344.13	-4.88
1.2 Dead+1.0 Wind 225 deg+1.0 Ice	210399.34	-26663.09	26673.87	1979.47	1972.55	17.33
1.2 Dead+1.0 Wind 240 deg+1.0 Ice	210399.34	-33219.73	19164.58	1368.77	2493.19	38.36
1.2 Dead+1.0 Wind 270 deg+1.0 Ice	210399.34	-37836.94	-38.91	-175.16	2873.37	71.33
1.2 Dead+1.0 Wind 300 deg+1.0 Ice	210399.34	-32630.06	-18869.07	-1694.35	2456.43	85.19
1.2 Dead+1.0 Wind 315 deg+1.0 Ice	210399.34	-26718.12	-26728.90	-2327.36	1978.45	83.55
1.2 Dead+1.0 Wind 330 deg+1.0 Ice	210399.34	-18952.17	-32800.41	-2815.58	1351.35	76.22
Dead+Wind 0 deg - Service	49446.76	-65.23	-22762.99	-1834.93	-5.83	26.90
Dead+Wind 30 deg - Service	49446.76	10847.36	-18866.43	-1531.18	-891.39	13.14
Dead+Wind 45 deg - Service	49446.76	15263.44	-15274.07	-1240.99	-1251.56	4.66
Dead+Wind 60 deg - Service	49446.76	18581.98	-10698.17	-870.24	-1523.52	-4.14
Dead+Wind 90 deg - Service	49446.76	21807.70	65.23	5.07	-1782.47	-20.32
Dead+Wind 120 deg - Service	49446.76	19732.93	11437.98	920.29	-1603.69	-31.05

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
Dead+Wind 135 deg - Service	49446.76	15798.93	15809.55	1276.37	-1291.88	-33.39
Dead+Wind 150 deg - Service	49446.76	10960.34	18931.65	1533.78	-904.45	-33.46
Dead+Wind 180 deg - Service	49446.76	65.23	21509.31	1746.12	-20.91	-26.90
Dead+Wind 210 deg - Service	49446.76	-10847.36	18866.43	1526.24	864.65	-13.14
Dead+Wind 225 deg - Service	49446.76	-15263.44	15274.07	1236.05	1224.83	-4.66
Dead+Wind 240 deg - Service	49446.76	-19667.70	11325.01	907.23	1569.42	4.14
Dead+Wind 270 deg - Service	49446.76	-21807.70	-65.23	-10.01	1755.73	20.32
Dead+Wind 300 deg - Service	49446.76	-18647.21	-10811.14	-883.29	1504.33	31.05
Dead+Wind 315 deg - Service	49446.76	-15355.68	-15366.31	-1251.65	1235.49	33.39
Dead+Wind 330 deg - Service	49446.76	-10960.34	-18931.65	-1538.72	877.71	33.46

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-49446.76	0.00	0.00	49446.76	0.00	0.000%
2	-288.34	-59336.11	-100626.08	288.34	59336.11	100626.08	0.000%
3	-288.34	-44502.08	-100626.08	288.34	44502.08	100626.08	0.000%
4	47951.86	-59336.11	-83400.92	-47951.86	59336.11	83400.92	0.000%
5	47951.86	-44502.08	-83400.92	-47951.86	44502.08	83400.92	0.000%
6	67473.57	-59336.11	-67520.54	-67473.57	59336.11	67520.54	0.000%
7	67473.57	-44502.08	-67520.54	-67473.57	44502.08	67520.54	0.000%
8	82143.51	-59336.11	-47292.32	-82143.51	59336.11	47292.32	0.000%
9	82143.51	-44502.08	-47292.32	-82143.51	44502.08	47292.32	0.000%
10	96403.13	-59336.11	288.34	-96403.13	59336.11	-288.34	0.000%
11	96403.13	-44502.08	288.34	-96403.13	44502.08	-288.34	0.000%
12	87231.38	-59336.11	50562.74	-87231.38	59336.11	-50562.74	0.000%
13	87231.38	-44502.08	50562.74	-87231.38	44502.08	-50562.74	0.000%
14	69840.74	-59336.11	69887.71	-69840.74	59336.11	-69887.71	0.000%
15	69840.74	-44502.08	69887.71	-69840.74	44502.08	-69887.71	0.000%
16	48451.27	-59336.11	83689.26	-48451.27	59336.11	-83689.26	0.000%
17	48451.27	-44502.08	83689.26	-48451.27	44502.08	-83689.26	0.000%
18	288.34	-59336.11	95084.05	-288.34	59336.11	-95084.05	0.000%
19	288.34	-44502.08	95084.05	-288.34	44502.08	-95084.05	0.000%
20	-47951.86	-59336.11	83400.92	47951.86	59336.11	-83400.92	0.000%
21	-47951.86	-44502.08	83400.92	47951.86	44502.08	-83400.92	0.000%
22	-67473.57	-59336.11	67520.54	67473.57	59336.11	-67520.54	0.000%
23	-67473.57	-44502.08	67520.54	67473.57	44502.08	-67520.54	0.000%
24	-86943.04	-59336.11	50063.33	86943.04	59336.11	-50063.33	0.000%
25	-86943.04	-44502.08	50063.33	86943.04	44502.08	-50063.33	0.000%
26	-96403.13	-59336.11	-288.34	96403.13	59336.11	288.34	0.000%
27	-96403.13	-44502.08	-288.34	96403.13	44502.08	288.34	0.000%
28	-82431.84	-59336.11	-47791.73	82431.84	59336.11	47791.73	0.000%
29	-82431.84	-44502.08	-47791.73	82431.84	44502.08	47791.73	0.000%
30	-67881.34	-59336.11	-67928.31	67881.34	59336.11	67928.31	0.000%
31	-67881.34	-44502.08	-67928.31	67881.34	44502.08	67928.31	0.000%
32	-48451.27	-59336.11	-83689.26	48451.27	59336.11	83689.26	0.000%
33	-48451.27	-44502.08	-83689.26	48451.27	44502.08	83689.26	0.000%
34	0.00	-210399.34	0.00	-0.00	210399.34	0.00	0.000%
35	-38.91	-210399.34	-38396.55	38.91	210399.34	38396.55	0.000%
36	18884.77	-210399.34	-32761.50	-18884.77	210399.34	32761.50	0.000%
37	26663.09	-210399.34	-26673.87	-26663.09	210399.34	26673.87	0.000%
38	32591.15	-210399.34	-18801.67	-32591.15	210399.34	18801.67	0.000%
39	37836.94	-210399.34	38.91	-37836.94	210399.34	-38.91	0.000%
40	33258.65	-210399.34	19231.98	-33258.64	210399.34	-19231.98	0.000%
41	26974.74	-210399.34	26985.52	-26974.74	210399.34	-26985.52	0.000%
42	18952.17	-210399.34	32800.41	-18952.17	210399.34	-32800.41	0.000%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
43	38.91	-210399.34	37670.73	-38.91	210399.34	-37670.73	0.000%
44	-18884.77	-210399.34	32761.50	18884.77	210399.34	-32761.50	0.000%
45	-26663.09	-210399.34	26673.87	26663.09	210399.34	-26673.87	0.000%
46	-33219.73	-210399.34	19164.58	33219.73	210399.34	-19164.58	0.000%
47	-37836.94	-210399.34	-38.91	37836.94	210399.34	38.91	0.000%
48	-32630.07	-210399.34	-18869.07	32630.06	210399.34	18869.07	0.000%
49	-26718.12	-210399.34	-26728.90	26718.12	210399.34	26728.90	0.000%
50	-18952.17	-210399.34	-32800.41	18952.17	210399.34	32800.41	0.000%
51	-65.23	-49446.76	-22762.99	65.23	49446.76	22762.99	0.000%
52	10847.36	-49446.76	-18866.43	-10847.36	49446.76	18866.43	0.000%
53	15263.44	-49446.76	-15274.07	-15263.44	49446.76	15274.07	0.000%
54	18581.98	-49446.76	-10698.17	-18581.98	49446.76	10698.17	0.000%
55	21807.70	-49446.76	65.23	-21807.70	49446.76	-65.23	0.000%
56	19732.93	-49446.76	11437.98	-19732.93	49446.76	-11437.98	0.000%
57	15798.93	-49446.76	15809.55	-15798.93	49446.76	-15809.55	0.000%
58	10960.34	-49446.76	18931.65	-10960.34	49446.76	-18931.65	0.000%
59	65.23	-49446.76	21509.31	-65.23	49446.76	-21509.31	0.000%
60	-10847.36	-49446.76	18866.43	10847.36	49446.76	-18866.43	0.000%
61	-15263.44	-49446.76	15274.07	15263.44	49446.76	-15274.07	0.000%
62	-19667.70	-49446.76	11325.01	19667.70	49446.76	-11325.01	0.000%
63	-21807.70	-49446.76	-65.23	21807.70	49446.76	65.23	0.000%
64	-18647.21	-49446.76	-10811.14	18647.21	49446.76	10811.14	0.000%
65	-15355.69	-49446.76	-15366.31	15355.68	49446.76	15366.31	0.000%
66	-10960.34	-49446.76	-18931.65	10960.34	49446.76	18931.65	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	160 - 150	2.648	56	0.1183	0.0325
T2	150 - 125	2.398	56	0.1183	0.0315
T3	125 - 100	1.757	56	0.1152	0.0269
T4	100 - 75	1.178	56	0.0977	0.0230
T5	75 - 66.6667	0.674	56	0.0804	0.0178
T6	66.6667 - 58.3333	0.530	56	0.0737	0.0158
T7	58.3333 - 50	0.398	56	0.0662	0.0137
T8	50 - 37.5	0.288	56	0.0537	0.0117
T9	37.5 - 25	0.161	56	0.0391	0.0086
T10	25 - 0	0.075	56	0.0229	0.0053

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Lightning Rod 2"x21'	56	2.648	0.1183	0.0325	213552
159.00	SC479-HF1LDF	56	2.623	0.1183	0.0324	213552
158.00	TMA 432-83H-01T	56	2.598	0.1182	0.0323	213552
157.50	SC479-HF1LDF(D00I-E6085)	56	2.586	0.1182	0.0323	213552
157.00	SC479-HF1LDF	56	2.574	0.1182	0.0323	213552
155.00	DB304-A	56	2.524	0.1182	0.0321	213552

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	SC479-HF1LDF(D00I-E6085) (Inverted)	56	2.398	0.1183	0.0315	127573
145.00	DC6-48-60-18-8F (Squid) Suppressor	56	2.270	0.1184	0.0307	204602
141.25	SC479-HF1LDF	56	2.173	0.1183	0.0300	653961
141.00	SC479-HF1LDF	56	2.166	0.1183	0.0300	766125
140.00	HPD2-4.7	56	2.141	0.1183	0.0298	Inf
139.50	SC479-HF1LDF	56	2.128	0.1183	0.0297	Inf
120.00	PD1142-1	56	1.634	0.1126	0.0261	83955
108.00	8' Stiff-Arm	56	1.355	0.1039	0.0243	107251
107.50	4"x96"x72" Ice Canopy	56	1.344	0.1035	0.0242	108465
107.00	6' w/ Radome	56	1.332	0.1031	0.0242	109707
106.50	6' w/ Radome	56	1.321	0.1027	0.0241	110977
97.00	APXVSPP18-C-A20	56	1.113	0.0955	0.0225	113462
82.00	16x16 Panel 19dBi 2.45GHz ISM	56	0.805	0.0855	0.0194	69126
75.00	SBNHH-1D65B	56	0.674	0.0804	0.0178	61823

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	160 - 150	11.686	12	0.5231	0.1436
T2	150 - 125	10.580	12	0.5232	0.1394
T3	125 - 100	7.745	12	0.5088	0.1191
T4	100 - 75	5.190	12	0.4308	0.1018
T5	75 - 66.6667	2.970	12	0.3540	0.0785
T6	66.6667 - 58.3333	2.334	12	0.3247	0.0698
T7	58.3333 - 50	1.754	12	0.2917	0.0607
T8	50 - 37.5	1.270	12	0.2362	0.0517
T9	37.5 - 25	0.712	12	0.1720	0.0378
T10	25 - 0	0.332	12	0.1009	0.0235

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Lightning Rod 2"x21'	12	11.686	0.5231	0.1436	49354
159.00	SC479-HF1LDF	12	11.577	0.5231	0.1433	49354
158.00	TMA 432-83H-01T	12	11.467	0.5231	0.1430	49354
157.50	SC479-HF1LDF(D00I-E6085)	12	11.412	0.5231	0.1428	49354
157.00	SC479-HF1LDF	12	11.357	0.5231	0.1426	49354
155.00	DB304-A	12	11.136	0.5231	0.1418	49354
150.00	SC479-HF1LDF(D00I-E6085) (Inverted)	12	10.580	0.5232	0.1394	29522
145.00	DC6-48-60-18-8F (Squid) Suppressor	12	10.014	0.5234	0.1358	47883
141.25	SC479-HF1LDF	12	9.585	0.5232	0.1326	162460
141.00	SC479-HF1LDF	12	9.556	0.5231	0.1324	193296
140.00	HPD2-4.7	12	9.442	0.5230	0.1316	293139
139.50	SC479-HF1LDF	12	9.384	0.5229	0.1313	264705

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	PD1142-1	12	7.206	0.4971	0.1154	18911
108.00	8' Stiff-Arm	12	5.972	0.4584	0.1075	24182
107.50	4"x96"x72" Ice Canopy	12	5.922	0.4567	0.1072	24466
107.00	6' w/ Radome	12	5.873	0.4549	0.1068	24757
106.50	6' w/ Radome	12	5.823	0.4532	0.1065	25055
97.00	APXVSPP18-C-A20	12	4.904	0.4211	0.0995	25739
82.00	16x16 Panel 19dBi 2.45GHz ISM	12	3.548	0.3765	0.0856	15645
75.00	SBNHH-1D65B	12	2.970	0.3540	0.0785	14033

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	160	Leg	A325X	0.7500	6	225.18	29820.60	0.008 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	1	2413.01	17943.80	0.134 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	981.04	10263.30	0.096 ✔	1	Member Block Shear
		Top Girt	A325N	0.6250	2	465.45	10263.30	0.045 ✔	1	Member Block Shear
T2	150	Leg	A325X	0.7500	6	2715.26	29820.60	0.091 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	1	10680.60	17943.80	0.595 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	3333.38	7187.70	0.464 ✔	1	Member Block Shear
T3	125	Leg	A325X	0.7500	6	9954.79	29820.60	0.334 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	1	16023.90	29906.30	0.536 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	5433.53	12829.10	0.424 ✔	1	Member Block Shear
T4	100	Leg	A325X	0.7500	6	20318.90	29820.60	0.681 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	1	21863.20	25230.00	0.867 ✔	1	Member Bearing
		Horizontal	A325X	0.6250	2	7898.83	15186.40	0.520 ✔	1	Bolt Shear
T5	75	Leg	A325X	0.8750	6	24175.50	40589.10	0.596 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	1	24759.20	35784.70	0.692 ✔	1	Bolt Shear
		Horizontal	A325X	0.6250	2	8949.70	15186.40	0.589 ✔	1	Bolt Shear
T6	66.6667	Leg	A325X	0.8750	6	28247.30	40589.10	0.696 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	1	25678.80	35784.70	0.718 ✔	1	Bolt Shear
		Top Girt	A325X	0.6250	2	9466.68	15186.40	0.623 ✔	1	Bolt Shear
T7	58.3333	Leg	A325X	0.8750	6	32240.60	40589.10	0.794 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	1	26066.10	31537.50	0.827 ✔	1	Member Bearing
		Top Girt	A325X	0.6250	2	9876.02	15186.40	0.650 ✔	1	Bolt Shear
T8	50	Leg	A325X	1.0000	8	27439.40	53014.40	0.518 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	33476.50	48810.90	0.686 ✔	1	Member Block Shear
T9	37.5	Leg	A325X	1.0000	8	31870.60	53014.40	0.601 ✔	1	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T10	25	Diagonal	A325N	1.0000	1	35454.10	45703.10	0.776 ✔	1	Member Block Shear
		Top Girt	A325X	0.6250	2	11317.50	15186.40	0.745 ✔	1	Bolt Shear
		Leg	A325X	1.0000	8	41798.60	53014.40	0.788 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	38315.40	54843.80	0.699 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	13150.00	15186.40	0.866 ✔	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 150	P.5x.250	10.01	5.01	35.7 K=1.00	3.7306	-4053.18	152929.00	0.027 [1] ✔
T2	150 - 125	P.5x.250	25.03	8.34	59.5 K=1.00	3.7306	-22656.60	129561.00	0.175 [1] ✔
T3	125 - 100	P.5x.250	25.03	8.34	59.5 K=1.00	3.7306	-71986.80	129561.00	0.556 [1] ✔
T4	100 - 75	P5x0.3 w/ (3) 1.5x5/8 Plates	25.03	8.34	51.4 K=1.00	7.2544	-142715.00	269039.00	0.530 [1] ✔
T5	75 - 66.6667	P5x0.4 w/ (3) 1.5x5/8 Plates	8.34	8.34	53.2 K=1.00	8.6530	-168992.00	316528.00	0.534 [1] ✔
T6	66.6667 - 58.3333	P5x0.4 w/ (3) 1.5x5/8 Plates	8.34	8.34	53.2 K=1.00	8.6530	-196602.00	316528.00	0.621 [1] ✔
T7	58.3333 - 50	HSS5x.4	8.34	4.17	30.7 K=1.00	5.7805	-223704.00	287435.00	0.778 [1] ✔
T8	50 - 37.5	HSS6.875x.4	12.51	12.51	65.5 K=1.00	8.1367	-252920.00	301661.00	0.838 [1] ✔
T9	37.5 - 25	HSS6.875x.4	12.51	6.26	32.7 K=1.00	8.1367	-293306.00	399956.00	0.733 [1] ✔
T10	25 - 0	HSS6.875x0.5 w/ (3) 2x5/8 Bars	25.03	12.51	58.7 K=1.00	13.1229	-383716.00	459193.00	0.836 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

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

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	160 - 150	2L2 1/2x2x3/16	7.43	6.88	104.5 K=1.00	1.6200	-2532.39	29528.70	0.086 [1] ✔
T2	150 - 125	2L2 1/2x2x3/16	10.57	9.96	151.3 K=1.00	1.6200	-10797.90	15986.60	0.675 [1] ✔
T3	125 - 100	2L2 1/2x2 1/2x5/16	11.21	10.63	167.6 K=1.00	2.9300	-16303.20	23555.00	0.692 [1] ✔
T4	100 - 75	2L3x2 1/2x1/4	11.91	11.21	142.4 K=1.00	2.6300	-22213.90	29311.90	0.758 [1] ✔
T5	75 - 66.6667	2L3x2 1/2x5/16	12.15	11.46	146.8 K=1.00	3.2422	-24759.20	33987.10	0.728 [1] ✔
T6	66.6667 - 58.3333	2L3x2 1/2x5/16	12.39	11.71	150.0 K=1.00	3.2422	-25678.80	32542.60	0.789 [1] ✔
T7	58.3333 - 50	2L3x3x5/16	12.64	12.09	115.1 K=1.00	3.5500	-26650.30	57230.60	0.466 [1] ✔
T8	50 - 37.5	2L3 1/2x3x3/8	16.01	15.22	167.5 K=1.00	4.5900	-33990.70	36939.50	0.920 [1] ✔
T9	37.5 - 25	2L3 1/2x3 1/2x5/16	16.33	15.55	126.9 K=1.00	4.1800	-36173.70	58613.30	0.617 [1] ✔
T10	25 - 0	2L4x3x3/8	16.99	16.06	163.3 K=1.00	4.9700	-39061.10	42115.30	0.927 [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	160 - 150	L3x3x1/4	10.60	5.09	93.5 K=0.91	1.4400	-1956.38	29433.90	0.066 [1] ✔
T2	150 - 125	L2 1/2x2 1/2x3/16	12.33	5.96	106.9 K=0.74	0.9020	-6742.25	16005.30	0.421 [1] ✔
T3	125 - 100	L3x3x5/16	14.33	6.96	106.1 K=0.75	1.7800	-10943.90	31894.50	0.343 [1] ✔
T4	100 - 75	L3x3x1/2	16.33	7.86	112.5 K=0.70	2.7500	-15628.70	45750.70	0.342 [1] ✔
T5	75 - 66.6667	L3x3x1/2	17.00	8.20	114.7 K=0.68	2.7500	-17847.60	44548.30	0.401 [1] ✔
T10	25 - 0	L4x4x1/2	22.00	10.59	112.8 K=0.69	3.7500	-25939.40	62155.00	0.417 [1] ✔

[1] $P_u / \phi P_n$ 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	160 - 150	L3x3x1/4	10.20	4.69	107.6 K=1.13	1.4400	-958.62	25371.20	0.038 [1] ✔
T4	100 - 75	L3x3x1/4	15.00	7.29	141.2 K=0.96	1.4400	-13276.50	16310.60	0.814 [1] ✔
T6	66.6667 - 58.3333	L3x3x1/2	17.67	8.33	159.1 K=0.93	2.7500	-18664.10	24547.70	0.760 [1] ✔
T7	58.3333 - 50	L3x3x1/2	18.33	8.67	164.3 K=0.92	2.7500	-19675.00	23013.00	0.855 [1] ✔
T8	50 - 37.5	L4x4x1/4	19.00	9.29	135.5 K=0.97	1.9400	-20831.50	23877.90	0.872 [1] ✔
T9	37.5 - 25	L4x4x5/16	20.00	9.52	138.6 K=0.96	2.4000	-22597.30	28223.90	0.801 [1] ✔

[1] P_u / ϕP_n controls

Redundant Horizontal (1) 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 $\frac{P_u}{\phi P_n}$
T7	58.3333 - 50	L2x2x5/16	4.58	4.38	134.6 K=1.00	1.1500	-3878.83	14336.70	0.271 [1] ✔
T9	37.5 - 25	L2x2x5/16	5.00	4.71	145.0 K=1.00	1.1500	-5086.33	12351.20	0.412 [1] ✔

[1] P_u / ϕP_n controls

Redundant Diagonal (1) 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 $\frac{P_u}{\phi P_n}$
T7	58.3333 - 50	L2x2x5/16	6.07	5.66	174.1 K=1.00	1.1500	-2569.62	8572.07	0.300 [1] ✔
T9	37.5 - 25	L2x2x5/16	7.85	7.38	227.0 K=1.00	1.1500	-3993.52	5040.84	0.792 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing 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 $\frac{P_u}{\phi P_n}$
T3	125 - 100	L2 1/2x2x3/16	7.17	7.17	201.4 K=1.00	0.8090	-13.32	4505.54	0.003 [1] ✔
T4	100 - 75	L2 1/2x2x3/16	7.50	7.50	210.8 K=1.00	0.8090	-233.45	4113.95	0.057 [1] ✔
T5	75 - 66.6667	L2 1/2x2x3/16	8.50	8.50	238.9 K=1.00	0.8090	-15.87	3202.90	0.005 [1] ✔
T6	66.6667 - 58.3333	L2 1/2x2x3/16	8.83	8.83	248.2 K=1.00	0.8090	-329.49	2965.74	0.111 [1] ✔
T7	58.3333 - 50	L2 1/2x2x3/16 KL/R > 250 (C) - 184	9.17	9.17	257.6 K=1.00	0.8090	-346.62	2753.97	0.126 [1] ✔
T8	50 - 37.5	L2 1/2x2 1/2x3/16	9.50	9.50	230.3 K=1.00	0.9020	-369.03	3841.91	0.096 [1] ✔
T9	37.5 - 25	L2 1/2x2 1/2x3/16	10.00	10.00	242.4 K=1.00	0.9020	-398.62	3467.32	0.115 [1] ✔
T10	25 - 0	L2 1/2x2 1/2x3/16 KL/R > 250 (C) - 242	11.00	11.00	266.7 K=1.00	0.9020	-25.65	2865.56	0.009 [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	160 - 150	P.5x.250	10.01	5.01	35.7	3.7306	651.35	167879.00	0.004 [1] ✔
T2	150 - 125	P.5x.250	25.03	8.34	59.5	3.7306	16291.60	167879.00	0.097 [1] ✔
T3	125 - 100	P.5x.250	25.03	8.34	59.5	3.7306	59728.80	167879.00	0.356 [1] ✔
T4	100 - 75	P5x0.3 w/ (3) 1.5x5/8 Plates	25.03	8.34	51.4	7.2544	121913.00	326448.00	0.373 [1] ✔
T5	75 - 66.6667	P5x0.4 w/ (3) 1.5x5/8 Plates	8.34	8.34	53.2	8.6530	145053.00	389385.00	0.373 [1] ✔
T6	66.6667 - 58.3333	P5x0.4 w/ (3) 1.5x5/8 Plates	8.34	8.34	53.2	8.6530	169484.00	389385.00	0.435 [1] ✔
T7	58.3333 - 50	HSS5x.4	8.34	4.17	30.7	5.7805	193618.00	312149.00	0.620 [1] ✔
T8	50 - 37.5	HSS6.875x.4	12.51	12.51	65.5	8.1367	219516.00	439383.00	0.500 [1] ✔
T9	37.5 - 25	HSS6.875x.4	12.51	6.26	32.7	8.1367	255292.00	439383.00	0.581 [1] ✔
T10	25 - 0	HSS6.875x0.5 w/ (3) 2x5/8 Bars	25.03	12.51	58.7	13.1229	334389.00	590531.00	0.566 [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

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	160 - 150	2L2 1/2x2x3/16	7.43	6.88	108.6	0.9689	2413.01	42147.40	0.057 [1] ✔
T2	150 - 125	2L2 1/2x2x3/16	10.57	9.96	155.4	0.9689	10680.60	42147.40	0.253 [1] ✔
T3	125 - 100	2L2 1/2x2 1/2x5/16	11.21	10.63	171.9	1.7873	16023.90	77749.50	0.206 [1] ✔
T4	100 - 75	2L3x2 1/2x1/4	11.91	11.21	145.8	1.6444	21863.20	71530.30	0.306 [1] ✔
T5	75 - 66.6667	2L3x2 1/2x5/16	12.15	11.46	150.3	2.0215	24350.40	98547.40	0.247 [1] ✔
T6	66.6667 - 58.3333	2L3x2 1/2x5/16	12.39	11.71	153.5	2.0215	25250.60	98547.40	0.256 [1] ✔
T7	58.3333 - 50	2L3x3x5/16	12.64	12.09	117.7	2.2523	26066.10	97977.00	0.266 [1] ✔
T8	50 - 37.5	2L3 1/2x3x3/8	16.01	15.22	171.2	2.8097	33476.50	122221.00	0.274 [1] ✔
T9	37.5 - 25	2L3 1/2x3 1/2x5/16	16.33	15.55	129.6	2.6077	35454.10	127123.00	0.279 [1] ✔
T10	25 - 0	2L4x3x3/8	16.99	16.06	166.7	3.0947	38315.40	150866.00	0.254 [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	160 - 150	L3x3x1/4	10.60	5.09	98.5	0.9394	1962.08	40862.80	0.048 [1] ✔
T2	150 - 125	L2 1/2x2 1/2x3/16	12.33	5.96	137.9	0.5710	6666.76	24839.90	0.268 [1] ✔
T3	125 - 100	L3x3x5/16	14.33	6.96	90.6	1.1592	10867.10	50426.00	0.216 [1] ✔
T4	100 - 75	L3x3x1/2	16.33	7.86	105.1	1.7813	15797.70	77484.40	0.204 [1] ✔
T5	75 - 66.6667	L3x3x1/2	17.00	8.20	109.6	1.7813	17899.40	77484.40	0.231 [1] ✔
T10	25 - 0	L4x4x1/2	22.00	10.59	104.2	2.5313	26300.00	110109.00	0.239 [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	160 - 150	L3x3x1/4	10.20	4.69	94.7	0.9394	930.91	40862.80	0.023 [1]
T4	100 - 75	L3x3x1/4	15.00	7.29	94.1	1.4400	13160.50	46656.00	0.282 [1]
T6	66.6667 - 58.3333	L3x3x1/2	17.67	8.33	114.0	1.7813	18933.40	77484.40	0.244 [1]
T7	58.3333 - 50	L3x3x1/2	18.33	8.67	118.5	1.7813	19752.00	77484.40	0.255 [1]
T8	50 - 37.5	L4x4x1/4	19.00	9.29	89.2	1.9400	21172.30	62856.00	0.337 [1]
T9	37.5 - 25	L4x4x5/16	20.00	9.52	94.0	1.6242	22635.00	79180.70	0.286 [1]

[1] P_u / ϕP_n controls

Redundant Horizontal (1) 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 $\frac{P_u}{\phi P_n}$
T7	58.3333 - 50	L2x2x5/16	4.58	4.38	87.4	1.1500	3878.83	37260.00	0.104 [1]
T9	37.5 - 25	L2x2x5/16	5.00	4.71	94.1	1.1500	5086.33	37260.00	0.137 [1]

[1] P_u / ϕP_n controls

Redundant Diagonal (1) 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 $\frac{P_u}{\phi P_n}$
T7	58.3333 - 50	L2x2x5/16	6.07	5.66	113.0	1.1500	2569.62	37260.00	0.069 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T9	37.5 - 25	L2x2x5/16	7.85	7.38	147.3	1.1500	3993.52	37260.00	0.107 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing 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 $\frac{P_u}{\phi P_n}$
T3	125 - 100	L2 1/2x2x3/16	7.17	7.17	143.4	0.8090	6.49	26211.60	0.000 [1] ✔
T4	100 - 75	L2 1/2x2x3/16	7.50	7.50	150.1	0.8090	228.72	26211.60	0.009 [1] ✔
T5	75 - 66.6667	L2 1/2x2x3/16	8.50	8.50	170.1	0.8090	6.14	26211.60	0.000 [1] ✔
T6	66.6667 - 58.3333	L2 1/2x2x3/16	8.83	8.83	176.7	0.8090	322.10	26211.60	0.012 [1] ✔
T7	58.3333 - 50	L2 1/2x2x3/16	9.17	9.17	183.4	0.8090	337.77	26211.60	0.013 [1] ✔
T8	50 - 37.5	L2 1/2x2 1/2x3/16	9.50	9.50	146.5	0.9020	359.03	29224.80	0.012 [1] ✔
T9	37.5 - 25	L2 1/2x2 1/2x3/16	10.00	10.00	154.2	0.9020	387.31	29224.80	0.013 [1] ✔
T10	25 - 0	L2 1/2x2 1/2x3/16	10.50	10.50	162.0	0.9020	8.56	29224.80	0.000 [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	160 - 150	Leg	P.5x.250	1	-2141.04	152929.00	1.4	Pass
		Leg	P.5x.250	2	-1803.62	152929.00	1.2	Pass
		Leg	P.5x.250	3	-4053.18	152929.00	2.7	Pass
T2	150 - 125	Leg	P.5x.250	22	-22344.20	129561.00	17.2	Pass
		Leg	P.5x.250	23	-22423.40	129561.00	17.3	Pass
		Leg	P.5x.250	24	-22656.60	129561.00	17.5	Pass
T3	125 - 100	Leg	P.5x.250	52	-71654.10	129561.00	55.3	Pass
		Leg	P.5x.250	53	-71986.80	129561.00	55.6	Pass
		Leg	P.5x.250	54	-71922.90	129561.00	55.5	Pass
T4	100 - 75	Leg	P5x0.3 w/ (3) 1.5x5/8 Plates	91	-141385.00	269039.00	52.6 67.4 (b)	Pass
		Leg	P5x0.3 w/ (3) 1.5x5/8 Plates	92	-142715.00	269039.00	53.0 68.1 (b)	Pass
		Leg	P5x0.3 w/ (3) 1.5x5/8 Plates	93	-142071.00	269039.00	52.8 67.6 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T5	75 - 66.6667	Leg	P5x0.4 w/ (3) 1.5x5/8 Plates	130	-167158.00	316528.00	52.8 59.0 (b)	Pass
		Leg	P5x0.4 w/ (3) 1.5x5/8 Plates	131	-168992.00	316528.00	53.4 59.6 (b)	Pass
		Leg	P5x0.4 w/ (3) 1.5x5/8 Plates	132	-168196.00	316528.00	53.1 59.2 (b)	Pass
T6	66.6667 - 58.3333	Leg	P5x0.4 w/ (3) 1.5x5/8 Plates	145	-194415.00	316528.00	61.4 69.1 (b)	Pass
		Leg	P5x0.4 w/ (3) 1.5x5/8 Plates	146	-196602.00	316528.00	62.1 69.6 (b)	Pass
		Leg	P5x0.4 w/ (3) 1.5x5/8 Plates	147	-195654.00	316528.00	61.8 69.2 (b)	Pass
T7	58.3333 - 50	Leg	HSS5x.4	160	-221193.00	287435.00	77.0 78.9 (b)	Pass
		Leg	HSS5x.4	161	-223704.00	287435.00	77.8 79.4 (b)	Pass
		Leg	HSS5x.4	162	-222618.00	287435.00	77.4 79.0 (b)	Pass
T8	50 - 37.5	Leg	HSS6.875x.4	187	-250006.00	301661.00	82.9	Pass
		Leg	HSS6.875x.4	188	-252920.00	301661.00	83.8	Pass
		Leg	HSS6.875x.4	189	-251657.00	301661.00	83.4	Pass
T9	37.5 - 25	Leg	HSS6.875x.4	202	-289974.00	399956.00	72.5	Pass
		Leg	HSS6.875x.4	203	-293306.00	399956.00	73.3	Pass
		Leg	HSS6.875x.4	204	-291864.00	399956.00	73.0	Pass
T10	25 - 0	Leg	HSS6.875x0.5 w/ (3) 2x5/8 Bars	229	-379559.00	459193.00	82.7	Pass
		Leg	HSS6.875x0.5 w/ (3) 2x5/8 Bars	230	-383716.00	459193.00	83.6	Pass
		Leg	HSS6.875x0.5 w/ (3) 2x5/8 Bars	231	-381918.00	459193.00	83.2	Pass
T1	160 - 150	Diagonal	2L2 1/2x2x3/16	8	-1430.81	29528.70	4.8 7.5 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	9	-1470.35	29528.70	5.0 7.3 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	11	-2150.14	29528.70	7.3 11.1 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	12	-2101.58	29528.70	7.1 11.3 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	14	-2527.48	29528.70	8.6 13.4 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	15	-2532.39	29528.70	8.6 13.4 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	16	-450.86	30254.00	1.5	Pass
		Diagonal	2L2 1/2x2x3/16	17	-449.18	30254.00	1.5	Pass
		Diagonal	2L2 1/2x2x3/16	18	-1160.03	30254.00	3.8 5.7 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	19	-1139.64	30254.00	3.8 5.8 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	20	-1141.25	30254.00	3.8 5.8 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	21	-1157.57	30254.00	3.8 5.7 (b)	Pass
T2	150 - 125	Diagonal	2L2 1/2x2x3/16	26	-8873.90	15986.60	55.5	Pass
		Diagonal	2L2 1/2x2x3/16	27	-8884.29	15986.60	55.6	Pass
		Diagonal	2L2 1/2x2x3/16	29	-10797.90	15986.60	67.5	Pass
		Diagonal	2L2 1/2x2x3/16	30	-10792.90	15986.60	67.5	Pass
		Diagonal	2L2 1/2x2x3/16	32	-10080.30	15986.60	63.1	Pass
		Diagonal	2L2 1/2x2x3/16	33	-10075.00	15986.60	63.0	Pass
		Diagonal	2L2 1/2x2x3/16	35	-7697.88	16654.00	46.2	Pass
		Diagonal	2L2 1/2x2x3/16	36	-7711.90	16654.00	46.3	Pass
		Diagonal	2L2 1/2x2x3/16	38	-9270.88	16654.00	55.7	Pass
		Diagonal	2L2 1/2x2x3/16	39	-9263.93	16654.00	55.6	Pass
		Diagonal	2L2 1/2x2x3/16	41	-8934.33	16654.00	53.6	Pass
		Diagonal	2L2 1/2x2x3/16	42	-8927.24	16654.00	53.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Diagonal	2L2 1/2x2x3/16	44	-1658.10	17339.00	9.6	Pass
		Diagonal	2L2 1/2x2x3/16	45	-1661.89	17339.00	9.6	Pass
		Diagonal	2L2 1/2x2x3/16	47	-3096.98	17339.00	17.9	Pass
		Diagonal	2L2 1/2x2x3/16	48	-2991.94	17339.00	17.3	Pass
		Diagonal	2L2 1/2x2x3/16	50	-3201.47	17339.00	18.5	Pass
		Diagonal	2L2 1/2x2x3/16	51	-3224.02	17339.00	18.6	Pass
T3	125 - 100	Diagonal	2L2 1/2x2 1/2x5/16	56	-13451.00	23555.00	57.1	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	57	-13473.80	23555.00	57.2	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	59	-16303.20	23555.00	69.2	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	60	-16288.10	23555.00	69.1	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	62	-15261.80	23555.00	64.8	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	63	-15254.10	23555.00	64.8	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	68	-12028.00	24561.80	49.0	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	69	-12026.10	24561.80	49.0	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	71	-14691.40	24561.80	59.8	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	72	-14692.00	24561.80	59.8	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	74	-12984.60	24561.80	52.9	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	75	-12985.90	24561.80	52.9	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	80	-10031.80	25605.30	39.2	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	81	-10037.30	25605.30	39.2	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	83	-12358.70	25605.30	48.3	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	84	-12354.60	25605.30	48.3	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	86	-11244.30	25605.30	43.9	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	87	-11242.90	25605.30	43.9	Pass
T4	100 - 75	Diagonal	2L3x2 1/2x1/4	98	-18229.40	29311.90	62.2 70.9 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	99	-18230.60	29311.90	62.2 70.9 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	101	-22213.90	29311.90	75.8 86.6 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	102	-22208.20	29311.90	75.8 86.7 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	104	-19759.50	29311.90	67.4 76.9 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	105	-19764.10	29311.90	67.4 76.9 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	110	-17856.30	30584.10	58.4 69.5 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	111	-17862.80	30584.10	58.4 69.5 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	113	-21498.80	30584.10	70.3 83.9 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	114	-21490.20	30584.10	70.3 83.9 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	116	-19569.60	30584.10	64.0 76.3 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	117	-19571.70	30584.10	64.0 76.2 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	121	-15929.90	31912.00	49.9 62.2 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	122	-15946.90	31912.00	50.0 62.1 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	123	-19201.90	31912.00	60.2 75.0 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	124	-19186.90	31912.00	60.1 75.1 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	125	-17857.10	31912.00	56.0 69.8 (b)	Pass
		Diagonal	2L3x2 1/2x1/4	126	-17855.20	31912.00	56.0 69.8 (b)	Pass
T5	75 - 66.6667	Diagonal	2L3x2 1/2x5/16	134	-19710.80	33987.10	58.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Diagonal	2L3x2 1/2x5/16	135	-19696.80	33987.10	58.0	Pass
		Diagonal	2L3x2 1/2x5/16	137	-24759.20	33987.10	72.8	Pass
		Diagonal	2L3x2 1/2x5/16	138	-24756.40	33987.10	72.8	Pass
		Diagonal	2L3x2 1/2x5/16	140	-21127.70	33987.10	62.2	Pass
		Diagonal	2L3x2 1/2x5/16	141	-21144.50	33987.10	62.2	Pass
T6	66.6667 - 58.3333	Diagonal	2L3x2 1/2x5/16	151	-20342.10	32542.60	62.5	Pass
		Diagonal	2L3x2 1/2x5/16	152	-20323.90	32542.60	62.5	Pass
		Diagonal	2L3x2 1/2x5/16	153	-25678.80	32542.60	78.9	Pass
		Diagonal	2L3x2 1/2x5/16	154	-25678.60	32542.60	78.9	Pass
		Diagonal	2L3x2 1/2x5/16	155	-21665.10	32542.60	66.6	Pass
		Diagonal	2L3x2 1/2x5/16	156	-21683.30	32542.60	66.6	Pass
T7	58.3333 - 50	Diagonal	2L3x3x5/16	166	-21101.70	57230.60	36.9 64.9 (b)	Pass
		Diagonal	2L3x3x5/16	169	-21089.40	57230.60	36.8 65.0 (b)	Pass
		Diagonal	2L3x3x5/16	172	-26650.30	57230.60	46.6 82.7 (b)	Pass
		Diagonal	2L3x3x5/16	175	-26648.00	57230.60	46.6 82.6 (b)	Pass
		Diagonal	2L3x3x5/16	178	-22334.10	57230.60	39.0 69.0 (b)	Pass
		Diagonal	2L3x3x5/16	181	-22501.10	57230.60	39.3 69.4 (b)	Pass
T8	50 - 37.5	Diagonal	2L3 1/2x3x3/8	193	-26545.00	36939.50	71.9	Pass
		Diagonal	2L3 1/2x3x3/8	194	-26511.10	36939.50	71.8	Pass
		Diagonal	2L3 1/2x3x3/8	195	-33984.40	36939.50	92.0	Pass
		Diagonal	2L3 1/2x3x3/8	196	-33990.70	36939.50	92.0	Pass
		Diagonal	2L3 1/2x3x3/8	197	-27999.30	36939.50	75.8	Pass
		Diagonal	2L3 1/2x3x3/8	198	-28026.90	36939.50	75.9	Pass
T9	37.5 - 25	Diagonal	2L3 1/2x3 1/2x5/16	208	-28363.70	58613.30	48.4 60.4 (b)	Pass
		Diagonal	2L3 1/2x3 1/2x5/16	211	-28341.50	58613.30	48.4 60.5 (b)	Pass
		Diagonal	2L3 1/2x3 1/2x5/16	214	-36170.80	58613.30	61.7 77.6 (b)	Pass
		Diagonal	2L3 1/2x3 1/2x5/16	217	-36173.70	58613.30	61.7 77.5 (b)	Pass
		Diagonal	2L3 1/2x3 1/2x5/16	220	-29650.90	58613.30	50.6 63.4 (b)	Pass
		Diagonal	2L3 1/2x3 1/2x5/16	223	-29982.80	58613.30	51.2 64.0 (b)	Pass
T10	25 - 0	Diagonal	2L4x3x3/8	233	-30185.60	42115.30	71.7	Pass
		Diagonal	2L4x3x3/8	234	-30133.20	42115.30	71.5	Pass
		Diagonal	2L4x3x3/8	236	-39043.70	42115.30	92.7	Pass
		Diagonal	2L4x3x3/8	237	-39061.10	42115.30	92.7	Pass
		Diagonal	2L4x3x3/8	239	-31316.10	42115.30	74.4	Pass
		Diagonal	2L4x3x3/8	240	-31361.40	42115.30	74.5	Pass
		Diagonal	2L4x3x3/8	245	-28474.70	43926.10	64.8	Pass
		Diagonal	2L4x3x3/8	246	-28426.10	43926.10	64.7	Pass
		Diagonal	2L4x3x3/8	248	-36884.10	43926.10	84.0	Pass
		Diagonal	2L4x3x3/8	249	-36898.40	43926.10	84.0	Pass
		Diagonal	2L4x3x3/8	251	-29725.50	43926.10	67.7	Pass
		Diagonal	2L4x3x3/8	252	-29770.10	43926.10	67.8	Pass
T1	160 - 150	Horizontal	L3x3x1/4	7	-1254.61	29433.90	4.3 6.1 (b)	Pass
		Horizontal	L3x3x1/4	10	-1746.14	29433.90	5.9 8.5 (b)	Pass
		Horizontal	L3x3x1/4	13	-1956.38	29433.90	6.6 9.6 (b)	Pass
T2	150 - 125	Horizontal	L2 1/2x2 1/2x3/16	25	-5398.76	16005.30	33.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Horizontal	L2 1/2x2 1/2x3/16	28	-6742.25	16005.30	37.8 (b) 42.1	Pass
		Horizontal	L2 1/2x2 1/2x3/16	31	-6234.81	16005.30	46.4 (b) 39.0	Pass
		Horizontal	L2 1/2x2 1/2x3/16	34	-5157.25	16479.60	43.6 (b) 31.3	Pass
		Horizontal	L2 1/2x2 1/2x3/16	37	-6168.69	16479.60	34.5 (b) 37.4	Pass
		Horizontal	L2 1/2x2 1/2x3/16	40	-5997.66	16479.60	41.6 (b) 36.4	Pass
		Horizontal	L2 1/2x2 1/2x3/16	43	-907.06	16955.80	40.4 (b) 5.3	Pass
		Horizontal	L2 1/2x2 1/2x3/16	46	-1731.14	16955.80	6.6 (b) 10.2	Pass
		Horizontal	L2 1/2x2 1/2x3/16	49	-1811.41	16955.80	12.2 (b) 10.7	Pass
T3	125 - 100	Horizontal	L3x3x5/16	55	-8817.38	31894.50	12.9 (b) 27.6	Pass
		Horizontal	L3x3x5/16	58	-10943.90	31894.50	34.9 (b) 34.3	Pass
		Horizontal	L3x3x5/16	61	-10162.10	31894.50	42.4 (b) 31.9	Pass
		Horizontal	L3x3x5/16	67	-7666.37	32682.10	40.1 (b) 23.5	Pass
		Horizontal	L3x3x5/16	70	-9587.46	32682.10	30.3 (b) 29.3	Pass
		Horizontal	L3x3x5/16	73	-8484.91	32682.10	37.1 (b) 26.0	Pass
		Horizontal	L3x3x5/16	79	-6223.11	33472.00	33.5 (b) 18.6	Pass
		Horizontal	L3x3x5/16	82	-7849.57	33472.00	24.4 (b) 23.5	Pass
		Horizontal	L3x3x5/16	85	-7108.48	33472.00	30.2 (b) 21.2	Pass
T4	100 - 75	Horizontal	L3x3x1/2	97	-12760.40	45750.70	27.9 (b) 27.9	Pass
		Horizontal	L3x3x1/2	100	-15628.70	45750.70	42.7 (b) 34.2	Pass
		Horizontal	L3x3x1/2	103	-13890.50	45750.70	52.0 (b) 30.4	Pass
		Horizontal	L3x3x1/2	109	-12285.50	46961.00	46.4 (b) 26.2	Pass
		Horizontal	L3x3x1/2	112	-15036.60	46961.00	40.9 (b) 32.0	Pass
		Horizontal	L3x3x1/2	115	-13658.90	46961.00	49.5 (b) 29.1	Pass
T5	75 - 66.6667	Horizontal	L3x3x1/2	133	-14067.50	44548.30	45.4 (b) 31.6	Pass
		Horizontal	L3x3x1/2	136	-17847.60	44548.30	47.0 (b) 40.1	Pass
		Horizontal	L3x3x1/2	139	-15315.40	44548.30	58.9 (b) 34.4	Pass
T10	25 - 0	Horizontal	L4x4x1/2	232	-20154.40	62155.00	51.0 (b) 32.4	Pass
		Horizontal	L4x4x1/2	235	-25939.40	62155.00	66.8 (b) 41.7	Pass
		Horizontal	L4x4x1/2	238	-21086.40	62155.00	86.6 (b) 33.9	Pass
		Horizontal	L4x4x1/2	244	-18823.60	64003.00	70.3 (b) 29.4 62.0 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Horizontal	L4x4x1/2	247	-24102.70	64003.00	37.7 79.6 (b)	Pass
		Horizontal	L4x4x1/2	250	-19821.40	64003.00	31.0 65.3 (b)	Pass
T1	160 - 150	Top Girt	L3x3x1/4	4	-400.23	25371.20	1.6 1.9 (b)	Pass
		Top Girt	L3x3x1/4	5	-958.62	25371.20	3.8 4.5 (b)	Pass
		Top Girt	L3x3x1/4	6	-956.92	25371.20	3.8 4.5 (b)	Pass
T4	100 - 75	Top Girt	L3x3x1/4	94	-10734.10	16310.60	65.8	Pass
		Top Girt	L3x3x1/4	95	-13276.50	16310.60	81.4	Pass
		Top Girt	L3x3x1/4	96	-12284.20	16310.60	75.3	Pass
T6	66.6667 - 58.3333	Top Girt	L3x3x1/2	148	-14713.40	24547.70	59.9	Pass
		Top Girt	L3x3x1/2	149	-18664.10	24547.70	76.0	Pass
		Top Girt	L3x3x1/2	150	-15783.30	24547.70	64.3	Pass
T7	58.3333 - 50	Top Girt	L3x3x1/2	163	-15403.90	23013.00	66.9	Pass
		Top Girt	L3x3x1/2	164	-19675.00	23013.00	85.5	Pass
		Top Girt	L3x3x1/2	165	-16559.70	23013.00	72.0	Pass
T8	50 - 37.5	Top Girt	L4x4x1/4	190	-16178.40	23877.90	67.8	Pass
		Top Girt	L4x4x1/4	191	-20831.50	23877.90	87.2	Pass
		Top Girt	L4x4x1/4	192	-17277.10	23877.90	72.4	Pass
T9	37.5 - 25	Top Girt	L4x4x5/16	205	-17549.70	28223.90	62.2	Pass
		Top Girt	L4x4x5/16	206	-22597.30	28223.90	80.1	Pass
		Top Girt	L4x4x5/16	207	-18584.80	28223.90	65.8	Pass
T7	58.3333 - 50	Redund Horz 1 Bracing	L2x2x5/16	167	-3835.29	14336.70	26.8	Pass
		Redund Horz 1 Bracing	L2x2x5/16	170	-3878.83	14336.70	27.1	Pass
		Redund Horz 1 Bracing	L2x2x5/16	173	-3878.83	14336.70	27.1	Pass
		Redund Horz 1 Bracing	L2x2x5/16	176	-3859.99	14336.70	26.9	Pass
		Redund Horz 1 Bracing	L2x2x5/16	179	-3859.99	14336.70	26.9	Pass
		Redund Horz 1 Bracing	L2x2x5/16	182	-3835.29	14336.70	26.8	Pass
T9	37.5 - 25	Redund Horz 1 Bracing	L2x2x5/16	209	-5028.55	12351.20	40.7	Pass
		Redund Horz 1 Bracing	L2x2x5/16	212	-5086.33	12351.20	41.2	Pass
		Redund Horz 1 Bracing	L2x2x5/16	215	-5086.33	12351.20	41.2	Pass
		Redund Horz 1 Bracing	L2x2x5/16	218	-5061.32	12351.20	41.0	Pass
		Redund Horz 1 Bracing	L2x2x5/16	221	-5061.32	12351.20	41.0	Pass
		Redund Horz 1 Bracing	L2x2x5/16	224	-5028.55	12351.20	40.7	Pass
T7	58.3333 - 50	Redund Diag 1 Bracing	L2x2x5/16	168	-2540.78	8572.07	29.6	Pass
		Redund Diag 1 Bracing	L2x2x5/16	171	-2569.62	8572.07	30.0	Pass
		Redund Diag 1 Bracing	L2x2x5/16	174	-2569.62	8572.07	30.0	Pass
		Redund Diag 1 Bracing	L2x2x5/16	177	-2557.14	8572.07	29.8	Pass
		Redund Diag 1 Bracing	L2x2x5/16	180	-2557.14	8572.07	29.8	Pass
		Redund Diag 1	L2x2x5/16	183	-2540.78	8572.07	29.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Bracing						
T9	37.5 - 25	Redund Diag 1 Bracing	L2x2x5/16	210	-3948.16	5040.84	78.3	Pass
		Redund Diag 1 Bracing	L2x2x5/16	213	-3993.52	5040.84	79.2	Pass
		Redund Diag 1 Bracing	L2x2x5/16	216	-3993.52	5040.84	79.2	Pass
		Redund Diag 1 Bracing	L2x2x5/16	219	-3973.89	5040.84	78.8	Pass
		Redund Diag 1 Bracing	L2x2x5/16	222	-3973.89	5040.84	78.8	Pass
		Redund Diag 1 Bracing	L2x2x5/16	225	-3948.16	5040.84	78.3	Pass
T3	125 - 100	Inner Bracing	L2 1/2x2x3/16	64	-13.24	4505.54	0.9	Pass
		Inner Bracing	L2 1/2x2x3/16	65	-13.32	4505.54	0.9	Pass
		Inner Bracing	L2 1/2x2x3/16	66	-13.17	4505.54	0.9	Pass
		Inner Bracing	L2 1/2x2x3/16	76	-12.78	4955.83	0.9	Pass
		Inner Bracing	L2 1/2x2x3/16	77	-12.84	4955.83	0.9	Pass
		Inner Bracing	L2 1/2x2x3/16	78	-12.69	4955.83	0.9	Pass
		Inner Bracing	L2 1/2x2x3/16	88	-12.20	5477.15	0.9	Pass
		Inner Bracing	L2 1/2x2x3/16	89	-12.27	5477.15	0.9	Pass
		Inner Bracing	L2 1/2x2x3/16	90	-12.14	5477.15	0.9	Pass
T4	100 - 75	Inner Bracing	L2 1/2x2x3/16	106	-14.85	3469.70	1.1	Pass
		Inner Bracing	L2 1/2x2x3/16	107	-14.93	3469.70	1.1	Pass
		Inner Bracing	L2 1/2x2x3/16	108	-14.78	3469.70	1.1	Pass
		Inner Bracing	L2 1/2x2x3/16	118	-14.71	3771.28	1.0	Pass
		Inner Bracing	L2 1/2x2x3/16	119	-14.79	3771.28	1.0	Pass
		Inner Bracing	L2 1/2x2x3/16	120	-14.65	3771.28	1.0	Pass
		Inner Bracing	L2 1/2x2x3/16	127	-233.44	4113.95	5.7	Pass
		Inner Bracing	L2 1/2x2x3/16	128	-233.45	4113.95	5.7	Pass
		Inner Bracing	L2 1/2x2x3/16	129	-216.36	4113.95	5.3	Pass
T5	75 - 66.6667	Inner Bracing	L2 1/2x2x3/16	142	-15.80	3202.90	1.1	Pass
		Inner Bracing	L2 1/2x2x3/16	143	-15.87	3202.90	1.1	Pass
		Inner Bracing	L2 1/2x2x3/16	144	-15.70	3202.90	1.1	Pass
T6	66.6667 - 58.3333	Inner Bracing	L2 1/2x2x3/16	157	-329.49	2965.74	11.1	Pass
		Inner Bracing	L2 1/2x2x3/16	158	-329.49	2965.74	11.1	Pass
		Inner Bracing	L2 1/2x2x3/16	159	-279.52	2965.74	9.4	Pass
T7	58.3333 - 50	Inner Bracing	L2 1/2x2x3/16	184	-346.62	2753.97	12.6	Pass
		Inner Bracing	L2 1/2x2x3/16	185	-346.62	2753.97	12.6	Pass
		Inner Bracing	L2 1/2x2x3/16	186	-292.57	2753.97	10.6	Pass
T8	50 - 37.5	Inner Bracing	L2 1/2x2 1/2x3/16	199	-369.03	3841.91	9.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	200	-369.03	3841.91	9.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	201	-307.39	3841.91	8.0	Pass
T9	37.5 - 25	Inner Bracing	L2 1/2x2 1/2x3/16	226	-398.62	3467.32	11.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	227	-398.62	3467.32	11.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	228	-328.98	3467.32	9.5	Pass
T10	25 - 0	Inner Bracing	L2 1/2x2 1/2x3/16	241	-25.57	2865.56	1.2	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	242	-25.65	2865.56	1.2	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	243	-25.34	2865.56	1.2	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	253	-25.21	3144.96	1.1	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	254	-25.29	3144.96	1.1	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	255	-24.97	3144.96	1.1	Pass
							Summary	
						Leg (T8)	83.8	Pass
						Diagonal (T10)	92.7	Pass
						Horizontal (T10)	86.6	Pass
						Top Girt (T8)	87.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
						Redund Horz 1 Bracing (T9)	41.2	Pass
						Redund Diag 1 Bracing (T9)	79.2	Pass
						Inner Bracing (T7)	12.6	Pass
						Bolt Checks	86.7	Pass
						RATING =	**92.7**	**Pass**

ANCHOR BOLT ANALYSIS

ANCHOR BOLT ANALYSIS

Input Data

Tower Reactions:

Uplift:	Uplift := 374.142kips	*user input*
Shear:	Shear := 55.619kips	*user input*
Compression:	Compression := 428.458kips	*user input*

Anchor Bolt Data:

Use ASTM A36	Use ASTM A36 per page 4.1 of structural analysis dated November 23, 1993		
Number of Anchor Bolts = N	N := 6	*user input*	
Bolt Ultimate Strength:	$F_u := 58 \cdot ksi$	*user input*	
Bolt Yield Strength:	Fy := 36·ksi	*user input*	
Bolt Modulus:	E := 29000ksi	*user input*	
Thickness of Anchor Bolts	D := 1.75in	*user input*	
Threads per Inch:	n := 5	*user input*	
Coefficient of Friction:	μ := 0.55	*user input*	(for baseplate with grout ASCE 10-15)
Length from top of pier to bottom of leveling nut:	$L_{ar} := 0in$	*user input*	
Bolt Modulus:	E := 29000·ksi	*user input*	

Anchor Bolt Section Properties:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4}\cdot D^2 \qquad A_g = 2.41\cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4}\cdot\left(D - \frac{0.9743\cdot in}{n}\right)^2 \qquad A_n = 1.9\cdot in^2$$

Net Diameter:

$$D_n := D - \frac{0.9743 in}{n} \qquad D_n = 1.56\cdot in$$

Radius of Gyration of Bolt:

$$r := \frac{D_n}{4} \qquad r = 0.39\cdot in$$

Plastic Section Modulus of Bolt:

$$Z_x := \frac{D_n^3}{6} \qquad Z_x = 0.63\cdot in^3$$

Forces:

Tension Force:

$$T_u := \frac{Uplift}{N}$$

$T_u = 62.36\cdot kip$

$T_{ub} := T_u$

Shear Force:

$$V_u := \frac{Shear}{N}$$

$V_u = 9.27\cdot kip$ $\qquad V_{ub} := V_u$

Resistance Factor for Flexure (ANSI/TIA-222-G 4.7):

$\phi_f := 0.9$

Resistance Factor for Anchor Bolt (ANSI/TIA-222-G 4.5.4.2):

$\phi_b := 0.80$

Resistance Factor for Tension (ANSI/TIA-222-G 4.9.6.1):

$\phi_t := 0.75$

Resistance Factor for Shear (ANSI/TIA-222-G 4.9.6.3):

$\phi_v := 0.75$

ANSI/TIA-222-G 4.7.1 Flexural Members:

Nominal Flexure Strength, Mn:

$M_n := Fy \cdot Z_x$

$M_n = 1.88 \cdot ft \cdot kip$

$\phi_f \cdot M_n = 1.69 \cdot ft \cdot kip$

Applied Moment due to Shear (worst case lever arm), Mu:

$M_u := L_{ar} \cdot V_u$

$M_u = 0 \cdot ft \cdot kip$

Flexure Check:

$FlexureCheck := if(M_u \le \phi_f \cdot M_n, "OK", "NO GOOD")$

FlexureCheck = "OK"

$\frac{M_u}{\phi_f \cdot M_n} = 0 \cdot \%$

ANSI/TIA-222-G 4.9.6.1 Tensile Strength:

Design Tensile Strength, Rnt:

$R_{nt} := F_u \cdot A_n$

$R_{nt} = 110.17 \cdot ft \cdot kip$

$\phi_t \cdot R_{nt} = 82.63 \cdot ft \cdot kip$

Tension Check:

$TensionCheck := if(T_u \le \phi_t \cdot R_{nt}, "OK", "NO GOOD")$

TensionCheck = "OK"

$\frac{T_u}{\phi_t \cdot R_{nt}} = 75.47 \cdot \%$

ANSI/TIA-222-G 4.9.6.3 Design Shear Strength:

Design Shear Strength, Rnv:

$R_{nv} := 0.45 \cdot F_u \cdot A_g$

$R_{nv} = 62.78 \cdot ft \cdot kip$

$\phi_v \cdot R_{nv} = 47.08 \cdot ft \cdot kip$

Shear Check:

$ShearCheck := if(V_u \le \phi_v \cdot R_{nv}, "OK", "NO GOOD")$

ShearCheck = "OK"

$\frac{V_u}{\phi_v \cdot R_{nv}} = 19.69 \cdot \%$

ANSI/TIA-222-G 4.9.6.4 Combined Shear and Tension:

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 \le 1$$

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 = 0.61$$

Combined Shear and Tension Check:

$$\text{ShearAndTensionCheck} := \text{if}\left[\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

ShearAndTensionCheck = "OK"

ANSI/TIA-222-G 4.9.9 Anchor Rods (Capacity):

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{\phi_b \cdot P_n} \le 1$$

$\eta := 0.55$ *user input from ANSI/TIA-222-G 4.9.9*

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{\phi_b \cdot F_u \cdot A_n} = 0.899$$

Capacity Check:

$$\text{CapacityCheck} := \text{if}\left[\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{\phi_b \cdot F_u \cdot A_n} \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

CapacityCheck = "OK"

NOTE: Previous additional tensile reinforcement (project 60404004) for tower anchor is not required due to the existing anchor (previous to MODification) capacity being below the allowable stress limit, therefore the anchor calculation modifications have been removed for this case. Refer to Project 60404004, Rev 2. for reinforcement details.

FOUNDATION ANALYSIS

AECOM

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PIER AND MAT FOUNDATION ANALYSIS - 3 PIERS

TOWER FORCES:

Moment Caused by Tower	$M_t := 8140 \cdot kip \cdot ft$
Shear at Base of Tower	$S_t := 100.826 kip$
Max Compressive Force	$C_t := 428.458 kip$
Max Uplift	$U_t := 374.142 kip$
Height of Tower	$H_t := 160 \cdot ft$
Width of Tower at Base	$W_t := 23 \cdot ft$
Weight of Tower	$WT_t := 1.0 \cdot kip$

NOTE: Weight of Tower is incorporated into the other loads listed above and is therefore set equal to one for programming.

FOOTING DIMENSIONS:

Width of Footing	$W_f := 36 \cdot ft$
Overall Depth of Footing	$D_f := 5ft$
Length of Pier	$L_p := 3.75 \cdot ft$
Extension of Pier Above Grade	$L_{pag} := 1 \cdot ft$
Diameter of Pier	$d_p := 3.5 \cdot ft$
Thickness of Footing	$T_f := 2.25 \cdot ft$
Reinforement Cover:	$Cvr := 3in$

MATERIAL PROPERTIES:

Compressive Strength of Concrete	$f'c := 3000 \cdot psi$	Unit Weight of Soil	$\gamma_s := 125 \cdot pcf$
Yield Strength of Steel Reinforcement	$fy := 60000 \cdot psi$	Unit Weight of Concrete	$\gamma_c := 150 \cdot pcf$
Internal Friction Angle of Soil	$\phi_s := 34 \cdot deg$	Depth to Neglect	$n := 0 \cdot ft$
Allowable Bearing Capacity	$q_s := 4500 \cdot psf$	Cohesion of Clay Type Soil	$c := 0 \cdot ksf$
Ultimate Bearing Capacity	$R_s := 2 \cdot q_s$	Note: Use 0 for Sandy Soil	

Coefficient of Lateral Soil Pressure $K_p := \frac{1 + \sin(\phi_s)}{1 - \sin(\phi_s)}$ $K_p = 3.5371$

What is Position of Center of Tower with respect to Center of Pad? 1=Offset 2=Not Offset $Pos_{tower} := 2$

STEEL REINFORCING:

PIER REINFORCEMENT:

Bar Size	$BSpier := 9$	Bar Diameter	$d_{bpier} := 1.1280 \cdot in$
Number of Bars	$NBpier := 9$	Bar Area	$A_{bpier} := 1.0 \cdot in^2$

PAD REINFORCEMENT:

Bar Size	$BS_{pad} := 11$	Bar Diameter	$d_{bpad} := 1.41 \cdot in$
Number of Bars	$NB_{pad} := 34$	Bar Area	$A_{bpad} := 1.56 \cdot in^2$

NOTE: Bar equivalent used here for weakest Moment resistance.

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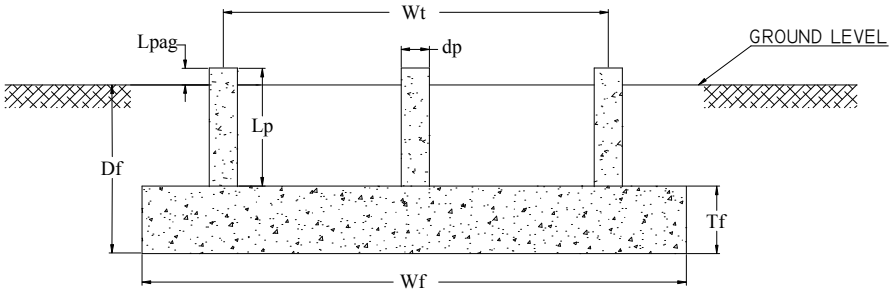
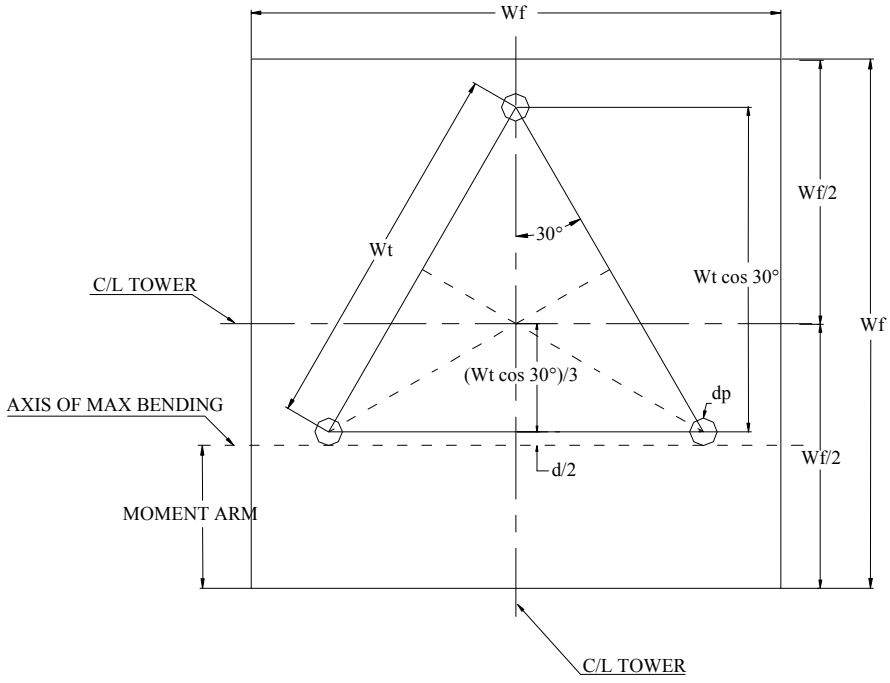
FOUNDATION OVERVIEW



ELEVATION



PLAN

STABILITY OF FOOTING

NOTE: Reduction factor is implemented as 0.75 for pull-out/uplift of foundation. Reduction factor shall be applied to Overturning Moment in this case

Passive Pressure:

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

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p}$ $\quad P_{pt} = 1.2159 \cdot ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}]$ $\quad P_{top} = 1.2159 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p}$ $\quad P_{bot} = 2.2107 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2}$ $\quad P_{ave} = 1.7133 \cdot ksf$

Shear:

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

$A_{pp} := W_f \cdot T_{pp}$ $\quad A_{pp} = 81 \cdot ft^2$

Ultimate Shear:

$S_u := P_{ave} \cdot A_{pp}$ $\quad S_u = 138.7772 \cdot kip$

Weight of Concrete Pad:

$WT_c := (W_f^2 \cdot T_f) \cdot \gamma_c$ $\quad WT_c = 437.4 \cdot kip$

Weight of Soil: above Footing:

$WT_{s1} := W_f^2 (|D_f - T_f|) \cdot \gamma_s$ $\quad WT_{s1} = 445.5 \cdot kip$

Weight of Soil Wedge at back face:

$WT_{s2} := \left[\frac{(D_f - n)^2 \cdot \tan(\phi_s)}{2} \cdot W_f \right] \cdot \gamma_s$ $\quad WT_{s2} = 37.9411 \cdot kip$

Distance to center of Tower Leg from Edge of Footing:

$X_{t1} := \frac{W_f}{2} - \frac{W_t \cdot \cos(30 \cdot deg)}{2}$ $\quad X_{t2} := \frac{W_f}{2} - \frac{W_t \cdot \cos(30 \cdot deg)}{3}$

$X_t := if(Pos_{tower} = 1, X_{t1}, X_{t2})$ $\quad X_t = 11.3605 \cdot ft$

Additional Offset of Footing:

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

$X_{off} := if(Pos_{tower} = 1, X_{off1}, X_{off2})$ $\quad X_{off} = 0 \cdot ft$

Resisting Moment:

$M_r := \left[0.9 (WT_c + WT_{s1}) \right] \cdot \frac{W_f}{2} + 0.90 \cdot \left[WT_t \cdot \left(\frac{W_f}{2} - X_{off} \right) \right] + 0.90 \cdot \left(S_u \cdot \frac{T_{pp}}{3} \right) \ldots$ $\quad M_r = 15659.4207 \cdot kip \cdot ft$

$+ WT_{s2} \cdot 0.90 \cdot \left(W_f + \frac{T_{pp} \cdot \tan(\phi_s)}{3} \right)$

$\phi_{OT} := 0.75$ ***ANSI/TIA-222-G REDUCTION FACTOR***

(Factored) Overturning Moment:

$M_{ot} := M_t + S_t \cdot (L_p + T_f) + WT_t \cdot X_{off}$ $\quad M_{ot} = 8744.956 \cdot kip \cdot ft$

Overturn Ratio (%):

$Ratio_{Stability} := \frac{M_{ot}}{M_r \cdot \phi_{OT}}$ $\quad Ratio_{Stability} = 74.46 \cdot \%$

$StabilityCheck := if(M_r \cdot \phi_{OT} > M_{ot}, "Okay", "No Good")$ $\quad StabilityCheck = "Okay"$

BEARING PRESSURE CHECK:

Pressure Applied: $LOAD_{tot} := \left(WT_c + WT_{s1} + WT_t\right)\cdot 0.9$ $LOAD_{tot} = 795.51\cdot kip$

$A_{mat} := W_f^{\,2}$ $A_{mat} = 1296\cdot ft^2$

$S := \frac{W_f^{\,3}}{6}$ $S = 7776\cdot ft^3$

$P_{max} := \frac{LOAD_{tot}}{A_{mat}} + \frac{M_{ot}}{S}$ $P_{max} = 1.7384\cdot ksf$

$P_{min} := \frac{LOAD_{tot}}{A_{mat}} - \frac{M_{ot}}{S}$ $P_{min} = -0.5108\cdot ksf$

$MaxPressure := if\left(P_{max} < 0.75R_s, "Okay", "No Good"\right)$ MaxPressure = "Okay"

$MinPressure := if\left[\left(P_{min} \geq 0\right)\cdot\left(P_{min} < 0.75\cdot R_s\right), "Okay", "No Good"\right]$ MinPressure = "No Good"

Distance to Resultant of Pressure Distribution:

$X_p := \frac{P_{max}}{\frac{P_{max}-P_{min}}{W_f}}\cdot\frac{1}{3}$ $X_p = 9.2748\cdot ft$

Distance to Kern: $X_k := \frac{W_f}{3}$ $X_k = 12\cdot ft$

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

Eccentricity: $e := \frac{M_{ot}}{LOAD_{tot}}$ $e = 10.9929$

Adjusted Soil Pressure: $q_a := \frac{2\cdot LOAD_{tot}}{3\cdot W_f\cdot\left(\frac{W_f}{2} - e\right)}$ $q_a = 2.1024\cdot ksf$

Revised Maximum: $q_{max} := if\left(X_p < X_k, q_a, P_{max}\right)$ $q_{max} = 2.1024\cdot ksf$

$PressureCheck := if\left(q_{max} < 0.75\cdot R_s, "Okay", "No Good"\right)$ PressureCheck = "Okay"

CHECK PUNCHING AND BEAM SHEAR:

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

$\phi_c := 0.85$ (ACI 9.3.2.3)

$d := T_f - Cvr - .5 \cdot in$ $\quad d = 23.5 \cdot in$

Factored load: $FL := \frac{C_t}{W_f^2}$ $\quad FL = 0.3306 \cdot ksf$

$V_{req} := \frac{FL \cdot \left(X_t - 0.5 \cdot d_p - d\right) \cdot W_f}{\phi_c}$ $\quad V_{req} = 107.1444 \cdot kip$

ACI 11.3.1.1 $V_{Avail} := 2 \cdot \sqrt{f'c \cdot psi} \cdot W_f \cdot d$ $\quad V_{Avail} = 1112.0959 \cdot kip$

$BeamShearCheck := if\left(V_{req} < V_{Avail}, "Okay", "No Good"\right)$ $\quad BeamShearCheck = "Okay"$

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.12.2.1)

$b_o := \left(d_p + d\right) \cdot \pi$ $\quad b_o = 17.1479 \cdot ft$

$V_{req} := FL \cdot \frac{W_f^2 - \left(d_p + d\right)^2 \cdot \frac{\pi}{4}}{\phi_c}$ $\quad V_{req} = 494.9671 \cdot kip$

$V_{Avail} := 4 \cdot \sqrt{f'c \cdot psi} \cdot b_o \cdot d$ $\quad V_{Avail} = 1059.448 \cdot kip$

$PunchingShearCheck := if\left(V_{req} < V_{Avail}, "Okay", "No Good"\right)$

$PunchingShearCheck = "Okay"$

TENSILE REINFORCEMENT IN PAD:

$\phi_m := 0.90$ per ACI 9.3.2.2

Applied Moments:

$$M_{nT} := \left[U_t \cdot \left(W_t \cdot \sin(60 \cdot deg) - \frac{d_p}{2} \right) + S_t \cdot \left(D_f + L_{pag} \right) \right] - WT_t \cdot 1.2 \cdot X_{off}$$

$$M_{nS} := -1 \cdot \left[\begin{array}{l} \frac{1}{2} \cdot \left(\frac{W_f}{2} + \frac{W_t}{3} \cdot \cos(30 \cdot deg) - \frac{d_p}{2} \right)^2 \cdot 0.9 W_t \cdot \left[\gamma_s \cdot \left(T_{pp} - T_f \right) \right] \ldots \\ + 0.9 WT_{s2} \cdot \left[\frac{W_f}{2} + \frac{W_t}{3} \cdot \cos(30 \cdot deg) - \frac{d_p}{2} + \left(D_f - n \right) \cdot \tan\left(\phi_s \right) \right] \end{array} \right]$$

$$M_{nC} := -1 \cdot \left[\frac{1}{2} \cdot \left(\frac{W_f}{2} + \frac{W_t}{3} \cdot \cos(30 \cdot deg) - \frac{d_p}{2} \right)^2 \cdot 0.9 W_t \cdot \left(\gamma_c \cdot T_f \right) \right]$$

Design Moment: $M_n := \frac{M_{nT} + M_{nS} + M_{nC}}{\phi_m}$ $M_n = 5195.1789 \cdot kips \cdot ft$

Required Reinforcement:

ACI 10.2.7.3 $\beta := if\left[f'c \le 4000 \cdot psi, .85, if\left[f'c \ge 8000 \cdot psi, .65, .85 - \left(\frac{\frac{f'c}{psi} - 4000}{1000} \right) \cdot .05 \right] \right]$ $\beta = 0.85$

Effective Width: $b_{eff} := W_t \cdot \cos(30 \cdot deg) + d_p$ $b_{eff} = 281.023 \cdot in$

$A_s := \frac{M_n}{\phi_m \cdot fy \cdot d}$ $A_s = 49.127 \cdot in^2$

$a := \frac{A_s \cdot fy}{\beta \cdot f'c \cdot b_{eff}}$ $a = 4.1133 \cdot in$

$A_s := \frac{M_n}{fy \cdot \left(d - \frac{a}{2} \right)}$ $A_s = 48.4549 \cdot in^2$

$\rho := \frac{A_s}{b_{eff} \cdot d}$ $\rho = 0.0073$

Temperature and Shrinkage: (ACI 7.12.2.1b)

$\rho_{sh} := if(fy \geq 60000 \cdot psi, 0.0018, 0.0020)$ $\rho_{sh} = 0.0018$

Area Required: $As := if\left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d\right)$ $As = 48.4549 \cdot in^2$

Area Provided: $As_{prov} := A_{bpad} \cdot NB_{pad}$ $As_{prov} = 53.04 \cdot in^2$

$PadReinforcement := if(As_{prov} > As, "Okay", "No Good")$ PadReinforcement = "Okay"

NOTE: Moment applied to area of steel has applied the Load factor and Resistance factor to obtain the following result.

$\frac{As}{As_{prov}} = 91.4 \cdot \%$

DEVELOPMENT LENGTH OF PAD REINFORCEMENT:

TENSION (ACI 12.2.3)

Bar Spacing: $B_{sPad} := \frac{W_f - 2 \cdot Cvr - NB_{pad} \cdot d_{bpad}}{NB_{pad} - 1}$ $B_{sPad} = 11.4564 \cdot in$

Development Length Factors:

Reinforcement Location Factor	$\alpha := 1.0$
Coating Factor	$\beta := 1.0$
Concrete strength Factor	$\lambda := 1.0$
Reinforcement Size Factor	$\gamma := 1.0$

Spacing or Cover Dimension: $c := if\left(Cvr < \frac{B_{sPad}}{2}, Cvr, \frac{B_{sPad}}{2}\right)$ $c = 3 \cdot in$

Transverse Reinforcement Inde As allowed by ACI 12.2.4 $k_{tr} := 0$

Development Length: $L_{dbt} := \frac{3}{40} \cdot \frac{fy}{\sqrt{f'c \cdot psi}} \cdot \frac{\alpha \cdot \beta \cdot \gamma \cdot \lambda}{\frac{c + k_{tr}}{d_{bpad}}} \cdot d_{bpad}$ $L_{dbt} = 54.4464 \cdot in$

$L_{dbmin} := 12 \cdot in$

Minimum Development Length: (ACI 12.2.1) $L_{dbtCheck} := if(L_{dbt} \geq L_{dbmin}, "Use L.dbt", "Use L.dbmin")$ $L_{dbtCheck} = "Use L.dbt"$

Available Length in Pad: $L_{Pad} := \frac{W_f}{2} - \frac{W_t}{2} - Cvr$ $L_{Pad} = 75 \cdot in$

$LpadTension := if(L_{Pad} > L_{dbt}, "Okay", "No Good")$ LpadTension = "Okay"

REINFORCEMENT IN PIER:

$A_p := \frac{\pi \cdot d_p^{\,2}}{4}$ $\quad A_p = 1385.4424 \cdot in^2$

(ACI 10.8.4 and 10.9.1)

$A_{smin} := 0.01 \cdot 0.5 \cdot A_p$ $\quad A_{smin} = 6.9272 \cdot in^2$

$A_{sprov} := NBpier \cdot A_{bpier}$ $\quad A_{sprov} = 9 \cdot in^2$

$SteelAreaCheck := if\left(A_{sprov} > A_{smin}, "Okay", "No Good"\right)$ $\quad SteelAreaCheck = "Okay"$

Bar Spacing In Pier: $B_{sPier} := \frac{d_p \cdot \pi}{NBpier} - d_{bpier}$ $\quad B_{sPier} = 13.5328 \cdot in$

Diamter of Reinforcement Cage: $Diam_{cage} := d_p - 2 \cdot Cvr$ $\quad Diam_{cage} = 36 \cdot in$

Maximum Moment in Pier: $M_p := \left(S_t \cdot L_p\right)$ $\quad M_p = 4537.17 \cdot kips \cdot in$

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

(defined variables) $\left(f'_c \;\; f_y \;\; cl \;\; Spiral\right) = (3 \;\; 60 \;\; 4 \;\; 0)$

The required input is column diameter in inches, number of reinforcing bars, bar size number, factored axial load in kips and moment in kip inches:

$\left(D \;\; N \;\; n \;\; P_u \;\; M_{xu}\right) := (42 \;\; 9 \;\; 9 \;\; 514 \;\; 5445)$

Clears any previous output: $\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) := (0 \;\; 0 \;\; 0 \;\; 0)$

$\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) := \phi P'_n\left(D, N, n, P_u, M_{xu}\right)^T$

The Output is given as useable axial load in kips, moment capacity in kip inches, splicing stress in ksi, and reinforcement ratio: $\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) = (1333.225 \;\; 14123.3656 \;\; -60 \;\; 0.0065)$

Column size and reinforcement may be changed to match capacity to the applied load.

$AxialLoadCheck := if\left(\phi P_n \geq P_u, "Okay", "No Good"\right)$ $\quad AxialLoadCheck = "Okay"$

$BendingCheck := if\left(\phi M_{xn} \geq M_{xu}, "Okay", "No Good"\right)$ $\quad BendingCheck = "Okay"$

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DEVELOPMENT LENGTH OF PIER REINFORCEMENT:

TENSION (ACI 12.2.3)

Spacing and Cover: $Cvr = 3\cdot in$ $B_{sPier} = 13.5328\cdot in$

Factors for development:

Reinforcement Location Factor	$\alpha := 1.0$
Coating Factor	$\beta := 1.0$
Concrete strength Factor	$\lambda := 1.0$
Reinforcement Size Factor	$\gamma := 1.0$

Spacing or Cover Dimension: $c := if\left(Cvr < \frac{B_{sPier}}{2}, Cvr, \frac{B_{sPier}}{2}\right)$ $c = 3\cdot in$

Transverse Reinforcement: As allowed by ACI 12.2.4 $k_{tr} := 0$

$$L_{dbt} := \frac{3}{40}\cdot\frac{fy}{\sqrt{f'c\cdot psi}}\cdot\frac{\alpha\cdot\beta\cdot\gamma\cdot\lambda}{\frac{c+k_{tr}}{d_{bpier}}}\cdot d_{bpier} \qquad L_{dbt} = 34.8457\cdot in$$

Minimum Development Length: (ACI 12.2.1) $L_{dbmin} := 12\cdot in$

$L_{dbtCheck} := if\left(L_{dbt} \geq L_{dbmin}, "Use\ L.dbt", "Use\ L.dbmin"\right)$ $L_{dbtCheck} = "Use\ L.dbt"$

COMPRESSION: (ACI 12.3.2)

$$L_{dbc1} := \frac{.02\cdot d_{bpier}\cdot fy}{\sqrt{f'c\cdot psi}} \qquad L_{dbc1} = 24.7132\cdot in$$

$L_{dbmin} := 0.0003\cdot\frac{in^2}{lb}\cdot\left(d_{bpier}\cdot fy\right)$ $L_{dbmin} = 20.304\cdot in$

$L_{dbc} := if\left(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}\right)$ $L_{dbc} = 24.7132\cdot in$

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Available Length in Pier:

$L_{pier} := L_p - 3 \cdot in$ $\quad L_{pier} = 42 \cdot in$

$L_{piertension} := if\left(L_{pier} > L_{dbt}, "Okay", "No Good"\right)$ $\quad L_{piertension} = "Okay"$

$L_{piercompression} := if\left(L_{pier} > L_{dbc}, "Okay", "No Good"\right)$ $\quad L_{piercompression} = "Okay"$

Available Length in Pad:

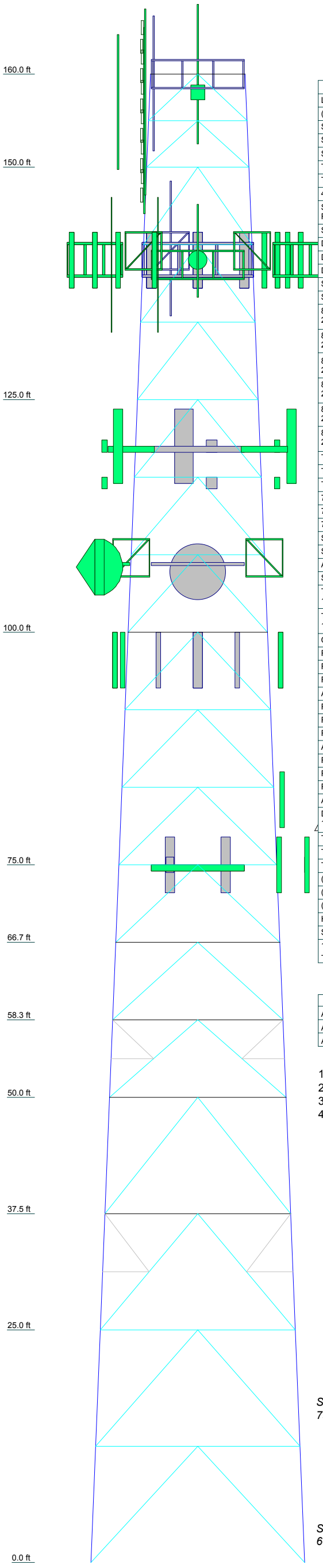
$L_{pad} := T_f - 3 \cdot in$ $\quad L_{pad} = 24 \cdot in$

$L_{padtension} := if\left[L_{pad} > \left(L_{dbt} - L_{pier}\right), "Okay", "No Good"\right]$ $\quad L_{padtension} = "Okay"$

$L_{padcompression} := if\left[L_{pad} > \left(L_{dbc} - L_{pier}\right), "Okay", "No Good"\right]$ $\quad L_{padcompression} = "Okay"$

ANALYSIS UNDER TIA-222-F DESIGN CRITERIA (DESPP / CSP)

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Legs	P.5x.250			P5x0.3 w/ (3) 1.5x5/8 Plates		P5x0.4 w/ (3) 1.5x5/8 Plates	HSS5x.4	HSS6.875x.4		HSS6.875x0.5 w/ (3) 2x5/8 Bars
Leg Grade	A500-50				A572-50			A514-60		A500-50
Diagonals	2L2 1/2x2 1/2x5/16	2L2 1/2x2x3/16	2L2 1/2x2 1/2x5/16	2L3x2 1/2x1/4	2L3x2 1/2x5/16		2L3x3x5/16	2L3 1/2x3x3/8	2L3 1/2x3 1/2x5/16	2L4x3x3/8
Diagonal Grade	A36				A529-50			A36		A529-50
Top Girts	N.A.	L3x3x1/4	L3x3x5/16	L3x3x1/4	N.A.		L3x3x1/2	L4x4x1/4	L4x4x5/16	N.A.
Horizontals	L2 1/2x2 1/2x3/16			L3x3x1/2				N.A.		L4x4x1/2
Red. Horizontals	N.A.						L2x2x5/16	N.A.	L2x2x5/16	N.A.
Red. Diagonals	N.A.			L2 1/2x2x3/16			L2x2x5/16	N.A.	L2x2x5/16	N.A.
Inner Bracing	N.A.									L2 1/2x2 1/2x3/16
Face Width (ft)	10.2	11	13	15	17	17.6667	18.3333	19	20	21
# Panels @ (ft)	2 @ 5			12 @ 8.33333						4 @ 12.5
Weight (lb)	1181.7	2323.9	3860.0	5084.2	2103.3	2141.0	2316.3	3003.5	3416.1	8678.7



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 2"x21' (DNK-33)	160	SC479-HF1LDF (DNK-20)	139.5
(PSA6) 6' Side-Arm (CSP)	160	PD1142-1 (DNK-11)	120
SC479-HF1LDF(D00-E6085) (CSP)	160	DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	120
SC479-HF1LDF(D00l-E6085) (Inverted) (CSP)	160 - 145	DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	120
SC479-HF1LDF (DNK-29)	159	DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	120
TMA 432-83H-01T (DNK-25)	158	RFS APXVAARR24_43-U-NA20 Panel Antenna w/ 108" Pipe Mount (T-Mobile)	120
TMA 432-83H-01T (DNK-30)	158	RFS APXVAARR24_43-U-NA20 Panel Antenna w/ 108" Pipe Mount (T-Mobile)	120
432E-83l-01T TTA Unit (CSP)	158	RFS APXVAARR24_43-U-NA20 Panel Antenna w/ 108" Pipe Mount (T-Mobile)	120
SC479-HF1LDF(D00l-E6085) (DNK-32 - Troop L RX (PNS-Proposed 01272017))	157.5	Ericsson Radio 4449 B66A RRH Unit (T-Mobile)	120
SC479-HF1LDF (DNK-26)	157	Ericsson Radio 4449 B66A RRH Unit (T-Mobile)	120
DB228-A (DNK-28)	157	Ericsson Radio 4449 B66A RRH Unit (T-Mobile)	120
DB304-A (DNK-27)	155	Ericsson 4449 B71 + B12 Radio Unit (T-Mobile)	120
DC6-48-60-18-8F (Squid) Suppressor (DNK-23)	145	Ericsson 4449 B71 + B12 Radio Unit (T-Mobile)	120
SC479-HF1LDF (DNK-21)	141.25	Ericsson 4449 B71 + B12 Radio Unit (T-Mobile)	120
SC479-HF1LDF (DNK-18)	141	Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	120
8' Stiff-Arm (DNK-18 (4 antennas Attached - 18, 24, 25, Sinclair))	141	Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	120
8' Stiff-Arm (DNK-18 (4 antennas Attached - 18, 24, 25, Sinclair))	141	Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	120
8' Stiff-Arm (DNK-21 (2 antennas Attached - 21,29))	141	8' Stiff-Arm (DNK-7)	108
8' Stiff-Arm (DNK-21 (2 antennas Attached - 21,29))	141	8' Stiff-Arm (DNK-7)	108
8' Stiff-Arm (DNK-22 (5 antennas Attached - 22,27,31,32,33))	141	4"x96"x72" Ice Canopy (DNK-5)	107.5
8' Stiff-Arm (DNK-22 (5 antennas Attached - 22,27,31,32,33))	141	4"x96"x72" Ice Canopy (DNK-6)	107.5
T-Frame (ATT DNK 12-17)	140	6' w/ Radome (DNK-6 / CSP-7)	107
T-Frame (ATT DNK 12-17)	140	6' w/ Radome (DNK-5 / CSP-6)	106.5
T-Frame (ATT DNK 12-17)	140	APXVSPP18-C-A20 (Sprint DNK 2-4)	97
7770.00 (ATT DNK 12-17)	140	APXVSPP18-C-A20 (Sprint DNK 2-4)	97
7770.00 (ATT DNK 12-17)	140	APXVSPP18-C-A20 (Sprint DNK 2-4)	97
7770.00 (ATT DNK 12-17)	140	DT465B-2XR-V2 Panels (Commscope) (Sprint DNK 2-4)	97
SBNH-1D6565C (ATT DNK 12-17)	140	DT465B-2XR-V2 Panels (Commscope) (Sprint DNK 2-4)	97
SBNH-1D6565C (ATT DNK 12-17)	140	DT465B-2XR-V2 Panels (Commscope) (Sprint DNK 2-4)	97
SBNH-1D6565C (ATT DNK 12-17)	140	RRH 800MHz 2x50W (Sprint DNK 2-4)	97
AM-X-CD-16-65-00T-RET (6') (ATT DNK 12-17)	140	RRH 800MHz 2x50W (Sprint DNK 2-4)	97
Surge Suppressor (ATT DNK 12-17)	140	RRH 800MHz 2x50W (Sprint DNK 2-4)	97
TPA-65R-LCUUUU-H8 Panel w/ RET (ATT DNK 12-17)	140	RRH 800MHz 2x50W (Sprint DNK 2-4)	97
TPA-65R-LCUUUU-H8 Panel w/ RET (ATT DNK 12-17)	140	RRH 800MHz 2x50W (Sprint DNK 2-4)	97
QS66512-3 Quintel Panel (ATT DNK 12-17)	140	PM-SU35-48 - Pipe Mount 48" (Sprint)	97
RRUS-32 (ATT DNK 12-17)	140	PM-SU35-48 - Pipe Mount 48" (Sprint)	97
RRUS-12 (ATT DNK 12-17)	140	PM-SU35-48 - Pipe Mount 48" (Sprint)	97
RRUS-11 (ATT DNK 12-17)	140	RRH 1900 MHz 2x40W (Sprint DNK 2-4)	97
A2 Module Unit (ATT DNK 12-17)	140	RRH 1900 MHz 2x40W (Sprint DNK 2-4)	97
RRUS-32 (ATT DNK 12-17)	140	PM-SU35-48 - Pipe Mount 48" (Sprint DNK 2-4)	97
RRUS-12 (ATT DNK 12-17)	140	PM-SU35-48 - Pipe Mount 48" (Sprint DNK 2-4)	97
RRUS-11 (ATT DNK 12-17)	140	PM-SU35-48 - Pipe Mount 48" (Sprint DNK 2-4)	97
A2 Module Unit (ATT DNK 12-17)	140	TD-RRH8x20 (Sprint DNK 2-4)	97
RRUS-32 (ATT DNK 12-17)	140	TD-RRH8x20 (Sprint DNK 2-4)	97
RRUS-12 (ATT DNK 12-17)	140	TD-RRH8x20 (Sprint DNK 2-4)	97
RRUS-11 (ATT DNK 12-17)	140	RRH 1900 MHz 2x40W (Sprint DNK 2-4)	97
A2 Module Unit (ATT DNK 12-17)	140	RRH 800MHz 2x50W (Sprint DNK 2-4)	97
DC6-48-60-18-8F (Squid) Suppressor (ATT DNK 12-17)	140	16x16 Panel 19dBi 2.45GHz ISM (DNK-1)	82
TT19-08BP111-001 TMA's (ATT DNK 12-17)	140	1' Side Mount Standoff (DNK-1)	82
TT19-08BP111-001 TMA's (ATT DNK 12-17)	140	SBNHH-1D65B (VZW-850PCS)	75
TT19-08BP111-001 TMA's (ATT DNK 12-17)	140	RRH_2x60-AWS (VZW)	75
(2) LGP21401 Diplexer (ATT DNK 12-17)	140	SBNHH-1D65B (VZW-700AWS)	75
(2) LGP21401 Diplexer (ATT DNK 12-17)	140	5' T-arm (VZW)	75
(2) LGP21401 Diplexer (ATT DNK 12-17)	140	RRH_2x60-AWS (VZW)	75
HPD2-4.7 (NWCT)	140	SBNHH-1D65B (VZW-850PCS)	75
SC479-HF1LDF (DNK-19)	139.5	SBNHH-1D65B (VZW-700AWS)	75
10' PCS Frame (1) (DNK-19 (3 antennas Attached - 19,20,26))	139.5	5' T-arm (VZW)	75
		RH_2x60-07-L (700 MHz) (VZW)	75
		DC6-48-60-18-8F (VZW)	75
		RH_2x60-07-L (700 MHz) (VZW)	75

MATERIAL STRENGTH

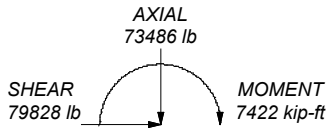
GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A529-50	50 ksi	65 ksi
A36	36 ksi	58 ksi	A514-60	60 ksi	80 ksi
A572-50	50 ksi	65 ksi			

TOWER DESIGN NOTES

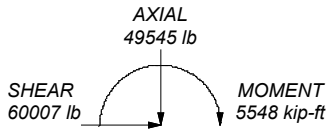
1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 90 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 90 mph wind.
4. TOWER RATING: 103.8%

MAX. CORNER REACTIONS AT BASE:
DOWN: 397109 lb
SHEAR: 45648 lb

UPLIFT: -337558 lb
SHEAR: 41056 lb



TORQUE 200 kip-ft
90 mph WIND - 0.5000 in ICE

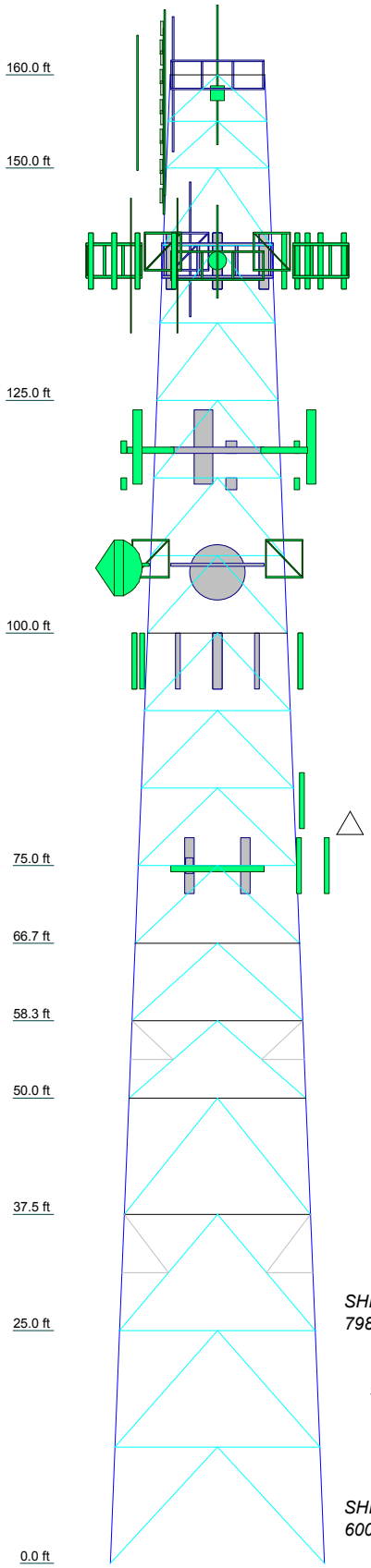


TORQUE 121 kip-ft
REACTIONS - 90 mph WIND

AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT
Phone: 860-529-8882
FAX: 860-529-3991

Job: ***160' Self Support Lattice - CSP #20***			
Project: ***Middlebury, CT / DESPP/CSP Design Loading***			
Client: Transcend Wireless / T-Mobile / TWM-014	Drawn by: MCD	App'd:	
Code: TIA/EIA-222-F	Date: 05/07/19	Scale: NTS	
Path: P:\Projects\Telcom\StructuralsByLocation\Connecticut\MiddleburyCSP#2026_60604310-TWM-014\TIA-F\DESPP_CSP_Middlebury_CT.eri		Dwg No. E-1	

Section	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	HSS6.875x0.5 w/ (3) 2x5/8 Bars	HSS6.875x.4		HSS5x.4	A		P5x0.3 w/ (3) 1.5x5/8 Plates	A500-50	P.5x.250	
Leg Grade	A500-50	A514-60			A572-50					
Diagonals	2L4x3x3/8	B	2L3 1/2x3x3/8	2L3x3x5/16	2L3x2 1/2x5/16		2L3x2 1/2x1/4	2L2 1/2x2 1/2x5/16	2L2 1/2x2x3/16	
Diagonal Grade	A529-50		A36		A529-50			A36		
Top Girts	N.A.	L4x4x5/16	L4x4x1/4	L3x3x1/2		N.A.	L3x3x1/4	N.A.		L3x3x1/4
Horizontals	L4x4x1/2		N.A.				L3x3x1/2	L3x3x5/16	L2 1/2x2 1/2x3/16	L3x3x1/4
Red. Horizontals	N.A.	L2x2x5/16	N.A.	L2x2x5/16				N.A.		
Red. Diagonals	N.A.	L2x2x5/16	N.A.	L2x2x5/16				N.A.		
Inner Bracing	L2 1/2x2 1/2x3/16						L2 1/2x2x3/16		N.A.	
Face Width (ft) 23	21	20	19	18.3333	17.6667	17	15	13	11	10.2
# Panels @ (ft)	4 @ 12.5						12 @ 8.33333			2 @ 5
Weight (lb) 34108.8	8678.7	3416.1	3003.5	2316.3	2141.0	2103.3	5084.2	3860.0	2323.9	1181.7



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	P5x0.4 w/ (3) 1.5x5/8 Plates	B	2L3 1/2x3 1/2x5/16

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A529-50	50 ksi	65 ksi
A36	36 ksi	58 ksi	A514-60	60 ksi	80 ksi
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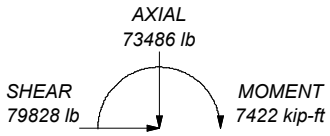
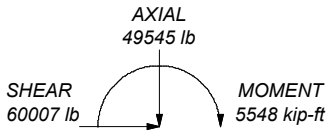


TORQUE 200 kip-ft
90 mph WIND - 0.5000 in ICE



TORQUE 121 kip-ft
REACTIONS - 90 mph WIND

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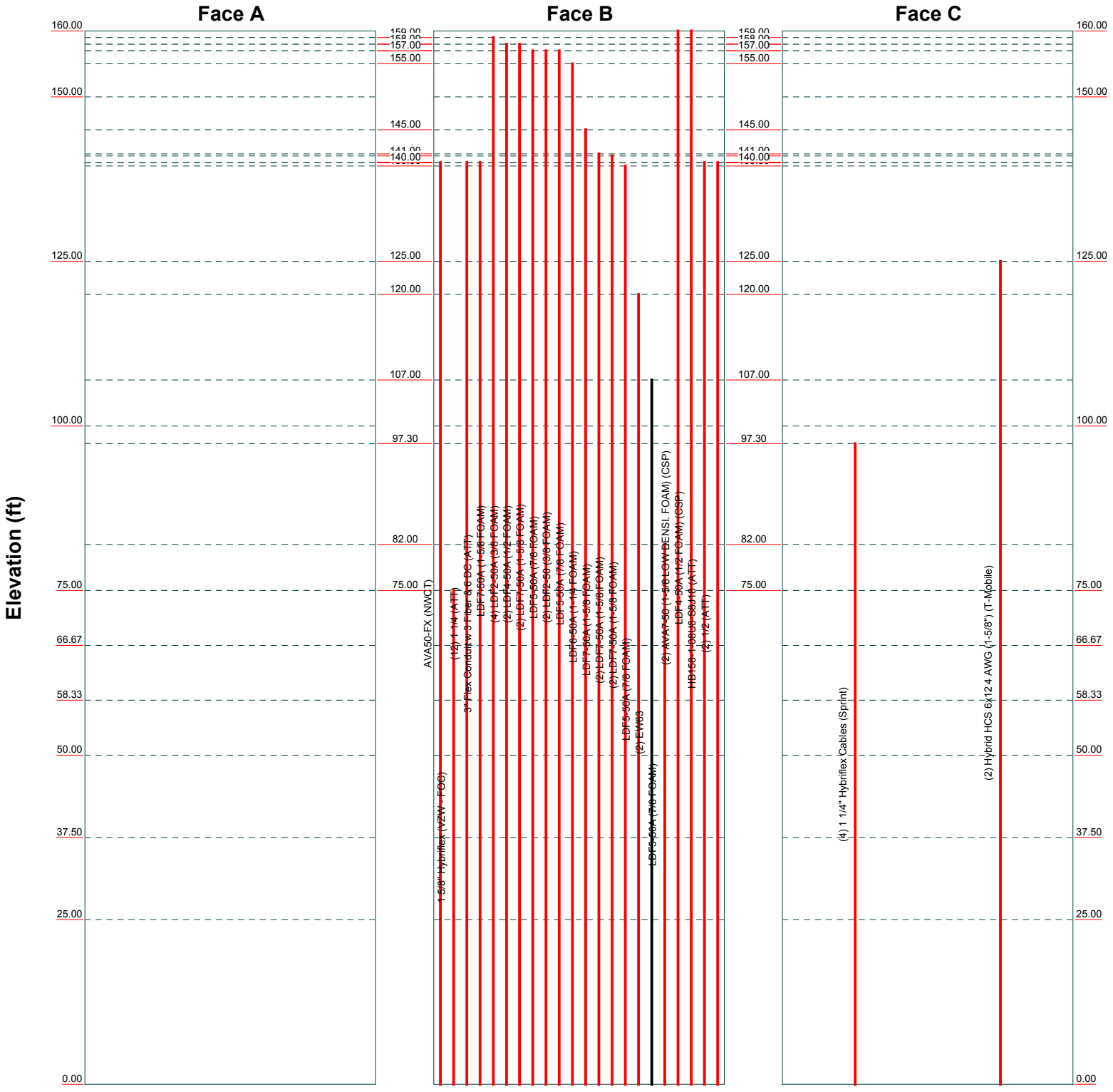
Job: ***160' Self Support Lattice - CSP #20***			
Project: ***Middlebury, CT / DESPP/CSP Design Loading***			
Client: Transcend Wireless / T-Mobile / TWM-014	Drawn by: MCD	App'd:	
Code: TIA/EIA-222-F	Date: 05/07/19	Scale: NTS	
Path: P:\Projects\Telcom\StructuralsByLocation\Connecticut\MiddleburyCSP#2026_60604310-TWM-014\TIA-F\DESPP_CSP_Middlebury_CT.eri		Dwg No. E-1	

Feed Line Distribution Chart
0' - 160'

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



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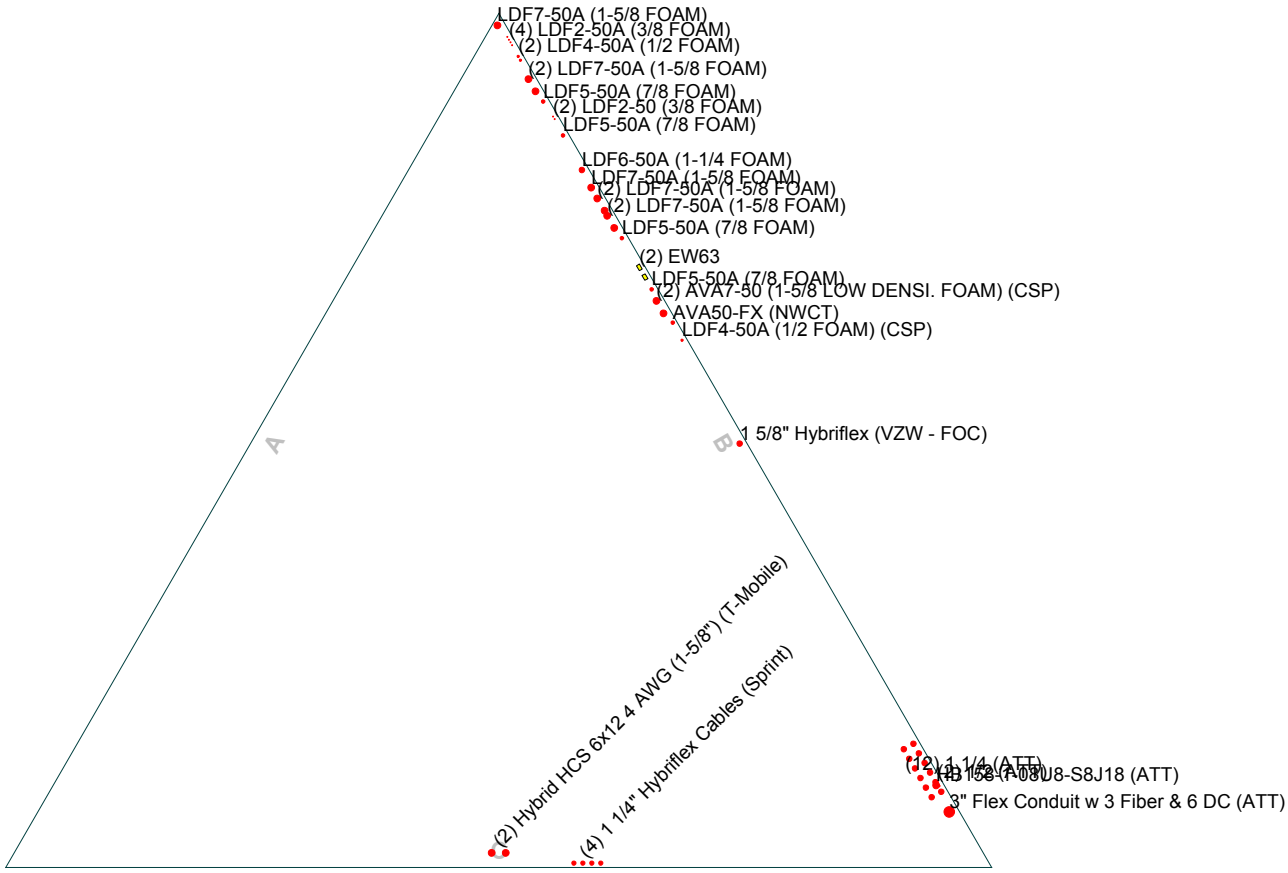
Path: P:\Projects\Telcom\StructuralsByLocation\Connecticut\MiddleburyCSP#2026_60604310-TWM-014\TIA-F\DESPP_CSP_Middlebury_CT.eri			Dwg No. E-7

Feed Line Plan

Round Flat App In Face App Out Face



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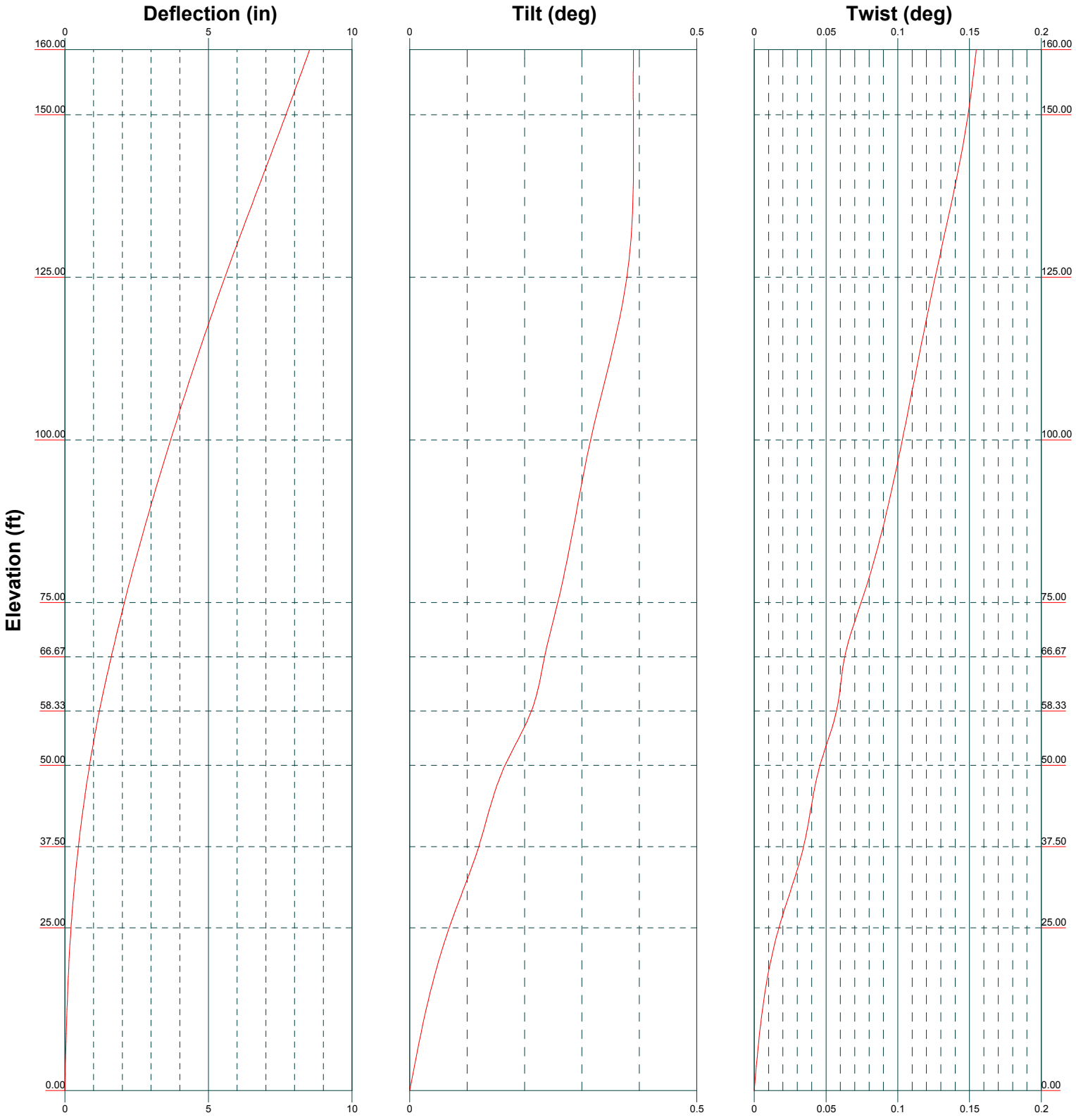
Path: P:\Projects\Telcom\StructuralsByLocation\Connecticut\MiddleburyCSP#2026_60604310-TWM-014\TIA-F\DESPP_CSP_Middlebury_CT.eri			Dwg No. E-7

TIA/EIA-222-F - Service - 90 mph

Maximum Values



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Project: ***Middlebury, CT / DESPP/CSP Design Loading***			
Client: Transcend Wireless / T-Mobile / TWM-014	Drawn by: MCD	App'd:	
Code: TIA/EIA-222-F	Date: 05/07/19	Scale: NTS	
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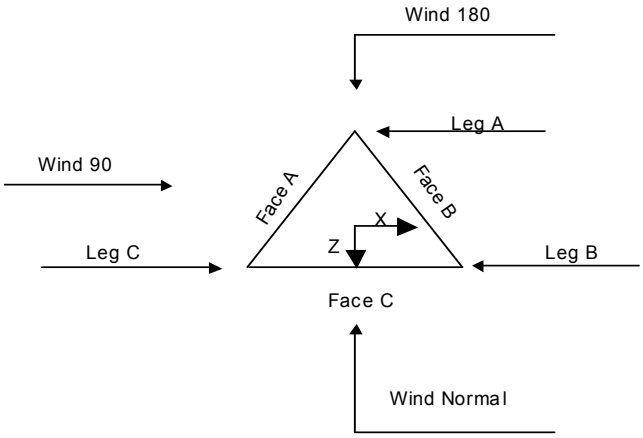
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 160.00 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 10.20 ft at the top and 23.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 90 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 90 mph is used in combination with ice.
Deflections calculated using a wind speed of 90 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	160.00-150.00			10.20	1	10.00
T2	150.00-125.00			11.00	1	25.00
T3	125.00-100.00			13.00	1	25.00
T4	100.00-75.00			15.00	1	25.00
T5	75.00-66.67			17.00	1	8.33
T6	66.67-58.33			17.67	1	8.33
T7	58.33-50.00			18.33	1	8.33
T8	50.00-37.50			19.00	1	12.50
T9	37.50-25.00			20.00	1	12.50
T10	25.00-0.00			21.00	1	25.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	160.00-150.00	5.00	K Brace Down	No	Yes	0.0000	0.0000
T2	150.00-125.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T3	125.00-100.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T4	100.00-75.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T5	75.00-66.67	8.33	K Brace Down	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	66.67-58.33	8.33	K Brace Down	No	Yes	0.0000	0.0000
T7	58.33-50.00	8.33	K1 Down	No	Yes	0.0000	0.0000
T8	50.00-37.50	12.50	K Brace Down	No	Yes	0.0000	0.0000
T9	37.50-25.00	12.50	K1 Down	No	Yes	0.0000	0.0000
T10	25.00-0.00	12.50	K Brace Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 160.00-150.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T2 150.00-125.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T3 125.00-100.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x5/16	A36 (36 ksi)
T4 100.00-75.00	Arbitrary Shape	P5x0.3 w/ (3) 1.5x5/8 Plates	A500-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4	A36 (36 ksi)
T5 75.00-66.67	Arbitrary Shape	P5x0.4 w/ (3) 1.5x5/8 Plates	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x5/16	A529-50 (50 ksi)
T6 66.67-58.33	Arbitrary Shape	P5x0.4 w/ (3) 1.5x5/8 Plates	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x5/16	A529-50 (50 ksi)
T7 58.33-50.00	Pipe	HSS5x.4	A514-60 (60 ksi)	Double Equal Angle	2L3x3x5/16	A36 (36 ksi)
T8 50.00-37.50	Pipe	HSS6.875x.4	A514-60 (60 ksi)	Double Angle	2L3 1/2x3x3/8	A36 (36 ksi)
T9 37.50-25.00	Pipe	HSS6.875x.4	A514-60 (60 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A529-50 (50 ksi)
T10 25.00-0.00	Arbitrary Shape	HSS6.875x0.5 w/ (3) 2x5/8 Bars	A500-50 (50 ksi)	Double Angle	2L4x3x3/8	A529-50 (50 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 160.00-150.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36M-50 (50 ksi)
T4 100.00-75.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T6 66.67-58.33	Single Angle	L3x3x1/2	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T7 58.33-50.00	Single Angle	L3x3x1/2	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T8 50.00-37.50	Single Angle	L4x4x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T9 37.50-25.00	Single Angle	L4x4x5/16	A529-50 (50 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 160.00-150.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T2 150.00-125.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 125.00-100.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T4 100.00-75.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T5 75.00-66.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T6 66.67-58.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T7 58.33-50.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T8 50.00-37.50	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T9 37.50-25.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T10 25.00-0.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/2	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T3 125.00-100.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T4 100.00-75.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T5 75.00-66.67	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T6 66.67-58.33	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T7 58.33-50.00	Equal Angle		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T8 50.00-37.50	Equal Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T9 37.50-25.00	Equal Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T10 25.00-0.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T7 58.33-50.00	A36 (36 ksi)	Horizontal (1) Diagonal (1)	Equal Angle Equal Angle	L2x2x5/16 L2x2x5/16	1 1
T9 37.50-25.00	A36 (36 ksi)	Horizontal (1) Diagonal (1)	Equal Angle Single Angle	L2x2x5/16 L2x2x5/16	1 1

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 160.00-150.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	0.0000	36.0000
T2 150.00-125.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 125.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 100.00-75.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 75.00-66.67	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 66.67-58.33	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 58.33-50.00	0.00	0.0000	A36 (36 ksi)	1	1	1.03	36.0000	36.0000	36.0000
T8 50.00-37.50	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 37.50-25.00	0.00	0.0000	A36 (36 ksi)	1	1	1.03	36.0000	36.0000	36.0000
T10 25.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 160.00-150.00	Yes	Yes	1	1 1	1 1	1 1	1 1	0.65 0.65	0.65 0.65	1 1
T2 150.00-125.00	Yes	Yes	1	1 1	1 1	1 1	1 1	0.65 0.65	0.65 0.65	1 1
T3 125.00-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	0.65 0.65	0.65 0.65	1 1
T4 100.00-75.00	Yes	Yes	1	1 1	1 1	1 1	1 1	0.65 0.65	0.65 0.65	1 1
T5 75.00-66.67	Yes	Yes	1	1 1	1 1	1 1	1 1	0.65 0.65	0.65 0.65	1 1
T6 66.67-58.33	Yes	Yes	1	1 1	1 1	1 1	1 1	0.65 0.65	0.65 0.65	1 1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T7	Yes	Yes	1	1	1	1	1	0.65	0.65	1
58.33-50.00				1	1	1	1	0.65	0.65	1
T8	Yes	Yes	1	1	1	1	1	0.65	0.65	1
50.00-37.50				1	1	1	1	0.65	0.65	1
T9	Yes	Yes	1	1	1	1	1	0.65	0.65	1
37.50-25.00				1	1	1	1	0.65	0.65	1
T10	Yes	Yes	1	1	1	1	1	0.65	0.65	1
25.00-0.00				1	1	1	1	0.65	0.65	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 Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
160.00-150.00														
T2	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
150.00-125.00														
T3	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
125.00-100.00														
T4	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
100.00-75.00														
T5 75.00-66.67	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 66.67-58.33	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 58.33-50.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 50.00-37.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 37.50-25.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 25.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Connection Offsets Diagonal Vert. Top in	Diagonal Horiz. Top in	Diagonal Vert. Bot. in	Diagonal Horiz. Bot. in	K-Bracing Vert. Top in	K-Bracing Horiz. Top in	K-Bracing Vert. Bot. in	K-Bracing Horiz. Bot. in
T1	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
160.00-150.00								
T2	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
150.00-125.00								
T3	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
125.00-100.00								

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T4 100.00-75.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T5 75.00-66.67	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T6 66.67-58.33	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T7 58.33-50.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T8 50.00-37.50	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T9 37.50-25.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T10 25.00-0.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 160.00-150.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T2 150.00-125.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T3 125.00-100.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T4 100.00-75.00	Flange	0.7500 A325X	6	0.7500 AISC 14th Ed ASD - A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T5 75.00-66.67	Flange	0.8750 A325X	6	0.7500 AISC 14th Ed ASD - A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T6 66.67-58.33	Flange	0.8750 A325X	6	0.7500 AISC 14th Ed ASD - A325N	1	0.6250 A325X	2	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T7 58.33-50.00	Flange	0.8750 A325X	6	0.7500 AISC 14th Ed ASD - A325N	1	0.6250 A325X	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T8 50.00-37.50	Flange	1.0000 A325X	8	1.0000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T9 37.50-25.00	Flange	1.0000 A325X	8	1.0000 A325N	1	0.6250 A325X	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T10 25.00-0.00	Flange	1.0000 A325X	8	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
AVA50-FX (NWCT)	B	Yes	No	Ar (CfAe)	140.00 - 0.00	-0.5000	-0.14	1	1	1.1020	1.1020		0.29
1 5/8" Hybriflex (VZW - FOC)	B	Yes	No	Ar (CfAe)	75.00 - 0.00	-1.0000	0	1	1	1.6250	1.6250		1.48
1 1/4 (ATT)	B	Yes	No	Ar (CfAe)	140.00 - 0.00	-4.0000	0.38	12	6	1.5500	1.5500		0.66
3" Flex Conduit w 3 Fiber & 6 DC (ATT)	B	Yes	No	Ar (CfAe)	140.00 - 0.00	-1.0000	0.43	1	1	3.0000	3.0000		3.00
LDF7-50A (1-5/8 FOAM)	B	Yes	No	Ar (CfAe)	159.00 - 0.00	-1.0000	-0.49	1	1	1.9800	1.9800		0.82
LDF2-50A (3/8 FOAM)	B	Yes	No	Ar (CfAe)	158.00 - 0.00	-1.0000	-0.47	4	4	0.4400	0.4400		0.08
LDF4-50A (1/2 FOAM)	B	Yes	No	Ar (CfAe)	158.00 - 0.00	-1.0000	-0.45	2	2	0.6300	0.6300		0.15
LDF7-50A (1-5/8 FOAM)	B	Yes	No	Ar (CfAe)	157.00 - 0.00	-1.0000	-0.42	2	2	1.9800	1.9800		0.82
LDF5-50A (7/8 FOAM)	B	Yes	No	Ar (CfAe)	157.00 - 0.00	-1.0000	-0.4	1	1	1.0900	1.0900		0.33
LDF2-50 (3/8 FOAM)	B	Yes	No	Ar (CfAe)	157.00 - 0.00	-1.0000	-0.38	2	2	0.4400	0.4400		0.08
LDF5-50A (7/8 FOAM)	B	Yes	No	Ar (CfAe)	155.00 - 0.00	-1.0000	-0.36	1	1	1.0900	1.0900		0.33
LDF6-50A (1-1/4 FOAM)	B	Yes	No	Ar (CfAe)	145.00 - 0.00	-1.0000	-0.32	1	1	1.5500	1.5500		0.66
LDF7-50A (1-5/8 FOAM)	B	Yes	No	Ar (CfAe)	141.33 - 0.00	-1.0000	-0.3	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	B	Yes	No	Ar (CfAe)	141.00 - 0.00	-1.0000	-0.28	2	2	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	B	Yes	No	Ar (CfAe)	139.50 - 0.00	-1.0000	-0.26	2	2	1.9800	1.9800		0.82
LDF5-50A (7/8 FOAM)	B	Yes	No	Ar (CfAe)	120.00 - 0.00	-1.0000	-0.24	1	1	1.0900	1.0900		0.33
EW63	B	Yes	No	Af (CfAe)	107.00 - 0.00	-1.0000	-0.2	2	2	1.5742	1.5742	5.0668	0.51
LDF5-50A (7/8 FOAM)	B	Yes	No	Ar (CfAe)	82.00 - 0.00	-1.0000	-0.18	1	1	1.0900	1.0900		0.33
AVA7-50 (1-5/8 LOW DENSI. FOAM) (CSP)	B	Yes	No	Ar (CfAe)	160.00 - 0.00	-1.0000	-0.16	2	2	1.9800	1.9800		0.72
LDF4-50A (1/2 FOAM) (CSP)	B	Yes	No	Ar (CfAe)	160.00 - 0.00	-1.0000	-0.12	1	1	0.6300	0.6300		0.15
HB158-1-08U8-S8J18 (ATT)	B	Yes	No	Ar (CfAe)	140.00 - 0.00	-1.0000	0.4	1	1	1.9800	1.9800		1.30
1/2 (ATT)	B	Yes	No	Ar (CfAe)	140.00 - 0.00	-1.0000	0.4	2	2	0.5800	0.5800		0.25
1 1/4" Hybriflex Cables (Sprint)	C	Yes	No	Ar (CfAe)	97.30 - 0.00	-0.5000	-0.09	4	4	1.2500	1.2500		1.13
Hybrid HCS 6x12 4 AWG (1-5/8") (T-Mobile)	C	Yes	No	Ar (CfAe)	125.00 - 0.00	-3.0000	0	2	2	1.9900	1.9900		1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	160.00-150.00	A	0.000	0.000	0.000	0.000	0.00
		B	11.237	0.000	0.000	0.000	44.80
		C	0.000	0.000	0.000	0.000	0.00
T2	150.00-125.00	A	0.000	0.000	0.000	0.000	0.00
		B	70.625	0.000	0.000	0.000	409.01
		C	0.000	0.000	0.000	0.000	0.00
T3	125.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	94.737	1.837	0.000	0.000	595.24
		C	8.292	0.000	0.000	0.000	95.00
T4	100.00-75.00	A	0.000	0.000	0.000	0.000	0.00
		B	95.828	6.559	0.000	0.000	617.56
		C	17.583	0.000	0.000	0.000	195.80
T5	75.00-66.67	A	0.000	0.000	0.000	0.000	0.00
		B	33.616	2.186	0.000	0.000	220.14
		C	6.236	0.000	0.000	0.000	69.33
T6	66.67-58.33	A	0.000	0.000	0.000	0.000	0.00
		B	33.616	2.186	0.000	0.000	220.14
		C	6.236	0.000	0.000	0.000	69.33
T7	58.33-50.00	A	0.000	0.000	0.000	0.000	0.00
		B	33.616	2.186	0.000	0.000	220.14
		C	6.236	0.000	0.000	0.000	69.33
T8	50.00-37.50	A	0.000	0.000	0.000	0.000	0.00
		B	50.424	3.280	0.000	0.000	330.21
		C	9.354	0.000	0.000	0.000	104.00
T9	37.50-25.00	A	0.000	0.000	0.000	0.000	0.00
		B	50.424	3.280	0.000	0.000	330.21
		C	9.354	0.000	0.000	0.000	104.00
T10	25.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	100.848	6.559	0.000	0.000	660.43
		C	18.708	0.000	0.000	0.000	208.00

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	160.00-150.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		17.013	3.113	0.000	0.000	161.50
		C		0.000	0.000	0.000	0.000	0.00
T2	150.00-125.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		108.449	11.408	0.000	0.000	1226.60
		C		0.000	0.000	0.000	0.000	0.00
T3	125.00-100.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		146.467	14.989	0.000	0.000	1738.96
		C		12.458	0.000	0.000	0.000	171.05
T4	100.00-75.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		148.557	21.712	0.000	0.000	1821.65
		C		29.183	0.000	0.000	0.000	367.20
T5	75.00-66.67	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		52.387	7.237	0.000	0.000	638.15
		C		10.403	0.000	0.000	0.000	130.32

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
T6	66.67-58.33	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		52.387	7.237	0.000	0.000	638.15
		C		10.403	0.000	0.000	0.000	130.32
T7	58.33-50.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		52.387	7.237	0.000	0.000	638.15
		C		10.403	0.000	0.000	0.000	130.32
T8	50.00-37.50	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		78.580	10.856	0.000	0.000	957.23
		C		15.604	0.000	0.000	0.000	195.48
T9	37.50-25.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		78.580	10.856	0.000	0.000	957.23
		C		15.604	0.000	0.000	0.000	195.48
T10	25.00-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		157.160	21.712	0.000	0.000	1914.45
		C		31.208	0.000	0.000	0.000	390.95

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	160.00-150.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.793	1.200	2.149
		C	0.000	0.000	0.000	0.000
T2	150.00-125.00	A	0.000	0.000	0.000	0.000
		B	0.000	3.216	4.737	8.040
		C	0.000	0.000	0.000	0.000
T3	125.00-100.00	A	0.000	0.000	0.000	0.000
		B	0.000	4.103	6.603	11.066
		C	0.000	0.316	0.567	0.852
T4	100.00-75.00	A	0.000	0.000	0.000	0.000
		B	0.000	4.170	7.463	12.511
		C	0.000	0.709	1.282	2.127
T5	75.00-66.67	A	0.000	0.000	0.000	0.000
		B	0.000	1.427	2.551	4.281
		C	0.000	0.247	0.444	0.741
T6	66.67-58.33	A	0.000	0.000	0.000	0.000
		B	0.000	1.413	2.525	4.239
		C	0.000	0.245	0.440	0.734
T7	58.33-50.00	A	0.000	0.000	0.000	0.000
		B	0.000	2.827	4.203	7.054
		C	0.000	0.489	0.732	1.221
T8	50.00-37.50	A	0.000	0.000	0.000	0.000
		B	0.000	1.562	3.437	5.769
		C	0.000	0.271	0.599	0.999
T9	37.50-25.00	A	0.000	0.000	0.000	0.000
		B	0.000	3.128	5.279	8.860
		C	0.000	0.542	0.920	1.534
T10	25.00-0.00	A	0.000	0.000	0.000	0.000
		B	0.000	2.998	7.146	11.994
		C	0.000	0.519	1.245	2.076

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	160.00-150.00	2.0467	-14.6658	2.7807	-17.4305
T2	150.00-125.00	18.6716	-29.2084	23.8678	-35.8191
T3	125.00-100.00	27.3768	-27.2863	34.6868	-33.6743
T4	100.00-75.00	25.7109	-22.0967	32.8156	-26.4892
T5	75.00-66.67	28.1152	-23.7795	35.9899	-28.6376
T6	66.67-58.33	28.6721	-24.2613	36.7130	-29.2259
T7	58.33-50.00	26.0728	-22.4990	32.1826	-25.6613
T8	50.00-37.50	31.3657	-26.5297	40.6630	-32.4407
T9	37.50-25.00	28.0338	-23.9273	35.7180	-28.4538
T10	25.00-0.00	29.6989	-24.9884	39.4300	-31.3718

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft / ft / ft	°	ft		ft^2	ft^2	lb
*** Inventory from D&K Climb (3/272016)									
*** Existing Carrier VZW									
SBNHH-1D65B (VZW-700&AWS)	A	From Leg	2.00 -3.00 0.00	0.0000	75.00	No Ice 1/2" Ice	8.43 8.99	5.42 5.88	40.60 91.24
SBNHH-1D65B (VZW-850&PCS)	A	From Leg	2.00 3.00 0.00	0.0000	75.00	No Ice 1/2" Ice	8.43 8.99	5.42 5.88	40.60 91.24
SBNHH-1D65B (VZW-700&AWS)	B	From Leg	2.00 -3.00 0.00	0.0000	75.00	No Ice 1/2" Ice	8.43 8.99	5.42 5.88	40.60 91.24
SBNHH-1D65B (VZW-850&PCS)	B	From Leg	2.00 3.00 0.00	0.0000	75.00	No Ice 1/2" Ice	8.43 8.99	5.42 5.88	40.60 91.24
5' T-arm (VZW)	A	None		0.0000	75.00	No Ice 1/2" Ice	4.50 5.50	2.50 3.20	250.00 315.00
5' T-arm (VZW)	A	None		0.0000	75.00	No Ice 1/2" Ice	4.50 5.50	2.50 3.20	250.00 315.00
RH_2x60-07-L (700 MHz) (VZW)	A	From Leg	2.00 -3.00 0.00	0.0000	75.00	No Ice 1/2" Ice	2.12 2.32	1.77 1.97	60.00 77.37
RH_2x60-07-L (700 MHz) (VZW)	B	From Leg	2.00 -3.00 0.00	0.0000	75.00	No Ice 1/2" Ice	2.12 2.32	1.77 1.97	60.00 77.37
DC6-48-60-18-8F (VZW)	C	None		0.0000	75.00	No Ice 1/2" Ice	1.27 1.46	1.27 1.46	20.00 35.12
RRH_2x60-AWS (VZW)	A	From Leg	2.00 3.00 0.00	0.0000	75.00	No Ice 1/2" Ice	2.18 2.38	1.42 1.60	44.00 59.92
RRH_2x60-AWS (VZW)	B	From Leg	2.00 3.00 0.00	0.0000	75.00	No Ice 1/2" Ice	2.18 2.38	1.42 1.60	44.00 59.92
*** D&K Climbed Inventory - Remaining Antennas									

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
16x16 Panel 19dBi 2.45GHz ISM (DNK-1)	B	From Leg	1.00 0.00 0.00	0.0000	82.00	No Ice 1/2" Ice	2.34 2.65	2.34 2.65	10.00 20.00
1' Side Mount Standoff (DNK-1)	B	None		0.0000	82.00	No Ice 1/2" Ice	2.64 3.69	2.64 3.69	40.00 50.00
4"x96"x72" Ice Canopy (DNK-5)	Fro	From Leg	3.00 0.00 0.00	0.0000	107.50	No Ice 1/2" Ice	3.73 4.39	2.80 3.30	300.00 551.38
4"x96"x72" Ice Canopy (DNK-6)	C	From Leg	3.00 0.00 0.00	0.0000	107.50	No Ice 1/2" Ice	3.73 4.39	2.80 3.30	300.00 551.38
8' Stiff-Arm (DNK-7)	B	From Leg	0.00 0.00 0.00	45.0000	108.00	No Ice 1/2" Ice	5.00 10.00	5.00 10.00	250.00 300.00
8' Stiff-Arm (DNK-7)	C	From Leg	0.00 0.00 0.00	-45.0000	108.00	No Ice 1/2" Ice	5.00 10.00	5.00 10.00	250.00 300.00
PD1142-1 (DNK-11)	C	From Face	5.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	1.32 3.21	1.32 3.21	10.00 23.85
*** Mount shared with DNK-7									
SC479-HF1LDF (DNK-18)	C	From Face	2.50 0.00 0.00	0.0000	141.00	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	34.00 69.82
8' Stiff-Arm (DNK-18 (4 antennas Attached - 18, 24, 25, Sinclair))	B	From Leg	0.00 0.00 0.00	45.0000	141.00	No Ice 1/2" Ice	5.00 10.00	5.00 10.00	250.00 300.00
8' Stiff-Arm (DNK-18 (4 antennas Attached - 18, 24, 25, Sinclair))	C	From Leg	0.00 0.00 0.00	-45.0000	141.00	No Ice 1/2" Ice	5.00 10.00	5.00 10.00	250.00 300.00
SC479-HF1LDF (DNK-19)	C	From Leg	1.00 5.00 0.00	0.0000	139.50	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	34.00 69.82
10' PCS Frame (1) (DNK-19 (3 antennas Attached - 19,20,26))	C	None		0.0000	139.50	No Ice 1/2" Ice	9.00 13.20	9.00 13.20	250.00 350.00
SC479-HF1LDF (DNK-20)	C	From Leg	1.00 -5.00 0.00	0.0000	139.50	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	34.00 69.82
SC479-HF1LDF (DNK-21)	A	From Face	0.00 0.00 0.00	0.0000	141.25	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	34.00 69.82
8' Stiff-Arm (DNK-21 (2 antennas Attached - 21,29))	A	From Face	0.00 0.00 0.00	-30.0000	141.00	No Ice 1/2" Ice	5.00 10.00	5.00 10.00	250.00 300.00
8' Stiff-Arm (DNK-21 (2 antennas Attached - 21,29))	C	From Leg	0.00 0.00 0.00	0.0000	141.00	No Ice 1/2" Ice	5.00 10.00	5.00 10.00	250.00 300.00
8' Stiff-Arm (DNK-22 (5 antennas Attached - 22,27,31,32,33))	A	From Leg	0.00 0.00 0.00	0.0000	141.00	No Ice 1/2" Ice	5.00 10.00	5.00 10.00	250.00 300.00
8' Stiff-Arm (DNK-22 (5 antennas Attached - 22,27,31,32,33))	C	From Face	0.00 0.00 0.00	30.0000	141.00	No Ice 1/2" Ice	5.00 10.00	5.00 10.00	250.00 300.00

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
DC6-48-60-18-8F (Squid)	B	From Leg	1.00 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	1.27 1.46	1.27 1.46	20.00 35.12
Suppressor (DNK-23) *** Appears to be leg mounted from Climb Photos *** Mount Shared with DNK-18									
TMA 432-83H-01T (DNK-25) *** Mount Shared with DNK-18	B	From Leg	1.25 0.00 0.00	0.0000	158.00	No Ice 1/2" Ice	1.63 1.81	0.95 1.09	25.00 37.44
SC479-HF1LDF (DNK-26) *** Mount Shared with DNK-19	C	From Leg	1.00 5.00 0.00	0.0000	157.00	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	34.00 69.82
DB304-A (DNK-27) *** Mount Shared with DNK-22	C	From Leg	0.50 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice	4.85 8.73	4.85 8.73	45.00 58.50
DB228-A (DNK-28) *** Mount Shared with DNK-30	C	From Leg	0.50 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice	7.30 13.14	7.30 13.14	72.00 93.60
SC479-HF1LDF (DNK-29) *** Mount Shared with DNK-21	A	From Face	2.50 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	34.00 69.82
TMA 432-83H-01T (DNK-30) *** Mount Shared with DNK-22	A	From Face	0.00 0.00 0.00	0.0000	158.00	No Ice 1/2" Ice	1.63 1.81	0.95 1.09	25.00 37.44
SC479-HF1LDF(D00I-E6085) (DNK-32 - Troop L RX (PNS-Proposed 01272017)) *** Mount Shared with DNK-22	A	From Leg	2.50 0.00 0.00	0.0000	157.50	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	30.00 69.82
Lightning Rod 2"x21' (DNK-33) *** PNS/Motorola Additions - Not Applicable *** PNS-621 Proposal Mount/Ant	A	None		0.0000	160.00	No Ice 1/2" Ice	4.20 6.33	4.20 6.33	80.00 112.30
(PSA6) 6' Side-Arm (CSP)	A	From Leg	0.00 0.00 0.00	45.0000	160.00	No Ice 1/2" Ice	10.60 15.40	10.60 15.40	140.00 212.00
SC479-HF1LDF(D00-E6085) (CSP)	A	From Leg	0.00 6.00 0.00	45.0000	160.00	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	30.00 69.82
432E-83I-01T TTA Unit (CSP)	A	None		0.0000	158.00	No Ice 1/2" Ice	3.33 3.57	1.11 1.27	25.00 44.70

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
SC479-HF1LDF(D00I-E6085	A	From Leg	0.00	45.0000	145.00 - 160.00	No Ice	5.06	5.06	34.00
) (Inverted)			6.00			1/2" Ice	6.54	6.54	69.82
(CSP)			0.00						
*** AIROSmith Antennas - Sprint (1/12/2018)									
APXVSPP18-C-A20	A	From Face	0.50	0.0000	97.00	No Ice	8.26	6.71	90.00
(Sprint DNK 2-4)			0.00			1/2" Ice	8.81	7.66	149.38
			0.00						
APXVSPP18-C-A20	B	From Face	0.50	0.0000	97.00	No Ice	8.26	6.71	90.00
(Sprint DNK 2-4)			0.00			1/2" Ice	8.81	7.66	149.38
			0.00						
APXVSPP18-C-A20	C	From Leg	0.50	0.0000	97.00	No Ice	8.26	6.71	90.00
(Sprint DNK 2-4)			0.00			1/2" Ice	8.81	7.66	149.38
			0.00						
DT465B-2XR-V2 Panels	A	From Leg	1.50	0.0000	97.00	No Ice	9.65	5.97	58.00
(Commscope)			0.00			1/2" Ice	10.21	6.43	116.00
(Sprint DNK 2-4)			0.00						
DT465B-2XR-V2 Panels	B	From Leg	1.50	0.0000	97.00	No Ice	9.65	5.97	58.00
(Commscope)			0.00			1/2" Ice	10.21	6.43	116.00
(Sprint DNK 2-4)			0.00						
DT465B-2XR-V2 Panels	C	From Leg	1.50	0.0000	97.00	No Ice	9.65	5.97	58.00
(Commscope)			0.00			1/2" Ice	10.21	6.43	116.00
(Sprint DNK 2-4)			0.00						
RRH 800MHz 2x50W	A	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	70.00
(Sprint DNK 2-4)			1.00			1/2" Ice	2.71	2.66	95.17
			0.00						
RRH 800MHz 2x50W	B	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	70.00
(Sprint DNK 2-4)			1.00			1/2" Ice	2.71	2.66	95.17
			0.00						
RRH 800MHz 2x50W	C	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	70.00
(Sprint DNK 2-4)			-5.00			1/2" Ice	2.71	2.66	95.17
			0.00						
RRH 800MHz 2x50W	A	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	70.00
(Sprint DNK 2-4)			1.00			1/2" Ice	2.71	2.66	95.17
			0.00						
RRH 800MHz 2x50W	B	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	70.00
(Sprint DNK 2-4)			1.00			1/2" Ice	2.71	2.66	95.17
			0.00						
RRH 800MHz 2x50W	C	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	70.00
(Sprint DNK 2-4)			-5.00			1/2" Ice	2.71	2.66	95.17
			0.00						
TD-RRH8x20	A	From Face	0.50	0.0000	97.00	No Ice	4.72	1.70	66.13
(Sprint DNK 2-4)			0.00			1/2" Ice	5.01	1.92	93.27
			0.00						
TD-RRH8x20	B	From Face	0.50	0.0000	97.00	No Ice	4.72	1.70	66.13
(Sprint DNK 2-4)			0.00			1/2" Ice	5.01	1.92	93.27
			0.00						
TD-RRH8x20	C	From Face	0.50	0.0000	97.00	No Ice	4.72	1.70	66.13
(Sprint DNK 2-4)			-5.00			1/2" Ice	5.01	1.92	93.27
			0.00						
RRH 1900 MHz 2x40W	A	From Face	0.50	0.0000	97.00	No Ice	2.49	3.34	100.00
(Sprint DNK 2-4)			0.00			1/2" Ice	2.71	3.69	126.85
			0.00						
RRH 1900 MHz 2x40W	B	From Face	0.50	0.0000	97.00	No Ice	2.49	3.34	100.00
(Sprint DNK 2-4)			0.00			1/2" Ice	2.71	3.69	126.85
			0.00						
RRH 1900 MHz 2x40W	C	From Face	0.50	0.0000	97.00	No Ice	2.49	3.34	100.00

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
(Sprint DNK 2-4)			-5.00 0.00			1/2" Ice	2.71	3.69	126.85
PM-SU35-48 - Pipe Mount 48"	A	From Leg	1.50 0.00	0.0000	97.00	No Ice 1/2" Ice	5.60 5.99	5.60 5.99	112.00 156.37
(Sprint DNK 2-4)			0.00						
PM-SU35-48 - Pipe Mount 48"	B	From Leg	1.50 0.00	0.0000	97.00	No Ice 1/2" Ice	5.60 5.99	5.60 5.99	112.00 156.37
(Sprint DNK 2-4)			0.00						
PM-SU35-48 - Pipe Mount 48"	C	From Leg	1.50 0.00	0.0000	97.00	No Ice 1/2" Ice	5.60 5.99	5.60 5.99	112.00 156.37
(Sprint DNK 2-4)			0.00						
*** AIROSmith Antennas - Sprint (1/12/2018)									
*** Empire Antennas - 1/16/2018									
T-Frame	A	From Leg	2.00	0.0000	140.00	No Ice	8.90	8.90	224.00
(ATT DNK 12-17)			0.00 0.00			1/2" Ice	13.80	13.80	317.00
T-Frame	B	From Leg	2.00	0.0000	140.00	No Ice	8.90	8.90	224.00
(ATT DNK 12-17)			0.00 0.00			1/2" Ice	13.80	13.80	317.00
T-Frame	C	From Leg	2.00	0.0000	140.00	No Ice	8.90	8.90	224.00
(ATT DNK 12-17)			0.00 0.00			1/2" Ice	13.80	13.80	317.00
7770.00	A	From Leg	1.50	0.0000	140.00	No Ice	5.90	4.01	52.03
(ATT DNK 12-17)			-5.00 0.00			1/2" Ice	6.34	4.64	97.08
7770.00	B	From Leg	1.50	0.0000	140.00	No Ice	5.90	4.01	52.03
(ATT DNK 12-17)			-5.00 0.00			1/2" Ice	6.34	4.64	97.08
7770.00	C	From Leg	1.50	0.0000	140.00	No Ice	5.90	4.01	52.03
(ATT DNK 12-17)			-5.00 0.00			1/2" Ice	6.34	4.64	97.08
SBNH-1D6565C	A	From Leg	1.50	0.0000	140.00	No Ice	11.48	9.64	81.81
(ATT DNK 12-17)			0.00 0.00			1/2" Ice	12.11	11.07	169.21
SBNH-1D6565C	B	From Leg	1.50	0.0000	140.00	No Ice	11.48	9.64	81.81
(ATT DNK 12-17)			0.00 0.00			1/2" Ice	12.11	11.07	169.21
AM-X-CD-16-65-00T-RET (6')	B	From Leg	1.50 0.00	0.0000	140.00	No Ice 1/2" Ice	8.26 8.81	4.64 5.09	50.00 95.50
(ATT DNK 12-17)			0.00						
Surge Suppressor	B	From Face	0.50	0.0000	140.00	No Ice	0.80	0.80	30.00
(ATT DNK 12-17)			5.00 0.00			1/2" Ice	0.94	0.94	41.94
TPA-65R-LCUUUU-H8 Panel w/ RET	A	From Leg	1.50 -5.00	0.0000	140.00	No Ice 1/2" Ice	13.08 13.81	10.38 11.79	104.20 202.42
(ATT DNK 12-17)			0.00						
TPA-65R-LCUUUU-H8 Panel w/ RET	B	From Leg	1.50 -5.00	0.0000	140.00	No Ice 1/2" Ice	13.08 13.81	10.38 11.79	104.20 202.42
(ATT DNK 12-17)			0.00						
QS66512-3 Quintel Panel	C	From Leg	1.50	0.0000	140.00	No Ice	8.40	8.22	126.90
(ATT DNK 12-17)			-5.00 0.00			1/2" Ice	8.95	9.19	199.99
RRUS-32	A	From Leg	1.50	0.0000	140.00	No Ice	3.88	2.76	80.00
(ATT DNK 12-17)			-5.00 0.00			1/2" Ice	4.14	2.98	112.20

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
RRUS-12	A	From Leg	1.50	0.0000	140.00	No Ice	3.67	1.49	58.00
(ATT DNK 12-17)			-5.00			1/2" Ice	3.93	1.67	81.22
			0.00						
RRUS-11	A	From Leg	1.50	0.0000	140.00	No Ice	2.99	1.25	50.00
(ATT DNK 12-17)			-5.00			1/2" Ice	3.23	1.41	69.57
			0.00						
A2 Module Unit	A	From Leg	1.50	0.0000	140.00	No Ice	2.42	0.54	22.00
(ATT DNK 12-17)			-5.00			1/2" Ice	2.63	0.67	34.73
			0.00						
RRUS-32	B	From Leg	1.50	0.0000	140.00	No Ice	3.88	2.76	80.00
(ATT DNK 12-17)			-5.00			1/2" Ice	4.14	2.98	112.20
			0.00						
RRUS-12	B	From Leg	1.50	0.0000	140.00	No Ice	3.67	1.49	58.00
(ATT DNK 12-17)			-5.00			1/2" Ice	3.93	1.67	81.22
			0.00						
RRUS-11	B	From Leg	1.50	0.0000	140.00	No Ice	2.99	1.25	50.00
(ATT DNK 12-17)			-5.00			1/2" Ice	3.23	1.41	69.57
			0.00						
A2 Module Unit	B	From Leg	1.50	0.0000	140.00	No Ice	2.42	0.54	22.00
(ATT DNK 12-17)			-5.00			1/2" Ice	2.63	0.67	34.73
			0.00						
RRUS-32	C	From Leg	1.50	0.0000	140.00	No Ice	3.88	2.76	80.00
(ATT DNK 12-17)			-5.00			1/2" Ice	4.14	2.98	112.20
			0.00						
RRUS-12	C	From Leg	1.50	0.0000	140.00	No Ice	3.67	1.49	58.00
(ATT DNK 12-17)			-5.00			1/2" Ice	3.93	1.67	81.22
			0.00						
RRUS-11	C	From Leg	1.50	0.0000	140.00	No Ice	2.99	1.25	50.00
(ATT DNK 12-17)			-5.00			1/2" Ice	3.23	1.41	69.57
			0.00						
A2 Module Unit	C	From Leg	1.50	0.0000	140.00	No Ice	2.42	0.54	22.00
(ATT DNK 12-17)			-5.00			1/2" Ice	2.63	0.67	34.73
			0.00						
DC6-48-60-18-8F (Squid)	A	From Leg	0.50	0.0000	140.00	No Ice	1.27	1.27	20.00
Suppressor			0.00			1/2" Ice	1.46	1.46	35.12
(ATT DNK 12-17)			0.00						
TT19-08BP111-001 TMA's	A	From Leg	1.50	0.0000	140.00	No Ice	0.55	0.45	16.00
(ATT DNK 12-17)			0.00			1/2" Ice	0.65	0.53	21.80
			0.00						
TT19-08BP111-001 TMA's	B	From Leg	1.50	0.0000	140.00	No Ice	0.55	0.45	16.00
(ATT DNK 12-17)			0.00			1/2" Ice	0.65	0.53	21.80
			0.00						
TT19-08BP111-001 TMA's	C	From Leg	1.50	0.0000	140.00	No Ice	0.55	0.45	16.00
(ATT DNK 12-17)			0.00			1/2" Ice	0.65	0.53	21.80
			0.00						
(2) LGP21401 Diplexer	A	From Leg	1.50	0.0000	140.00	No Ice	1.10	0.21	14.10
(ATT DNK 12-17)			0.00			1/2" Ice	1.24	0.27	21.26
			0.00						
(2) LGP21401 Diplexer	B	From Leg	1.50	0.0000	140.00	No Ice	1.10	0.21	14.10
(ATT DNK 12-17)			0.00			1/2" Ice	1.24	0.27	21.26
			0.00						
(2) LGP21401 Diplexer	C	From Leg	1.50	0.0000	140.00	No Ice	1.10	0.21	14.10
(ATT DNK 12-17)			0.00			1/2" Ice	1.24	0.27	21.26
			0.00						
PM-SU35-48 - Pipe Mount	A	From Leg	1.50	0.0000	97.00	No Ice	5.07	5.07	112.00
48"			0.00			1/2" Ice	5.39	5.39	156.37
(Sprint)			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
PM-SU35-48 - Pipe Mount 48" (Sprint)	B	From Leg	1.50 0.00 0.00	0.0000	97.00	No Ice 1/2" Ice	5.07 5.39	5.07 5.39	112.00 156.37
PM-SU35-48 - Pipe Mount 48" (Sprint) ** Proposed TWM-014 Inventory Update	C	From Leg	1.50 0.00 0.00	0.0000	97.00	No Ice 1/2" Ice	5.07 5.39	5.07 5.39	112.00 156.37
DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	A	From Leg	0.50 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	6.65 8.00	2.32 2.86	156.00 222.51
DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	B	From Leg	0.50 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	6.65 8.00	2.32 2.86	156.00 222.51
DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	C	From Leg	0.50 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	6.65 8.00	2.32 2.86	156.00 222.51
RFS APXVAARR24_43-U-NA20 Panel Antenna w/ 108" Pipe Mount (T-Mobile)	A	From Leg	3.00 -1.50 0.00	0.0000	120.00	No Ice 1/2" Ice	22.62 23.50	11.03 12.55	186.15 322.45
RFS APXVAARR24_43-U-NA20 Panel Antenna w/ 108" Pipe Mount (T-Mobile)	B	From Leg	3.00 -1.50 0.00	0.0000	120.00	No Ice 1/2" Ice	22.62 23.50	11.03 12.55	186.15 322.45
RFS APXVAARR24_43-U-NA20 Panel Antenna w/ 108" Pipe Mount (T-Mobile)	C	From Leg	3.00 -1.50 0.00	0.0000	120.00	No Ice 1/2" Ice	22.62 23.50	11.03 12.55	186.15 322.45
Ericsson Radio 4449 B66A RRH Unit (T-Mobile)	A	From Leg	3.00 1.50 4.00	0.0000	120.00	No Ice 1/2" Ice	1.91 2.10	1.58 1.75	72.00 89.60
Ericsson Radio 4449 B66A RRH Unit (T-Mobile)	B	From Leg	3.00 1.50 4.00	0.0000	120.00	No Ice 1/2" Ice	1.91 2.10	1.58 1.75	72.00 89.60
Ericsson Radio 4449 B66A RRH Unit (T-Mobile)	C	From Leg	3.00 1.50 4.00	0.0000	120.00	No Ice 1/2" Ice	1.91 2.10	1.58 1.75	72.00 89.60
Ericsson 4449 B71 + B12 Radio Unit (T-Mobile)	A	From Leg	3.00 1.50 -4.00	0.0000	120.00	No Ice 1/2" Ice	1.93 2.12	1.35 1.51	80.00 96.16
Ericsson 4449 B71 + B12 Radio Unit (T-Mobile)	B	From Leg	3.00 1.50 -4.00	0.0000	120.00	No Ice 1/2" Ice	1.93 2.12	1.35 1.51	80.00 96.16
Ericsson 4449 B71 + B12 Radio Unit (T-Mobile)	C	From Leg	3.00 1.50 -4.00	0.0000	120.00	No Ice 1/2" Ice	1.93 2.12	1.35 1.51	80.00 96.16
Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	A	From Leg	3.00 1.50 0.00	0.0000	120.00	No Ice 1/2" Ice	2.17 2.36	0.96 1.11	50.00 64.25
Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	B	From Leg	3.00 1.50 0.00	0.0000	120.00	No Ice 1/2" Ice	2.17 2.36	0.96 1.11	50.00 64.25
Ericsson Radio 4415 B25	C	From Leg	3.00	0.0000	120.00	No Ice	2.17	0.96	50.00

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
RRH Unit (T-Mobile) ** Proposed TWM-014 Inventory Update			1.50 0.00			1/2" Ice	2.36	1.11	64.25

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
HPD2-4.7 (NWCT)	C	Paraboloid w/Shroud (HP)	From Face	0.50 0.00 0.00	Worst		140.00	2.00	No Ice 1/2" Ice	3.14 3.41	27.00 44.50
6' w/ Radome (DNK-5 / CSP-6)	A	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	Worst		106.50	6.00	No Ice 1/2" Ice	28.27 29.07	230.00 340.00
6' w/ Radome (DNK-6 / CSP-7)	C	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	Worst		107.00	6.00	No Ice 1/2" Ice	28.27 29.07	230.00 340.00

Tower Pressures - No Ice

$G_H = 1.129$

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 160.00-150.00	155.00	1.556	32	110.170	A B C	10.889 9.689 10.889	8.342 19.579 8.342	8.342	43.38 28.50 43.38	0.000 0.000 0.000	0.000 0.000 0.000
T2 150.00-125.00	137.50	1.503	31	310.425	A B C	19.557 14.819 19.557	20.856 91.481 20.856	20.856	51.61 19.62 51.61	0.000 0.000 0.000	0.000 0.000 0.000
T3 125.00-100.00	112.50	1.42	29	360.425	A B C	23.281 18.515 22.714	20.856 115.593 29.147	20.856	47.25 15.55 40.21	0.000 0.000 0.000	0.000 0.000 0.000
T4 100.00-75.00	87.50	1.321	27	416.680	A B C	28.204 27.300 26.922	30.202 126.029 47.785	30.202	51.71 19.70 40.43	0.000 0.000 0.000	0.000 0.000 0.000
T5 75.00-66.67	70.83	1.244	26	150.004	A B C	9.964 9.600 9.520	10.067 43.683 16.303	10.067	50.26 18.89 38.98	0.000 0.000 0.000	0.000 0.000 0.000
T6 66.67-58.33	62.50	1.2	25	155.560	A B	10.257 9.918	10.067 43.683	10.067	49.53 18.78	0.000 0.000	0.000 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
					C	9.817	16.303		38.54	0.000	0.000
T7 58.33-50.00	54.17	1.152	24	159.031	A	13.957	6.952	6.952	33.25	0.000	0.000
					B	11.941	40.568		13.24	0.000	0.000
					C	13.225	13.188		26.32	0.000	0.000
T8 50.00-37.50	43.75	1.084	22	250.917	A	15.266	14.338	14.338	48.43	0.000	0.000
					B	15.109	64.762		17.95	0.000	0.000
					C	14.668	23.692		37.38	0.000	0.000
T9 37.50-25.00	31.25	1	21	263.417	A	19.771	14.338	14.338	42.04	0.000	0.000
					B	17.771	64.762		17.37	0.000	0.000
					C	18.851	23.692		33.70	0.000	0.000
T10 25.00-0.00	12.50	1	21	572.674	A	35.491	40.587	40.587	53.35	0.000	0.000
					B	34.904	141.435		23.02	0.000	0.000
					C	34.246	59.295		43.39	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.129$

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	155.00	1.556	32	0.5000	111.004	A	10.889	14.033	10.011	40.17	0.000	0.000
160.00-150.00						B	11.853	30.254		23.77	0.000	0.000
						C	10.889	14.033		40.17	0.000	0.000
T2	137.50	1.503	31	0.5000	312.510	A	19.557	32.849	25.027	47.76	0.000	0.000
150.00-125.00						B	22.925	138.082		15.54	0.000	0.000
						C	19.557	32.849		47.76	0.000	0.000
T3	112.50	1.42	29	0.5000	362.510	A	23.281	33.677	25.027	43.94	0.000	0.000
125.00-100.00						B	27.205	176.041		12.31	0.000	0.000
						C	22.429	45.819		36.67	0.000	0.000
T4 100.00-75.00	87.50	1.321	27	0.5000	418.765	A	28.204	43.774	34.373	47.75	0.000	0.000
						B	37.404	188.160		15.24	0.000	0.000
						C	26.077	72.248		34.96	0.000	0.000
T5 75.00-66.67	70.83	1.244	26	0.5000	150.699	A	9.964	14.779	11.458	46.31	0.000	0.000
						B	12.921	65.739		14.57	0.000	0.000
						C	9.223	24.935		33.54	0.000	0.000
T6 66.67-58.33	62.50	1.2	25	0.5000	156.255	A	10.257	14.877	11.458	45.59	0.000	0.000
						B	13.256	65.851		14.48	0.000	0.000
						C	9.523	25.035		33.15	0.000	0.000
T7 58.33-50.00	54.17	1.152	24	0.5000	159.726	A	13.957	13.552	8.342	30.32	0.000	0.000
						B	14.141	63.112		10.80	0.000	0.000
						C	12.736	23.465		23.04	0.000	0.000
T8 50.00-37.50	43.75	1.084	22	0.5000	251.960	A	15.266	20.564	16.424	45.84	0.000	0.000
						B	20.353	97.582		13.93	0.000	0.000
						C	14.268	35.898		32.74	0.000	0.000
T9 37.50-25.00	31.25	1	21	0.5000	264.460	A	19.771	22.705	16.424	38.67	0.000	0.000
						B	21.767	98.157		13.70	0.000	0.000
						C	18.237	37.768		29.33	0.000	0.000
T10 25.00-0.00	12.50	1	21	0.5000	574.759	A	35.491	53.631	44.758	50.22	0.000	0.000
						B	45.209	207.793		17.69	0.000	0.000
						C	33.415	84.320		38.02	0.000	0.000

Tower Pressure - Service

$G_H = 1.129$

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	155.00	1.556	32	110.170	A	10.889	8.342	8.342	43.38	0.000	0.000
160.00-150.00					B	9.689	19.579		28.50	0.000	0.000
					C	10.889	8.342		43.38	0.000	0.000
T2	137.50	1.503	31	310.425	A	19.557	20.856	20.856	51.61	0.000	0.000
150.00-125.00					B	14.819	91.481		19.62	0.000	0.000
					C	19.557	20.856		51.61	0.000	0.000
T3	112.50	1.42	29	360.425	A	23.281	20.856	20.856	47.25	0.000	0.000
125.00-100.00					B	18.515	115.593		15.55	0.000	0.000
					C	22.714	29.147		40.21	0.000	0.000
T4	87.50	1.321	27	416.680	A	28.204	30.202	30.202	51.71	0.000	0.000
100.00-75.00					B	27.300	126.029		19.70	0.000	0.000
					C	26.922	47.785		40.43	0.000	0.000
T5 75.00-66.67	70.83	1.244	26	150.004	A	9.964	10.067	10.067	50.26	0.000	0.000
					B	9.600	43.683		18.89	0.000	0.000
					C	9.520	16.303		38.98	0.000	0.000
T6 66.67-58.33	62.50	1.2	25	155.560	A	10.257	10.067	10.067	49.53	0.000	0.000
					B	9.918	43.683		18.78	0.000	0.000
					C	9.817	16.303		38.54	0.000	0.000
T7 58.33-50.00	54.17	1.152	24	159.031	A	13.957	6.952	6.952	33.25	0.000	0.000
					B	11.941	40.568		13.24	0.000	0.000
					C	13.225	13.188		26.32	0.000	0.000
T8 50.00-37.50	43.75	1.084	22	250.917	A	15.266	14.338	14.338	48.43	0.000	0.000
					B	15.109	64.762		17.95	0.000	0.000
					C	14.668	23.692		37.38	0.000	0.000
T9 37.50-25.00	31.25	1	21	263.417	A	19.771	14.338	14.338	42.04	0.000	0.000
					B	17.771	64.762		17.37	0.000	0.000
					C	18.851	23.692		33.70	0.000	0.000
T10 25.00-0.00	12.50	1	21	572.674	A	35.491	40.587	40.587	53.35	0.000	0.000
					B	34.904	141.435		23.02	0.000	0.000
					C	34.246	59.295		43.39	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	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	44.80	1181.68	A	0.175	2.683	0.586	1	1	15.774	1877.05	187.70	B
160.00-150.00			B	0.266	2.391	0.606	1	1	21.554			
			C	0.175	2.683	0.586	1	1	15.774			
T2	409.01	2323.89	A	0.13	2.846	0.579	1	1	31.625	5580.66	223.23	B
150.00-125.00			B	0.342	2.189	0.63	1	1	72.434			
			C	0.13	2.846	0.579	1	1	31.625			
T3	690.24	3860.01	A	0.122	2.875	0.578	1	1	35.328	6527.13	261.09	B
125.00-100.00			B	0.372	2.122	0.641	1	1	92.565			
			C	0.144	2.794	0.581	1	1	39.636			
T4	813.36	5084.15	A	0.14	2.808	0.58	1	1	45.721	7107.31	284.29	B
100.00-75.00			B	0.368	2.131	0.639	1	1	107.841			
			C	0.179	2.667	0.586	1	1	54.943			
T5	289.47	2103.33	A	0.134	2.833	0.579	1	1	15.794	2346.01	281.52	B
75.00-66.67			B	0.355	2.159	0.634	1	1	37.311			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			C	0.172	2.692	0.585	1	1	19.060			
T6	289.47	2140.98	A	0.131	2.844	0.579	1	1	16.083	2298.79	275.85	B
66.67-58.33			B	0.345	2.184	0.631	1	1	37.462			
			C	0.168	2.707	0.584	1	1	19.344			
T7	289.47	2316.33	A	0.131	2.841	0.579	1	1	17.981	2233.16	267.98	B
58.33-50.00			B	0.33	2.219	0.626	1	1	37.320			
			C	0.166	2.713	0.584	1	1	20.928			
T8	434.21	3003.52	A	0.118	2.893	0.577	1	1	23.541	3158.66	252.69	B
50.00-37.50			B	0.318	2.248	0.622	1	1	55.370			
			C	0.153	2.761	0.582	1	1	28.455			
T9	434.21	3416.13	A	0.129	2.848	0.579	1	1	28.066	3066.12	245.29	B
37.50-25.00			B	0.313	2.261	0.62	1	1	57.928			
			C	0.162	2.73	0.583	1	1	32.671			
T10	868.43	8678.73	A	0.133	2.836	0.579	1	1	58.991	6516.54	260.66	B
25.00-0.00			B	0.308	2.275	0.618	1	1	122.361			
			C	0.163	2.723	0.584	1	1	68.852			
Sum Weight:	4562.68	34108.77						OTM	3160.75 kip-ft	40711.43		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	44.80	1181.68	A	0.175	2.683	0.586	0.825	1	13.868	1729.39	172.94	B
160.00-150.00			B	0.266	2.391	0.606	0.825	1	19.858			
			C	0.175	2.683	0.586	0.825	1	13.868			
T2	409.01	2323.89	A	0.13	2.846	0.579	0.825	1	28.202	5380.85	215.23	B
150.00-125.00			B	0.342	2.189	0.63	0.825	1	69.841			
			C	0.13	2.846	0.579	0.825	1	28.202			
T3	690.24	3860.01	A	0.122	2.875	0.578	0.825	1	31.254	6298.66	251.95	B
125.00-100.00			B	0.372	2.122	0.641	0.825	1	89.325			
			C	0.144	2.794	0.581	0.825	1	35.661			
T4	813.36	5084.15	A	0.14	2.808	0.58	0.825	1	40.786	6792.44	271.70	B
100.00-75.00			B	0.368	2.131	0.639	0.825	1	103.063			
			C	0.179	2.667	0.586	0.825	1	50.232			
T5	289.47	2103.33	A	0.134	2.833	0.579	0.825	1	14.051	2240.37	268.84	B
75.00-66.67			B	0.355	2.159	0.634	0.825	1	35.631			
			C	0.172	2.692	0.585	0.825	1	17.394			
T6	289.47	2140.98	A	0.131	2.844	0.579	0.825	1	14.288	2192.29	263.07	B
66.67-58.33			B	0.345	2.184	0.631	0.825	1	35.727			
			C	0.168	2.707	0.584	0.825	1	17.626			
T7	289.47	2316.33	A	0.131	2.841	0.579	0.825	1	15.539	2108.12	252.97	B
58.33-50.00			B	0.33	2.219	0.626	0.825	1	35.230			
			C	0.166	2.713	0.584	0.825	1	18.614			
T8	434.21	3003.52	A	0.118	2.893	0.577	0.825	1	20.869	3007.83	240.63	B
50.00-37.50			B	0.318	2.248	0.622	0.825	1	52.726			
			C	0.153	2.761	0.582	0.825	1	25.888			
T9	434.21	3416.13	A	0.129	2.848	0.579	0.825	1	24.606	2901.51	232.12	B
37.50-25.00			B	0.313	2.261	0.62	0.825	1	54.818			
			C	0.162	2.73	0.583	0.825	1	29.372			
T10	868.43	8678.73	A	0.133	2.836	0.579	0.825	1	52.780	6191.23	247.65	B
25.00-0.00			B	0.308	2.275	0.618	0.825	1	116.253			
			C	0.163	2.723	0.584	0.825	1	62.859			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
Sum Weight:	4562.68	34108.77						OTM	3020.42 kip-ft	38842.69		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	44.80	1181.68	A	0.175	2.683	0.586	0.8	1	13.596	1708.29	170.83	B
160.00-150.00			B	0.266	2.391	0.606	0.8	1	19.616			
			C	0.175	2.683	0.586	0.8	1	13.596			
T2	409.01	2323.89	A	0.13	2.846	0.579	0.8	1	27.713	5352.31	214.09	B
150.00-125.00			B	0.342	2.189	0.63	0.8	1	69.470			
			C	0.13	2.846	0.579	0.8	1	27.713			
T3	690.24	3860.01	A	0.122	2.875	0.578	0.8	1	30.672	6266.02	250.64	B
125.00-100.00			B	0.372	2.122	0.641	0.8	1	88.862			
			C	0.144	2.794	0.581	0.8	1	35.093			
T4	813.36	5084.15	A	0.14	2.808	0.58	0.8	1	40.081	6747.46	269.90	B
100.00-75.00			B	0.368	2.131	0.639	0.8	1	102.380			
			C	0.179	2.667	0.586	0.8	1	49.559			
T5	289.47	2103.33	A	0.134	2.833	0.579	0.8	1	13.801	2225.28	267.03	B
75.00-66.67			B	0.355	2.159	0.634	0.8	1	35.391			
			C	0.172	2.692	0.585	0.8	1	17.156			
T6	289.47	2140.98	A	0.131	2.844	0.579	0.8	1	14.032	2177.07	261.25	B
66.67-58.33			B	0.345	2.184	0.631	0.8	1	35.479			
			C	0.168	2.707	0.584	0.8	1	17.381			
T7	289.47	2316.33	A	0.131	2.841	0.579	0.8	1	15.190	2090.26	250.83	B
58.33-50.00			B	0.33	2.219	0.626	0.8	1	34.932			
			C	0.166	2.713	0.584	0.8	1	18.283			
T8	434.21	3003.52	A	0.118	2.893	0.577	0.8	1	20.488	2986.29	238.90	B
50.00-37.50			B	0.318	2.248	0.622	0.8	1	52.348			
			C	0.153	2.761	0.582	0.8	1	25.521			
T9	434.21	3416.13	A	0.129	2.848	0.579	0.8	1	24.112	2877.99	230.24	B
37.50-25.00			B	0.313	2.261	0.62	0.8	1	54.374			
			C	0.162	2.73	0.583	0.8	1	28.901			
T10	868.43	8678.73	A	0.133	2.836	0.579	0.8	1	51.893	6144.76	245.79	B
25.00-0.00			B	0.308	2.275	0.618	0.8	1	115.380			
			C	0.163	2.723	0.584	0.8	1	62.002			
Sum Weight:	4562.68	34108.77						OTM	3000.37 kip-ft	38575.73		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	44.80	1181.68	A	0.175	2.683	0.586	0.85	1	14.140	1750.48	175.05	B
160.00-150.00			B	0.266	2.391	0.606	0.85	1	20.100			
			C	0.175	2.683	0.586	0.85	1	14.140			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T2	409.01	2323.89	A	0.13	2.846	0.579	0.85	1	28.691	5409.39	216.38	B
150.00-125.00			B	0.342	2.189	0.63	0.85	1	70.211			
			C	0.13	2.846	0.579	0.85	1	28.691			
T3	690.24	3860.01	A	0.122	2.875	0.578	0.85	1	31.836	6331.30	253.25	B
125.00-100.00			B	0.372	2.122	0.641	0.85	1	89.787			
			C	0.144	2.794	0.581	0.85	1	36.229			
T4	813.36	5084.15	A	0.14	2.808	0.58	0.85	1	41.491	6837.42	273.50	B
100.00-75.00			B	0.368	2.131	0.639	0.85	1	103.745			
			C	0.179	2.667	0.586	0.85	1	50.905			
T5	289.47	2103.33	A	0.134	2.833	0.579	0.85	1	14.300	2255.46	270.66	B
75.00-66.67			B	0.355	2.159	0.634	0.85	1	35.871			
			C	0.172	2.692	0.585	0.85	1	17.632			
T6	289.47	2140.98	A	0.131	2.844	0.579	0.85	1	14.544	2207.50	264.90	B
66.67-58.33			B	0.345	2.184	0.631	0.85	1	35.975			
			C	0.168	2.707	0.584	0.85	1	17.872			
T7	289.47	2316.33	A	0.131	2.841	0.579	0.85	1	15.888	2125.98	255.12	B
58.33-50.00			B	0.33	2.219	0.626	0.85	1	35.529			
			C	0.166	2.713	0.584	0.85	1	18.944			
T8	434.21	3003.52	A	0.118	2.893	0.577	0.85	1	21.251	3029.38	242.35	B
50.00-37.50			B	0.318	2.248	0.622	0.85	1	53.103			
			C	0.153	2.761	0.582	0.85	1	26.255			
T9	434.21	3416.13	A	0.129	2.848	0.579	0.85	1	25.101	2925.03	234.00	B
37.50-25.00			B	0.313	2.261	0.62	0.85	1	55.263			
			C	0.162	2.73	0.583	0.85	1	29.843			
T10	868.43	8678.73	A	0.133	2.836	0.579	0.85	1	53.667	6237.70	249.51	B
25.00-0.00			B	0.308	2.275	0.618	0.85	1	117.126			
			C	0.163	2.723	0.584	0.85	1	63.715			
Sum Weight:	4562.68	34108.77						OTM	3040.46 kip-ft	39109.66		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	161.50	1715.75	A	0.225	2.516	0.596	1	1	19.249	2402.38	240.24	B
160.00-150.00			B	0.379	2.106	0.643	1	1	31.318			
			C	0.225	2.516	0.596	1	1	19.249			
T2	1226.60	3377.81	A	0.168	2.707	0.584	1	1	38.752	7965.17	318.61	B
150.00-125.00			B	0.515	1.881	0.705	1	1	120.325			
			C	0.168	2.707	0.584	1	1	38.752			
T3	1910.01	5245.23	A	0.157	2.745	0.583	1	1	42.901	9491.78	379.67	B
125.00-100.00			B	0.561	1.834	0.73	1	1	155.770			
			C	0.188	2.636	0.588	1	1	49.375			
T4	2188.86	6931.26	A	0.172	2.693	0.585	1	1	53.815	9895.85	395.83	B
100.00-75.00			B	0.539	1.855	0.718	1	1	172.498			
			C	0.235	2.484	0.598	1	1	69.290			
T5	768.47	2741.25	A	0.164	2.72	0.584	1	1	18.592	3246.49	389.58	B
75.00-66.67			B	0.522	1.873	0.709	1	1	59.527			
			C	0.227	2.509	0.596	1	1	24.090			
T6	768.47	2791.71	A	0.161	2.732	0.583	1	1	18.933	3157.21	378.87	B
66.67-58.33			B	0.506	1.892	0.701	1	1	59.398			
			C	0.221	2.527	0.595	1	1	24.417			
T7	768.47	3032.39	A	0.172	2.691	0.585	1	1	21.887	2988.12	358.57	B
58.33-50.00			B	0.484	1.922	0.689	1	1	57.644			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
			C	0.227	2.509	0.596	1	1	26.726			
T8	1152.70	3836.95	A	0.142	2.8	0.58	1	1	27.200	4287.26	342.98	B
50.00-37.50			B	0.468	1.945	0.682	1	1	86.879			
			C	0.199	2.599	0.59	1	1	35.455			
T9	1152.70	4458.90	A	0.161	2.733	0.583	1	1	33.011	4054.07	324.33	B
37.50-25.00			B	0.453	1.968	0.675	1	1	88.010			
			C	0.212	2.557	0.593	1	1	40.628			
T10	2305.41	10921.16	A	0.155	2.753	0.582	1	1	66.718	8579.38	343.18	B
25.00-0.00			B	0.44	1.99	0.669	1	1	184.186			
			C	0.205	2.58	0.591	1	1	83.282			
Sum Weight:	12403.20	45052.39						OTM	4411.93 kip-ft	56067.72		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	161.50	1715.75	A	0.225	2.516	0.596	0.825	1	17.343	2243.27	224.33	B
160.00-150.00			B	0.379	2.106	0.643	0.825	1	29.244			
			C	0.225	2.516	0.596	0.825	1	17.343			
T2	1226.60	3377.81	A	0.168	2.707	0.584	0.825	1	35.329	7699.59	307.98	B
150.00-125.00			B	0.515	1.881	0.705	0.825	1	116.313			
			C	0.168	2.707	0.584	0.825	1	35.329			
T3	1910.01	5245.23	A	0.157	2.745	0.583	0.825	1	38.827	9201.68	368.07	B
125.00-100.00			B	0.561	1.834	0.73	0.825	1	151.009			
			C	0.188	2.636	0.588	0.825	1	45.450			
T4	2188.86	6931.26	A	0.172	2.693	0.585	0.825	1	48.879	9520.34	380.81	B
100.00-75.00			B	0.539	1.855	0.718	0.825	1	165.952			
			C	0.235	2.484	0.598	0.825	1	64.726			
T5	768.47	2741.25	A	0.164	2.72	0.584	0.825	1	16.848	3123.16	374.78	B
75.00-66.67			B	0.522	1.873	0.709	0.825	1	57.266			
			C	0.227	2.509	0.596	0.825	1	22.476			
T6	768.47	2791.71	A	0.161	2.732	0.583	0.825	1	17.138	3033.91	364.07	B
66.67-58.33			B	0.506	1.892	0.701	0.825	1	57.078			
			C	0.221	2.527	0.595	0.825	1	22.751			
T7	768.47	3032.39	A	0.172	2.691	0.585	0.825	1	19.445	2859.84	343.18	B
58.33-50.00			B	0.484	1.922	0.689	0.825	1	55.170			
			C	0.227	2.509	0.596	0.825	1	24.497			
T8	1152.70	3836.95	A	0.142	2.8	0.58	0.825	1	24.529	4111.50	328.92	B
50.00-37.50			B	0.468	1.945	0.682	0.825	1	83.317			
			C	0.199	2.599	0.59	0.825	1	32.958			
T9	1152.70	4458.90	A	0.161	2.733	0.583	0.825	1	29.551	3878.61	310.29	B
37.50-25.00			B	0.453	1.968	0.675	0.825	1	84.201			
			C	0.212	2.557	0.593	0.825	1	37.437			
T10	2305.41	10921.16	A	0.155	2.753	0.582	0.825	1	60.508	8210.85	328.43	B
25.00-0.00			B	0.44	1.99	0.669	0.825	1	176.274			
			C	0.205	2.58	0.591	0.825	1	77.434			
Sum Weight:	12403.20	45052.39						OTM	4244.09 kip-ft	53882.74		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	161.50	1715.75	A	0.225	2.516	0.596	0.8	1	17.071	2220.54	222.05	B
160.00-150.00			B	0.379	2.106	0.643	0.8	1	28.947			
			C	0.225	2.516	0.596	0.8	1	17.071			
T2	1226.60	3377.81	A	0.168	2.707	0.584	0.8	1	34.841	7661.65	306.47	B
150.00-125.00			B	0.515	1.881	0.705	0.8	1	115.740			
			C	0.168	2.707	0.584	0.8	1	34.841			
T3	1910.01	5245.23	A	0.157	2.745	0.583	0.8	1	38.245	9160.24	366.41	B
125.00-100.00			B	0.561	1.834	0.73	0.8	1	150.329			
			C	0.188	2.636	0.588	0.8	1	44.889			
T4	2188.86	6931.26	A	0.172	2.693	0.585	0.8	1	48.174	9466.69	378.67	B
100.00-75.00			B	0.539	1.855	0.718	0.8	1	165.017			
			C	0.235	2.484	0.598	0.8	1	64.074			
T5	768.47	2741.25	A	0.164	2.72	0.584	0.8	1	16.599	3105.55	372.67	B
75.00-66.67			B	0.522	1.873	0.709	0.8	1	56.943			
			C	0.227	2.509	0.596	0.8	1	22.245			
T6	768.47	2791.71	A	0.161	2.732	0.583	0.8	1	16.881	3016.30	361.96	B
66.67-58.33			B	0.506	1.892	0.701	0.8	1	56.747			
			C	0.221	2.527	0.595	0.8	1	22.513			
T7	768.47	3032.39	A	0.172	2.691	0.585	0.8	1	19.096	2841.51	340.98	B
58.33-50.00			B	0.484	1.922	0.689	0.8	1	54.816			
			C	0.227	2.509	0.596	0.8	1	24.179			
T8	1152.70	3836.95	A	0.142	2.8	0.58	0.8	1	24.147	4086.39	326.91	B
50.00-37.50			B	0.468	1.945	0.682	0.8	1	82.808			
			C	0.199	2.599	0.59	0.8	1	32.602			
T9	1152.70	4458.90	A	0.161	2.733	0.583	0.8	1	29.057	3853.54	308.28	B
37.50-25.00			B	0.453	1.968	0.675	0.8	1	83.657			
			C	0.212	2.557	0.593	0.8	1	36.981			
T10	2305.41	10921.16	A	0.155	2.753	0.582	0.8	1	59.620	8158.20	326.33	B
25.00-0.00			B	0.44	1.99	0.669	0.8	1	175.144			
			C	0.205	2.58	0.591	0.8	1	76.599			
Sum Weight:	12403.20	45052.39						OTM	4220.11 kip-ft	53570.60		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	161.50	1715.75	A	0.225	2.516	0.596	0.85	1	17.615	2266.00	226.60	B
160.00-150.00			B	0.379	2.106	0.643	0.85	1	29.540			
			C	0.225	2.516	0.596	0.85	1	17.615			
T2	1226.60	3377.81	A	0.168	2.707	0.584	0.85	1	35.818	7737.53	309.50	B
150.00-125.00			B	0.515	1.881	0.705	0.85	1	116.886			
			C	0.168	2.707	0.584	0.85	1	35.818			
T3	1910.01	5245.23	A	0.157	2.745	0.583	0.85	1	39.409	9243.13	369.73	B
125.00-100.00			B	0.561	1.834	0.73	0.85	1	151.689			
			C	0.188	2.636	0.588	0.85	1	46.010			
T4	2188.86	6931.26	A	0.172	2.693	0.585	0.85	1	49.584	9573.98	382.96	B
100.00-75.00			B	0.539	1.855	0.718	0.85	1	166.887			
			C	0.235	2.484	0.598	0.85	1	65.378			
T5	768.47	2741.25	A	0.164	2.72	0.584	0.85	1	17.097	3140.78	376.89	B
75.00-66.67			B	0.522	1.873	0.709	0.85	1	57.589			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			C	0.227	2.509	0.596	0.85	1	22.706			
T6	768.47	2791.71	A	0.161	2.732	0.583	0.85	1	17.394	3051.53	366.18	B
66.67-58.33			B	0.506	1.892	0.701	0.85	1	57.410			
			C	0.221	2.527	0.595	0.85	1	22.989			
T7	768.47	3032.39	A	0.172	2.691	0.585	0.85	1	19.794	2878.17	345.38	B
58.33-50.00			B	0.484	1.922	0.689	0.85	1	55.523			
			C	0.227	2.509	0.596	0.85	1	24.816			
T8	1152.70	3836.95	A	0.142	2.8	0.58	0.85	1	24.910	4136.61	330.93	B
50.00-37.50			B	0.468	1.945	0.682	0.85	1	83.826			
			C	0.199	2.599	0.59	0.85	1	33.315			
T9	1152.70	4458.90	A	0.161	2.733	0.583	0.85	1	30.046	3903.67	312.29	B
37.50-25.00			B	0.453	1.968	0.675	0.85	1	84.745			
			C	0.212	2.557	0.593	0.85	1	37.893			
T10	2305.41	10921.16	A	0.155	2.753	0.582	0.85	1	61.395	8263.50	330.54	B
25.00-0.00			B	0.44	1.99	0.669	0.85	1	177.404			
			C	0.205	2.58	0.591	0.85	1	78.269			
Sum Weight:	12403.20	45052.39						OTM	4268.07 kip-ft	54194.88		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	44.80	1181.68	A	0.175	2.683	0.586	1	1	15.774	1877.05	187.70	B
160.00-150.00			B	0.266	2.391	0.606	1	1	21.554			
			C	0.175	2.683	0.586	1	1	15.774			
T2	409.01	2323.89	A	0.13	2.846	0.579	1	1	31.625	5580.66	223.23	B
150.00-125.00			B	0.342	2.189	0.63	1	1	72.434			
			C	0.13	2.846	0.579	1	1	31.625			
T3	690.24	3860.01	A	0.122	2.875	0.578	1	1	35.328	6527.13	261.09	B
125.00-100.00			B	0.372	2.122	0.641	1	1	92.565			
			C	0.144	2.794	0.581	1	1	39.636			
T4	813.36	5084.15	A	0.14	2.808	0.58	1	1	45.721	7107.31	284.29	B
100.00-75.00			B	0.368	2.131	0.639	1	1	107.841			
			C	0.179	2.667	0.586	1	1	54.943			
T5	289.47	2103.33	A	0.134	2.833	0.579	1	1	15.794	2346.01	281.52	B
75.00-66.67			B	0.355	2.159	0.634	1	1	37.311			
			C	0.172	2.692	0.585	1	1	19.060			
T6	289.47	2140.98	A	0.131	2.844	0.579	1	1	16.083	2298.79	275.85	B
66.67-58.33			B	0.345	2.184	0.631	1	1	37.462			
			C	0.168	2.707	0.584	1	1	19.344			
T7	289.47	2316.33	A	0.131	2.841	0.579	1	1	17.981	2233.16	267.98	B
58.33-50.00			B	0.33	2.219	0.626	1	1	37.320			
			C	0.166	2.713	0.584	1	1	20.928			
T8	434.21	3003.52	A	0.118	2.893	0.577	1	1	23.541	3158.66	252.69	B
50.00-37.50			B	0.318	2.248	0.622	1	1	55.370			
			C	0.153	2.761	0.582	1	1	28.455			
T9	434.21	3416.13	A	0.129	2.848	0.579	1	1	28.066	3066.12	245.29	B
37.50-25.00			B	0.313	2.261	0.62	1	1	57.928			
			C	0.162	2.73	0.583	1	1	32.671			
T10	868.43	8678.73	A	0.133	2.836	0.579	1	1	58.991	6516.54	260.66	B
25.00-0.00			B	0.308	2.275	0.618	1	1	122.361			
			C	0.163	2.723	0.584	1	1	68.852			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
Sum Weight:	4562.68	34108.77						OTM	3160.75 kip-ft	40711.43		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	44.80	1181.68	A	0.175	2.683	0.586	0.825	1	13.868	1729.39	172.94	B
160.00-150.00			B	0.266	2.391	0.606	0.825	1	19.858			
			C	0.175	2.683	0.586	0.825	1	13.868			
T2	409.01	2323.89	A	0.13	2.846	0.579	0.825	1	28.202	5380.85	215.23	B
150.00-125.00			B	0.342	2.189	0.63	0.825	1	69.841			
			C	0.13	2.846	0.579	0.825	1	28.202			
T3	690.24	3860.01	A	0.122	2.875	0.578	0.825	1	31.254	6298.66	251.95	B
125.00-100.00			B	0.372	2.122	0.641	0.825	1	89.325			
			C	0.144	2.794	0.581	0.825	1	35.661			
T4	813.36	5084.15	A	0.14	2.808	0.58	0.825	1	40.786	6792.44	271.70	B
100.00-75.00			B	0.368	2.131	0.639	0.825	1	103.063			
			C	0.179	2.667	0.586	0.825	1	50.232			
T5	289.47	2103.33	A	0.134	2.833	0.579	0.825	1	14.051	2240.37	268.84	B
75.00-66.67			B	0.355	2.159	0.634	0.825	1	35.631			
			C	0.172	2.692	0.585	0.825	1	17.394			
T6	289.47	2140.98	A	0.131	2.844	0.579	0.825	1	14.288	2192.29	263.07	B
66.67-58.33			B	0.345	2.184	0.631	0.825	1	35.727			
			C	0.168	2.707	0.584	0.825	1	17.626			
T7	289.47	2316.33	A	0.131	2.841	0.579	0.825	1	15.539	2108.12	252.97	B
58.33-50.00			B	0.33	2.219	0.626	0.825	1	35.230			
			C	0.166	2.713	0.584	0.825	1	18.614			
T8	434.21	3003.52	A	0.118	2.893	0.577	0.825	1	20.869	3007.83	240.63	B
50.00-37.50			B	0.318	2.248	0.622	0.825	1	52.726			
			C	0.153	2.761	0.582	0.825	1	25.888			
T9	434.21	3416.13	A	0.129	2.848	0.579	0.825	1	24.606	2901.51	232.12	B
37.50-25.00			B	0.313	2.261	0.62	0.825	1	54.818			
			C	0.162	2.73	0.583	0.825	1	29.372			
T10	868.43	8678.73	A	0.133	2.836	0.579	0.825	1	52.780	6191.23	247.65	B
25.00-0.00			B	0.308	2.275	0.618	0.825	1	116.253			
			C	0.163	2.723	0.584	0.825	1	62.859			
Sum Weight:	4562.68	34108.77						OTM	3020.42 kip-ft	38842.69		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	44.80	1181.68	A	0.175	2.683	0.586	0.8	1	13.596	1708.29	170.83	B
160.00-150.00			B	0.266	2.391	0.606	0.8	1	19.616			
			C	0.175	2.683	0.586	0.8	1	13.596			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T2	409.01	2323.89	A	0.13	2.846	0.579	0.8	1	27.713	5352.31	214.09	B
150.00-125.00			B	0.342	2.189	0.63	0.8	1	69.470			
			C	0.13	2.846	0.579	0.8	1	27.713			
T3	690.24	3860.01	A	0.122	2.875	0.578	0.8	1	30.672	6266.02	250.64	B
125.00-100.00			B	0.372	2.122	0.641	0.8	1	88.862			
			C	0.144	2.794	0.581	0.8	1	35.093			
T4	813.36	5084.15	A	0.14	2.808	0.58	0.8	1	40.081	6747.46	269.90	B
100.00-75.00			B	0.368	2.131	0.639	0.8	1	102.380			
			C	0.179	2.667	0.586	0.8	1	49.559			
T5	289.47	2103.33	A	0.134	2.833	0.579	0.8	1	13.801	2225.28	267.03	B
75.00-66.67			B	0.355	2.159	0.634	0.8	1	35.391			
			C	0.172	2.692	0.585	0.8	1	17.156			
T6	289.47	2140.98	A	0.131	2.844	0.579	0.8	1	14.032	2177.07	261.25	B
66.67-58.33			B	0.345	2.184	0.631	0.8	1	35.479			
			C	0.168	2.707	0.584	0.8	1	17.381			
T7	289.47	2316.33	A	0.131	2.841	0.579	0.8	1	15.190	2090.26	250.83	B
58.33-50.00			B	0.33	2.219	0.626	0.8	1	34.932			
			C	0.166	2.713	0.584	0.8	1	18.283			
T8	434.21	3003.52	A	0.118	2.893	0.577	0.8	1	20.488	2986.29	238.90	B
50.00-37.50			B	0.318	2.248	0.622	0.8	1	52.348			
			C	0.153	2.761	0.582	0.8	1	25.521			
T9	434.21	3416.13	A	0.129	2.848	0.579	0.8	1	24.112	2877.99	230.24	B
37.50-25.00			B	0.313	2.261	0.62	0.8	1	54.374			
			C	0.162	2.73	0.583	0.8	1	28.901			
T10	868.43	8678.73	A	0.133	2.836	0.579	0.8	1	51.893	6144.76	245.79	B
25.00-0.00			B	0.308	2.275	0.618	0.8	1	115.380			
			C	0.163	2.723	0.584	0.8	1	62.002			
Sum Weight:	4562.68	34108.77						OTM	3000.37 kip-ft	38575.73		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	44.80	1181.68	A	0.175	2.683	0.586	0.85	1	14.140	1750.48	175.05	B
160.00-150.00			B	0.266	2.391	0.606	0.85	1	20.100			
			C	0.175	2.683	0.586	0.85	1	14.140			
T2	409.01	2323.89	A	0.13	2.846	0.579	0.85	1	28.691	5409.39	216.38	B
150.00-125.00			B	0.342	2.189	0.63	0.85	1	70.211			
			C	0.13	2.846	0.579	0.85	1	28.691			
T3	690.24	3860.01	A	0.122	2.875	0.578	0.85	1	31.836	6331.30	253.25	B
125.00-100.00			B	0.372	2.122	0.641	0.85	1	89.787			
			C	0.144	2.794	0.581	0.85	1	36.229			
T4	813.36	5084.15	A	0.14	2.808	0.58	0.85	1	41.491	6837.42	273.50	B
100.00-75.00			B	0.368	2.131	0.639	0.85	1	103.745			
			C	0.179	2.667	0.586	0.85	1	50.905			
T5	289.47	2103.33	A	0.134	2.833	0.579	0.85	1	14.300	2255.46	270.66	B
75.00-66.67			B	0.355	2.159	0.634	0.85	1	35.871			
			C	0.172	2.692	0.585	0.85	1	17.632			
T6	289.47	2140.98	A	0.131	2.844	0.579	0.85	1	14.544	2207.50	264.90	B
66.67-58.33			B	0.345	2.184	0.631	0.85	1	35.975			
			C	0.168	2.707	0.584	0.85	1	17.872			
T7	289.47	2316.33	A	0.131	2.841	0.579	0.85	1	15.888	2125.98	255.12	B
58.33-50.00			B	0.33	2.219	0.626	0.85	1	35.529			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
			C	0.166	2.713	0.584	0.85	1	18.944			
T8	434.21	3003.52	A	0.118	2.893	0.577	0.85	1	21.251	3029.38	242.35	B
50.00-37.50			B	0.318	2.248	0.622	0.85	1	53.103			
			C	0.153	2.761	0.582	0.85	1	26.255			
T9	434.21	3416.13	A	0.129	2.848	0.579	0.85	1	25.101	2925.03	234.00	B
37.50-25.00			B	0.313	2.261	0.62	0.85	1	55.263			
			C	0.162	2.73	0.583	0.85	1	29.843			
T10	868.43	8678.73	A	0.133	2.836	0.579	0.85	1	53.667	6237.70	249.51	B
25.00-0.00			B	0.308	2.275	0.618	0.85	1	117.126			
			C	0.163	2.723	0.584	0.85	1	63.715			
Sum Weight:	4562.68	34108.77						OTM	3040.46 kip-ft	39109.66		

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	11767.25					
Bracing Weight	22341.53					
Total Member Self-Weight	34108.77			-2.47	-13.37	
Total Weight	49545.31			-2.47	-13.37	
Wind 0 deg - No Ice		-200.48	-59859.63	-5508.16	10.50	81.51
Wind 30 deg - No Ice		28937.88	-50352.54	-4654.43	-2685.26	23.27
Wind 45 deg - No Ice		40839.34	-40863.99	-3779.46	-3790.17	-7.56
Wind 60 deg - No Ice		49859.96	-28688.34	-2654.45	-4630.37	-37.49
Wind 90 deg - No Ice		58223.00	200.48	21.40	-5398.50	-88.86
Wind 120 deg - No Ice		51910.02	30103.43	2771.05	-4793.14	-120.50
Wind 135 deg - No Ice		41122.87	41147.51	3808.29	-3823.93	-117.34
Wind 150 deg - No Ice		29285.12	50553.02	4673.36	-2726.61	-112.13
Wind 180 deg - No Ice		200.48	57723.92	5342.83	-37.24	-77.07
Wind 210 deg - No Ice		-28937.88	50352.54	4649.49	2658.52	-23.27
Wind 225 deg - No Ice		-40839.34	40863.99	3774.53	3763.44	7.56
Wind 240 deg - No Ice		-51709.53	29756.19	2729.70	4742.53	38.99
Wind 270 deg - No Ice		-58223.00	-200.48	-26.34	5371.76	88.86
Wind 300 deg - No Ice		-50060.44	-29035.58	-2695.79	4627.50	114.55
Wind 315 deg - No Ice		-41122.87	-41147.51	-3813.23	3797.20	117.34
Wind 330 deg - No Ice		-29285.12	-50553.02	-4678.30	2699.87	112.13
Member Ice	10943.62					
Total Weight Ice	73485.63			-21.04	-40.08	
Wind 0 deg - Ice		-192.96	-79689.68	-7376.06	-17.60	144.30
Wind 30 deg - Ice		38722.20	-67294.88	-6254.85	-3626.39	49.12
Wind 45 deg - Ice		54640.62	-54667.66	-5087.25	-5106.58	-2.68
Wind 60 deg - Ice		66721.13	-38429.17	-3583.17	-6232.71	-53.71
Wind 90 deg - Ice		77778.61	192.96	1.44	-7251.65	-143.01
Wind 120 deg - Ice		69076.66	40011.95	3675.93	-6421.31	-200.00
Wind 135 deg - Ice		54913.51	54940.54	5076.95	-5138.37	-198.48
Wind 150 deg - Ice		39056.41	67487.84	6235.24	-3665.33	-192.13
Wind 180 deg - Ice		192.96	77192.56	7142.15	-62.56	-137.62
Wind 210 deg - Ice		-38722.20	67294.88	6212.76	3546.24	-49.12
Wind 225 deg - Ice		-54640.62	54667.66	5045.16	5026.42	2.68
Wind 240 deg - Ice		-68883.70	39677.73	3637.00	6318.67	55.70
Wind 270 deg - Ice		-77778.61	-192.96	-43.52	7171.49	143.01
Wind 300 deg - Ice		-66914.09	-38763.39	-3622.11	6175.03	191.32
Wind 315 deg - Ice		-54913.51	-54940.54	-5119.04	5058.21	198.48

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 330 deg - Ice		-39056.41	-67487.84	-6277.33	3585.17	192.13
Total Weight	49545.31			-2.47	-13.37	
Wind 0 deg - Service		-200.48	-59859.63	-5506.71	28.01	81.51
Wind 30 deg - Service		28937.88	-50352.54	-4652.98	-2667.75	23.27
Wind 45 deg - Service		40839.34	-40863.99	-3778.02	-3772.66	-7.56
Wind 60 deg - Service		49859.96	-28688.34	-2653.00	-4612.86	-37.49
Wind 90 deg - Service		58223.00	200.48	22.84	-5380.99	-88.86
Wind 120 deg - Service		51910.02	30103.43	2772.49	-4775.63	-120.50
Wind 135 deg - Service		41122.87	41147.51	3809.73	-3806.42	-117.34
Wind 150 deg - Service		29285.12	50553.02	4674.80	-2709.10	-112.13
Wind 180 deg - Service		200.48	57723.92	5344.27	-19.73	-77.07
Wind 210 deg - Service		-28937.88	50352.54	4650.93	2676.03	-23.27
Wind 225 deg - Service		-40839.34	40863.99	3775.97	3780.95	7.56
Wind 240 deg - Service		-51709.53	29756.19	2731.14	4760.04	38.99
Wind 270 deg - Service		-58223.00	-200.48	-24.90	5389.27	88.86
Wind 300 deg - Service		-50060.44	-29035.58	-2694.35	4645.01	114.55
Wind 315 deg - Service		-41122.87	-41147.51	-3811.78	3814.71	117.34
Wind 330 deg - Service		-29285.12	-50553.02	-4676.86	2717.38	112.13

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice
19	Dead+Wind 0 deg+Ice
20	Dead+Wind 30 deg+Ice
21	Dead+Wind 45 deg+Ice
22	Dead+Wind 60 deg+Ice
23	Dead+Wind 90 deg+Ice
24	Dead+Wind 120 deg+Ice
25	Dead+Wind 135 deg+Ice
26	Dead+Wind 150 deg+Ice
27	Dead+Wind 180 deg+Ice
28	Dead+Wind 210 deg+Ice
29	Dead+Wind 225 deg+Ice
30	Dead+Wind 240 deg+Ice
31	Dead+Wind 270 deg+Ice
32	Dead+Wind 300 deg+Ice
33	Dead+Wind 315 deg+Ice

Comb. No.	Description
34	Dead+Wind 330 deg+Ice
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	160 - 150	Leg	Max Tension	32	750.54	-0.45	0.02
			Max. Compression	19	-2219.65	-0.09	-0.15
			Max. Mx	24	-188.93	-0.51	-0.02
			Max. My	30	-659.34	-0.23	0.66
			Max. Vy	27	-726.36	0.00	0.00
			Max. Vx	23	1091.02	-0.00	-0.00
		Diagonal	Max Tension	28	2779.33	0.00	0.00
			Max. Compression	28	-2948.31	0.00	0.00
			Max. Mx	23	1560.10	0.04	0.00
			Max. My	24	216.74	0.00	0.00
			Max. Vy	23	-23.56	0.00	0.00
			Max. Vx	24	0.93	0.00	0.00
		Horizontal	Max Tension	21	2243.59	0.03	0.01
			Max. Compression	30	-2175.46	0.00	0.00
			Max. Mx	32	28.16	0.03	0.00
			Max. My	30	31.24	0.02	0.01
			Max. Vy	32	25.60	0.03	0.00
			Max. Vx	30	-2.33	0.00	0.00
		Top Girt	Max Tension	22	1142.78	0.02	0.01
			Max. Compression	30	-1186.10	0.03	0.00
			Max. Mx	32	-735.16	0.03	0.00
			Max. My	24	726.02	0.02	0.01
			Max. Vy	32	24.61	0.03	0.00
			Max. Vx	24	-2.25	0.00	0.00
T2	150 - 125	Leg	Max Tension	32	17660.61	-1.17	-0.24
			Max. Compression	19	-26225.32	1.26	-0.22
			Max. Mx	32	2806.66	-2.27	-0.29
			Max. My	31	-1887.88	-0.03	-2.32
			Max. Vy	32	-3269.75	-2.27	-0.29
			Max. Vx	23	3215.44	-0.07	2.31
		Diagonal	Max Tension	26	12128.74	0.00	0.00
			Max. Compression	26	-12294.22	0.00	0.00
			Max. Mx	23	8758.60	0.07	0.00
			Max. My	24	1929.95	0.00	0.00
			Max. Vy	23	-27.93	0.00	0.00
			Max. Vx	24	-1.39	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Horizontal	Max Tension	33	7664.65	0.00	0.00
			Max. Compression	25	-7609.06	0.03	0.02
			Max. Mx	32	263.37	0.04	0.01
			Max. My	32	-6496.37	0.02	0.02
			Max. Vy	32	22.46	0.04	0.01
			Max. Vx	32	-3.94	0.00	0.00
T3	125 - 100	Leg	Max Tension	22	63338.06	-0.91	0.25
			Max. Compression	19	-79806.84	1.49	-0.13
			Max. Mx	32	30799.43	1.72	-0.28
			Max. My	23	-8152.44	-0.04	1.75
			Max. Vy	22	-1223.18	-0.91	0.25
			Max. Vx	31	-1396.97	-0.01	-1.28
		Diagonal	Max Tension	26	17974.44	0.00	0.00
			Max. Compression	26	-18345.91	0.00	0.00
			Max. Mx	23	12017.02	0.14	0.00
			Max. My	24	3403.45	0.00	0.01
			Max. Vy	23	-50.45	0.00	0.00
			Max. Vx	24	-2.16	0.00	0.00
		Horizontal	Max Tension	33	12270.15	0.00	0.00
			Max. Compression	25	-12168.75	0.08	0.01
			Max. Mx	32	759.28	0.12	0.02
			Max. My	24	-1324.96	0.01	-0.03
			Max. Vy	32	47.82	0.12	0.02
			Max. Vx	24	4.95	0.01	-0.03
		Inner Bracing	Max Tension	23	7.87	0.00	0.00
			Max. Compression	33	-15.94	0.00	0.00
			Max. Mx	18	-3.52	-0.03	0.00
			Max. My	24	6.78	0.00	-0.00
			Max. Vy	18	17.50	0.00	0.00
			Max. Vx	19	0.15	0.00	0.00
T4	100 - 75	Leg	Max Tension	32	122844.70	-0.91	-0.22
			Max. Compression	19	-149023.29	1.13	-0.23
			Max. Mx	32	80424.31	1.92	-0.28
			Max. My	23	-10076.99	-0.03	2.08
			Max. Vy	32	-1344.37	-1.54	-0.29
			Max. Vx	31	-1448.09	-0.04	-1.75
		Diagonal	Max Tension	26	22580.56	0.00	0.00
			Max. Compression	26	-23041.65	0.00	0.00
			Max. Mx	23	14916.66	0.16	0.00
			Max. My	24	4364.09	0.00	0.01
			Max. Vy	23	-53.51	0.00	0.00
			Max. Vx	24	-2.04	0.00	0.00
		Horizontal	Max Tension	26	16324.21	0.11	-0.00
			Max. Compression	26	-16164.88	0.11	-0.00
			Max. Mx	32	1385.71	0.16	0.02
			Max. My	24	-1898.24	0.05	-0.03
			Max. Vy	32	69.38	0.16	0.02
			Max. Vx	30	5.55	0.05	-0.03
		Top Girt	Max Tension	33	14198.87	0.05	-0.01
			Max. Compression	25	-14061.94	0.06	0.01
			Max. Mx	32	-3641.74	0.08	0.03
			Max. My	24	-1462.35	0.03	-0.03
			Max. Vy	32	39.59	0.08	0.03
			Max. Vx	24	5.22	0.03	-0.03
		Inner Bracing	Max Tension	25	243.56	0.00	0.00
			Max. Compression	25	-243.56	0.00	0.00
			Max. Mx	18	-4.16	-0.04	0.00
			Max. My	24	5.78	0.00	-0.00
			Max. Vy	18	19.95	0.00	0.00
			Max. Vx	24	0.14	0.00	0.00
T5	75 - 66.6667	Leg	Max Tension	32	144241.74	-1.14	-0.28

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	24	-173990.53	1.56	0.19
			Max. Mx	19	-173857.07	1.56	-0.18
			Max. My	23	-12863.72	-0.02	1.43
			Max. Vy	32	-1037.60	-1.14	-0.28
			Max. Vx	24	1295.93	-0.60	1.39
		Diagonal	Max Tension	26	24332.04	0.00	0.00
			Max. Compression	26	-24854.96	0.00	0.00
			Max. Mx	23	15699.84	0.20	0.00
			Max. My	24	4805.05	0.00	0.01
			Max. Vy	23	-64.81	0.00	0.00
			Max. Vx	24	-2.38	0.00	0.00
		Horizontal	Max Tension	26	17889.59	0.12	-0.00
			Max. Compression	26	-17785.67	0.12	-0.00
			Max. Mx	22	1591.41	0.17	0.03
			Max. My	24	-2495.03	0.07	-0.03
			Max. Vy	22	70.72	0.17	0.03
			Max. Vx	19	5.42	0.07	-0.03
		Inner Bracing	Max Tension	31	6.82	0.00	0.00
			Max. Compression	25	-19.49	0.00	0.00
			Max. Mx	18	-4.63	-0.04	0.00
			Max. My	24	4.34	0.00	-0.00
			Max. Vy	18	20.76	0.00	0.00
			Max. Vx	24	0.13	0.00	0.00
T6	66.6667 - 58.3333	Leg	Max Tension	22	166412.88	-1.43	0.02
			Max. Compression	24	-199409.88	-0.57	0.35
			Max. Mx	19	-198716.57	1.56	-0.18
			Max. My	23	-14908.97	-0.18	2.07
			Max. Vy	30	774.61	1.55	-0.02
			Max. Vx	24	-752.14	-0.02	1.97
		Diagonal	Max Tension	26	24958.53	0.00	0.00
			Max. Compression	26	-25511.13	0.00	0.00
			Max. Mx	34	24942.57	0.21	0.00
			Max. My	24	4979.55	0.00	0.01
			Max. Vy	34	-67.21	0.00	0.00
			Max. Vx	24	-2.38	0.00	0.00
		Top Girt	Max Tension	26	18728.80	0.13	-0.00
			Max. Compression	26	-18511.87	0.13	-0.00
			Max. Mx	22	1196.87	0.18	0.03
			Max. My	24	-3223.01	0.07	-0.03
			Max. Vy	22	73.44	0.18	0.03
			Max. Vx	19	5.15	0.07	-0.03
		Inner Bracing	Max Tension	26	320.64	0.00	0.00
			Max. Compression	26	-320.64	0.00	0.00
			Max. Mx	18	-4.76	-0.05	0.00
			Max. My	24	298.96	0.00	-0.00
			Max. Vy	18	21.57	0.00	0.00
			Max. Vx	24	0.12	0.00	0.00
T7	58.3333 - 50	Leg	Max Tension	22	187636.14	-2.10	-0.09
			Max. Compression	24	-224225.98	0.53	0.42
			Max. Mx	24	-224039.91	2.81	-0.32
			Max. My	23	-16036.09	-0.14	2.24
			Max. Vy	24	-1055.91	2.81	-0.32
			Max. Vx	23	-1102.26	-0.14	2.24
		Diagonal	Max Tension	26	25301.14	0.00	0.00
			Max. Compression	26	-25950.20	0.00	0.00
			Max. Mx	33	9819.31	-0.28	0.01
			Max. My	33	-25183.45	0.04	0.02
			Max. Vy	33	83.78	-0.28	0.01
			Max. Vx	32	3.68	0.00	0.00
		Top Girt	Max Tension	26	19060.58	0.14	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-19276.89	0.14	-0.00
			Max. Mx	22	807.87	0.22	0.02
			Max. My	24	-3179.37	0.06	-0.03
			Max. Vy	22	80.77	0.22	0.02
			Max. Vx	19	5.09	0.06	-0.03
		Redund Horz 1 Bracing	Max Tension	24	3886.81	0.00	0.00
			Max. Compression	24	-3886.81	0.00	0.00
			Max. Mx	18	287.96	-0.02	0.00
			Max. My	24	3886.81	0.00	0.00
			Max. Vy	18	13.67	0.00	0.00
			Max. Vx	24	-0.32	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	24	2574.91	0.00	0.00
			Max. Compression	24	-2574.91	0.00	0.00
			Max. Mx	34	2221.57	-0.02	0.00
			Max. My	24	1079.28	0.00	-0.00
			Max. Vy	34	13.24	0.00	0.00
			Max. Vx	24	0.48	0.00	0.00
		Inner Bracing	Max Tension	26	333.89	0.00	0.00
			Max. Compression	26	-333.89	0.00	0.00
			Max. Mx	18	-5.71	-0.05	0.00
			Max. My	24	313.53	0.00	-0.00
			Max. Vy	18	-22.77	0.00	0.00
			Max. Vx	24	-0.12	0.00	0.00
T8	50 - 37.5	Leg	Max Tension	22	210663.92	-0.79	0.09
			Max. Compression	24	-250257.66	-0.06	0.65
			Max. Mx	19	-249117.81	-1.97	-0.33
			Max. My	23	-17383.37	-0.23	3.42
			Max. Vy	30	756.52	0.55	-0.09
			Max. Vx	24	-966.81	-0.36	3.30
		Diagonal	Max Tension	26	31944.42	0.00	0.00
			Max. Compression	26	-32614.32	0.00	0.00
			Max. Mx	34	31933.02	0.40	0.00
			Max. My	24	6647.39	0.00	0.02
			Max. Vy	34	-99.21	0.00	0.00
			Max. Vx	24	4.04	0.00	0.00
		Top Girt	Max Tension	26	20116.66	0.13	-0.00
			Max. Compression	26	-20037.85	0.13	-0.00
			Max. Mx	22	1145.40	0.26	0.05
			Max. My	24	-3402.25	0.00	-0.06
			Max. Vy	22	74.78	0.26	0.05
			Max. Vx	30	7.44	0.00	-0.06
		Inner Bracing	Max Tension	26	347.07	0.00	0.00
			Max. Compression	26	-347.07	0.00	0.00
			Max. Mx	18	-6.51	-0.06	0.00
			Max. My	24	324.21	0.00	-0.00
			Max. Vy	18	25.63	0.00	0.00
			Max. Vx	24	0.10	0.00	0.00
T9	37.5 - 25	Leg	Max Tension	22	240758.54	-0.44	0.12
			Max. Compression	24	-285933.05	-2.59	0.79
			Max. Mx	24	-285596.25	7.08	-0.64
			Max. My	23	-19087.71	-0.42	3.72
			Max. Vy	24	1875.86	7.08	-0.64
			Max. Vx	23	-1310.32	-0.42	3.72
		Diagonal	Max Tension	34	33048.76	-0.30	-0.01
			Max. Compression	26	-33693.18	0.00	0.00
			Max. Mx	33	12867.05	-0.46	0.02
			Max. My	25	-32286.61	0.22	-0.04
			Max. Vy	33	106.83	-0.46	0.02
			Max. Vx	25	6.43	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Top Girt	Max Tension	26	20821.83	0.17	-0.00
			Max. Compression	26	-21204.88	0.17	-0.00
			Max. Mx	22	820.99	0.32	0.05
			Max. My	24	-3588.37	0.01	-0.06
			Max. Vy	22	91.79	0.32	0.05
			Max. Vx	30	7.38	0.01	-0.06
		Redund Horz 1 Bracing	Max Tension	24	4956.46	0.00	0.00
			Max. Compression	24	-4956.46	0.00	0.00
			Max. Mx	18	344.11	-0.02	0.00
			Max. My	25	293.43	0.00	0.00
			Max. Vy	18	14.92	0.00	0.00
			Max. Vx	25	-0.34	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	24	3891.56	0.00	0.00
			Max. Compression	24	-3891.56	0.00	0.00
			Max. Mx	25	3697.23	-0.03	0.00
			Max. My	24	1603.81	0.00	-0.00
			Max. Vy	25	14.23	0.00	0.00
			Max. Vx	24	0.59	0.00	0.00
		Inner Bracing	Max Tension	26	367.28	0.00	0.00
			Max. Compression	26	-367.28	0.00	0.00
			Max. Mx	18	-7.46	-0.07	0.00
			Max. My	24	344.09	0.00	-0.00
			Max. Vy	18	27.44	0.00	0.00
			Max. Vx	24	0.08	0.00	0.00
T10	25 - 0	Leg	Max Tension	22	306324.28	-4.22	0.05
			Max. Compression	24	-361426.51	-0.00	-0.00
			Max. Mx	24	-325128.11	4.54	0.43
			Max. My	23	-20337.62	-0.42	3.72
			Max. Vy	30	-1266.89	4.52	-0.05
			Max. Vx	23	1094.07	0.04	3.30
		Diagonal	Max Tension	34	33414.36	0.00	0.00
			Max. Compression	34	-34330.37	0.00	0.00
			Max. Mx	34	33414.36	0.52	0.00
			Max. My	30	-2404.85	0.00	0.02
			Max. Vy	34	-122.24	0.00	0.00
			Max. Vx	24	-4.23	0.00	0.00
		Horizontal	Max Tension	34	22879.16	0.00	0.00
			Max. Compression	34	-22792.16	0.27	-0.01
			Max. Mx	22	3261.97	0.41	0.04
			Max. My	30	2503.10	0.11	-0.06
			Max. Vy	22	127.08	0.41	0.04
			Max. Vx	19	7.49	0.09	-0.06
		Inner Bracing	Max Tension	32	5.24	0.00	0.00
			Max. Compression	24	-26.76	0.00	0.00
			Max. Mx	18	-8.60	-0.08	0.00
			Max. My	24	1.52	0.00	-0.00
			Max. Vy	18	29.68	0.00	0.00
			Max. Vx	24	0.05	0.00	0.00

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	160 - 150	8.526	40	0.3913	0.1539

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T2	150 - 125	7.697	40	0.3914	0.1505
T3	125 - 100	5.573	40	0.3790	0.1255
T4	100 - 75	3.682	40	0.3160	0.1024
T5	75 - 66.6667	2.070	40	0.2563	0.0729
T6	66.6667 - 58.3333	1.614	40	0.2342	0.0638
T7	58.3333 - 50	1.200	40	0.2095	0.0545
T8	50 - 37.5	0.859	40	0.1686	0.0457
T9	37.5 - 25	0.470	40	0.1218	0.0326
T10	25 - 0	0.212	40	0.0708	0.0198

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Lightning Rod 2"x21'	40	8.526	0.3913	0.1539	62267
159.00	SC479-HF1LDF	40	8.444	0.3913	0.1537	62267
158.00	TMA 432-83H-01T	40	8.361	0.3913	0.1534	62267
157.50	SC479-HF1LDF(D00I-E6085)	40	8.320	0.3913	0.1533	62267
157.00	SC479-HF1LDF	40	8.279	0.3913	0.1532	62267
155.00	DB304-A	40	8.114	0.3913	0.1526	62267
150.00	SC479-HF1LDF(D00I-E6085) (Inverted)	40	7.697	0.3914	0.1505	37331
145.00	DC6-48-60-18-8F (Squid) Suppressor	40	7.272	0.3914	0.1470	61783
141.25	SC479-HF1LDF	40	6.950	0.3912	0.1435	236098
141.00	SC479-HF1LDF	40	6.929	0.3911	0.1432	289557
140.00	HPD2-4.7	40	6.843	0.3910	0.1422	Inf
139.50	SC479-HF1LDF	40	6.800	0.3909	0.1417	629197
120.00	PD1142-1	40	5.171	0.3694	0.1205	22786
108.00	8' Stiff-Arm	40	4.257	0.3381	0.1099	28491
107.50	4"x96"x72" Ice Canopy	40	4.220	0.3367	0.1095	28791
107.00	6' w/ Radome	40	4.184	0.3353	0.1090	29098
106.50	6' w/ Radome	40	4.147	0.3339	0.1086	29411
97.00	APXVSPP18-C-A20	40	3.473	0.3083	0.0992	30497
82.00	16x16 Panel 19dBi 2.45GHz ISM	40	2.487	0.2735	0.0812	20025
75.00	SBNHH-1D65B	40	2.070	0.2563	0.0729	18269

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	160 - 150	11.460	24	0.5285	0.2498
T2	150 - 125	10.343	24	0.5282	0.2457
T3	125 - 100	7.477	24	0.5108	0.2086
T4	100 - 75	4.933	24	0.4248	0.1705
T5	75 - 66.6667	2.770	24	0.3440	0.1209
T6	66.6667 - 58.3333	2.160	24	0.3141	0.1058
T7	58.3333 - 50	1.605	24	0.2810	0.0904
T8	50 - 37.5	1.148	24	0.2261	0.0758
T9	37.5 - 25	0.627	24	0.1633	0.0541

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T10	25 - 0	0.282	24	0.0948	0.0329

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Lightning Rod 2"x21'	24	11.460	0.5285	0.2498	45419
159.00	SC479-HF1LDF	24	11.349	0.5284	0.2495	45419
158.00	TMA 432-83H-01T	24	11.239	0.5284	0.2493	45419
157.50	SC479-HF1LDF(D00I-E6085)	24	11.183	0.5284	0.2492	45419
157.00	SC479-HF1LDF	24	11.127	0.5283	0.2490	45419
155.00	DB304-A	24	10.905	0.5283	0.2484	45419
150.00	SC479-HF1LDF(D00I-E6085) (Inverted)	24	10.343	0.5282	0.2457	27229
145.00	DC6-48-60-18-8F (Squid) Suppressor	24	9.770	0.5281	0.2407	45040
141.25	SC479-HF1LDF	24	9.336	0.5276	0.2356	166112
141.00	SC479-HF1LDF	24	9.307	0.5275	0.2353	201502
140.00	HPD2-4.7	24	9.190	0.5272	0.2338	Inf
139.50	SC479-HF1LDF	24	9.132	0.5271	0.2330	404000
120.00	PD1142-1	24	6.935	0.4976	0.2008	16602
108.00	8' Stiff-Arm	24	5.705	0.4549	0.1833	20517
107.50	4"x96"x72" Ice Canopy	24	5.656	0.4530	0.1826	20719
107.00	6' w/ Radome	24	5.607	0.4511	0.1818	20925
106.50	6' w/ Radome	24	5.558	0.4492	0.1811	21135
97.00	APXVSPP18-C-A20	24	4.652	0.4144	0.1650	21904
82.00	16x16 Panel 19dBi 2.45GHz ISM	24	3.329	0.3671	0.1347	14817
75.00	SBNHH-1D65B	24	2.770	0.3440	0.1209	13592

(REFERENCE) STRUCTURAL ANALYSIS REPORT – ANTENNA MOUNT ANALYSIS OF SITEPRO1 (DSM2 MOUNT WITH HORIZONTAL STABILIZER ASSEMBLY)

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

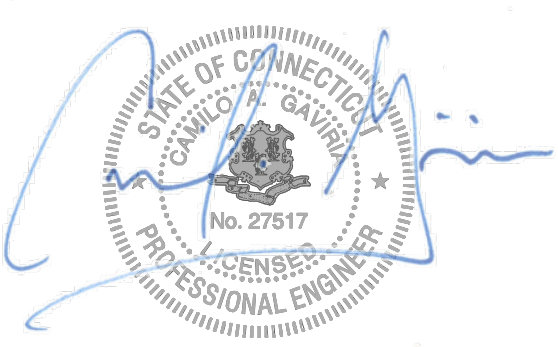
T-Mobile Site #: CT11052E

100'W of 50 South Street,6-6 Parcel 73,
Pole2357
Middlebury, CT

Centek Project No. 19027.03

Date: May 1, 2019

Max Stress Ratio = 59.2%



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

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CENTEK engineering

Centered on Solutions℠

May 1, 2019

Mr. Dan Reid
Transcend Wireless
10 Industrial Ave
Mahwah, NJ 07430

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CT11052E
100'W of 50 South Street,6-6 Parcel 73, Pole235
Middlebury, CT 06762

Centek Project No. 19027.03

Dear Mr. Reid,

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 six (6) antenna standoff arm mounts 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:**
  Standoff arms: Three (3) RFS APXVAARR24-43-NA20 panel antennas, three (3) Ericsson 4449 B71_B12 remote radio units, three (3) Ericsson 4415 B25 remote radio units, three (3) Ericsson 4415 B66A remote radio units mounted on three (3) T-Arms with a RAD center elevation of 120-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 93 mph for Middlebury 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 mounts with one (1) frame stabilizer (SitePro P/N: SFS) have sufficient capacity** to support the aforementioned antenna configuration. Necessary modifications will be indicated on the construction documents upon submission. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Camilo A. Gaviria, PE
Structural Engineer

STATE OF CONNECTICUT
CAMILO A. GAVIRIA
No. 27517
LICENSED
PROFESSIONAL ENGINEER

Prepared by:

Fernando J. Palacios
Engineer

Section 2 - Calculations

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

Subject: Loads on Equipment

Location: Middlebury, CT

Rev. 0: 04/25/19

Prepared by: F.J.P Checked by: C.A.G.
Job No. 19027.03

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

Wind Speeds

Basic Wind Speed	$V := 93$	mph	(User Input - 2018 CSBC Appendix N)
Basic Wind Speed with Ice	$V_i := 50$	mph	(User Input per Annex B of TIA-222-G)

Input

Structure Type =	$Structure\_Type := Lattice$		(User Input)
Structure Category =	$SC := II$		(User Input)
Exposure Category =	$Exp := C$		(User Input)
Structure Height =	$h := 160$	ft	(User Input)
Height to Center of Antennas =	$z := 120$	ft	(User Input)
Radial Ice Thickness =	$t_i := 0.75$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topograpic Factor =	$K_{zt} := 1.0$		(User Input)
	$K_a := 1.0$		(User Input)
Gust Response Factor =	$G_H = 1.14$		(User Input)

Output

Wind Direction Probability Factor =

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

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

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

Importance Factors =

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

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

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

$$K_{iz} := \left(\frac{z}{33}\right)^{0.1} = 1.138$$

Velocity Pressure Coefficient Antennas =

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.707$$

$$Kz := 2.01 \cdot \left(\left(\frac{z}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.315$$

Velocity Pressure w/o Ice Antennas = $qz := 0.00256 \cdot K_d \cdot Kz \cdot V^2 \cdot I_{Wind} = 24.751$ psf

Velocity Pressure with Ice Antennas = $qz_{ice} := 0.00256 \cdot K_d \cdot Kz \cdot V_i^2 \cdot I_{Wind} = 7.154$ psf

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAARR24_43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 19.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 133.4$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.9$		
Antenna Force Coefficient =	$Ca_{ant} = 1.31$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 13.1$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 483$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 213$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 15.9$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 170$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.4$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 89$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 133$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \cdot 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \cdot 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 368$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 368$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 4449 B71B12		
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 =	$N_{RRUS} := 1$		
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 =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 46$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 36$	lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 21$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.8$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 17$	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 =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2157$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 70$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 70$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 4415 B25		
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 =	$N_{RRUS} := 1$		
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 =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 52$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.7$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 23$	lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.3$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 23$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.3$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 13$	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 =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 1814$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 59$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 59$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 4415 B66		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 16.54$	in	(User Input)
RRUS Width =	$W_{RRUS} := 13.46$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 5.86$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 47.4$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.2$		
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$		

Wind Load (without ice)

Surface Area for One RRUS =	$SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.5$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 52$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.7$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 23$	lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.3$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 23$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.3$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 13$	lbs

Gravity Load (without ice)

Weight of All RRUSs =	$WT_{RRUS} \cdot N_{RRUS} = 47$	lbs

Gravity Loads (ice only)

Volume of Each RRUS =	$V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 1305$	cu in
Volume of Ice on Each RRUS =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 1818$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 59$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 59$	lbs

Development of Wind & Ice Load on TMA's

TMA Data:

TMA Model =	Ericsson KRY112 TMA		
TMA Shape =	Flat	in	(User Input)
TMA Height =	$L_{TMA} := 6.9$	in	(User Input)
TMA Width =	$W_{TMA} := 6.1$	in	(User Input)
TMA Thickness =	$T_{TMA} := 2.8$	lbs	(User Input)
TMA Weight =	$WT_{TMA} := 11$		(User Input)
Number of TMA's =	$N_{TMA} := 1$		(User Input)
TMA Aspect Ratio =	$Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1.1$		
TMA Force Coefficient =	$Ca_{TMA} = 1.2$		

Wind Load (without ice)

Surface Area for One TMA =	$SA_{TMAF} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.3$	sf
Total TMA Wind Force =	$F_{TMA} := qz \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAF} = 10$	lbs
Surface Area for One TMA =	$SA_{TMAS} := \frac{L_{TMA} \cdot T_{TMA}}{144} = 0.1$	sf
Total TMA Wind Force =	$F_{TMA} := qz \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAS} = 5$	lbs

Wind Load (with ice)

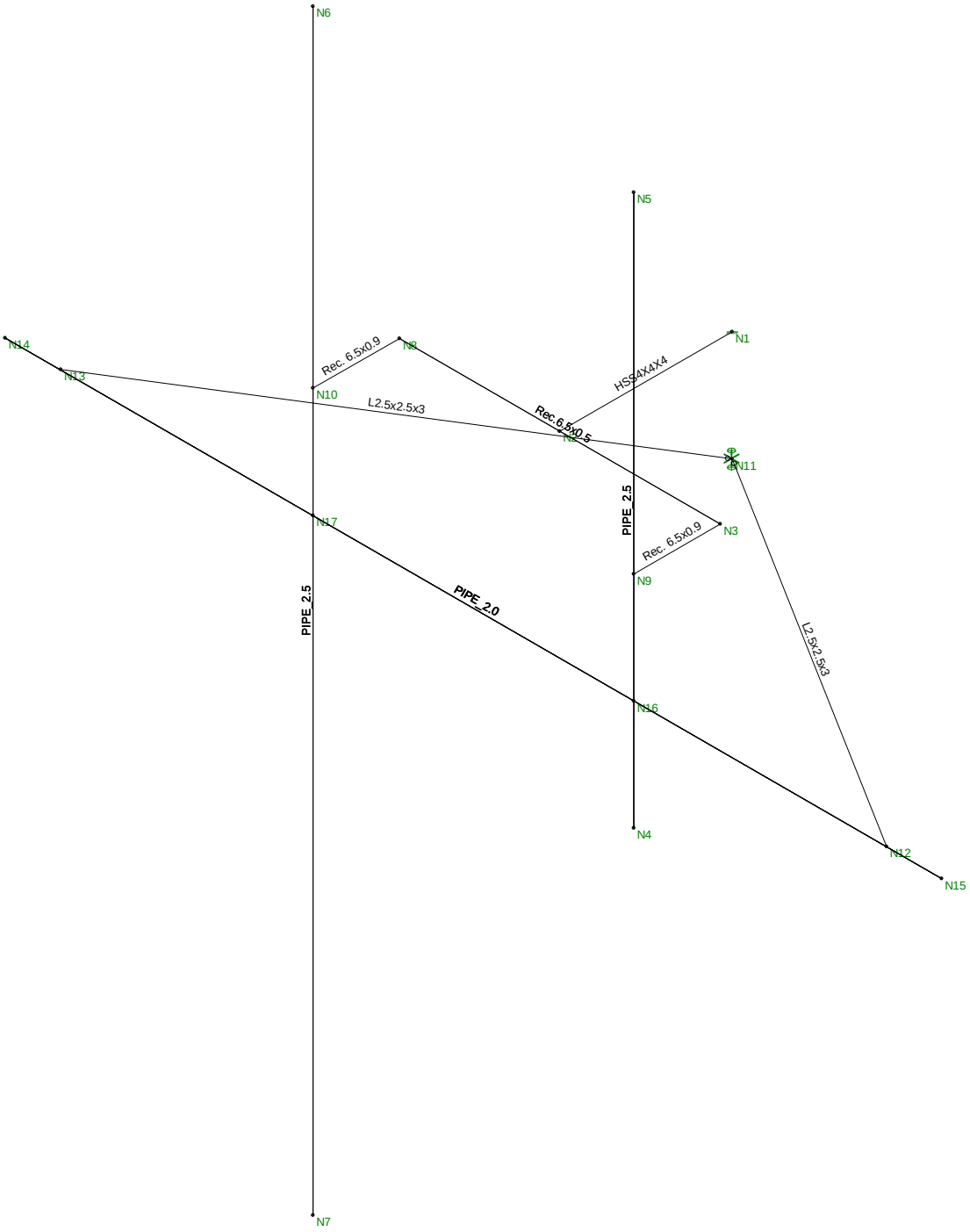
Surface Area for One TMA w/ Ice =	$SA_{ICETMAF} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz})}{144} = 0.7$	sf
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAF} = 7$	lbs
Surface Area for One TMA w/ Ice =	$SA_{ICETMAS} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz})}{144} = 0.4$	sf
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAS} = 4$	lbs

Gravity Load (without ice)

Weight of All TMAs =	$WT_{TMA} \cdot N_{TMA} = 11$	lbs

Gravity Loads (ice only)

Volume of Each TMA =	$V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 118$	cu in
Volume of Ice on Each TMA =	$V_{ice} := (L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz}) - V_{TMA} = 492$	cu in
Weight of Ice on Each TMA =	$W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 16$	lbs
Weight of Ice on All TMAs =	$W_{ICETMA} \cdot N_{TMA} = 16$	lbs



Envelope Only Solution

Centek		
FJP	CT11052E- Mount	May 1, 2019 at 1:56 PM
19027.03	Member Framing	CT11052E_AMA.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 S100-12: ASD
Wood Code	AWC NDS-15: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	ACI 530-13: Strength
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	None

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

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	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 Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[..	Lcomp bot[..	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	(E)Outrigger	1.563			Lbyy						Lateral
2	M2	(E)Antenn...	5	Segment	Segment	Segment	Segment	Segm...				Lateral
3	M3	(E)Antenn...	9.5	Segment	Segment	Segment	Segment	Segm...				Lateral
4	M4	(E) Rec.6....	2.917	Segment	Segment	Segment	Segment	Segm...				Lateral
5	M5	(E)Rec. 6....	.785			Lbyy						Lateral
6	M6	(E)Rec. 6....	.785			Lbyy						Lateral
7	M7	(P) Horizo...	8.5			Lbyy						Lateral
8	M8	(P) Stabiliz...	4.424			Lbyy						Lateral
9	M9	(P) Stabiliz...	4.424			Lbyy						Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Desig..	A [in2]	Iyy [i...	Izz [i...	J [in4]
1	(E)Outrigger	HSS4X4X4	Beam	Tube	A500 Gr.46	Typical	3.37	7.8	7.8	12.8
2	(E)Antenna Mast	PIPE_2.5	Colu...	Pipe	A53 Grade B	Typical	1.61	1.45	1.45	2.89
3	(E) Rec.6.5x0.5	Rec.6.5x0.5	Beam	RECT	A36 Gr.36	Typical	3.25	.068	11.4...	.258
4	(E)Rec. 6.5x0.9	Rec. 6.5x0.9	Beam	RECT	A36 Gr.36	Typical	5.85	.395	20.5...	1.442
5	(P) Stabilizers	L2.5x2.5x3	Beam	Single An...	A36 Gr.36	Typical	.901	.535	.535	.011
6	(P) Horizonta Pipe_2.0	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2			(E)Outrigger	Beam	Tube	A500 Gr.46	Typical
2	M2	N5	N4			(E)Antenna Mast	Column	Pipe	A53 Grad...	Typical
3	M3	N6	N7			(E)Antenna Mast	Column	Pipe	A53 Grad...	Typical
4	M4	N8	N3			(E) Rec.6.5x0.5	Beam	RECT	A36 Gr.36	Typical
5	M5	N8	N10			(E)Rec. 6.5x0.9	Beam	RECT	A36 Gr.36	Typical
6	M6	N3	N9			(E)Rec. 6.5x0.9	Beam	RECT	A36 Gr.36	Typical
7	M7	N14	N15			(P) Horizonta Pipe...	Beam	Pipe	A53 Grad...	Typical
8	M8	N13	N11		90	(P) Stabilizers	Beam	Single Angle	A36 Gr.36	Typical
9	M9	N12	N11		180	(P) Stabilizers	Beam	Single Angle	A36 Gr.36	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
1	N1	0	0	0	0	
2	N2	0	0	1.5625	0	
3	N3	1.458333	0	1.5625	0	
4	N4	1.458333	-2	2.34725	0	
5	N5	1.458333	3	2.34725	0	
6	N6	-1.458333	3	2.34725	0	
7	N7	-1.458333	-6.5	2.34725	0	
8	N8	-1.458333	0	1.5625	0	
9	N9	1.458333	0	2.34725	0	
10	N10	-1.458333	0	2.34725	0	
11	N11	0	-1	0	0	
12	N12	3.75	-1	2.34725	0	
13	N13	-3.75	-1	2.34725	0	
14	N14	-4.25	-1	2.34725	0	
15	N15	4.25	-1	2.34725	0	
16	N16	1.458333	-1	2.34725	0	
17	N17	-1.458333	-1	2.34725	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	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N11	Reaction	Reaction	Reaction		Reaction	
3	N12						
4	N13						
5	N14						
6	N15						

Member Point Loads (BLC 2 : Dead Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M3	Y	-.067	.75
2	M3	Y	-.067	8.75
3	M3	Y	-.074	4.167
4	M3	Y	-.047	5
5	M2	Y	-.046	4

Member Point Loads (BLC 3 : Ice Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M3	Y	-.184	.75
2	M3	Y	-.184	8.75
3	M3	Y	-.07	4.167
4	M3	Y	-.059	5
5	M2	Y	-.059	4

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M3	X	.044	.75
2	M3	X	.044	8.75
3	M3	X	.021	4.167
4	M3	X	.023	5
5	M2	X	.023	4

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M3	X	.106	.75
2	M3	X	.106	8.75
3	M3	X	.046	4.167
4	M3	X	.052	5
5	M2	X	.052	4

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M3	Z	.085	.75
2	M3	Z	.085	8.75
3	M3	Z	.017	4.167
4	M3	Z	.013	5
5	M2	Z	.013	4

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M3	Z	.241	.75
2	M3	Z	.241	8.75
3	M3	Z	.036	4.167
4	M3	Z	.023	5
5	M2	Z	.023	4

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.002	.002	0	0
2	M5	X	.002	.002	0	0
3	M6	X	.002	.002	0	0
4	M8	X	.002	.002	0	0
5	M9	X	.002	.002	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.008	.008	0	0
2	M5	X	.008	.008	0	0
3	M6	X	.008	.008	0	0
4	M8	X	.008	.008	0	0
5	M9	X	.008	.008	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M4	Z	.004	.004	0	0
2	M8	Z	.004	.004	0	0
3	M9	Z	.004	.004	0	0
4	M7	Z	.004	.004	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M4	Z	.012	.012	0	0
2	M8	Z	.012	.012	0	0
3	M9	Z	.012	.012	0	0
4	M7	Z	.012	.012	0	0

Basic Load Cases

	BLC Description	Category	X Gr...	Y Gr...	Z Gr...	Joint	Point	Distri...	Area(...	Surface(Plate/Wall)
1	Self Weight	None		-1						
2	Dead Load	None					5			
3	Ice Load	None					5			
4	Wind with Ice X	None					5	5		
5	Wind X	None					5	5		
6	Wind with Ice Z	None					5	4		
7	Wind Z	None					5	4		

Load Combinations

	Description	Solve	P...	SR...	BLC	F...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2D + 1.6W (X-direction)	Yes	Y		1	1...	2	1.2	5	1.6																
2	0.9D + 1.6W (X-direction)	Yes	Y		1	.9	2	.9	5	1.6																
3	1.2D + 1.0Di + 1.0Wi (X...	Yes	Y		1	1...	2	1.2	3	1	4	1														
4	1.2D + 1.6W (Z-direction)	Yes	Y		1	1...	2	1.2	7	1.6																
5	0.9D + 1.6W (Z-direction)	Yes	Y		1	.9	2	.9	7	1.6																
6	1.2D + 1.0Di + 1.0Wi (Z...	Yes	Y		1	1...	2	1.2	3	1	6	1														

Envelope Joint Reactions

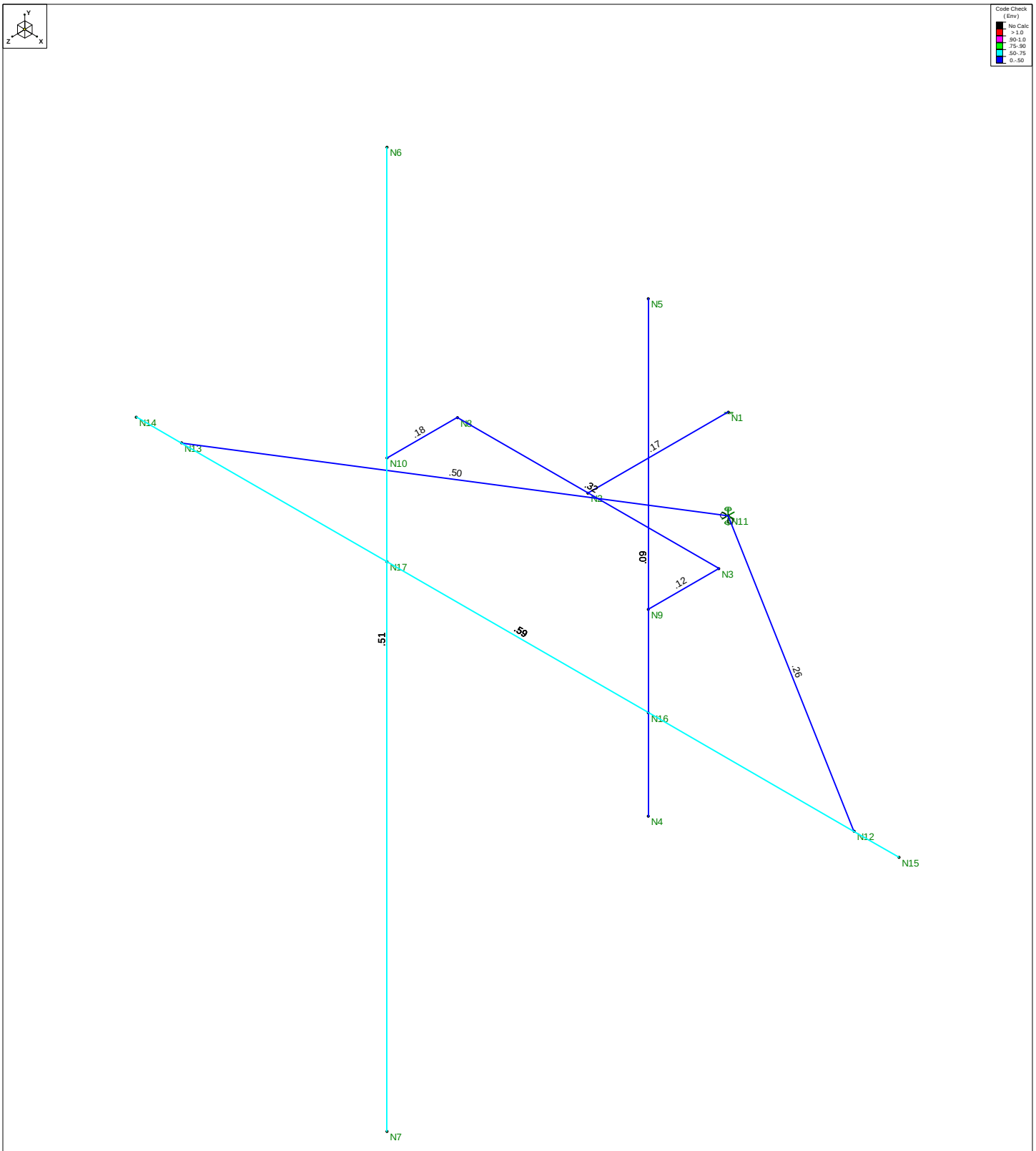
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	-.06	6	1.193	3	-.15	2	-.196	5	-.272	6	-.938	5
2		min	-.842	2	.434	5	-.398	6	-2.241	3	-1.563	1	-1.543	1
3	N11	max	.628	5	.032	4	.371	3	0	6	0	6	0	6
4		min	-.052	3	-.017	3	-1.034	5	0	1	0	1	0	1
5	Totals:	max	0	6	1.177	6	0	3						
6		min	-.739	1	.466	2	-1.305	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	0	6	0	6	0	6	0	6	0	6	0	6
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N2	max	.014	1	0	5	0	6	1.635e-03	3	1.141e-03	1	2.432e-03	1
4		min	.003	6	-.02	3	0	2	-1.725e-04	5	2.802e-04	6	1.478e-03	5
5	N3	max	.014	1	.035	2	.012	6	1.333e-02	3	1.007e-02	2	2.731e-03	1
6		min	.003	6	.012	6	-.101	2	-1.74e-02	5	1.811e-03	6	1.455e-03	5
7	N4	max	.227	1	.19	5	.359	5	1.357e-02	3	1.068e-02	5	5.03e-03	1
8		min	.108	6	-.111	3	-.322	3	-1.823e-02	5	4.813e-04	3	7.627e-04	5
9	N5	max	.065	5	.19	5	.482	3	1.335e-02	3	1.04e-02	5	4.99e-03	1
10		min	-.125	3	-.111	3	-.702	5	-1.745e-02	5	1.457e-03	3	1.089e-03	5
11	N6	max	.01	1	.131	5	.81	3	1.873e-02	3	8.603e-03	1	4.274e-03	4
12		min	-.091	5	-.238	3	-.388	5	-1.315e-02	5	2.942e-03	5	1.387e-03	3
13	N7	max	.979	1	.131	5	2.822	5	1.689e-02	3	7.661e-03	1	1.464e-02	1
14		min	.188	6	-.238	3	-1.2	3	-4.243e-02	5	5.082e-04	5	1.868e-03	6
15	N8	max	.014	1	-.031	5	.157	1	1.871e-02	3	1.037e-02	1	2.933e-03	1
16		min	.003	6	-.061	3	.122	5	-1.724e-02	5	5.075e-03	6	1.979e-03	5
17	N9	max	.104	5	.19	5	.012	6	1.335e-02	3	1.04e-02	5	4.989e-03	1
18		min	.021	6	-.111	3	-.101	2	-1.745e-02	5	1.457e-03	3	1.089e-03	5
19	N10	max	.105	1	.131	5	.157	1	1.868e-02	3	8.603e-03	1	4.27e-03	4
20		min	.043	6	-.237	3	.122	5	-1.733e-02	5	2.942e-03	5	1.776e-03	6
21	N11	max	0	6	0	6	0	6	1.55e-02	3	0	6	7.201e-03	5
22		min	0	1	0	1	0	1	-2.222e-02	5	0	1	8.402e-04	3
23	N12	max	.167	1	.196	5	-.104	6	1.299e-02	3	1.121e-02	5	4.847e-03	3
24		min	.064	6	.016	3	-.268	1	-1.755e-02	5	-1.172e-03	3	-2.648e-04	5
25	N13	max	.167	1	-.002	5	.266	1	1.607e-02	3	7.933e-03	1	5.472e-03	1
26		min	.064	6	-.319	1	.103	6	-2.343e-02	5	-7.622e-03	5	1.432e-03	6
27	N14	max	.167	1	-.034	5	.314	1	1.607e-02	3	7.933e-03	1	5.473e-03	1
28		min	.064	6	-.352	1	.128	6	-2.343e-02	5	-7.618e-03	5	1.433e-03	6
29	N15	max	.167	1	.195	5	-.105	6	1.299e-02	3	1.12e-02	5	4.846e-03	3
30		min	.064	6	.045	3	-.29	1	-1.755e-02	5	-1.172e-03	3	-2.654e-04	5
31	N16	max	.166	1	.19	5	.141	5	1.357e-02	3	1.068e-02	5	5.03e-03	1
32		min	.064	6	-.111	3	-.159	3	-1.823e-02	5	4.813e-04	3	7.627e-04	5
33	N17	max	.167	1	.131	5	.368	5	1.721e-02	3	7.661e-03	1	6.331e-03	1
34		min	.064	6	-.238	3	-.078	3	-2.393e-02	5	5.082e-04	5	1.903e-03	6

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

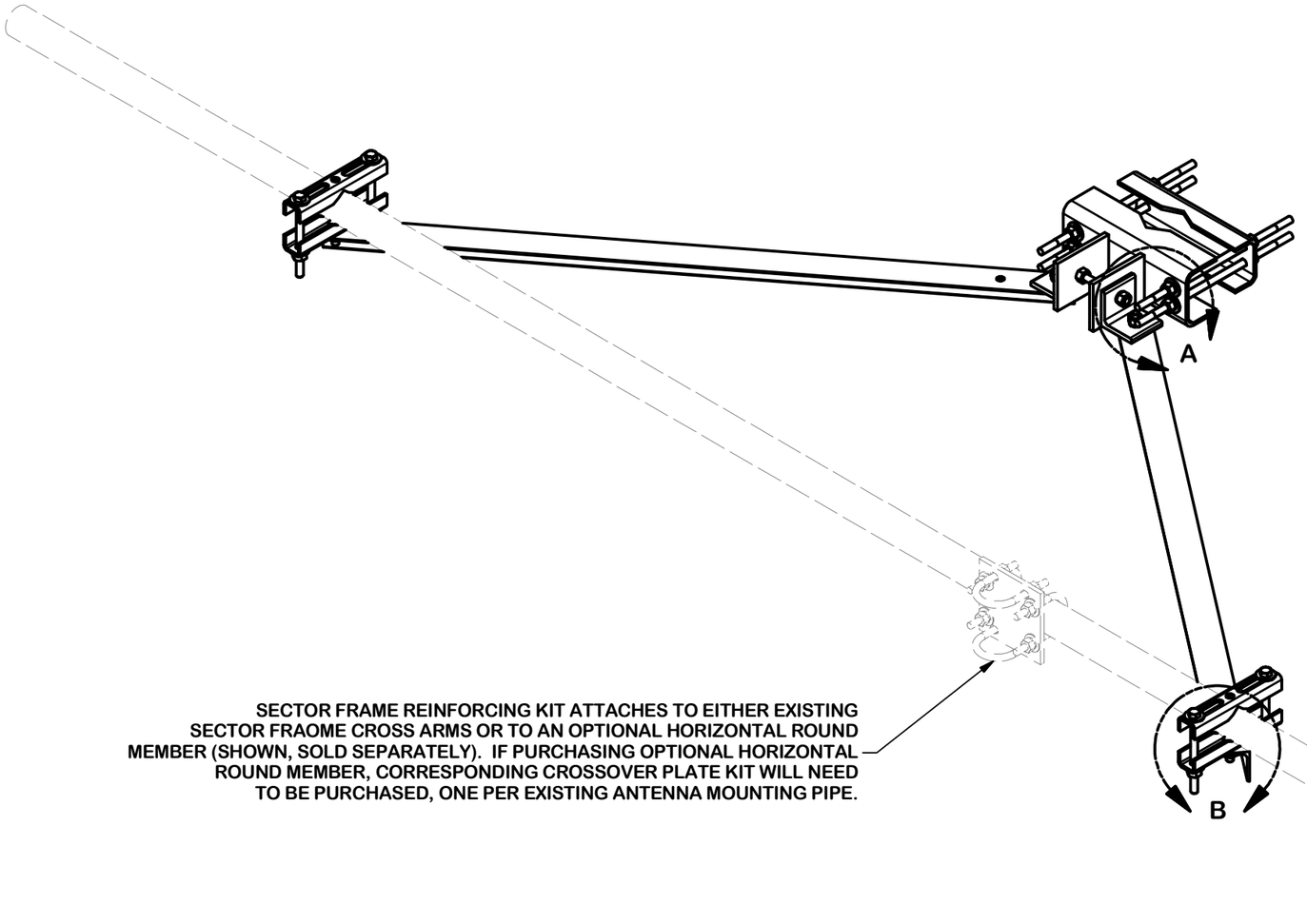
	Me...	Shape	Code C...	Loc...	LC	Shear C...	Loc[ft]	Dir	LC	phi*Pn...	phi*P...	phi*Mn...	phi*...	Cb	Eqn
1	M1	HSS4X4X4	.167	0	1	.135	0	z	1	138.1	139.5...	16.181	16.181	1.516	H1-1b
2	M2	PIPE_2.5	.094	3.0...	1	.175	3.021		1	50.302	50.715	3.596	3.596	2.251	H1-1b
3	M3	PIPE_2.5	.512	4.0...	5	.213	3.068		5	39.594	50.715	3.596	3.596	1.647	H1-1b
4	M4	Rec.6.5x0.5	.317	1.4...	3	.302	1.458	y	3	49.946	105.3	1.097	14.259	1.749	H1-1b
5	M5	Rec. 6.5x0.9	.176	.785	5	.129	0	y	5	176.874	189.54	3.554	25.667	1.303	H1-1b
6	M6	Rec. 6.5x0.9	.124	.785	1	.125	.785	y	1	176.874	189.54	3.554	25.667	1.327	H1-1b
7	M7	PIPE_2.0	.592	2.7...	5	.134	5.667		5	13.511	32.13	1.872	1.872	2.49	H1-1b
8	M8	L2.5x2.5x3	.496	0	5	.013	4.424	y	5	15.323	29.192	.873	1.816	1.49	H2-1
9	M9	L2.5x2.5x3	.259	0	5	.009	4.424	z	5	15.323	29.192	.873	1.761	1.285	H2-1



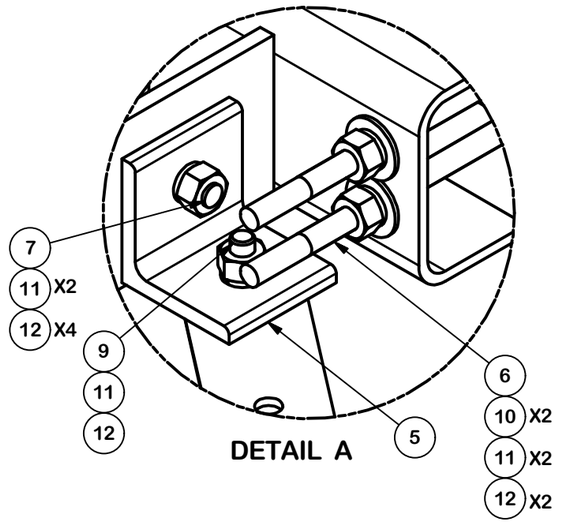
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
FJP	CT11052E- Mount	May 1, 2019 at 1:55 PM
19027.03	Member Unity Check	CT11052E_AMA.r3d

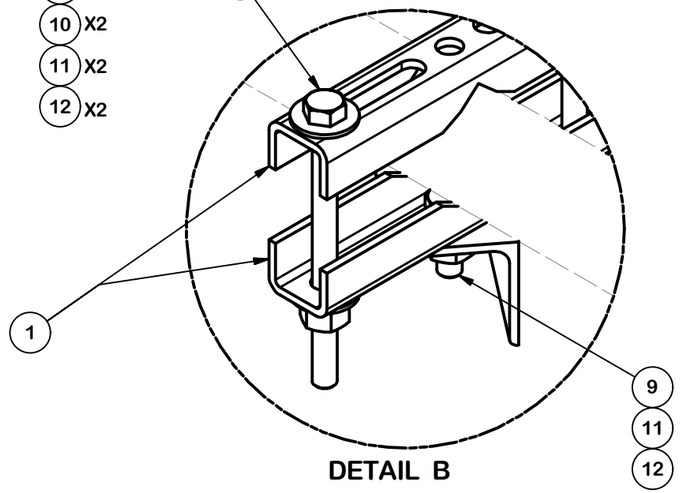
PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	4	X-STU	STIFF ARM CHANNEL BRACKET	8 1/2 in	1.37	5.49
2	2	X-232697	TRPD-HD DIAGONAL ANGLE - SITE PRO 1	52 1/2 in	14.35	28.69
3	1	CFS	LOWER GATE FOOT WELDMENT		12.72	12.72
4	1	GBB	GATE BACKING BAR	11 1/2 in	4.53	4.53
5	2	SHCM-T	CHAIN MOUNT TIGHTENER BRACKET	3 in	1.86	3.72
6	4	G12R-15	1/2" x 15" THREADED ROD (HDG.)		0.40	1.60
6	4	G12R-12	1/2" x 12" THREADED ROD (HDG.)		0.40	1.60
7	1	G12R-6	1/2" x 6" GALV. THREADED ROD		0.33	0.33
8	4	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	1.64
9	4	G12112	1/2" x 1-1/2" HDG HEX BOLT GR5	1/2 in	0.15	0.59
10	16	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	0.55
11	18	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	0.25
12	20	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.43
					TOTAL WT. #	65.66



SECTOR FRAME REINFORCING KIT ATTACHES TO EITHER EXISTING SECTOR FRAOME CROSS ARMS OR TO AN OPTIONAL HORIZONTAL ROUND MEMBER (SHOWN, SOLD SEPARATELY). IF PURCHASING OPTIONAL HORIZONTAL ROUND MEMBER, CORRESPONDING CROSSOVER PLATE KIT WILL NEED TO BE PURCHASED, ONE PER EXISTING ANTENNA MOUNTING PIPE.



DETAIL A



DETAIL B

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED MAX. DIA. FOR HANDRAIL CONNECTION	5563	BC	10/25/2017

REVISION HISTORY

TOLERANCE NOTES

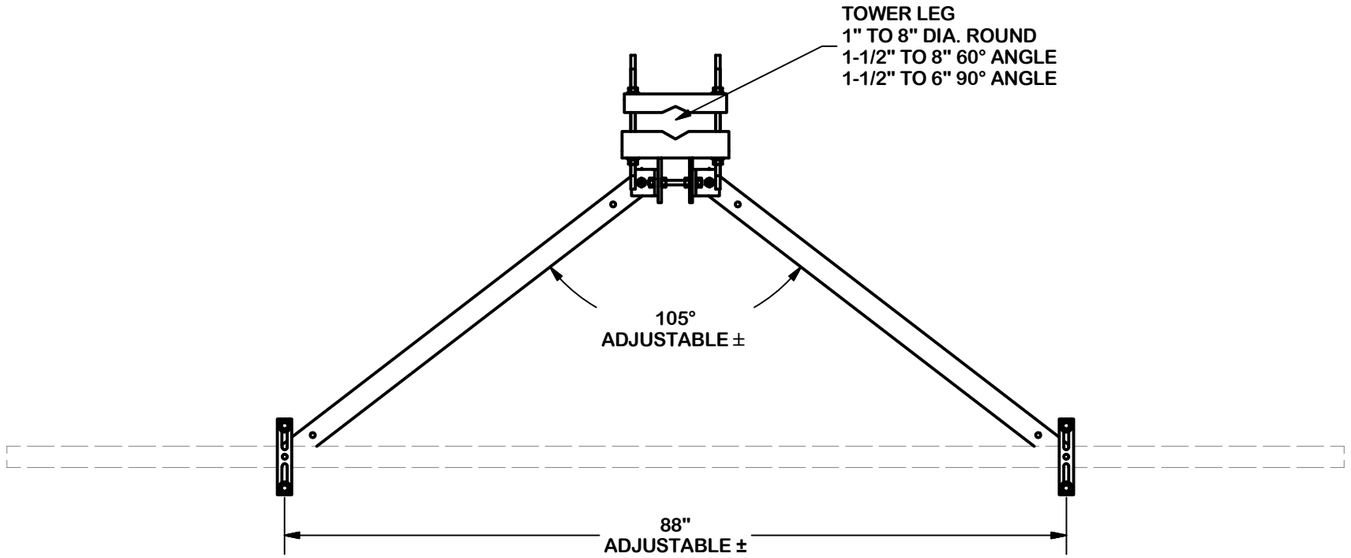
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (± 0.060")

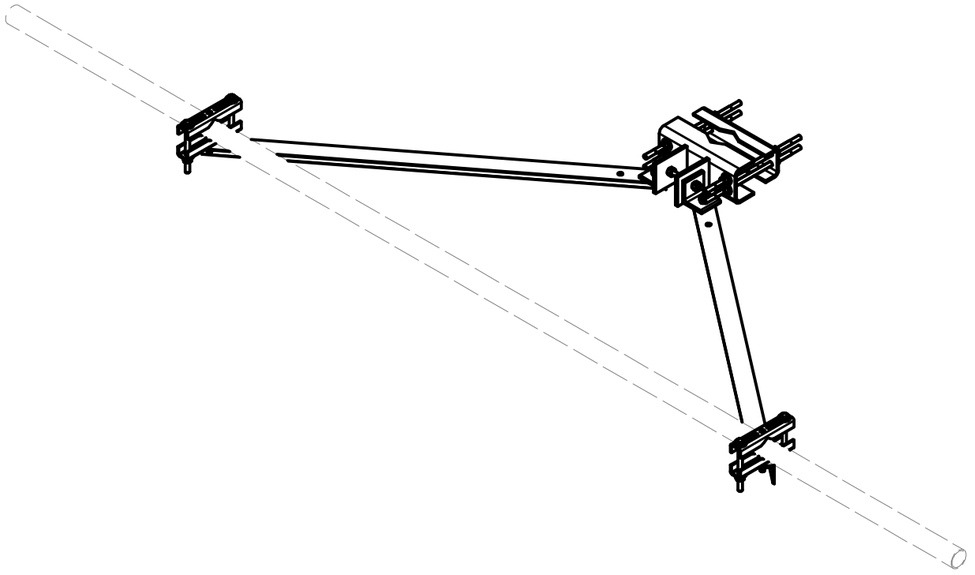
DESCRIPTION
SECTOR FRAME
STABILIZER - HORIZONTAL

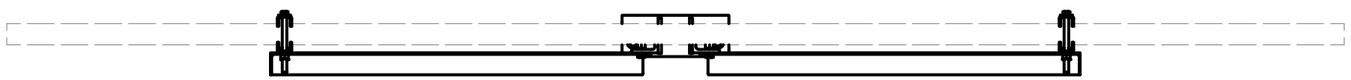
SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

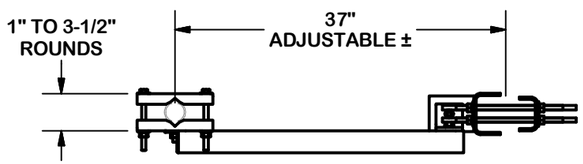
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
5563	CEK 4/29/2014		SFS-H

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 4/30/2014	SFS-H









REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED MAX. DIA. FOR HANDRAIL CONNECTION	5563	BC	10/25/2017

REVISION HISTORY

TOLERANCE NOTES

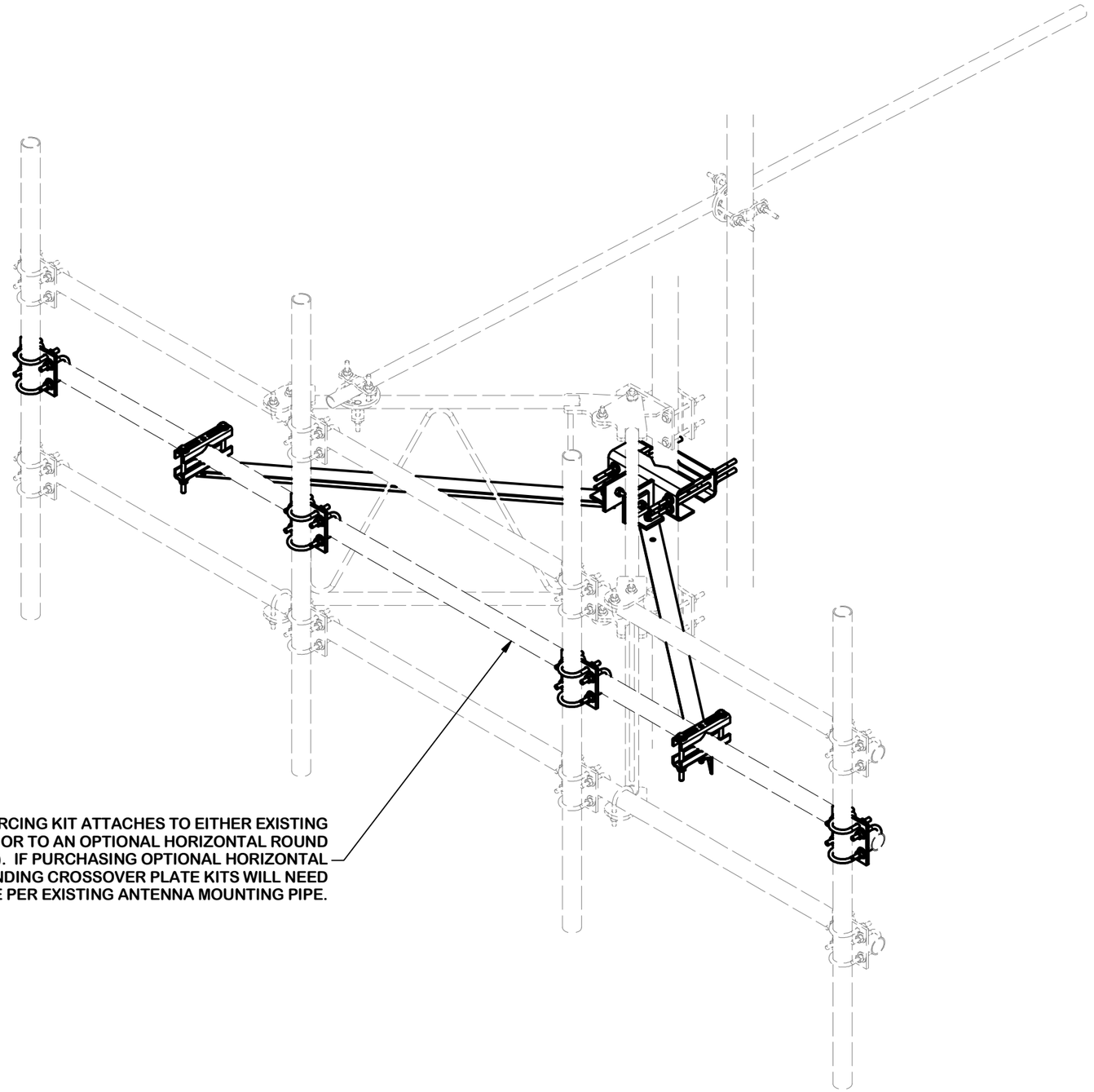
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (± 0.060")

DESCRIPTION
SECTOR FRAME
STABILIZER - HORIZONTAL

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
5563	CEK 4/29/2014		SFS-H

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 4/30/2014	SFS-H

SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX



SECTOR FRAME REINFORCING KIT ATTACHES TO EITHER EXISTING SECTOR FRAME CROSS ARMS OR TO AN OPTIONAL HORIZONTAL ROUND MEMBER (SHOWN, SOLD SEPARATELY). IF PURCHASING OPTIONAL HORIZONTAL ROUND MEMBER, CORRESPONDING CROSSOVER PLATE KITS WILL NEED TO BE PURCHASED, ONE PER EXISTING ANTENNA MOUNTING PIPE.

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED MAX. DIA. FOR HANDRAIL CONNECTION	5563	BC	10/25/2017

REVISION HISTORY

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (± 0.060")

DESCRIPTION
SECTOR FRAME
STABILIZER - HORIZONTAL

CPD NO.	DRAWN BY	ENG. APPROVAL
5563	CEK 4/29/2014	

CLASS	SUB	DRAWING USAGE	CHECKED BY
81	01	CUSTOMER	BMC 4/30/2014

SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

PART NO. SFS-H

DWG. NO. SFS-H

RAN Template:	A&L Template:	Power System Template:
67D95F	67D95F_1OP	Custom

CT11052E_L600_2.1_draft

Section 1 - Site Information

Site ID: CT11052E
Status: Draft
Version: 2.1
Project Type: L600
Approved: Not Approved
Approved By: Not Approved
Last Modified: 4/24/2019 4:36:47 PM
Last Modified By: GSM1900\AMurill9

Site Name: Middlebury I84 X16&17_1
Site Class: Self Support Tower
Site Type: Structure Non Building
Plan Year: 2019
Market: CONNECTICUT
Vendor: Ericsson
Landlord: <undefined>

Latitude: 41.5135200000
Longitude: -73.1242600000
Address: 100' w of 50 South St, Map 6-6 Parcel 73,Pole23571
City, State: Middlebury, CT
Region: NORTHEAST

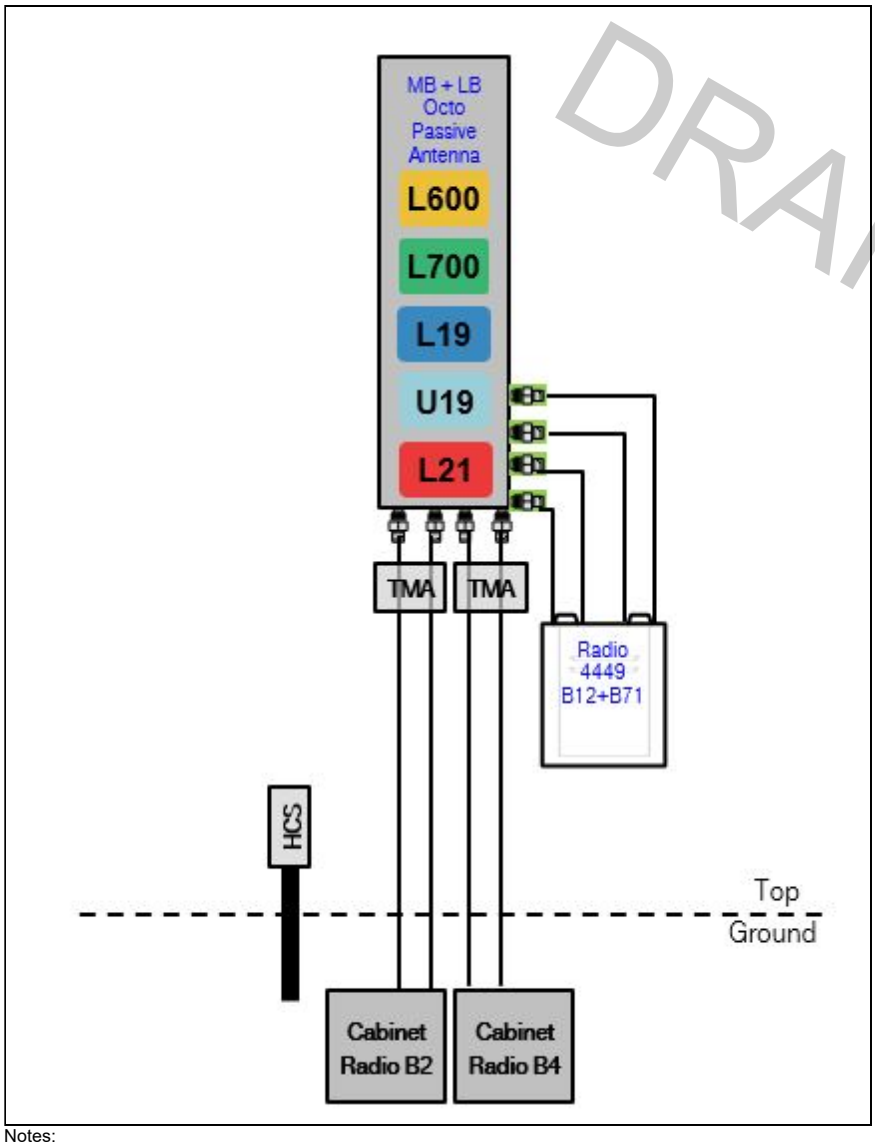
RAN Template: 67D95F			AL Template: 67D95F_1OP	
Sector Count: 3	**Antenna Count:** 3	**Coax Line Count:** 0	**TMA Count:** 0	**RRU Count:** 9

Section 2 - Existing Template Images

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

Section 3 - Proposed Template Images

67D95F_1OP.JPG



Notes:

Section 4 - Siteplan Images

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

RAN Template:	A&L Template:	Power System Template:
67D95F	67D95F_1OP	Custom

CT11052E_L600_2.1_draft

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 704G

Enclosure	1
Enclosure Type	RBS 6201
Baseband	DUG20 (G1900); DUS41 (L1900, L700)
Radio	RUS01 B2 (x3) (L1900, G1900); RUS01 B12 (x6) (L700)

Proposed RAN Equipment

Template: 67D95F

Enclosure	1
Enclosure Type	RBS 6201
Baseband	DUG20 (G1900); BB 6630 (L2100, L1900, L700, L600); BB 6630 (N600 (DARK))
Hybrid Cable System	Ericsson 6x12 HCS *Select Length & AWG* (x2)

RAN Scope of Work:

Replace (1) DUS41 with (1) BB6630 for LTE.
Install (1) BB6630 for future 5G N600.
Remove All RUS01.

Add (2) 6X12 HCS.
Existing: (12) Coaxial Lines

RAN Template:	A&L Template:	Power System Template:
67D95F	67D95F_1OP	Custom

CT11052E_L600_2.1_draft

Section 6 - A&L Equipment

Existing Template: 704G
Proposed Template: 67D95F_1OP

Sector 1 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	**1**	**2**
Antenna Model	EMS - RR90-17-XXDP (Dual)	Andrew - LNX-6515DS-A1M (Dual)
Azimuth	0	0
M. Tilt	0	0
Height	120	120
Ports	**P1**	**P2**
Active Tech.	L1900 G1900	L700
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	2
Cables	1-5/8" Coax - 210 ft. **(x2)**	1-5/8" Coax - 210 ft. **(x2)**
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	
Diplexers / Combiners		
Radio		RRUS11 B12 (At Antenna)
Sector Equipment		

Unconnected Equipment:

Scope of Work:

Two Mounts per sector. No Empty Mount in Position 1

RAN Template:	A&L Template:	Power System Template:
67D95F	67D95F_1OP	Custom

CT11052E_L600_2.1_draft

Sector 1 (Proposed) view from behind						
Coverage Type	A - Outdoor Macro					
Antenna	1	2				
Antenna Model	Empty Antenna Mount (Empty mount)	RFS - APXVAARR24_43-U-NA20 (Octo)				
Azimuth		0				
M. Tilt		0				
Height		120				
Ports		P1	P2	P3	P4	
Active Tech.		L700 L600	L700 L600	L1900 G1900	L2100	
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt		2	2	2	2	
Cables						
TMAs						
Diplexers / Combiners						
Radio		Radio 4449 B71+B12 (At Antenna)	SHARED Radio 4449 B71+B12 (At Antenna)	Radio 4415 B25 (At Antenna)	Radio 4415 B66A (At Antenna)	
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*** Existing Comments Has Two Mounts per sector. No Empty Mount Originally in Position 1; EMS Antenna in Position 1. ***
Remove all Coaxial Lines.
Remove EMS Antenna in Position 1,
Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (1) Radio 4449 B71+B12 to Position 1 for L600 and L700.
Add (1) Radio 4415 B25 to Position 1 for L1900 and GSM.
Add (1) Radio 4449 B66A to Position 1 for L2100.

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

RAN Template:	A&L Template:	Power System Template:
67D95F	67D95F_1OP	Custom

CT11052E_L600_2.1_draft

Sector 2 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	2
Antenna Model	EMS - RR90-17-XXDP (Dual)	Andrew - LNX-6515DS-A1M (Dual)
Azimuth	110	110
M. Tilt	0	0
Height	120	120
Ports	P1	P2
Active Tech.	L1900 G1900	L700
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	2
Cables	1-5/8" Coax - 210 ft. (x2)	1-5/8" Coax - 210 ft. (x2)
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	
Diplexers / Combiners		
Radio		RRUS11 B12 (At Antenna)
Sector Equipment		

Unconnected Equipment:

Scope of Work:

Two Mounts per sector. No Empty Mount in Position 1

RAN Template:	A&L Template:	Power System Template:
67D95F	67D95F_1OP	Custom

CT11052E_L600_2.1_draft

Sector 2 (Proposed) view from behind						
Coverage Type	A - Outdoor Macro					
Antenna	1	2				
Antenna Model	Empty Antenna Mount (Empty mount)	RFS - APXVAARR24_43-U-NA20 (Octo)				
Azimuth		110				
M. Tilt		0				
Height		120				
Ports		P1	P2	P3	P4	
Active Tech.		L700 L600	L700 L600	L1900 G1900	L2100	
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt		2	2	2	2	
Cables						
TMAs						
Diplexers / Combiners						
Radio		Radio 4449 B71+B12 (At Antenna)	SHARED Radio 4449 B71+B12 (At Antenna)	Radio 4415 B25 (At Antenna)	Radio 4415 B66A (At Antenna)	
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*** Existing Comments Has Two Mounts per sector. No Empty Mount Originally in Position 1; EMS Antenna in Position 1. ***
Remove all Coaxial Lines and TMA.
Remove EMS Antenna in Position 1,
Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (1) Radio 4449 B71+B12 to Position 1 for L600 and L700.
Add (1) Radio 4415 B25 to Position 1 for L1900 and GSM.
Add (1) Radio 4449 B66A to Position 1 for L2100.

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

RAN Template:	A&L Template:	Power System Template:
67D95F	67D95F_1OP	Custom

CT11052E_L600_2.1_draft

Sector 3 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	2
Antenna Model	EMS - RR90-17-XXDP (Dual)	Andrew - LNX-6515DS-A1M (Dual)
Azimuth	250	250
M. Tilt	0	0
Height	120	120
Ports	P1	P2
Active Tech.	L1900 G1900	L700
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	2
Cables	1-5/8" Coax - 210 ft. (x2)	1-5/8" Coax - 210 ft. (x2)
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	
Diplexers / Combiners		
Radio		RRUS11 B12 (At Antenna)
Sector Equipment		

Unconnected Equipment:

Scope of Work:

Two Mounts per sector. No Empty Mount in Position 1

RAN Template:	A&L Template:	Power System Template:
67D95F	67D95F_1OP	Custom

CT11052E_L600_2.1_draft

Sector 3 (Proposed) view from behind						
Coverage Type	A - Outdoor Macro					
Antenna	1	2				
Antenna Model	Empty Antenna Mount (Empty mount)	RFS - APXVAARR24_43-U-NA20 (Octo)				
Azimuth		250				
M. Tilt		0				
Height		120				
Ports		P1	P2	P3	P4	
Active Tech.		L700 L600	L700 L600	L1900 G1900	L2100	
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt		2	2	2	2	
Cables						
TMAs						
Diplexers / Combiners						
Radio		Radio 4449 B71+B12 (At Antenna)	SHARED Radio 4449 B71+B12 (At Antenna)	Radio 4415 B25 (At Antenna)	Radio 4415 B66A (At Antenna)	
Sector Equipment						

Unconnected Equipment:

Scope of Work:

*** Existing Comments Has Two Mounts per sector. No Empty Mount Originally in Position 1; EMS Antenna in Position 1. ***
Remove all Coaxial Lines.
Remove EMS Antenna in Position 1,
Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (1) Radio 4449 B71+B12 to Position 1 for L600 and L700.
Add (1) Radio 4415 B25 to Position 1 for L1900 and GSM.
Add (1) Radio 4449 B66A to Position 1 for L2100.

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

RAN Template:	A&L Template:	Power System Template:
67D95F	67D95F_1OP	Custom

CT11052E_L600_2.1_draft

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

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

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: CT11052E

Middlebury I84 X16&17_1
100' W. of 50 South Street, Map 6-6 Parcel 73, Pole 23571
Middlebury, Connecticut 06762

May 20, 2019

EBI Project Number: 6219001678

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**49.27%**

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

May 20, 2019

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

Emissions Analysis for Site: CT11052E - Middlebury I84 X16&17_1

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **100' W. of 50 South Street, Map 6-6 Parcel 73, Pole 23571** in **Middlebury, 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 100' W. of 50 South Street, Map 6-6 Parcel 73, Pole 23571 in Middlebury, 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 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) 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.

3) 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.

4) 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.

5) 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.

6) 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.

7) 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.

8) The antennas used in this modeling are the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s) in Sector A, the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s) in Sector B, the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 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.

9) The antenna mounting height centerline of the proposed antennas is 120 feet above ground level (AGL).

10) 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.

11) 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 APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz
Gain:	12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd
Height (AGL):	120 feet	Height (AGL):	120 feet	Height (AGL):	120 feet
Channel Count:	12	Channel Count:	12	Channel Count:	12
Total TX Power (W):	480 Watts	Total TX Power (W):	480 Watts	Total TX Power (W):	480 Watts
ERP (W):	16,474.09	ERP (W):	16,474.09	ERP (W):	16,474.09
Antenna A1 MPE %:	**4.93%**	Antenna B1 MPE %:	**4.93%**	Antenna C1 MPE %:	**4.93%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	4.93%
AT&T	3.35%
Verizon	19.1%
Metro PCS	0.96%
Sprint	6.94%
Unidentified (from DPS)	7.06%
DOT	6.93%
Site Total MPE % :	49.27%

T-Mobile Sector A Total:	4.93%
T-Mobile Sector B Total:	4.93%
T-Mobile Sector C Total:	4.93%
Site Total:	49.27%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 600 MHz LTE	2	591.73	120.0	2.95	600 MHz LTE	400	0.74%
T-Mobile 700 MHz LTE	2	648.82	120.0	3.24	700 MHz LTE	467	0.69%
T-Mobile 1900 MHz LTE PCS	2	2203.69	120.0	11.00	1900 MHz LTE PCS	1000	1.10%
T-Mobile 1900 MHz GSM	4	1101.85	120.0	11.00	1900 MHz GSM	1000	1.10%
T-Mobile 2100 MHz LTE AWS	2	2589.11	120.0	12.93	2100 MHz LTE AWS	1000	1.29%
						Total:	**4.93%**

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:	4.93%
Sector B:	4.93%
Sector C:	4.93%
T-Mobile Maximum MPE % (Sector A):	4.93%
Site Total:	49.27%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **49.27%** 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.

STATE OF CONNECTICUT

DEPARTMENT OF EMERGENCY SERVICES AND PUBLIC PROTECTION

May 15, 2019

Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Letter of Authorization** – Co-location on Connecticut State Police tower
Property address: 100' W. of 50 South Street, Middlebury, CT
Latitude: 41.5135200000 Longitude: -73.1242600000

To Whom It May Concern:

T-Mobile Northeast LLC (T-Mobile) has an Agreement with the Connecticut Department of Emergency Services and Public Protection (DESPP) to co-locate its communications equipment on the DESPP tower located at 100' W. of 50 South Street, Middlebury, CT.

T-Mobile shall be required by the terms of the agreement to seek and obtain all necessary permits and approvals. As a duly authorized representative of the DESPP, permission is hereby granted to T-Mobile and agents thereof, for the purpose of consummating any applications necessary to gain the required approvals from the State of Connecticut.

Any fees or charges associated with all applications or permits and any conditions placed on the applicant shall be the sole responsibility of T-Mobile.

Yours truly,

Brian Benito
Planning Specialist
State Of Connecticut
Department of Emergency Services and Public Protection
CTS Unit
860-685-8297
brian.benito@ct.gov