Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

July 17, 2019

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

RE: Notice of Exempt Modification
57 Cook Drive, Montville, CT 06382
Latitude: 41.4748874700
Longitude: -72.1055295000
T-Mobile Site#: CTNL023C – L600

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 188-foot and 190-foot level of the existing 190-foot guyed tower at 57 Cook Drive, Montville, CT. The 190-foot guyed tower is owned and operated by Wireless Solutions, LLC. The property is owned by Robert and Karen Kingsborough. T-Mobile now intends to replace three (3) of its existing antennas with three (3) new 600/700/1900 MHz antennas. The new antennas will be installed at the same 188-foot level of the tower.

Planned Modifications:
Tower:

Remove
(6) 1-5/8" Coax

Remove and Replace:
(3) LNX-6515DS (Remove) - APXVAARR24_43-U-NA20 Antenna (Replace) 600/700/1900 MHz
(3) RRUS11B12 (Remove) - Radio 4449 B71+B12 (Replace)

Install New:
(3) 1-3/8" Hybrid Cables

Existing to Remain:
(3) RFS APX16DWV-16DWV-S—E-A20 Antenna 2100 MHz
(6) TMA
(12) 1-5/8" Coax

Ground:

Install New: Equipment inside existing 6102 cabinet

This tower facility was originally approved by the Town of Montville Planning and Zoning Commission on January 14, 1997. This approval did not come with conditions that would be violated by the modification. A copy of this original approval is enclosed.

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 Mayor – Ronald McDaniel, Elected Official, and Marcia Vlaun, Town Planner for the Town of Montville, as well as the property owner and tower owner.

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

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

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

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

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

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

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

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

Sincerely,

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

Attachments
cc: Ronald McDaniel – Town of Montville
Marcia Vlaun – Town of Monvtille Town Planner
Wireless Solutions, LLC – tower owner
Robert and Karen Kingsborough – property owner

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Wednesday, July 17, 2019 11:45 AM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CTNL023C CSC PO

A signature is required for package delivery

You have a package coming.

Scheduled Delivery Date: Thursday, 07/18/2019

Sign Now

Change Delivery | Manage Preferences | View Delivery Planner

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:	1ZV257424292660794
Ship To:	Robert and Karen Kingsborough 57 Cook Road UNCASVILLE, CT 063821313 US

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Wednesday, July 17, 2019 11:47 AM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CTNL023C CSC ZO

You have a package coming.

Scheduled Delivery Date: Thursday, 07/18/2019

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Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424293638825
Ship To:	Marcia Vlaun Town of Montville 310 Norwich- New London Tpke. UNCASVILLE, CT 063822599 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	07/18/2019
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CTNL023C CSC ZO

Download the UPS mobile app

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Wednesday, July 17, 2019 11:49 AM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CTNL023C CSC EO

You have a package coming.

Scheduled Delivery Date: Thursday, 07/18/2019

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Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424294172835
Ship To:	Ron McDaniel Town of Montville 310 Norwich-New London Tpke. 2nd Floor UNCASVILLE, CT 063822523 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	07/18/2019
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CTNL023C CSC EO

Download the UPS mobile app

7004 3410 0002 0384 4370

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at www.usps.com®

OFFICIAL USE

OLD LYME, CT 06371

Postage	$3.50 $2.80	0721 18
Certified Fee	$0.00 $0.00	Postmark Here
Return Receipt Fee (Endorsement Required)	$0.00 $0.00	
Restricted Delivery Fee (Endorsement Required)	$1.75	
Total Postage & Fees	$ $8.05	07/17/2019

Sent To: Wireless Solutions LLC

Street, Apt. No.; or PO Box No.: PO BOX 284

City, State, ZIP+4: Old Lyme, CT 06371

PS Form 3800, August 2006 — See Reverse for Instructions

Property Location 57 COOK RD | Map ID 040/ 013/ 000/ / | Bldg Name SFR & L LSE & TOWER | State Use 1010
Vision ID 2568 | Account # K0555700 | Bldg # 1 | Sec # 1 of 1 | Card # 1 of 1 | Print Date 9/11/2017 10:37:52 A

CURRENT OWNER

KINGSBOROUGH ROBERT W & KAR

57 COOK RD

UNCASVILLE CT 06382

TOPO		UTILITIES		STRT / ROAD		LOCATION	
1	Level	7	Electric	2	Semi-Improve	S	Mohegan Schl
		5	Well			F	Mohegan
		6	Septic				

SUPPLEMENTAL DATA

Alt Parcel ID	040/013-000		
Census	695100		
Dev Lot			
Subdiv			
Map #		Callback	R
Zoning Notes	C3		
Gis ID	040/013-000	ASSOC PID#	

CURRENT ASSESSMENT

Description	Code	Appraised	Assessed
Res Land	1-1	60,800	42,560
Res Exces	1-2	330	230
Dwelling	1-3	306,940	214,860
Res OB	1-4	696,810	487,770
Forest	6-2	103,750	6,970
	Total	1,168,630	752,390

6086

MONTVILLE, CT

RECORD OF OWNERSHIP

	BK-VOL/PAGE		SALE DATE	Q/U	V/I	SALE PRICE	VC
KINGSBOROUGH ROBERT W & KAREN A	0546	0511	03-04-2010	U	I	0	29
KINGSBOROUGH ROBERT W	0292	0446	10-23-1996		I	0	
KINGSBOROUGH ROBERT W & D L MARIE	0207	0299	11-12-1988		I	0	

PREVIOUS ASSESSMENTS (HISTORY)

Year	Code	Assessed	Year	Code	Assessed	Year	Code	Assessed
2016	1-1	42,560	2015	1-1	53,760	2014	1-1	53,760
	1-2	230		1-2	410		1-2	410
	1-3	214,860		1-3	172,880		1-3	172,880
	1-4	487,770		1-4	487,770		1-4	487,770
	Total	752,390		Total	718,600		Total	718,600

EXEMPTIONS

Year	Code	Description	Amount
		Total	0.00

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm Int

This signature acknowledges a visit by a Data Collector or Assessor

ASSESSING NEIGHBORHOOD

NBHD	NBHD Name	Street Index Name	Tracing	Batch
0001				

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	302,740
Appraised XF (B) Value (Bldg)	4,200
Appraised OB (B) Value (Bldg)	696,810
Appraised Land Value (Bldg)	164,880
Special Land Value	6,970
Total Appraised Parcel Value	1,168,630
Valuation Method	C
Adjustment	
Total Appraised Parcel Value	1,168,630

NOTES

AT&T ANTENNAE =$163,600 PER SITE = $654,400

L: OLD MAPBLOLOT WAS 098/002-000

VC09: ADDITION

CELL TOWER VALUE = $2000 MO LESS

25% EXPENSES = $18,000 CAPPED AT 11%

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp Date	% Comp	Date Comp	Comments
B2017-0123	04-20-2017	79		15,000		0		VERIZON TO REPL
B2015-0505	11-17-2015	79	Misc	33,434		100	10-27-2016	CA-THREE ANTEN
B2015-0345	08-13-2015	79		15,000		100		REPL ANTENNA PA
E2015-0022	02-09-2015	00		5,700		100	02-11-2015	CA-REPAIR/RELOC
B2015-0035	02-03-2015	79	Misc	8,000		100	08-03-2015	CA-3 RADIO HEAD
B2014-0221	06-25-2014	79	Misc	15,000		100		REPLACE 6 ANTEN
B2013-0052	03-20-2013	79	Misc	129,000		100		STRUCTURAL CHA

VISIT / CHANGE HISTORY

Date	Type	IS	ID	Cd	Purpost/Result
03-28-2013			BAA	BN	BAA No Change
09-12-2011			RH	00	Interior + Exterior Inspe
07-01-2011			KN	09	All Refused- Estimated
10-26-2009			LB	08	Interior Refused-Exteri

LAND LINE VALUATION SECTION

B	Use co	Description	Zone	D	Fronta	Depth	Units		Unit Price	I. Fact	S.A.	Ac Di	C. Fact	St. Idx	Adj	Notes	Special Pricing Spec Use	Special Pricing Spec Calc	S Adj	Adj Unit Pric	Land Value
1	1010	Single Family	C-3				160,000	SF	0.38	1.000	5	1.000	1.00	002	1.00		0		1.000		60,800
1	1010	Single Family	C3				0	AC	2,500.00	1.000	0	1.000	1.00	002	1.00		0		0.000		330
1	700	Forest	C-3				42	AC	2,500.00	1.000	0	1.000	1.00	002	1.00		240		0.000		103,750
1	4340	Cell Tower						SF	2,500.00	1.000		1.000	1.00		1.00		0		0.000		0
							Total Card Land Units		45.303	AC	Parcel Total Land Area		45.3031						Total Land Value		164,880

Property Location	57 COOK RD		Map ID	040/ 013/ 000/ /	Bldg Name	SFR & L LSE & TOWER	State Use 1010
Vision ID 2568		Account # K0555700		Bldg # 1	Sec # 1 of 1	Card # 1 of 1	Print Date 9/11/2017 10:37:52 A

CONSTRUCTION DETAIL

Element	Cd	Description
Style	01	Ranch
Model	01	Residential
Grade:	11	B
Stories:	1	
Occupancy	1	
Exterior Wall A	25	Vinyl Siding
Exterior Wall B		
Roof Structure:	03	Gable
Roof Cover	03	Asphalt
Interior Wall A	05	Drywall
Interior Wall B		
Interior Flr A	14	Carpet
Interior Flr B		
Heat Fuel	02	Oil
Heat Type:	05	Hot Water
AC Type:	01	None
Total Bedrooms	05	5 Bedrooms
Total Bthrms:	3	
Total Half Baths	0	0
Total Xtra Fixtrs	0	
Total Rooms:	9	
Bath Style:	02	Average
Kitchen Style:	02	Average
Whirlpool Tub		
Fireplaces	1	
Fin Bsmnt		
Fin Bsmnt Qual		
Attic Access	01	None
Basement Gara	0	
	1	
MH Basement		
MHP/Complex		

CONSTRUCTION DETAIL (CONTINUED)

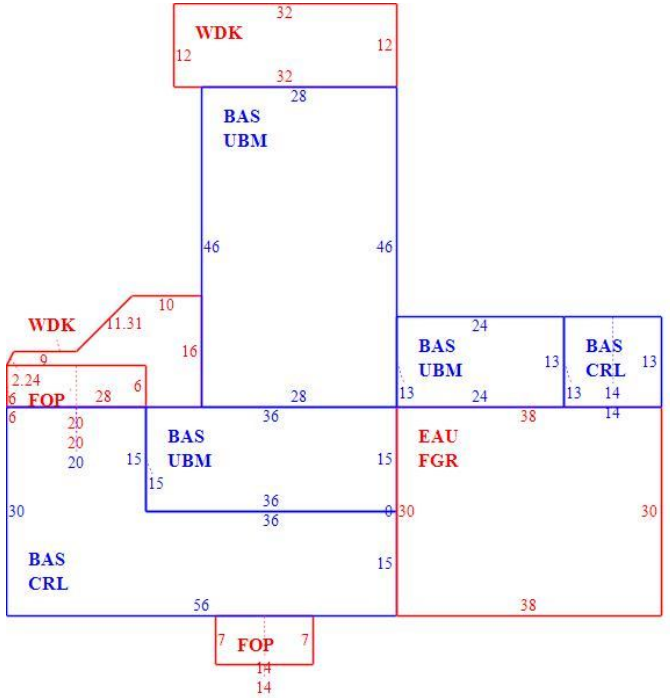
Element	Cd	Description

MIXED USE

Code	Description	Percentage
1010	Single Family	100
		0
		0

COST / MARKET VALUATION

Base Rate	90.00
RCN	
Net Other Adj	
Year Built	1989
Effective Year Built	
Depreciation Code	G
Remodel Rating	MJ
Year Remodeled	2009
Depreciation %	16
Functional Obsol	
Economic Obsol	
Cost Trend Factor	1
Condition	
% Complete	
	84
RCNLD	302,740
Dep % Ovr	
Dep Ovr Comment	
Misc Imp Ovr	
Misc Imp Ovr Comment	
Cost to Cure Ovr	
Cost to Cure Ovr Comment	

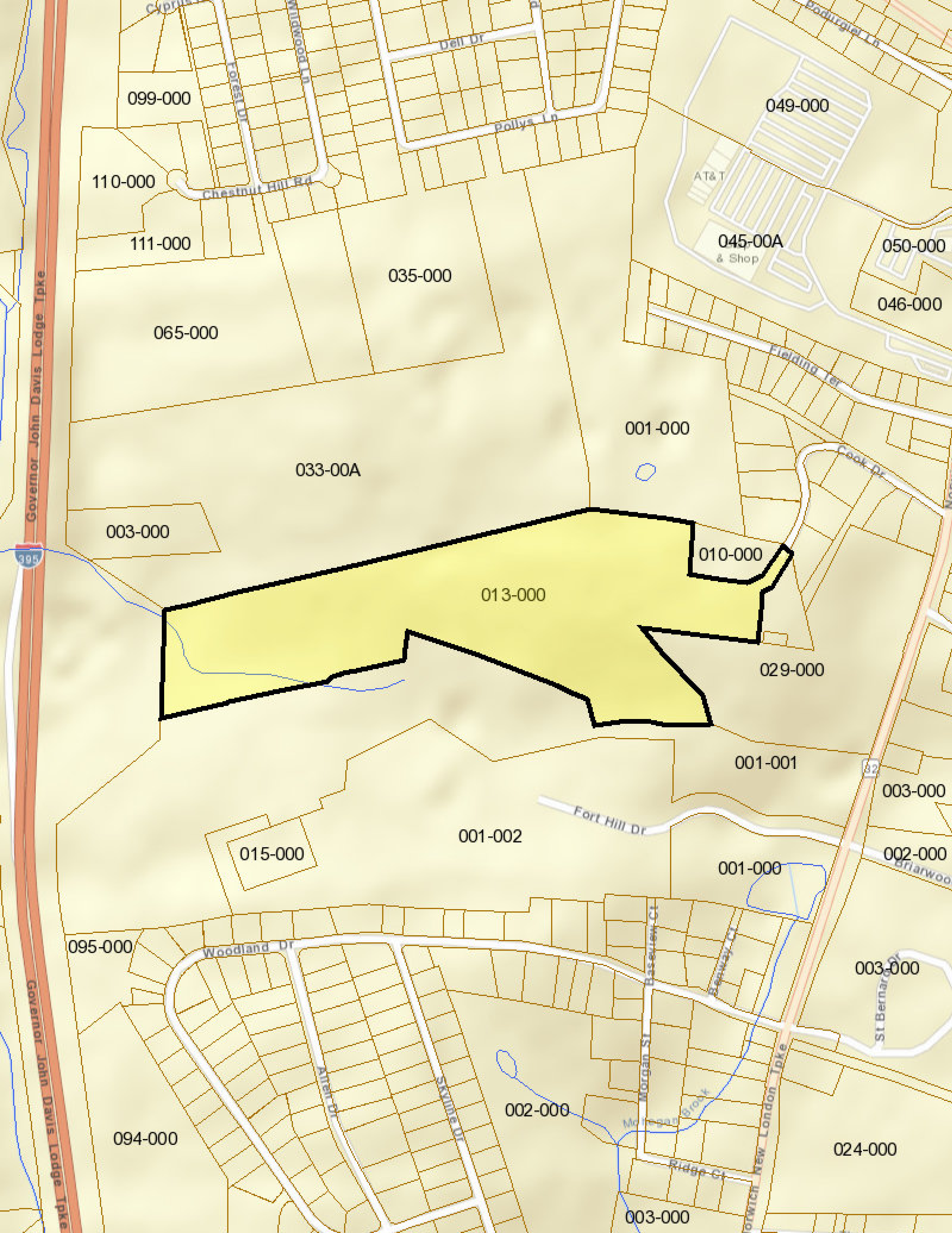


OB - OUTBUILDING & YARD ITEMS(L) / XF - BUILDING EXTRA FEATURES(B)

Code	Description	Su	Sub Type	Lan	Units	Unit Price	Year	Pct	Depre	Conditio	Qu		Apprais Va
SHD1	Shed			B	168	12.00	1999	50	0.00	AV	A	1.00	1,010
KIT	Kitchen			B	1	5000.00	2000	84	1.00			0.00	4,200
CELL	Cell Tower			B	4	163600.0	2009	100	0.00			0.00	654,400
CELS	Cell Shed			B	240	100.00	2009	50	0.00	AV	08	1.00	12,000
CELS	Cell Shed			B	240	100.00	2009	50	0.00	AV	08	1.00	12,000
CELS	Cell Shed			B	144	100.00	2009	50	0.00	AV	08	1.00	7,200
CELS	Cell Shed			B	192	100.00	2009	50	0.00	AV	08	1.00	9,600
FN3	6' Chain Fen			B	100	12.00	2009	50	0.00	AV	08	1.00	600

BUILDING SUB-AREA SUMMARY SECTION

Subarea	Description	Living	Gross	Eff Area	Unit Cost	Undeprec Value
BAS	First Floor	3,462	3,462		79.60	275,560
CRL	Crawl Space	0	1,322		0.00	0
EAU	Unfinished Expansion Attic	0	1,140		14.31	16,317
FGR	Garage	0	1,140		23.88	27,222
FOP	Open Porch	0	218		12.05	2,627
UBM	Basement	0	2,140		15.92	34,067
WDK	Wood Deck	0	719		6.42	4,617
	Ttl Gross Liv / Lease Area	3,462	10,141			



Wildwood Ln
Forest Dr
Dell Dr
Pollys Ln
Podurgiel Ln
099-000
049-000
AT&T
110-000
Chestnut Hill Rd
111-000
045-00A
& Shop
050-000
035-000
046-000
065-000
Fielding Ter
001-000
033-00A
Cook Dr
Governor John Davis Lodge Tpke
003-000
395
010-000
013-000
029-000
001-001
32
003-000
Fort Hill Dr
001-002
002-000
015-000
001-000
095-000
Woodland Dr
Baseview Ct
Benway Ct
003-000
St Bernard Dr
Allen Dr
Skyline Dr
Morgan St
Mohegan Brook
002-000
094-000
024-000
Ridge Ct
Governor John Davis Lodge Tpke
Norwich New London Tpke
003-000

TEL: 848-8549
FAX: 848-2354

TOWN OF MONTVILLE
PLANNING & ZONING COMMISSION

310 NORWICH-NEW LONDON TPKE.
UNCASVILLE, CONNECTICUT 06382-2599

LEGAL NOTICE

The Montville Planning and Zoning Commission at its meeting held on January 14, 1997, took the following action:

APPROVED the site plan submitted by **Wireless Solutions, LLC and Robert W. Kingsborough** to install a 180' radio tower and antenna for wireless communication purposes on property located at 57 Cook Drive, Montville, Ct. Shown on Assessor's Map 98, Lot 2.

APPROVED modifications to approved subdivision plans of **Lochdale Estates Subdivision** to eliminate the requirement that dry sewers be installed in Phase II and Phase III.

The application of **Christy's Market, Inc./Jack D'Elia** was withdrawn.

Maps and documentation concerning the above applications are on file in the office of the Town Planner, Town Hall Annex, Montville, Ct.

Dated at Montville, Ct. this 15th day of January, 1997.

MONTVILLE PLANNING AND ZONING COMMISSION
Gregory Majewski, Chairman

PUBLISH IN THE NEW LONDON DAY January 17, 1997.

PLEASE REFERENCE PURCHASE ORDER 6100 F 1 ON INVOICE.

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

CT023/MONTVILLE MP

SITE ID: CTNL023C

57 COOK DRIVE

MONTVILLE, CT 06382

T-MOBILE RF CONFIGURATION

67D04B_1QP+1OP

PROJECT SUMMARY

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

   A. REPLACE (3) POS.1 LNX-6515DS-A1M ANTENNAS, TYP. (1) PER SECTOR WITH (3) APXVAARR24_43-U-NA20 ANTENNAS, TYP. (1) PER SECTOR.

   B. REPLACE (3) POS.1 RRUS11 B12, TYP. (1) PER SECTOR WITH (3) RADIO 4449 B71+B12, TYP. (1) PER SECTOR.

   C. REMOVE (2) COAXIAL LINES PER SECTOR, TOTAL OF (6).

   D. INSTALL (3) 6x12 HYBRID CABLES.

   E. REPLACE (1) DUS41 WITH (1) BB6630 FOR LTE.

   F. INSTALL (1) ADDITIONAL BB6630 FOR FUTURE 5G N600

   G. REMOVE (1) XMU

   H. INSTALL 100A BREAKER

PROJECT INFORMATION

SITE NAME:	CT023/MONTVILLE MP
SITE ID:	CTNL023C
SITE ADDRESS:	57 COOK DRIVE MONTVILLE, CT 06382
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°-28'-29.82" N LONGITUDE: 72°-06'-18.14" W GROUND ELEVATION: 362'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	GENERAL NOTES AND SPECIFICATIONS	0
C-1	SITE LOCATION PLAN	0
C-2	COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION	0
C-3	ANTENNA CONFIGURATION AND ELEVATION	0
E-1	TYPICAL ELECTRICAL DETAILS	0
E-2	TYPICAL ELECTRICAL DETAILS	0

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER 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

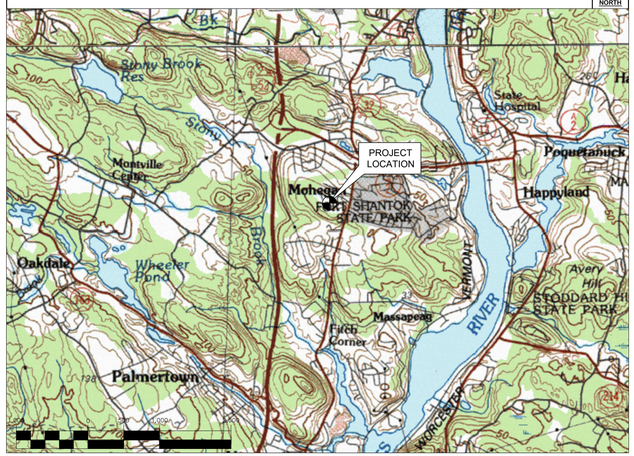
TO: 57 COOK DRIVE
MONTVILLE, CT 06382

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.	0.64 MI.
4.	STAY STRAIGHT TO GO ONTO BLUE HILLS AVE/CT-187.	1.24 MI.
5.	TURN LEFT ONTO OLD WINDSOR RD/CT-305. CONTINUE TO FOLLOW CT-305.	2.33 MI.
6.	MERGE ONTO I-91 S TOWARD HARTFORD.	6.04 MI.
7.	MERGE ONTO I-84 E/US-6 E VIA EXIT 30 ON THE LEFT TOWARD NEW LONDON/E HARTFORD/CT-2.	0.61 MI.
8.	MERGE ONTO CT-2 E VIA EXIT 55 TOWARD NEW LONDON/NORWICH.	36.36 MI.
9.	MERGE ONTO I-395 S/CT-2A E VIA EXIT 28S TOWARD NEW HAVEN.	3.87 MI.
10.	MERGE ONTO CT-2A E VIA EXIT 9 TOWARD LEDYARD/PRESTON.	1.11 MI.
11.	TAKE THE CT-32 EXIT, EXIT 5, TOWARD NORWICH/UNCASVILLE.	0.38 MI.
12.	TURN RIGHT ONTO NORWICH NEW LONDON TURNPIKE/CT-32.	0.41 MI.
13.	TURN RIGHT ONTO COOK DR.	0.25 MI.
14.	57 COOK DR, UNCASVILLE, CT 06382-1313, 57 COOK DR IS ON THE RIGHT.	

VICINITY MAP

SCALE: 1" = 1000'

NORTH



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57 COOK DRIVE
MONTVILLE, CT 06382

DATE: 06/10/19
SCALE: AS NOTED
JOB NO. 19027.72

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:

- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 105 MPH (Vasd) (EXPOSURE B/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.

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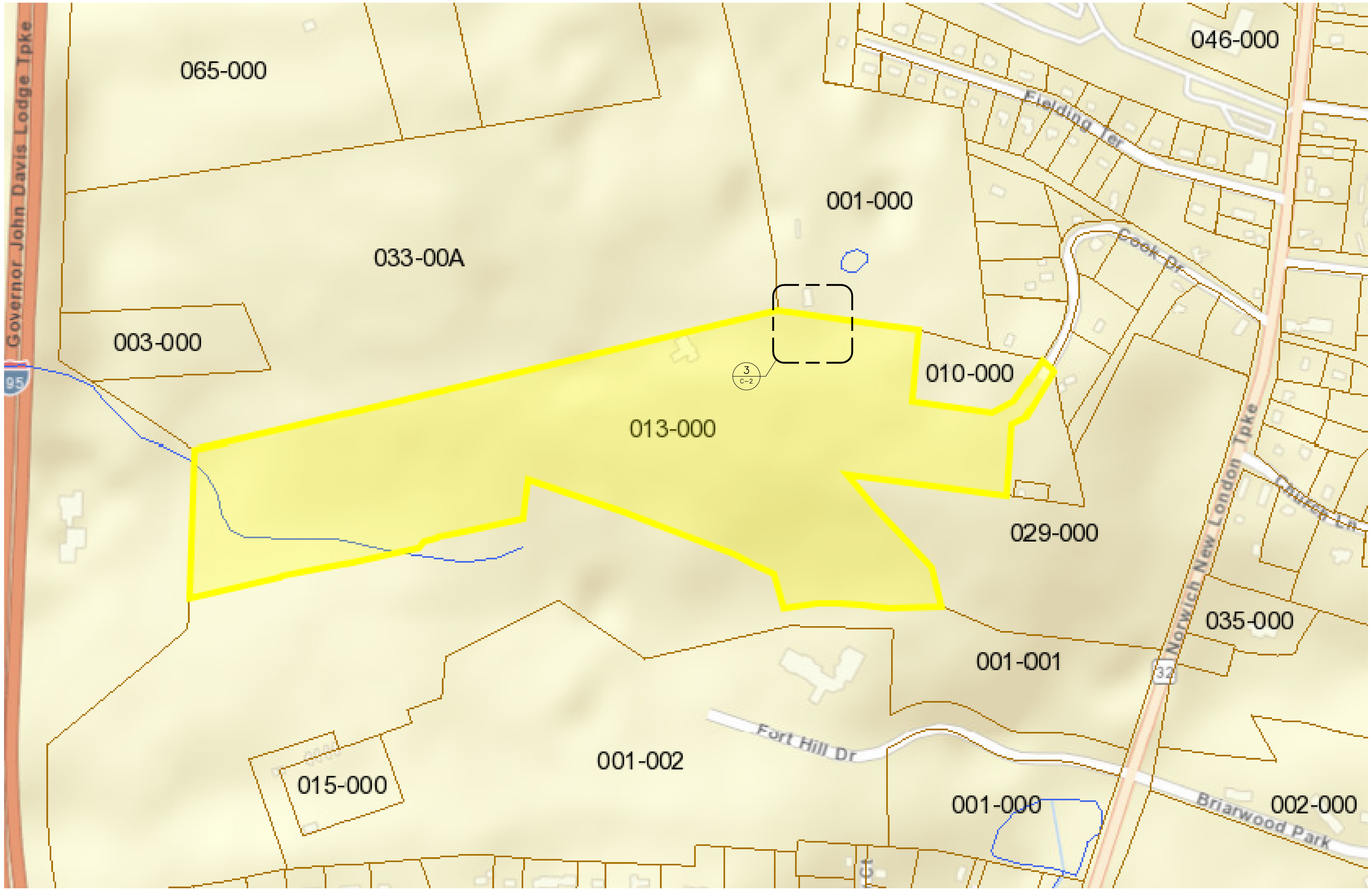
SCALE: AS NOTED
JOB NO. 19027.72

GENERAL NOTES AND SPECIFICATIONS

N–1



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

TRUE NORTH

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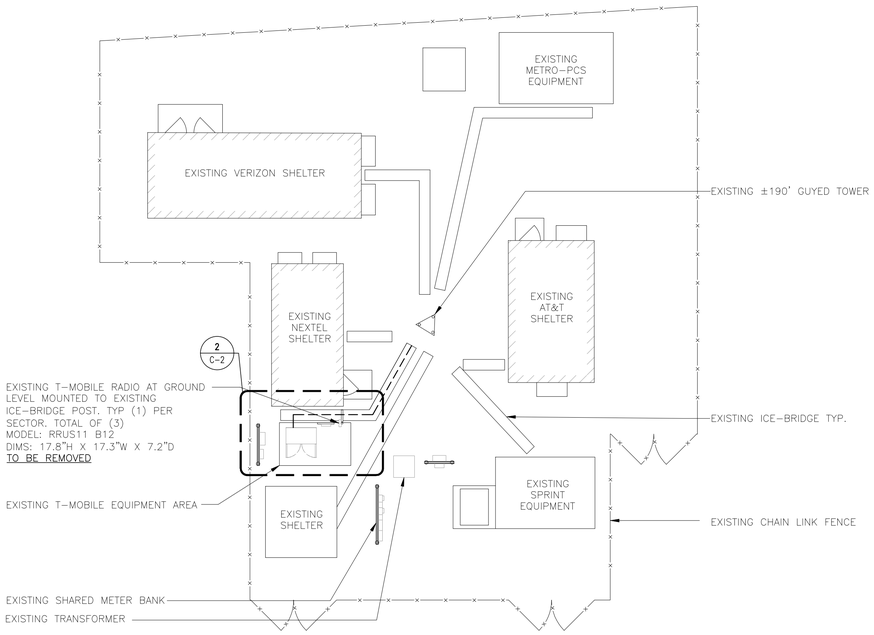
SITE LOCATION PLAN

C-1

Sheet No. 3 of 7

T-MOBILE RAN TEMPLATE:
67D04B HYBRID

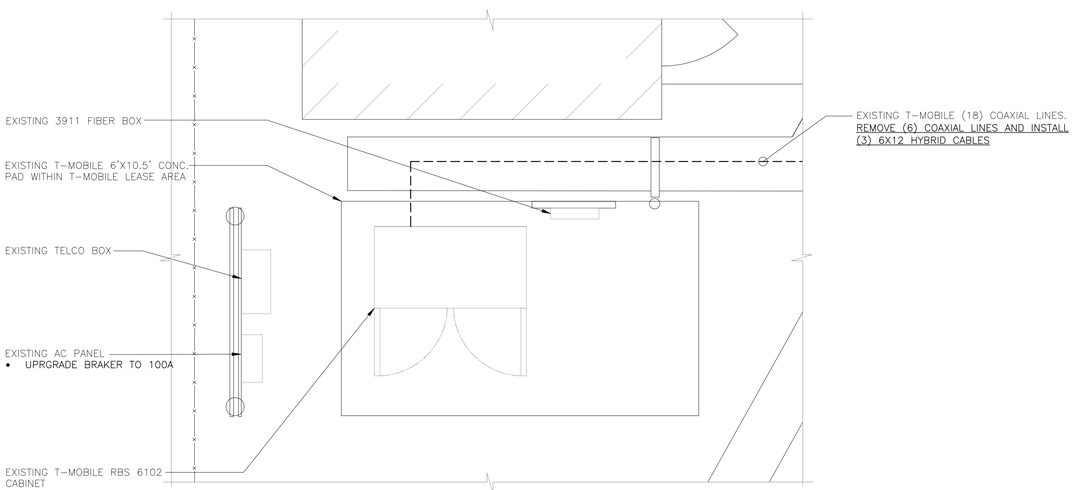
T-MOBILE RF CONFIGURATION:
67D04B_1QP+Q



1 C-2 **COMPOUND PLAN**
SCALE: 1" = 10'

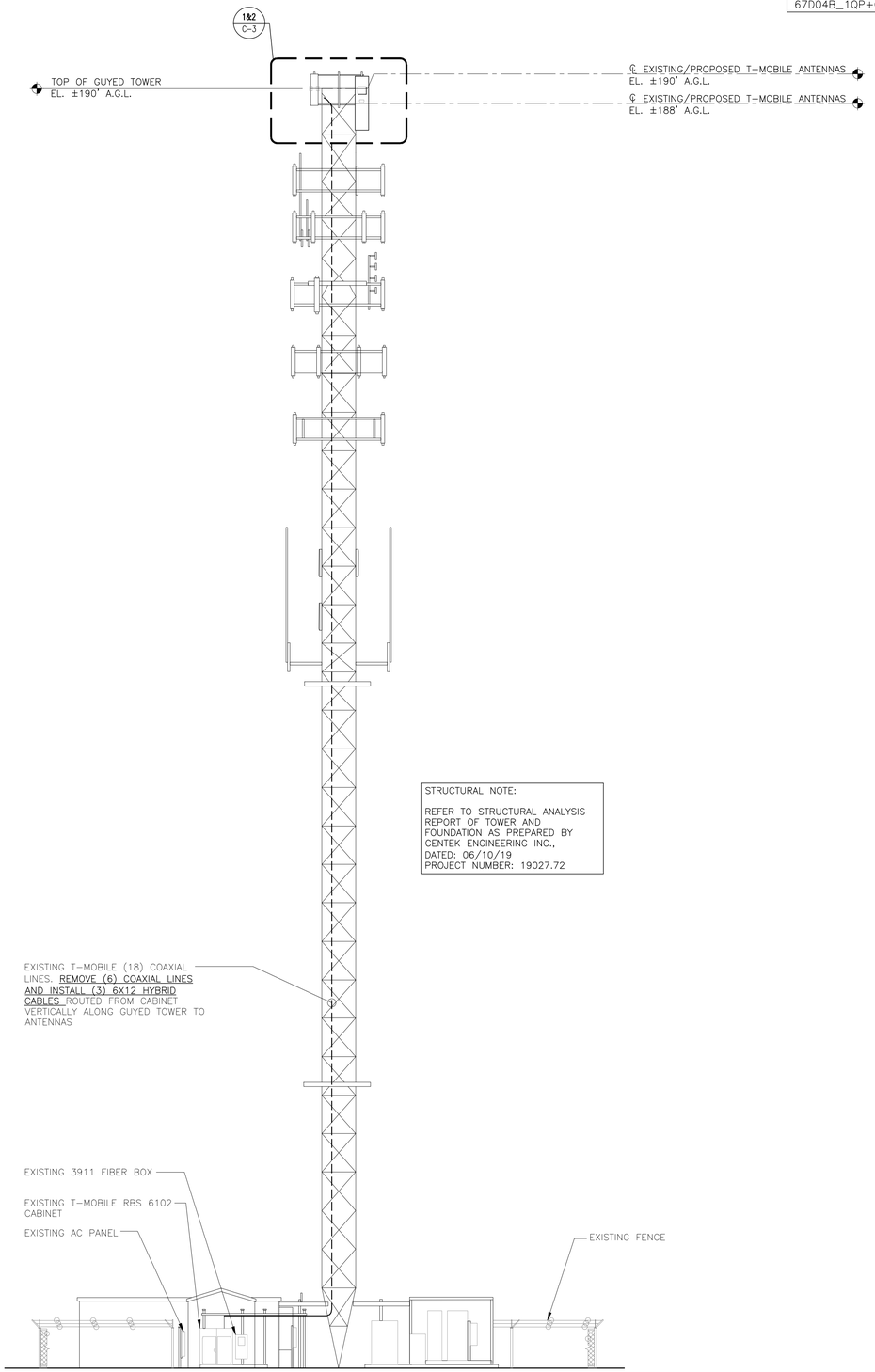
APPROXIMATE NORTH

NOTE:
REFERENCE SHEET T-1 FOR
T-MOBILE EQUIPMENT SCOPE OF WORK



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

APPROXIMATE NORTH



STRUCTURAL NOTE:

REFER TO STRUCTURAL ANALYSIS REPORT OF TOWER AND FOUNDATION AS PREPARED BY CENTEK ENGINEERING INC., DATED: 06/10/19 PROJECT NUMBER: 19027.72

3 C-2 **GUYED TOWER ELEVATION**
SCALE: 1" = 10'

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SCALE: AS NOTED
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COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION

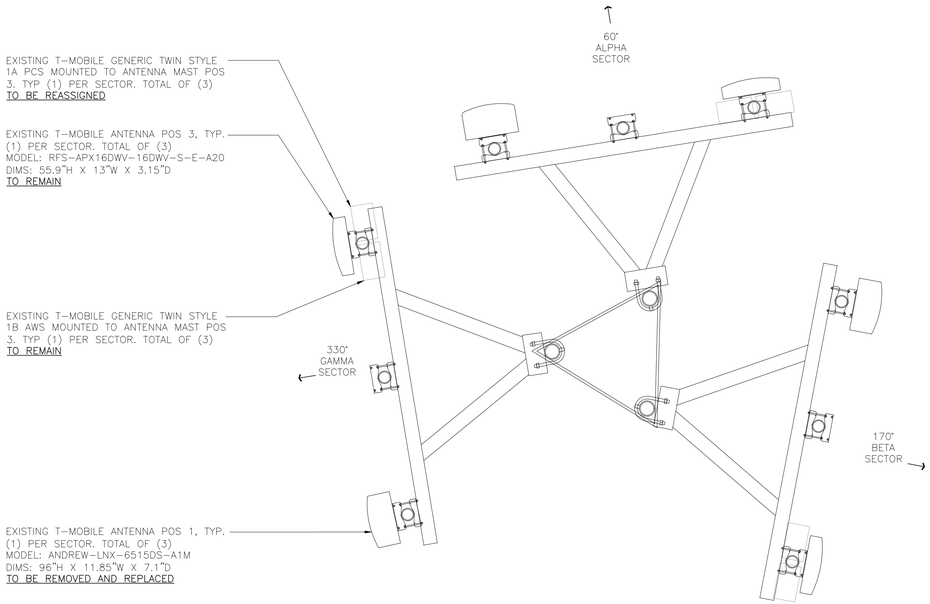
C-2

Sheet No. 4 of 7

NOTE:
ANTENNA EQUIPMENT (BY OTHERS) NOT SHOWN FOR CLARITY.

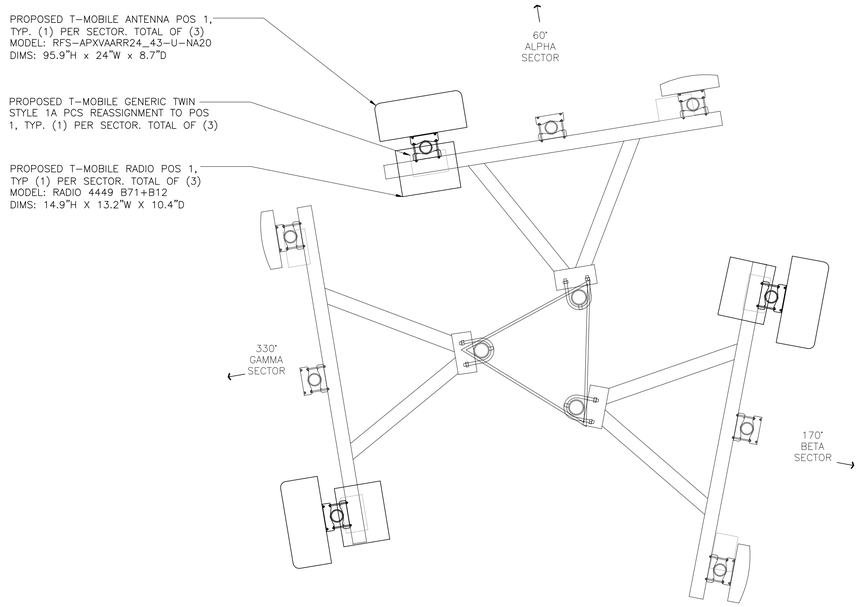
T-MOBILE RAN TEMPLATE:
67D02C OUTDOOR

T-MOBILE RF CONFIGURATION:
6702C_2xAIR+1OP



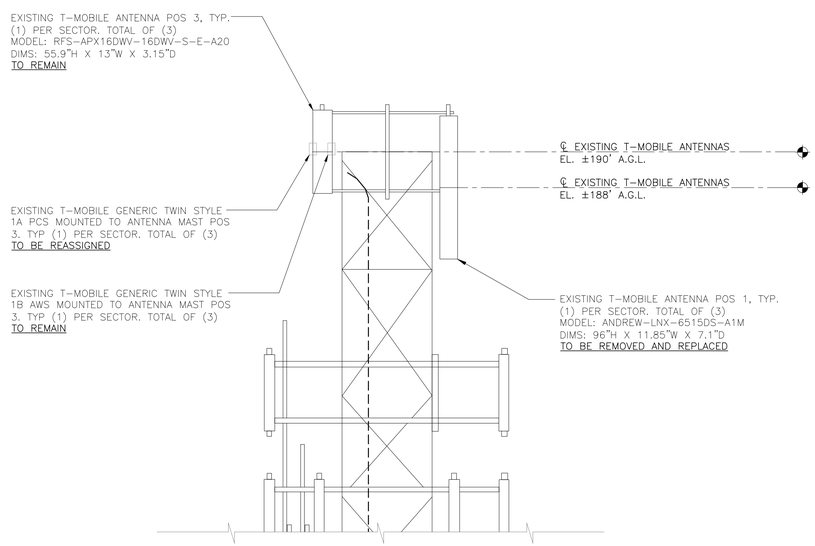
1 C-3 **EXISTING ANTENNA CONFIGURATION**
SCALE: 3/4" = 1"

APPROXIMATE NORTH



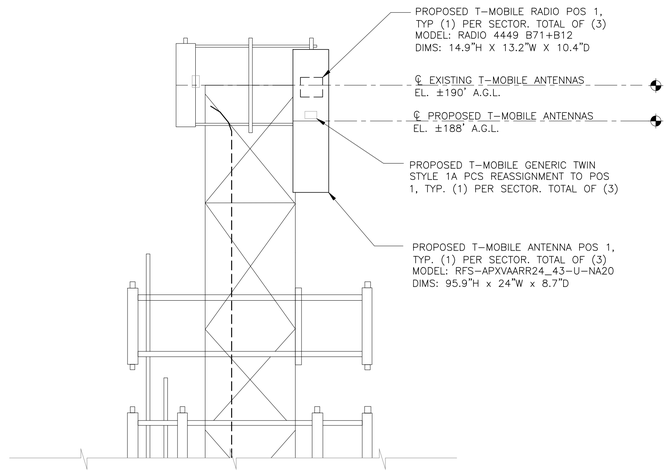
2 C-3 **PROPOSED ANTENNA CONFIGURATION**
SCALE: 3/4" = 1"

APPROXIMATE NORTH



TYPICAL SECTOR

1A C-3 **ANTENNA ELEVATION - EXISTING**
SCALE: 1" = 10'



TYPICAL SECTOR

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

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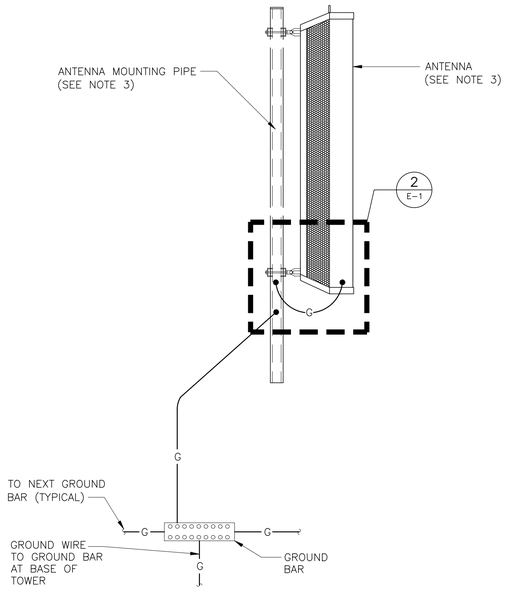
ANTENNA CONFIGURATION AND ELEVATION

C-3

Sheet No. 5 of 7

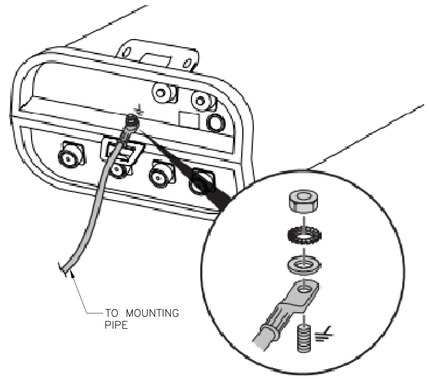


NOTES:

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.

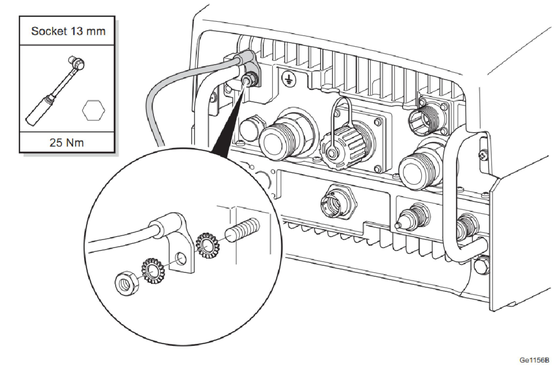
1 / E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE



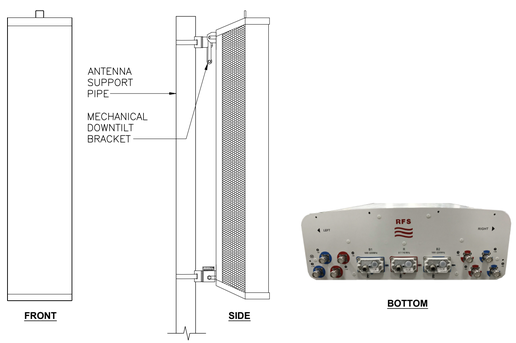
2 / E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE



3 / E-1 TYPICAL RRU GROUNDING DETAIL

SCALE: NOT TO SCALE



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APXVAARR24_43-U-NA20	95.9"L x 24"W x 8.7"D	153 LBS.

NOTES:
1. INSTALL ANTENNA TO PIPE MAST USING MANUFACTURERS SUPPLIED BRACKETS AND MOUNTING HARDWARE.
2. SET MECHANICAL DOWNTILT TO VALUE SPECIFIED IN LATEST RFDS.

4 / E-1 PROPOSED ANTENNA DETAIL

SCALE: NOT TO SCALE

ISOMETRIC VIEW

RRU (REMOTE RADIO UNIT)		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: RADIO 4449 B71+B12	14.9"L x 13.2"W x 10.4"D	74 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 AND CLEARANCE REQUIREMENTS.

5 / E-1 PROPOSED RRU DETAIL

SCALE: NOT TO SCALE

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DATE: 06/10/19

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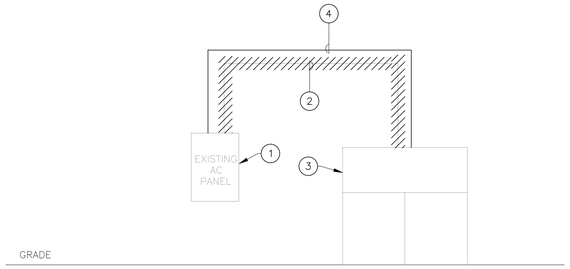
TYPICAL ELECTRICAL DETAILS

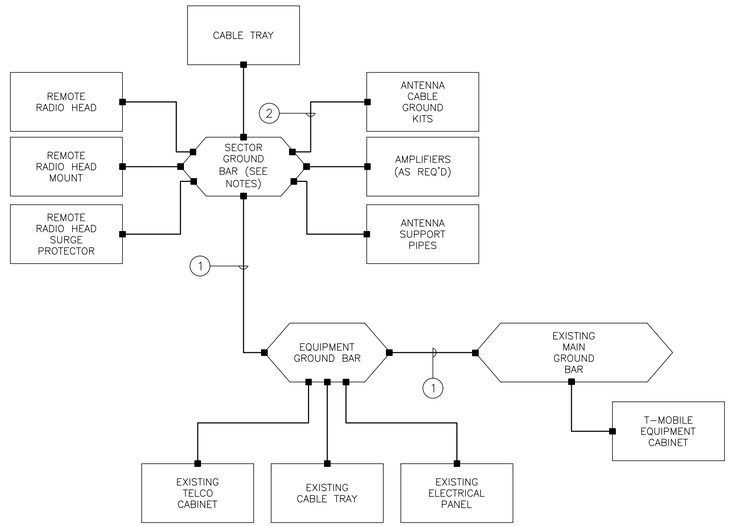
E-1

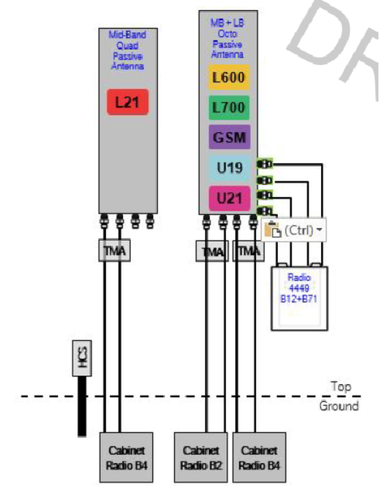
RISER DIAGRAM NOTES

1. EXISTING AC PANEL TO REMAIN
2. EXISTING CONDUITS, CONDUCTORS AND ASSOCIATED CIRCUIT BREAKER TO BE REMOVED.
3. EXISTING RADIO CABINET TO REMAIN
4. (3) #1 AWG, (1) #6 AWG GROUND, 1–1/2" CONDUIT CONNECTED TO NEW 100A/2P CIRCUIT BREAKER.

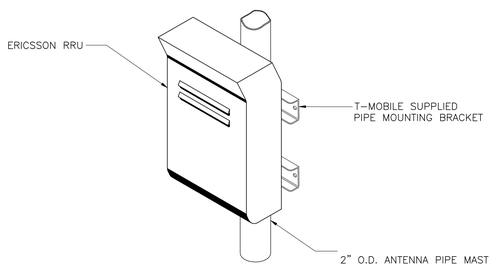


1 / E–2 **ELECTRICAL POWER RISER DIAGRAM**
SCALE: NOT TO SCALE





2 / E–2 **PROPOSED PLUMBING DIAGRAM**
SCALE: NOT TO SCALE



ISOMETRIC VIEW

NOTES:

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

3 / E–2 **TYPICAL RRU MOUNTING DETAIL**
SCALE: NOT TO SCALE

GROUNDING SCHEMATIC NOTES

1. #2 AWG
2. #6 AWG

GENERAL NOTES:

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

4 / E–2 **TYPICAL GROUNDING DIAGRAM**
SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/16/19	RTS	CAG	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

Transcend Wireless

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

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
CT023/MONTVILLE MP
SITE ID: CTNL023C
57 COOK DRIVE
MONTVILLE, CT 06382

DATE: 06/10/19
SCALE: AS NOTED
JOB NO. 19027.72

TYPICAL ELECTRICAL DETAILS

E-2

Sheet No. 7 of 7

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

193-ft Existing Guyed Lattice Tower

Proposed T-Mobile
Antenna Upgrade (L600)

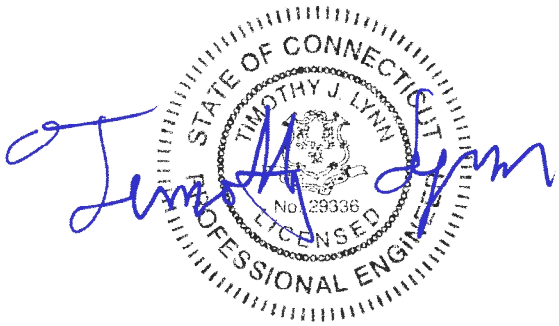
T-Mobile Site Ref: CTNL023C

57 Cook Drive
Montville, CT

Centek Project No. 19027.72

Date: June 10, 2019

Max Stress Ratio = 89.5%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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Introduction

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

The host tower is a 193-ft, three face, guyed steel lattice tower originally designed and manufactured by UNR-ROHN. The tower was extended by 10-ft to its current height of 193-ft in 2002 per UHN-ROHN drawing no. C020301. The tower geometry, structure member sizes and foundation design information were obtained from UNR-ROHN design drawing B971656, job no. 35489PH dated March, 1997. Subsequent tower reinforcement material information was obtained from MetroPCS construction drawings prepared by Fullerton Engineering Consultants, dated November 12, 2010; a previous Reinforcement Design prepared by this office Centek Job No. 11001.CO27, marked Revision #1, dated May 25, 2012; and a Structural Analysis Report with Modification Plan for AT&T prepared by Hudson Design Group dated March 14, 2013.

Antenna and appurtenance information was taken from a combination of a Structural Analysis Report prepared for T-Mobile by Maser Consulting, dated December 14, 2018; a Structural Analysis Report prepared for Sprint by Maser Consulting, dated October 27, 2017 and a T-Mobile RF data sheet.

The tower consists of eleven (11) vertical sections constructed of steel pipe legs conforming to ASTM A572-50. Diagonal and horizontal lateral support bracing consists of a combination of steel angle and steel pipe construction conforming to ASTM A36 and ASTM A53-B-42. The vertical tower sections are connected by bolted flange plates with the diagonal and horizontal bracing to pipe legs consisting of bolted connections. The width of the tower face is 3.42-ft at throughout its length with the exception of a 5'-0" high tapered base section.

Antenna and Appurtenance Summary

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

- UNKNOWN (Existing):
  Antenna: One (1) 20' by 3" ∅ Omni-directional (whip) antenna mounted with an elevation of ±188.75-ft above the tower base.
  Coax Cable: One (1) 7/8" coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) 6' by 3" ∅ Omni-directional (whip) antenna mounted with an elevation of ±180.0-ft above the tower base.
  Coax Cable: One (1) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- AT&T (Existing):
  Antennas: Three (3) Powerwave 7770 panel antennas, three (3) CCI HPA-65R-BUU-H8 panel antennas, two (2) CCI TPA-65R-LCUUUU-H8 panel antennas, one (1) Quintel QS66512-2 panel antennas, six (6) TMAs, six (6) triplexers, three (3) RRUS11, three (3) RRUS12, three (3) RRUS32, three (3) 4426 B66 RRHs and two (2) DC6-48-60-18-8F Surge Arrestors mounted on three (3) 12-ft Boom Gates with a RAD center elevation of ±178.75-ft above the existing tower base.
  Coax Cables: Twelve (12) 1-1/4" ∅ coax cables, two (2) fiber line, and four (4) DC power cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- VERIZON (Existing):
  Antennas: Three (3) Antel LPA 80080/4CF panel antennas, nine (9) Andrew SBNHH-1D65B panel antennas, three (3) Alcatel-Lucent RRH2x60-700 remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads, three (3) Alcatel-Lucent RRH4x45-AWS remote radio heads and two (2) RFS DB-T1-6Z-8AB-0Z main distribution boxes mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±169-ft above the existing tower base.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables and two (2) 1-5/8" ∅ Hybriflex fiber cables running on the face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) 6-ft 4-Bay Dipole antenna mounted with an elevation of ±155.5-ft above the tower base.
  Coax Cable: One (1) 1-1/4" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- SPRINT (Existing):
  Antennas: Three (3) RFS APXV9ERR18-C panel antennas, three (3) RFS APXVTM14 panel antennas and nine (9) RRHs mounted on three (3) 12-ft Boom Gates with a RAD center elevation of ±150.0-ft above the existing tower base.
  Coax Cables: Six (6) 1-5/8" ∅ fiber lines running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (EXISTING):
  Antenna: One (1) Decibel DB408 8-Bay Dipole antenna mounted on a 3' Standoff with an elevation of ±126-ft above the tower base.
  Coax Cable: One (1) 1-1/4" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (EXISTING):
  Antenna: Two (2) PD220 antennas mounted on 3'-6" Standoffs with an elevation of ±121-ft above the tower base.
  Coax Cable: Two (2) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) Folded Dipole antenna on a 6' x 3" Pipe Mount with an elevation of ±111-ft above the tower base.
  Coax Cable: One (1) 1-1/4" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) 2' by 2" ∅ Omni-directional (whip) antenna mounted on a 2' Stand-off with an elevation of ±106-ft above the tower base.
  Coax Cable: Two (2) 1/2" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- T-MOBILE (Existing to Remain):
  Antennas: Three (3) RFS APX16DWV-16DWVS panel antennas and six (6) TMAs mounted on three (3) Boom Gates with a RAD center elevation of ±188.0-ft above the existing tower base.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the exterior of the existing tower.
- T-MOBILE (Existing to Remove):
  Antennas: Three (3) Andrew LNX-6515DS panel antennas and three (3) Ericsson RRUS-11 remote radio heads mounted on three (3) Boom Gates with a RAD center elevation of ±188.0-ft above the existing tower base.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- **T-MOBILE (Proposed):**
  Antennas: Three (3) RFS APXVAARR24_43 panel antennas and three (3) Ericsson 4449 B71 B12 remote radio heads mounted on three (3) Boom Gates with a RAD center elevation of ±188.0-ft above the existing tower base.
  Coax Cables: Three (3) 6x12 fiber cable running on the inside of the existing tower.

Primary Assumptions Used in the Analysis

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

Analysis

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

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

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

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 0.75" radial ice on the tower structure and its components.

Basic Wind Speed:	Montville; v = 105 mph (3 second gust)	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 105 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 0.75" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

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

Tower Capacity

- Calculated stresses were found to be within allowable limits. This tower was found to be at **89.5%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T2)	160'-0"-180'-0"	81.2%	**PASS**
Diagonal (T9)	20'-0"-40'-0"	56.6%	**PASS**
Guy C @ 140-ft radius (T2)	160'-0"	89.5%	**PASS**

Base Foundation and Guy Anchors

The existing tower foundation consists of a 2.5-ft ∅ reinforced concrete pedestal with a 7.0-ft square reinforced concrete pad bearing directly on the existing sub grade. Additionally, guy wire loading is transferred to three (3) 9.0-ft long by 5.0-ft wide by 2.0-ft thick reinforced concrete anchor support blocks at a 140-ft radius from the center of the existing tower and three (3) 12.0-ft long by 6.0-ft wide by 4.0-ft thick reinforced concrete anchor support blocks at a 88-ft radius from the center of the existing tower. The sub-grade conditions used as the basis for the foundation analysis were derived from a geo-technical study report for a proposed lattice tower within proximity of the subject guyed tower. The geo-technical report was prepared by Clarence Welti Associates, Inc., dated April 18, 2001.

- The worst case tower base and guy anchor reactions developed from the governing Load Case were used in the verification of the anchorage foundations:

Tower Guy Reactions		
Vector	**Proposed Reactions Guy Anchor B @ Radius of 88-ft**	**Proposed Reactions Guy Anchor C @ Radius of 140-ft**
Horizontal (In Plane of GW)	**32 kips**	**39 kips**
Horizontal (Out of Plane of GW)	**1 kips**	**1 kips**
Vertical	**32 kips**	**45 kips**
Resultant Force at end of Guy Wire	**45 kips**	**59 kips**
Tower Base Reactions		
Vector	**Proposed Reaction**	
Horizontal Shear	**4.0 kips**	
Axial Compression	**213 kips**	
Moment	**0 kip-ft**	

Foundation	Design Limit	TIA-222-G Section 9.4 FS[1]	Proposed Loading (FS)[1]	Result
Reinf. Conc. Anchor Block (B) at 88-ft radius.	Uplift	1.0	2.32	**PASS**
	Sliding	1.0	3.6	**PASS**
Reinf. Conc. Anchor Block (C) at 140-ft radius.	Uplift	1.0	2.23	**PASS**
	Sliding	1.0	1.9	**PASS**
		Ultimate	**Proposed**	
Base Foundation	Bearing	12.0 ksf	4.54 ksf	**PASS**

Note 1: FS denotes 'Factor of Safety'.

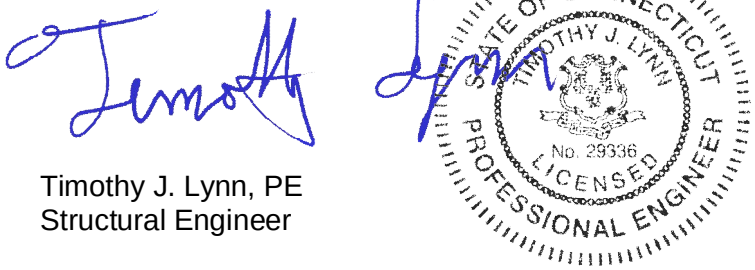
Conclusion

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

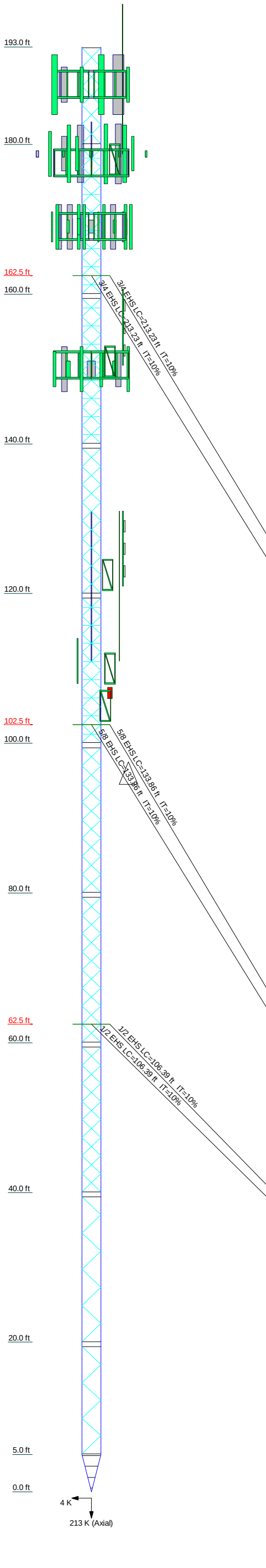
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

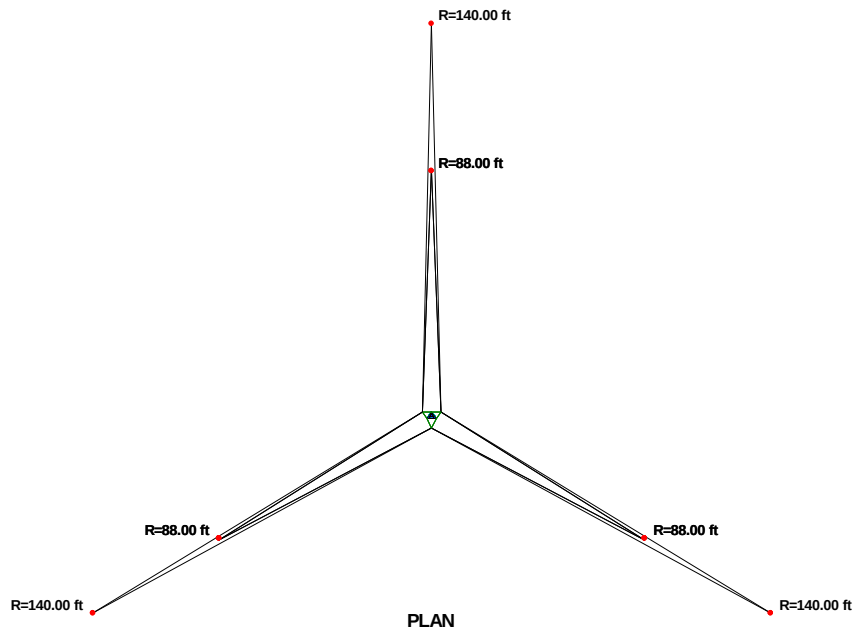
TnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, TnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

TnxTower Features:

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

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	
Legs	P2.5x.276	ROHN 2.5 EH w/plate	L2x2x1/4	P2.5x.276	L2x2x1/4	ROHN TS1.5x16 ga	L1 3/4x1 3/4x3/16	P3x.3	ROHN TS1.5x16 ga	6 @ 2.38368	5 @ 2.56667	3.417
Leg Grade	A572-50											
Diagonals	N.A.	L2x2x1/4	A36	ROHN TS1.5x11 ga	L2x2x1/4	ROHN TS1.5x16 ga	A53-B-42	ROHN TS1.5x11 ga	ROHN TS1.5x16 ga	ROHN TS1.5x11 ga	A	64 @ 2.41276
Diagonal Grade	N.A.	A53-B-42	A36	ROHN TS1.5x11 ga	A53-B-42	ROHN TS1.5x16 ga	A36	ROHN TS1.5x11 ga	A53-B-42	ROHN TS1.5x16 ga		
Top Girts	L3x3x1/2	ROHN TS1.5x11 ga	L2x2x1/4	ROHN TS1.5x11 ga	L2x2x1/4	ROHN TS1.5x16 ga	ROHN TS1.5x11 ga	ROHN TS1.5x11 ga	ROHN TS1.5x16 ga	ROHN TS1.5x11 ga		
Mid Girts	L3x3x1/2		N.A.									
Bottom Girts	L3x3x1/2	ROHN TS1.5x11 ga	L2x2x1/4	ROHN TS1.5x11 ga	L2x2x1/4	ROHN TS1.5x16 ga	ROHN TS1.5x11 ga	ROHN TS1.5x11 ga	ROHN TS1.5x16 ga	ROHN TS1.5x11 ga		
Sec. Horizontals		N.A.	L2x2x1/4	N.A.	L2x2x1/4	N.A.	N.A.	N.A.	N.A.	N.A.		
Face Width (ft)		2.5		0.9		0.8		1.6		1.0		2.3
# Panels @ (ft)	A	0.4	1.5	0.8	2.5	0.8	1.6	1.0	2.3	0.6	0.8	0.7
Weight (K)	13.1											





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
20' x 3" Dia Omni	188.75	LPA-80080-4CF (Verizon)	169
APX16DWV-16DWVS-E-A20 (T-Mobile)	188	SBNHH-1D65B (Verizon)	169
APX16DWV-16DWVS-E-A20 (T-Mobile)	188	SBNHH-1D65B (Verizon)	169
APXVAARR24-43 (T-Mobile - Proposed)	188	SBNHH-1D65B (Verizon)	169
APXVAARR24-43 (T-Mobile - Proposed)	188	LPA-80080-4CF (Verizon)	169
APXVAARR24-43 (T-Mobile - Proposed)	188	RRH4x45/2x90-AWS (Verizon)	169
(2) KRY 112 TMA (T-Mobile)	188	RRH4x45/2x90-AWS (Verizon)	169
(2) KRY 112 TMA (T-Mobile)	188	RRH4x45/2x90-AWS (Verizon)	169
(2) KRY 112 TMA (T-Mobile)	188	RRH2x60-PCS (Verizon)	169
Radio 4449 B71 B12 (T-Mobile - Proposed)	188	RRH2x60-PCS (Verizon)	169
Radio 4449 B71 B12 (T-Mobile - Proposed)	188	RRH2x60-PCS (Verizon)	169
Radio 4449 B71 B12 (T-Mobile - Proposed)	188	RRH2x60-07-U (Verizon)	169
Rohn 6'x10' Boom Gate (T-Mobile)	188	RRH2x60-07-U (Verizon)	169
Rohn 6'x10' Boom Gate (T-Mobile)	188	RRH2x60-07-U (Verizon)	169
Rohn 6'x10' Boom Gate (T-Mobile)	188	DB-T1-6Z-8AB-0Z (Verizon)	169
APX16DWV-16DWVS-E-A20 (T-Mobile)	188	DB-T1-6Z-8AB-0Z (Verizon)	169
6' x 3" Dia Omni	180	Pirod 15' T-Frame Sector Mount (1) (Verizon)	169
TPA-65R-LCUUUU-H8 (AT∐)	178.75	Pirod 15' T-Frame Sector Mount (1) (Verizon)	169
7770.00 (AT∐)	178.75	Pirod 15' T-Frame Sector Mount (1) (Verizon)	169
HPA-65R-BUU-H8 (AT∐)	178.75	SBNHH-1D65B (Verizon)	169
TPA-65R-LCUUUU-H8 (AT∐)	178.75	SBNHH-1D65B (Verizon)	169
7770.00 (AT∐)	178.75	LPA-80080-4CF (Verizon)	169
HPA-65R-BUU-H8 (AT∐)	178.75	SBNHH-1D65B (Verizon)	169
QS66512-2 (AT∐)	178.75	4 Bay Dipole	155.5
(2) TT19-08BP111-001 TMA (AT∐)	178.75	3'-6" Standoff	151
(2) TT19-08BP111-001 TMA (AT∐)	178.75	Rohn 6'x15' Boom Gate (Sprint)	150.5
(2) TT19-08BP111-001 TMA (AT∐)	178.75	Rohn 6'x15' Boom Gate (Sprint)	150.5
(2) DBCT108F1V92-1 (AT∐)	178.75	Rohn 6'x15' Boom Gate (Sprint)	150.5
(2) DBCT108F1V92-1 (AT∐)	178.75	FD-RRH 2x50 800 (Sprint)	150
(2) DBCT108F1V92-1 (AT∐)	178.75	FD-RRH 2x50 800 (Sprint)	150
RRUS-11 (AT∐)	178.75	FD-RRH 2x50 800 (Sprint)	150
RRUS-11 (AT∐)	178.75	TD-RRH8x20-25 (Sprint)	150
RRUS-11 (AT∐)	178.75	TD-RRH8x20-25 (Sprint)	150
RRUS-12 (AT∐)	178.75	TD-RRH8x20-25 (Sprint)	150
RRUS-12 (AT∐)	178.75	FD-RRH 4x40 1900 (Sprint)	150
RRUS-12 (AT∐)	178.75	FD-RRH 4x40 1900 (Sprint)	150
RRUS-32 (AT∐)	178.75	FD-RRH 4x40 1900 (Sprint)	150
RRUS-32 (AT∐)	178.75	APXV9ERR18-C-A20 w/ Mount (Sprint)	150
RRUS-32 (AT∐)	178.75	APXV9ERR18-C-A20 w/ Mount (Sprint)	150
4426 B66 (AT∐)	178.75	APXV9ERR18-C-A20 w/ Mount (Sprint)	150
4426 B66 (AT∐)	178.75	APXVTM14 (Sprint)	150
4426 B66 (AT∐)	178.75	APXVTM14 (Sprint)	150
DC6-48-60-18-8F Surge Arrestor (AT∐)	178.75	APXVTM14 (Sprint)	150
DC6-48-60-18-8F Surge Arrestor (AT∐)	178.75	DB408	126
7770.00 (AT∐)	178.75	3' Standoff	122.5
HPA-65R-BUU-H8 (AT∐)	178.75	PD220	121
6' Standoff	178	PD220	121
3' Standoff	178	Folded Dipole	111
Rohn 6'x15' Boom Gate (AT∐)	177.5	6'x3" Pipe Mount	111
Rohn 6'x15' Boom Gate (AT∐)	177.5	3'-6" Standoff	110
Rohn 6'x15' Boom Gate (AT∐)	177.5	3'-6" Standoff	110
SBNHH-1D65B (Verizon)	169	2'x2" Omni	106
SBNHH-1D65B (Verizon)	169	2' Standoff	105
SBNHH-1D65B (Verizon)	169		

SYMBOL LIST

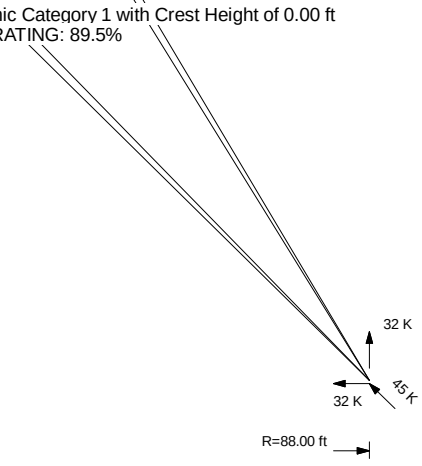
MARK	SIZE	MARK	SIZE
A	3 @ 1.44444		

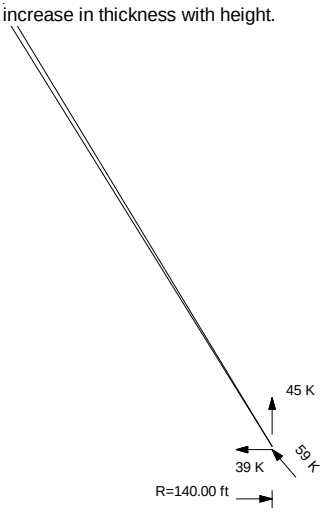
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A53-B-42	42 ksi	63 ksi
A36	36 ksi	58 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-G Standard.
2. Tower designed for a 105 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 II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 89.5%





ALL REACTIONS ARE FACTORED

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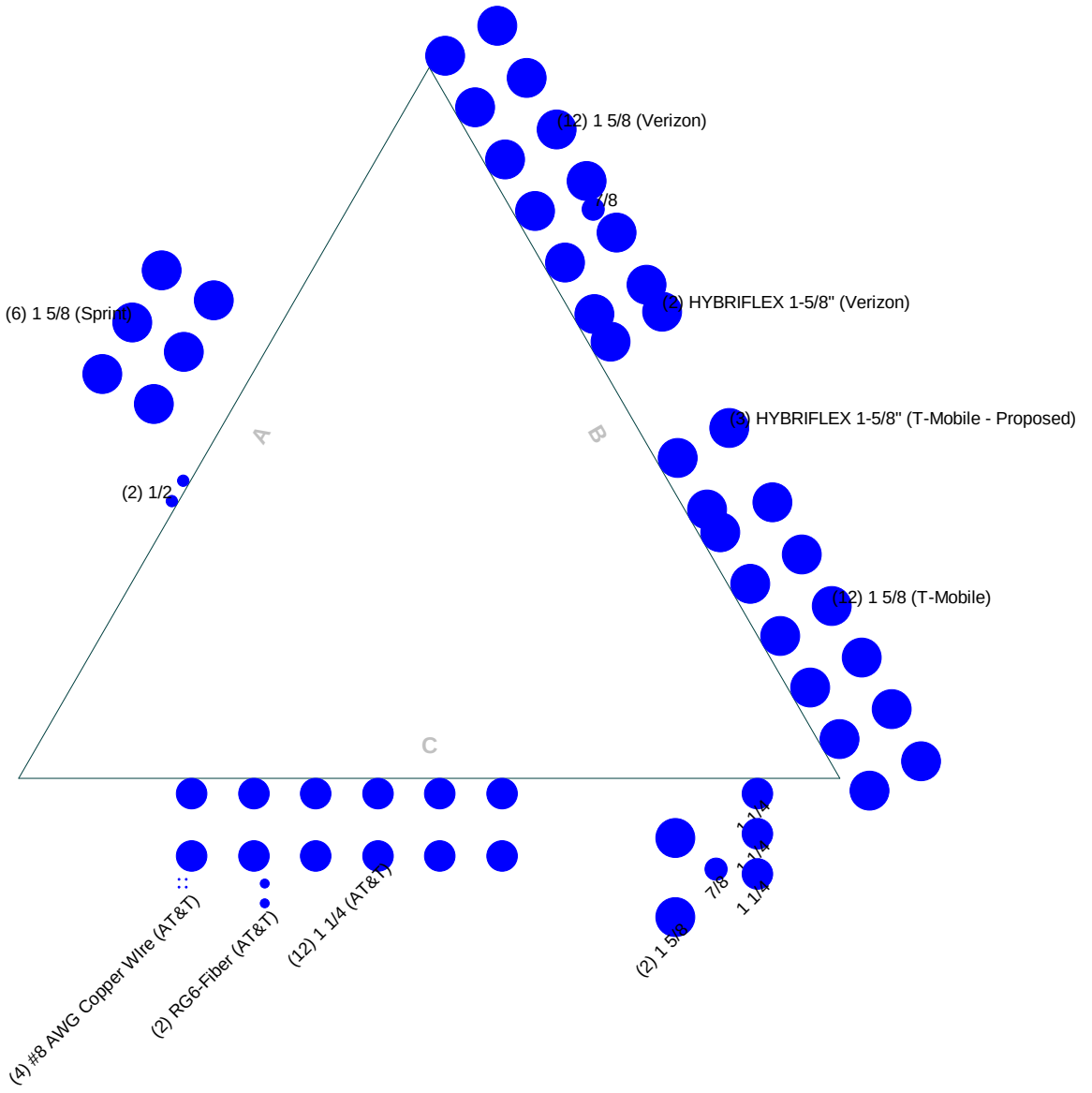
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: ***19027.72 - CTNL023C***			
Project: ***193' Guyed Lattice Tower - 57 Cook Road, Montville, CT***			
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 06/10/19	Scale: NTS	
Path: J:\Jobs\1902700.WI\72_CTNL023C\05_Structural\Tower Analysis\Backup Documentation\Calcs\tnxTower Files\193' Guyed Rohn Tower.eri		Dwg No. E-1	

Feed Line Plan

Round Flat App In Face App Out Face



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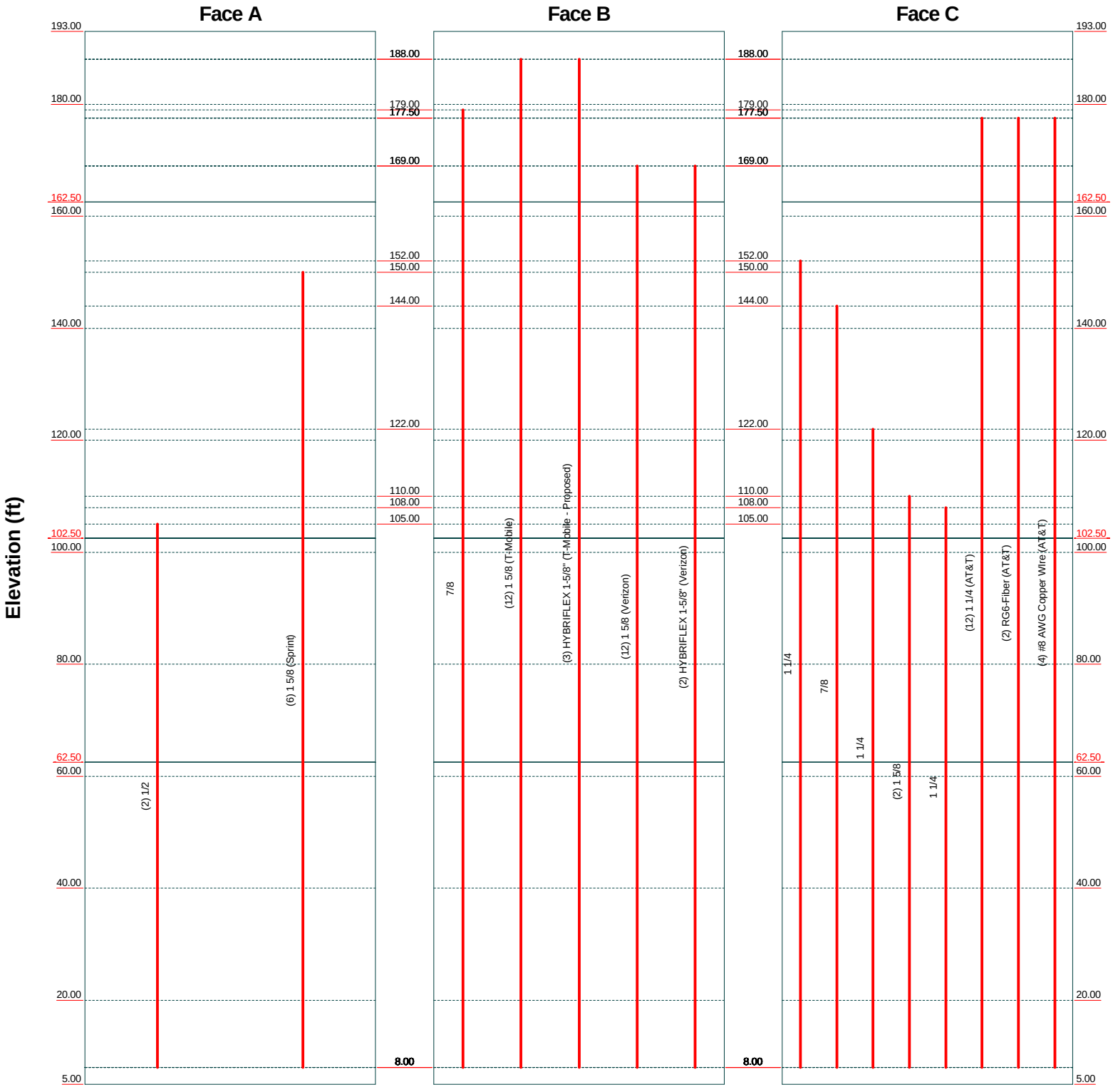
Path: J:\Jobs\1902700.WI\72_CTNL023C\05_Structural\Tower Analysis\Backup Documentation\Calculinx\Tower Files\193' Guyed Rohn Tower.eri			Dwg No. E-7

Feed Line Distribution Chart
5' - 193'

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



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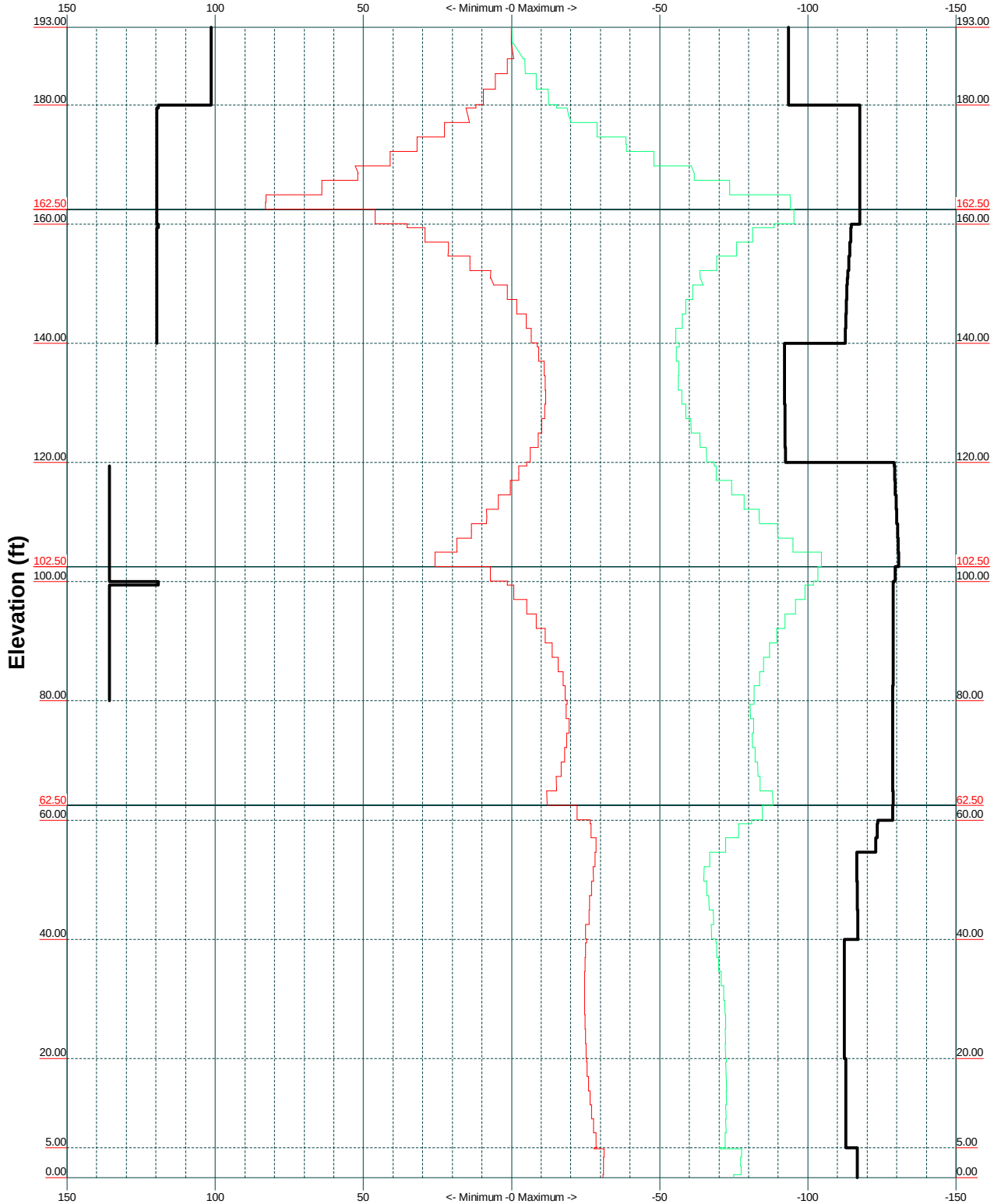
Code: TIA-222-G		Date: 06/10/19	Scale: NTS
Path: J:\Jobs\1902700.WI\72_CTNL023C\05_Structural\Tower Analysis\Backup Documentation\Celcite\Tower Files\193' Guyed Rohn Tower.eri			Dwg No. E-7

TIA-222-G - 105 mph/50 mph 0.7500 in Ice Exposure B

Leg Capacity ——— **Leg Compression (K)**



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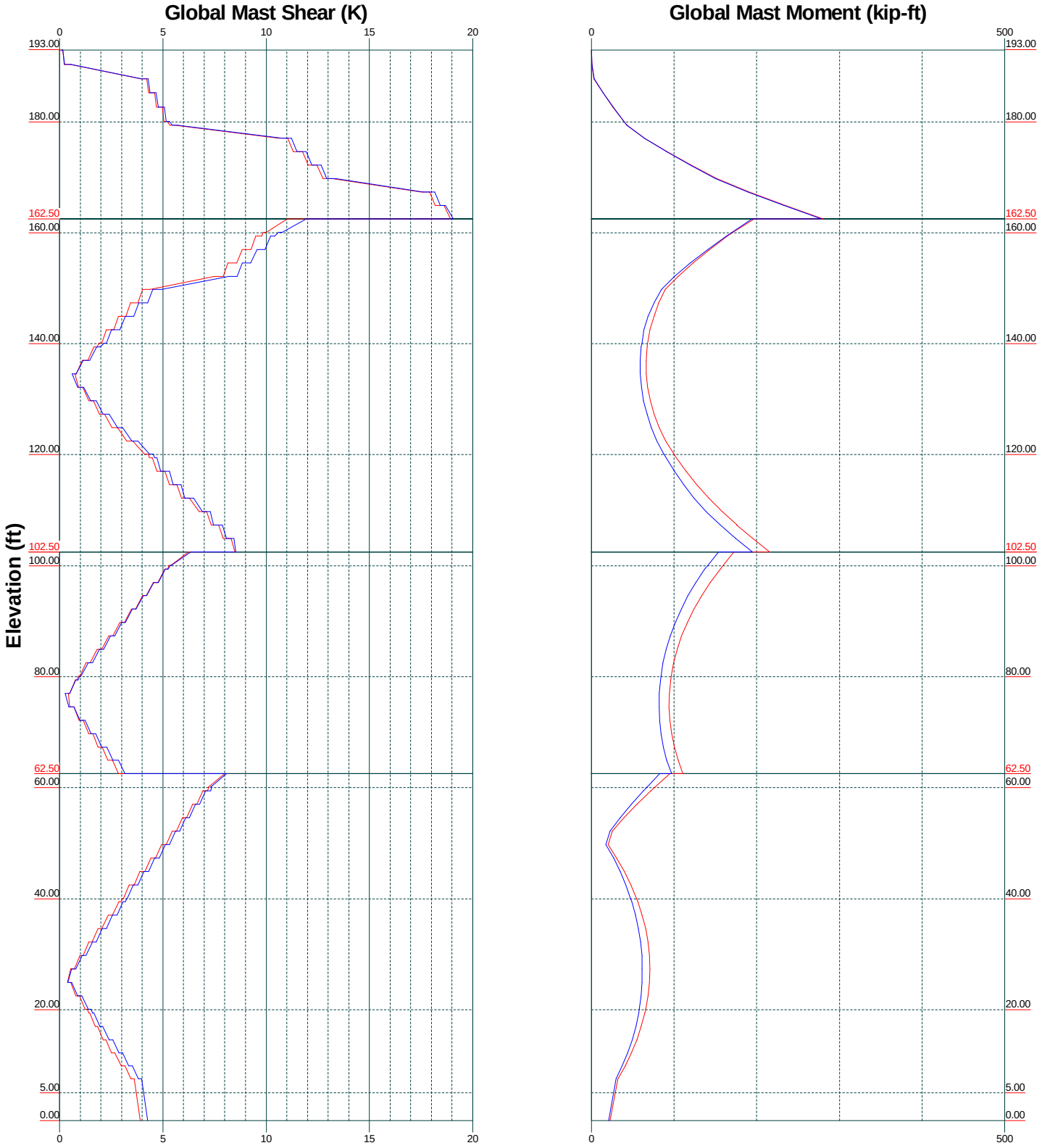
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 06/10/19	Scale: NTS	
Path: J:\Jobs\1902700.WI\72_CTNL023C\05_Structural\Tower Analysis\Backup Documentation\Calcs\tnxTower Files\193' Guyed Rohn Tower.eri		Dwg No. E-3	

TIA-222-G - 105 mph/50 mph 0.7500 in Ice Exposure B

Maximum Values

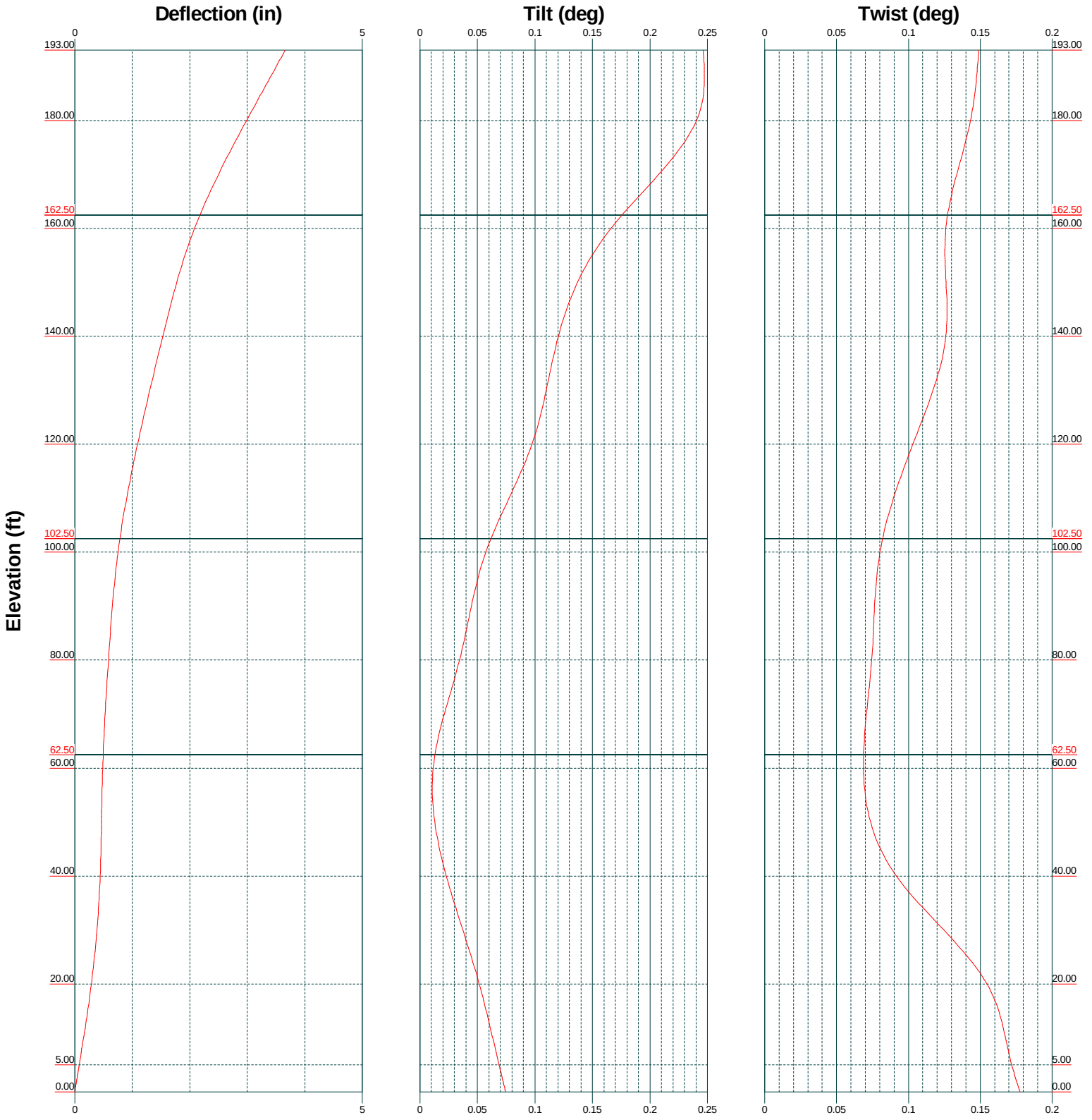
Vx Vz Mx Mz



Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: ***19027.72 - CTNL023C***		
	Project: ***193' Guyed Lattice Tower - 57 Cook Road, Montville, CT***		
	Client: T-Mobile	Drawn by: TJL	App'd:
	Code: TIA-222-G	Date: 06/10/19	Scale: NTS
	Path: J:\Jobs\1902700.WI\72_CTNL023C\05_Structural\Tower Analysis\Backup Documentation\Calculinx\Tower Files\193' Guyed Rohn Tower.eri		Dwg No. E-4

TIA-222-G - Service - 60 mph

Maximum Values



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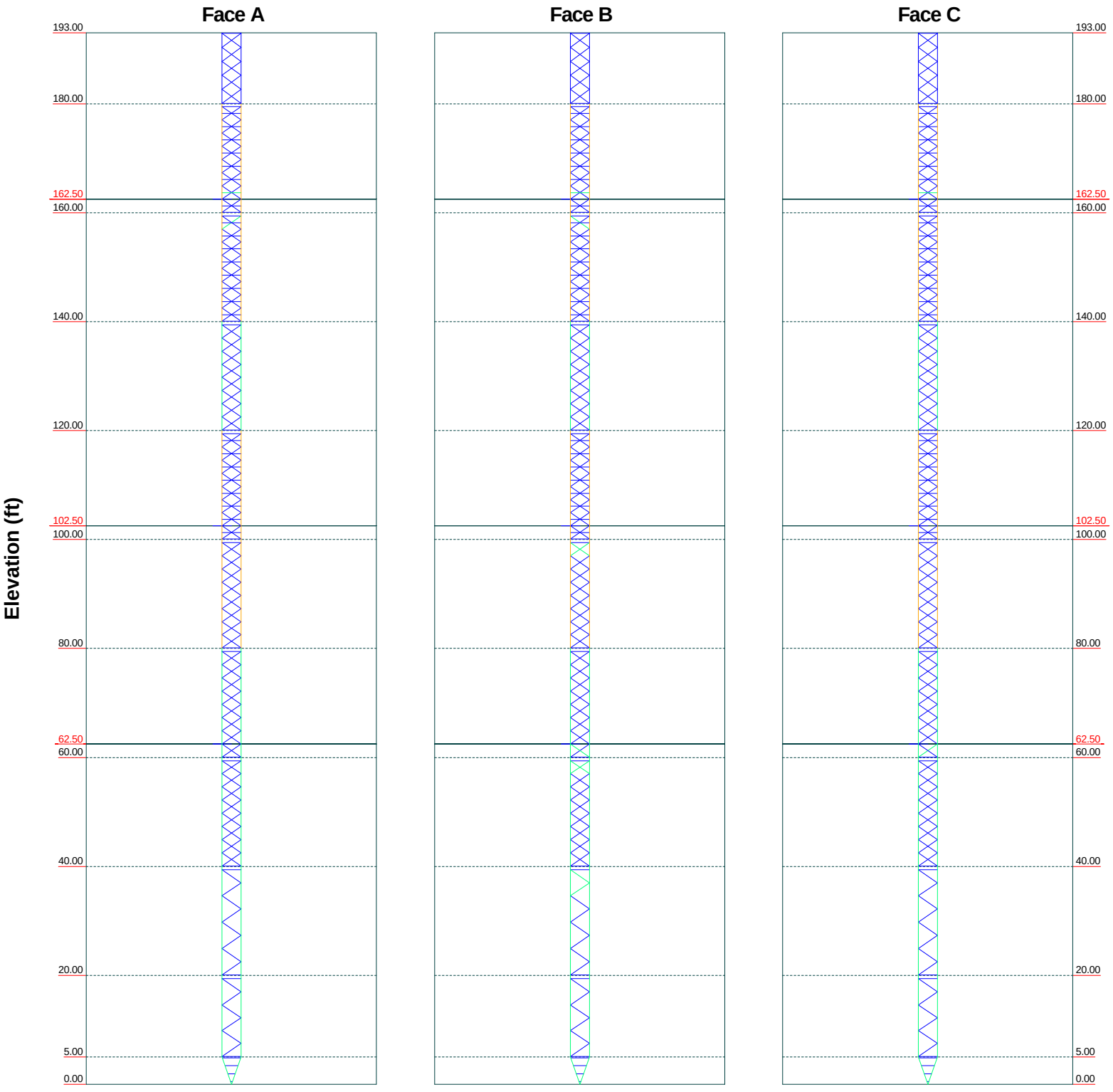
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 06/10/19	Scale: NTS	
Path: J:\Jobs\1902700.WI\72_CTNL023C\05_Structural\Tower Analysis\Backup Documentation\Calcs\tnxTower Files\193' Guyed Rohn Tower.eri		Dwg No. E-5	

Stress Distribution Chart
0' - 193'

> 100% | 90%-100% | 75%-90% | 50%-75% | < 50% Overstress



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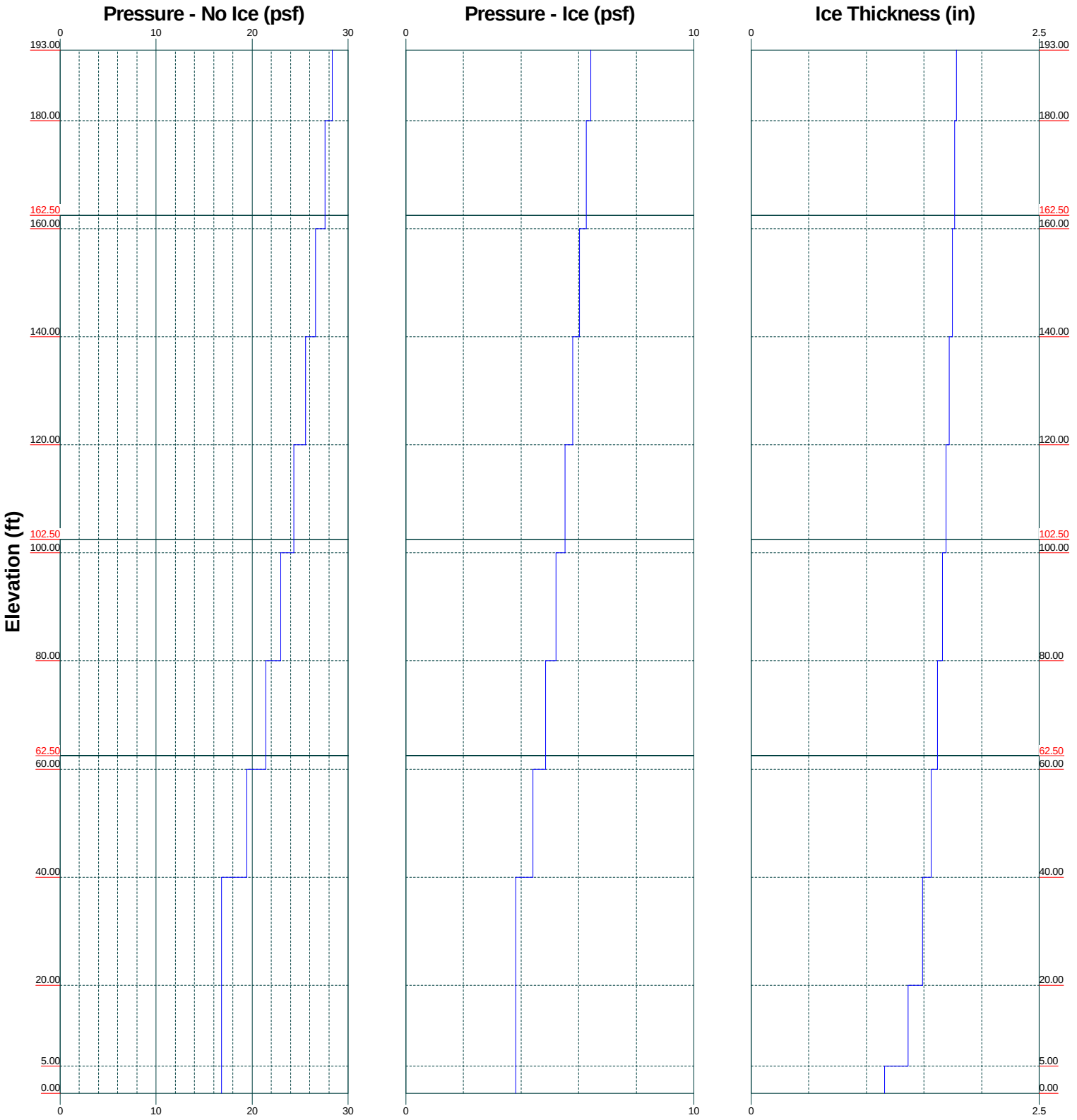
Code: TIA-222-G	Date: 06/10/19	Scale: NTS	
Path: J:\Jobs\1902700.WI\72_CTNL023C\05_Structural\Tower Analysis\Backup Documentation\Calcs\tnxTower Files\193' Guyed Rohn Tower.eri		Dwg No. E-8	

Wind Pressures and Ice Thickness

TIA-222-G - 105 mph/50 mph 0.7500 in Ice Exposure B



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Client: T-Mobile		Drawn by: TJL	App'd:
Code: TIA-222-G		Date: 06/10/19	Scale: NTS
Path: J:\Jobs\1902700.WI\72_CTNL023C\05_Structural\Tower Analysis\Backup Documentation\Calculinx\Tower Files\193' Guyed Rohn Tower.eri			Dwg No. E-9

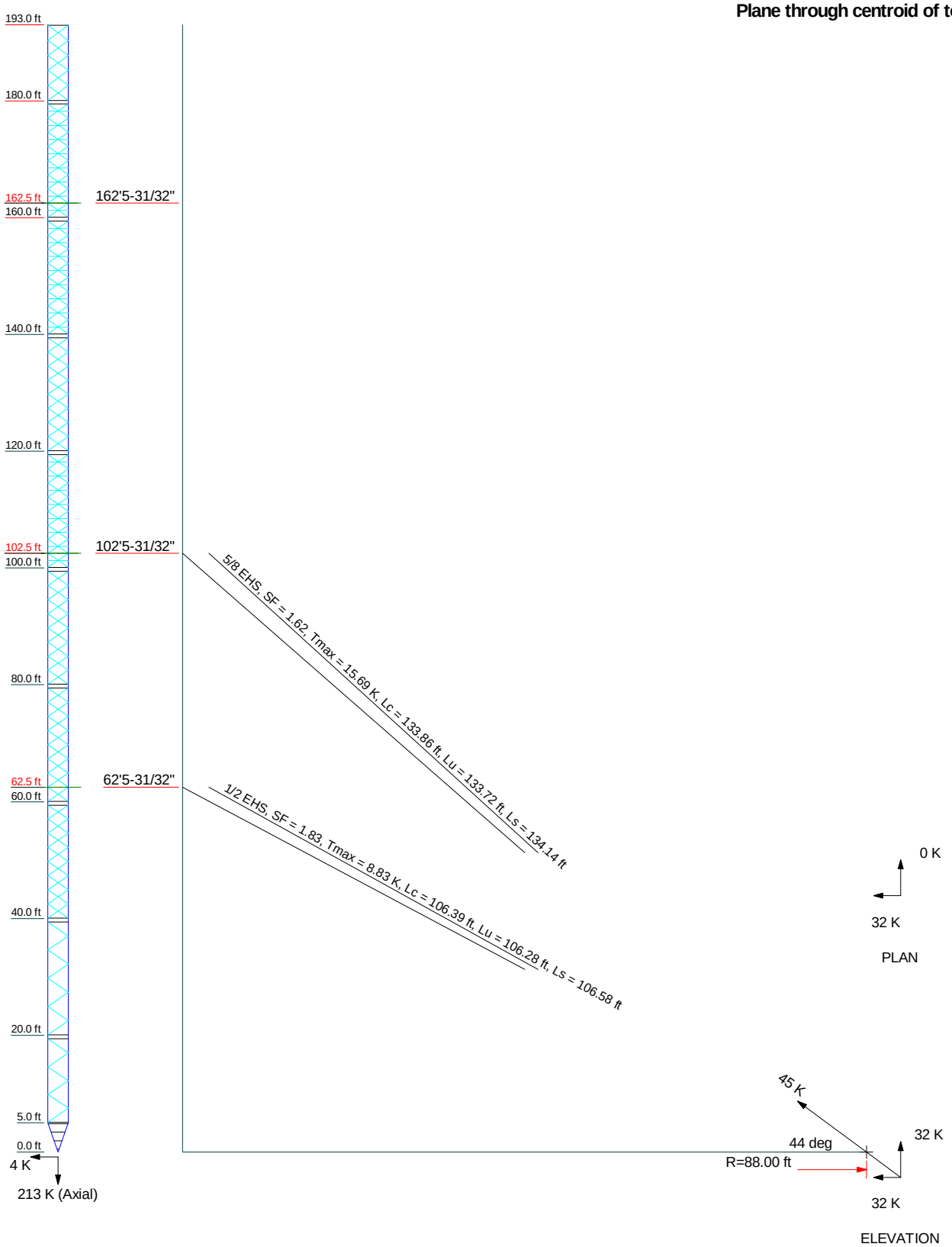
Guy Tensions and Tower Reactions

TIA-222-G - 105 mph/50 mph 0.7500 in Ice Exposure B

Maximum Values

Anchor 'B'@88 ft Azimuth 120 deg Elev 0 ft

Plane through centroid of tower



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	Project: ***193' Guyed Lattice Tower - 57 Cook Road, Montville, CT***		
	Client: T-Mobile	Drawn by: TJL	App'd:
	Code: TIA-222-G	Date: 06/10/19	Scale: NTS
	Path: J:\Jobs\1902700.WI\72_CTNL023C\05_Structural\Tower Analysis\Backup Documentation\Calculinx\Tower Files\193' Guyed Rohn Tower.eri		Dwg No. E-6

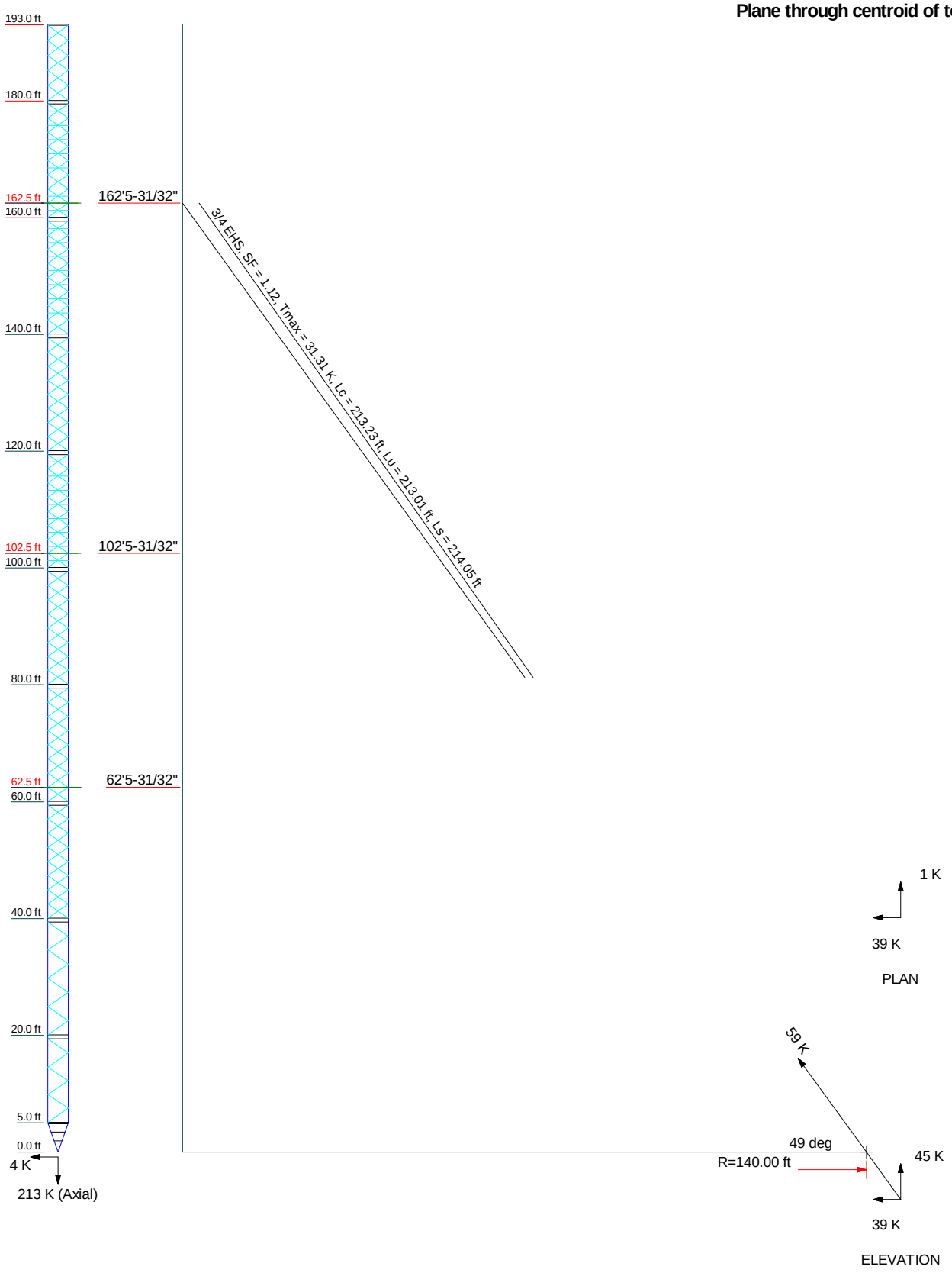
Guy Tensions and Tower Reactions

TIA-222-G - 105 mph/50 mph 0.7500 in Ice Exposure B

Maximum Values

Anchor 'C'@140 ft Azimuth 240 deg Elev 0 ft

Plane through centroid of tower



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	Project: ***193' Guyed Lattice Tower - 57 Cook Road, Montville, CT***		
	Client: T-Mobile	Drawn by: TJL	App'd:
	Code: TIA-222-G	Date: 06/10/19	Scale: NTS
	Path: J:\Jobs\1902700.WI\72_CTNL023C\05_Structural\Tower Analysis\Backup Documentation\Calcs\tnxTower Files\193' Guyed Rohn Tower.eri		Dwg No. E-6

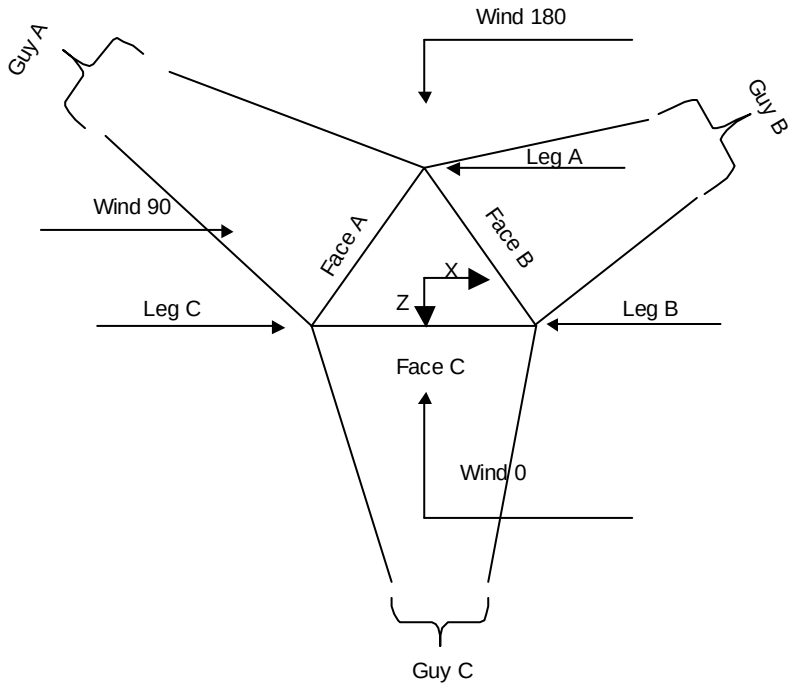
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 193.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 3.42 ft at the top and tapered at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

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

Options

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



Face Guyed

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	193.00-180.00			3.42	1	13.00
T2	180.00-160.00			3.42	1	20.00
T3	160.00-140.00			3.42	1	20.00
T4	140.00-120.00			3.42	1	20.00
T5	120.00-100.00			3.42	1	20.00
T6	100.00-80.00			3.42	1	20.00
T7	80.00-60.00			3.42	1	20.00
T8	60.00-40.00			3.42	1	20.00
T9	40.00-20.00			3.42	1	20.00
T10	20.00-5.00			3.42	1	15.00
T11	5.00-0.00			3.42	1	5.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	193.00-180.00	2.57	X Brace	No	No	1.0000	1.0000
T2	180.00-160.00	2.41	X Brace	No	Yes	7.3750	1.0000
T3	160.00-140.00	2.41	X Brace	No	Yes	7.3750	1.0000
T4	140.00-120.00	2.41	CX Brace	No	No	7.3750	1.0000
T5	120.00-100.00	2.41	X Brace	No	Yes	7.3750	1.0000
T6	100.00-80.00	2.41	CX Brace	No	No	7.3750	1.0000
T7	80.00-60.00	2.41	X Brace	No	No	7.3750	1.0000
T8	60.00-40.00	2.41	CX Brace	No	No	7.3750	1.0000
T9	40.00-20.00	2.41	K Brace Left	No	No	7.3750	1.0000
T10	20.00-5.00	2.38	K Brace Left	No	No	7.3750	1.0000
T11	5.00-0.00	1.44	X Brace	No	Yes	2.0000	6.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 193.00-180.00	Pipe	P2.5x.276	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T2 180.00-160.00	Pipe	ROHN 2.5 EH w/plate	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T3 160.00-140.00	Pipe	ROHN 2.5 EH w/plate	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T4 140.00-120.00	Pipe	P2.5x.276	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T5 120.00-100.00	Pipe	P3x.3	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T6 100.00-80.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T7 80.00-60.00	Pipe	P3x.3	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T8 60.00-40.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A36 (36 ksi)
T9 40.00-20.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T10 20.00-5.00	Pipe	P3x.3	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T11 5.00-0.00	Pipe	P3x.3	A572-50 (50 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 193.00-180.00	Single Angle	L2x2x1/4	A36 (36 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T2 180.00-160.00	Single Angle	L2x2x1/4	A36 (36 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T3 160.00-140.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T4 140.00-120.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T5 120.00-100.00	Single Angle	L2x2x1/4	A36 (36 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T6 100.00-80.00	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T7 80.00-60.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T8 60.00-40.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T9 40.00-20.00	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x16 ga	A53-B-42 (42 ksi)
T10 20.00-5.00	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 ga	A53-B-42 (42 ksi)
T11 5.00-0.00	Single Angle	L3x3x1/2	A36 (36 ksi)	Equal Angle	L3x3x1/2	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
T11 5.00-0.00	2	Single Angle	L3x3x1/2	A36 (36 ksi)	Single Angle		A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T2 180.00-160.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T3 160.00-140.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T5 120.00-100.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 193.00-180.00	0.28	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 180.00-160.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 160.00-140.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 140.00-120.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 120.00-100.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 100.00-80.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 80.00-60.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8 60.00-40.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 40.00-20.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T10 20.00-5.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T11 5.00-0.00	0.07	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	Yes	1	1	1	1	1	1	1	1
193.00-180.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
180.00-160.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T9	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T10	Yes	Yes	1	1	1	1	1	1	1	1
20.00-5.00				1	1	1	1	1	1	1
T11 5.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 193.00-180.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 20.00-5.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 5.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower 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 193.00-180.00	Flange	0.7500 A325N	4	0.6250 A325N	2	0.6250 A325N	2	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 180.00-160.00	Flange	0.7500 A325N	4	0.6250 A325N	2	0.6250 A325N	2	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T3 160.00-140.00	Flange	0.7500 A325N	4	0.6250 A325X	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T4 140.00-120.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 120.00-100.00	Flange	0.7500 A325N	4	0.6250 A325N	2	0.6250 A325N	2	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	1
T6 100.00-80.00	Flange	0.7500 A325N	4	0.5000 A490X	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 80.00-60.00	Flange	0.7500 A325N	4	0.6250 A325X	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 60.00-40.00	Flange	0.7500 A325N	4	0.5000 A325X	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 40.00-20.00	Flange	0.7500 A325N	4	0.6250 A490X	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 20.00-5.00	Flange	0.7500 A325N	4	0.5000 A490X	1	0.5000 A325N	1	0.6250 A490X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T11 5.00-0.00	Flange	0.7500 A325N	4	0.5000 A325N	0	0.5000 A325N	0	0.5000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension K	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
162.496	EHS	A	3/4	5.83	10%	19000	1.155	213.04	140.00	0.0000	0.00	100%
		B	3/4	5.83	10%	19000	1.155	213.04	140.00	0.0000	0.00	100%
		C	3/4	5.83	10%	19000	1.155	213.04	140.00	0.0000	0.00	100%
102.496	EHS	A	5/8	4.24	10%	21000	0.813	133.74	88.00	0.0000	0.00	100%
		B	5/8	4.24	10%	21000	0.813	133.74	88.00	0.0000	0.00	100%
		C	5/8	4.24	10%	21000	0.813	133.74	88.00	0.0000	0.00	100%
62.4961	EHS	A	1/2	2.69	10%	21000	0.517	106.30	88.00	0.0000	0.00	100%
		B	1/2	2.69	10%	21000	0.517	106.30	88.00	0.0000	0.00	100%
		C	1/2	2.69	10%	21000	0.517	106.30	88.00	0.0000	0.00	100%

Guy Data *(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
162.496	Torque Arm	6.83	0.0000	Channel	A36 (36 ksi)	Channel	C15x50
102.496	Torque Arm	6.83	0.0000	Channel	A36 (36 ksi)	Channel	C15x33.9
62.4961	Torque Arm	6.83	0.0000	Channel	A36 (36 ksi)	Channel	C12x25

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
162.50	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Channel	
102.50	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Channel	
62.50	A572-50 (50 ksi)	Solid Round				A36 (36 ksi)	Channel	

Guy Data *(cont'd)*

Guy Elevation ft	Cable Weight A K	Cable Weight B K	Cable Weight C K	Cable Weight D K	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
162.496	0.25	0.25	0.25		4.43 3.6 sec/pulse	4.43 3.6 sec/pulse	4.43 3.6 sec/pulse	
102.496	0.11	0.11	0.11		1.70 2.3 sec/pulse	1.70 2.3 sec/pulse	1.70 2.3 sec/pulse	
62.4961	0.05	0.05	0.05		1.08 1.8 sec/pulse	1.08 1.8 sec/pulse	1.08 1.8 sec/pulse	

Guy Data *(cont'd)*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
162.496	No	No	1	1	1	1	1	1
102.496	No	No	1	1	1	1	1	1
62.4961	No	No	1	1	1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
162.496	0.8750 A325N	4	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
102.496	0.8750 A325N	4	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
62.4961	0.8750 A325N	4	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
162.496	A	81.25	22	5	1.6414
	B	81.25	22	5	1.6414
	C	81.25	22	5	1.6414
102.496	A	51.25	20	4	1.5675
	B	51.25	20	4	1.5675
	C	51.25	20	4	1.5675
62.4961	A	31.25	17	4	1.4918

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
	B	31.25	17	4	1.4918
	C	31.25	17	4	1.4918

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top / Bottom K	F_x K	F_y K	F_z K	M_x kip-ft	M_y kip-ft	M_z kip-ft
162.496	A	49.6461	6.02 5.83	-0.09	4.64	-3.83	-9.15	13.29	-15.84
	A	49.6461	6.02 5.83	0.09	4.64	-3.83	-9.15	-13.29	15.84
	B	49.6461	6.02 5.83	3.37	4.64	1.83	18.30	13.29	0.00
	B	49.6461	6.02 5.83	3.27	4.64	2.00	-9.15	-13.29	-15.84
	C	49.6461	6.02 5.83	-3.27	4.64	2.00	-9.15	13.29	15.84
	C	49.6461	6.02 5.83	-3.37	4.64	1.83	18.30	-13.29	0.00
			Sum:	0.00	27.82	0.00	-0.00	0.00	0.00
102.496	A	49.9703	4.32 4.24	-0.11	3.33	-2.75	-6.58	9.62	-11.39
	A	49.9703	4.32 4.24	0.11	3.33	-2.75	-6.58	-9.62	11.39
	B	49.9703	4.32 4.24	2.44	3.33	1.28	13.15	9.62	0.00
	B	49.9703	4.32 4.24	2.33	3.33	1.47	-6.58	-9.62	-11.39
	C	49.9703	4.32 4.24	-2.33	3.33	1.47	-6.58	9.62	11.39
	C	49.9703	4.32 4.24	-2.44	3.33	1.28	13.15	-9.62	0.00
			Sum:	0.00	20.00	0.00	-0.00	0.00	0.00
62.4961	A	35.9758	2.72 2.69	-0.09	1.62	-2.19	-3.19	7.65	-5.53
	A	35.9758	2.72 2.69	0.09	1.62	-2.19	-3.19	-7.65	5.53
	B	35.9758	2.72 2.69	1.94	1.62	1.02	6.38	7.65	0.00
	B	35.9758	2.72 2.69	1.85	1.62	1.17	-3.19	-7.65	-5.53
	C	35.9758	2.72 2.69	-1.85	1.62	1.17	-3.19	7.65	5.53
	C	35.9758	2.72 2.69	-1.94	1.62	1.02	6.38	-7.65	0.00
			Sum:	0.00	9.70	0.00	-0.00	0.00	0.00

Guy-Mast Forces (Excluding Wind) - Ice

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
162.496	A	49.6461	10.20 9.23	-0.16	8.04	-6.28	-15.85	21.76	-27.46
	A	49.6461	10.20 9.23	0.16	8.04	-6.28	-15.85	-21.76	27.46
	B	49.6461	10.20 9.23	5.51	8.04	3.00	31.70	21.76	0.00
	B	49.6461	10.20 9.23	5.36	8.04	3.27	-15.85	-21.76	-27.46
	C	49.6461	10.20 9.23	-5.36	8.04	3.27	-15.85	21.76	27.46
	C	49.6461	10.20 9.23	-5.51	8.04	3.00	31.70	-21.76	0.00
			Sum:	0.00	48.21	0.00	-0.00	0.00	0.00
102.496	A	49.9703	6.95 6.44	-0.17	5.46	-4.30	-10.77	15.03	-18.66
	A	49.9703	6.95 6.44	0.17	5.46	-4.30	-10.77	-15.03	18.66
	B	49.9703	6.95 6.44	3.81	5.46	2.00	21.55	15.03	0.00
	B	49.9703	6.95 6.44	3.64	5.46	2.30	-10.77	-15.03	-18.66
	C	49.9703	6.95 6.44	-3.64	5.46	2.30	-10.77	15.03	18.66
	C	49.9703	6.95 6.44	-3.81	5.46	2.00	21.55	-15.03	0.00
			Sum:	0.00	32.77	0.00	-0.00	0.00	0.00
62.4961	A	35.9758	4.65 4.39	-0.14	2.87	-3.65	-5.67	12.75	-9.82
	A	35.9758	4.65 4.39	0.14	2.87	-3.65	-5.67	-12.75	9.82
	B	35.9758	4.65 4.39	3.23	2.87	1.70	11.33	12.75	0.00
	B	35.9758	4.65 4.39	3.09	2.87	1.95	-5.67	-12.75	-9.82
	C	35.9758	4.65 4.39	-3.09	2.87	1.95	-5.67	12.75	9.82
	C	35.9758	4.65 4.39	-3.23	2.87	1.70	11.33	-12.75	0.00
			Sum:	0.00	17.24	0.00	-0.00	0.00	0.00

Guy-Mast Forces (Excluding Wind) - Service

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
162.496	A	49.6461	6.02 5.83	-0.09	4.64	-3.83	-9.15	13.29	-15.84
	A	49.6461	6.02 5.83	0.09	4.64	-3.83	-9.15	-13.29	15.84
	B	49.6461	6.02 5.83	3.37	4.64	1.83	18.30	13.29	0.00
	B	49.6461	6.02	3.27	4.64	2.00	-9.15	-13.29	-15.84

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
			5.83						
	C	49.6461	6.02	-3.27	4.64	2.00	-9.15	13.29	15.84
			5.83						
	C	49.6461	6.02	-3.37	4.64	1.83	18.30	-13.29	0.00
			5.83						
			Sum:	0.00	27.82	0.00	-0.00	0.00	0.00
102.496	A	49.9703	4.32	-0.11	3.33	-2.75	-6.58	9.62	-11.39
			4.24						
	A	49.9703	4.32	0.11	3.33	-2.75	-6.58	-9.62	11.39
			4.24						
	B	49.9703	4.32	2.44	3.33	1.28	13.15	9.62	0.00
			4.24						
	B	49.9703	4.32	2.33	3.33	1.47	-6.58	-9.62	-11.39
			4.24						
	C	49.9703	4.32	-2.33	3.33	1.47	-6.58	9.62	11.39
			4.24						
	C	49.9703	4.32	-2.44	3.33	1.28	13.15	-9.62	0.00
			4.24						
			Sum:	0.00	20.00	0.00	-0.00	0.00	0.00
62.4961	A	35.9758	2.72	-0.09	1.62	-2.19	-3.19	7.65	-5.53
			2.69						
	A	35.9758	2.72	0.09	1.62	-2.19	-3.19	-7.65	5.53
			2.69						
	B	35.9758	2.72	1.94	1.62	1.02	6.38	7.65	0.00
			2.69						
	B	35.9758	2.72	1.85	1.62	1.17	-3.19	-7.65	-5.53
			2.69						
	C	35.9758	2.72	-1.85	1.62	1.17	-3.19	7.65	5.53
			2.69						
	C	35.9758	2.72	-1.94	1.62	1.02	6.38	-7.65	0.00
			2.69						
			Sum:	0.00	9.70	0.00	-0.00	0.00	0.00

Guy-Tensioning Information

				Temperature At Time Of Tensioning													
				0 F		20 F		40 F		60 F		80 F		100 F		120 F	
Guy Elevation		H	V	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept
ft		ft	ft	K	ft	K	ft	K	ft	K	ft	K	ft	K	ft	K	ft
162.496	A	138.07	162.50	6.824	3.79	6.490	3.98	6.159	4.20	5.830	4.43	5.505	4.69	5.183	4.97	4.867	5.29
	B	138.07	162.50	6.824	3.79	6.490	3.98	6.159	4.20	5.830	4.43	5.505	4.69	5.183	4.97	4.867	5.29
	C	138.07	162.50	6.824	3.79	6.490	3.98	6.159	4.20	5.830	4.43	5.505	4.69	5.183	4.97	4.867	5.29
102.496	A	86.10	102.50	5.024	1.44	4.761	1.51	4.500	1.60	4.240	1.70	3.981	1.81	3.724	1.93	3.468	2.07
	B	86.10	102.50	5.024	1.44	4.761	1.51	4.500	1.60	4.240	1.70	3.981	1.81	3.724	1.93	3.468	2.07
	C	86.10	102.50	5.024	1.44	4.761	1.51	4.500	1.60	4.240	1.70	3.981	1.81	3.724	1.93	3.468	2.07
62.4961	A	86.10	62.50	3.480	0.84	3.215	0.90	2.952	0.98	2.690	1.08	2.430	1.20	2.173	1.34	1.920	1.51
	B	86.10	62.50	3.480	0.84	3.215	0.90	2.952	0.98	2.690	1.08	2.430	1.20	2.173	1.34	1.920	1.51
	C	86.10	62.50	3.480	0.84	3.215	0.90	2.952	0.98	2.690	1.08	2.430	1.20	2.173	1.34	1.920	1.51

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
1/2	A	No	No	Ar (CaAa)	105.00 - 8.00	0.0000	-0.1	2	2	0.5800	0.5800		0.25
7/8	B	No	No	Ar (CaAa)	179.00 - 8.00	3.0000	-0.25	1	1	1.1100	1.1100		0.54
1 1/4	C	No	No	Ar (CaAa)	152.00 - 8.00	0.0000	-0.4	1	1	1.5500	1.5500		0.66
7/8	C	No	No	Ar (CaAa)	144.00 - 8.00	4.0000	-0.35	1	1	1.1100	1.1100		0.54
1 1/4	C	No	No	Ar (CaAa)	122.00 - 8.00	2.0000	-0.4	1	1	1.5500	1.5500		0.66
1 5/8	C	No	No	Ar (CaAa)	110.00 - 8.00	2.0000	-0.3	2	1	1.9800	1.9800		1.04
1 1/4	C	No	No	Ar (CaAa)	108.00 - 8.00	4.0000	-0.4	1	1	1.5500	1.5500		0.66
1 5/8 (T-Mobile)	B	No	No	Ar (CaAa)	188.00 - 8.00	0.0000	0.35	12	6	1.0000	1.9800		1.04
HYBRIFLEX 1-5/8" (T-Mobile - Proposed)	B	No	No	Ar (CaAa)	188.00 - 8.00	0.0000	0.1	3	2	1.0000	1.9800		1.90
1 1/4 (AT&T)	C	No	No	Ar (CaAa)	177.50 - 8.00	0.0000	0.1	12	6	1.5500	1.5500		0.66
RG6-Fiber (AT&T)	C	No	No	Ar (CaAa)	177.50 - 8.00	5.0000	0.2	2	1	0.5000	0.5000		1.00
#8 AWG Copper WIre (AT&T)	C	No	No	Ar (CaAa)	177.50 - 8.00	5.0000	0.3	4	2	0.2500	0.1285		0.05
1 5/8 (Verizon)	B	No	No	Ar (CaAa)	169.00 - 8.00	0.0000	-0.32	12	6	1.0000	1.9800		1.04
HYBRIFLEX 1-5/8" (Verizon)	B	No	No	Ar (CaAa)	169.00 - 8.00	0.0000	-0.1	2	1	1.0000	1.9800		1.90
1 5/8 (Sprint)	A	No	No	Ar (CaAa)	150.00 - 8.00	2.5000	0.05	6	3	1.0000	1.9800		1.04

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	193.00-180.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	23.760	0.000	0.15
		C	0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	86.457	0.000	0.52
		C	0.000	0.000	35.200	0.000	0.18
T3	160.00-140.00	A	0.000	0.000	11.880	0.000	0.06
		B	0.000	0.000	117.060	0.000	0.70
		C	0.000	0.000	42.532	0.000	0.21
T4	140.00-120.00	A	0.000	0.000	23.760	0.000	0.12
		B	0.000	0.000	117.060	0.000	0.70
		C	0.000	0.000	45.858	0.000	0.23
T5	120.00-100.00	A	0.000	0.000	24.340	0.000	0.13
		B	0.000	0.000	117.060	0.000	0.70
		C	0.000	0.000	53.848	0.000	0.27
T6	100.00-80.00	A	0.000	0.000	26.080	0.000	0.13

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	117.060	0.000	0.70
		C	0.000	0.000	59.668	0.000	0.29
T7	80.00-60.00	A	0.000	0.000	26.080	0.000	0.13
		B	0.000	0.000	117.060	0.000	0.70
		C	0.000	0.000	59.668	0.000	0.29
T8	60.00-40.00	A	0.000	0.000	26.080	0.000	0.13
		B	0.000	0.000	117.060	0.000	0.70
		C	0.000	0.000	59.668	0.000	0.29
T9	40.00-20.00	A	0.000	0.000	26.080	0.000	0.13
		B	0.000	0.000	117.060	0.000	0.70
		C	0.000	0.000	59.668	0.000	0.29
T10	20.00-5.00	A	0.000	0.000	15.648	0.000	0.08
		B	0.000	0.000	70.236	0.000	0.42
		C	0.000	0.000	35.801	0.000	0.18
T11	5.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	193.00-180.00	A	1.784	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	34.214	0.000	0.70
		C		0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	1.767	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	130.403	0.000	2.61
		C		0.000	0.000	75.072	0.000	1.39
T3	160.00-140.00	A	1.745	0.000	0.000	17.769	0.000	0.34
		B		0.000	0.000	174.512	0.000	3.49
		C		0.000	0.000	93.233	0.000	1.70
T4	140.00-120.00	A	1.720	0.000	0.000	35.364	0.000	0.68
		B		0.000	0.000	173.742	0.000	3.46
		C		0.000	0.000	104.915	0.000	1.86
T5	120.00-100.00	A	1.692	0.000	0.000	39.213	0.000	0.70
		B		0.000	0.000	172.858	0.000	3.42
		C		0.000	0.000	130.363	0.000	2.19
T6	100.00-80.00	A	1.658	0.000	0.000	50.889	0.000	0.79
		B		0.000	0.000	171.815	0.000	3.37
		C		0.000	0.000	148.270	0.000	2.41
T7	80.00-60.00	A	1.617	0.000	0.000	50.313	0.000	0.78
		B		0.000	0.000	170.538	0.000	3.32
		C		0.000	0.000	146.484	0.000	2.35
T8	60.00-40.00	A	1.564	0.000	0.000	49.564	0.000	0.76
		B		0.000	0.000	168.880	0.000	3.24
		C		0.000	0.000	144.164	0.000	2.27
T9	40.00-20.00	A	1.486	0.000	0.000	48.475	0.000	0.73
		B		0.000	0.000	166.468	0.000	3.14
		C		0.000	0.000	140.788	0.000	2.17
T10	20.00-5.00	A	1.361	0.000	0.000	28.040	0.000	0.41
		B		0.000	0.000	97.569	0.000	1.78
		C		0.000	0.000	81.236	0.000	1.20
T11	5.00-0.00	A	1.159	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	193.00-180.00	8.7022	1.7335	6.8947	0.8513
T2	180.00-160.00	6.6464	1.5001	4.3841	1.9349
T3	160.00-140.00	5.3965	-1.4333	3.8734	-0.0776
T4	140.00-120.00	5.0010	-1.7702	3.8400	-0.0740
T5	120.00-100.00	4.8051	-1.0472	3.9566	0.8494
T6	100.00-80.00	5.3164	-0.6794	4.2842	1.5061
T7	80.00-60.00	5.0998	-0.6603	4.2396	1.4774
T8	60.00-40.00	5.3164	-0.6794	4.3195	1.4687
T9	40.00-20.00	5.4186	-0.6925	4.5274	1.4949
T10	20.00-5.00	5.2696	-0.6735	4.4264	1.3893
T11	5.00-0.00	0.0000	0.0000	0.0000	0.0000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	8	1 5/8	180.00 - 188.00	1.0000	1.0000
T1	9	HYBRIFLEX 1-5/8"	180.00 - 188.00	1.0000	1.0000
T2	2	7/8	160.00 - 179.00	1.0000	1.0000
T2	8	1 5/8	160.00 - 180.00	1.0000	1.0000
T2	9	HYBRIFLEX 1-5/8"	160.00 - 180.00	1.0000	1.0000
T2	10	1 1/4	160.00 - 177.50	1.0000	1.0000
T2	11	RG6-Fiber	160.00 - 177.50	1.0000	1.0000
T2	12	#8 AWG Copper WIre	160.00 - 177.50	1.0000	1.0000
T2	13	1 5/8	160.00 - 169.00	1.0000	1.0000
T2	14	HYBRIFLEX 1-5/8"	160.00 - 169.00	1.0000	1.0000
T3	2	7/8	140.00 - 160.00	1.0000	1.0000
T3	3	1 1/4	140.00 - 152.00	1.0000	1.0000
T3	4	7/8	140.00 - 144.00	1.0000	1.0000
T3	8	1 5/8	140.00 - 160.00	1.0000	1.0000
T3	9	HYBRIFLEX 1-5/8"	140.00 - 160.00	1.0000	1.0000
T3	10	1 1/4	140.00 - 160.00	1.0000	1.0000
T3	11	RG6-Fiber	140.00 - 160.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	12	#8 AWG Copper WIre	140.00 - 160.00	1.0000	1.0000
T3	13	1 5/8	140.00 - 160.00	1.0000	1.0000
T3	14	HYBRIFLEX 1-5/8"	140.00 - 160.00	1.0000	1.0000
T3	15	1 5/8	140.00 - 150.00	1.0000	1.0000
T4	2	7/8	120.00 - 140.00	1.0000	1.0000
T4	3	1 1/4	120.00 - 140.00	1.0000	1.0000
T4	4	7/8	120.00 - 140.00	1.0000	1.0000
T4	5	1 1/4	120.00 - 122.00	1.0000	1.0000
T4	8	1 5/8	120.00 - 140.00	1.0000	1.0000
T4	9	HYBRIFLEX 1-5/8"	120.00 - 140.00	1.0000	1.0000
T4	10	1 1/4	120.00 - 140.00	1.0000	1.0000
T4	11	RG6-Fiber	120.00 - 140.00	1.0000	1.0000
T4	12	#8 AWG Copper WIre	120.00 - 140.00	1.0000	1.0000
T4	13	1 5/8	120.00 - 140.00	1.0000	1.0000
T4	14	HYBRIFLEX 1-5/8"	120.00 - 140.00	1.0000	1.0000
T4	15	1 5/8	120.00 - 140.00	1.0000	1.0000
T5	1	1/2	100.00 - 105.00	1.0000	1.0000
T5	2	7/8	100.00 - 120.00	1.0000	1.0000
T5	3	1 1/4	100.00 - 120.00	1.0000	1.0000
T5	4	7/8	100.00 - 120.00	1.0000	1.0000
T5	5	1 1/4	100.00 - 120.00	1.0000	1.0000
T5	6	1 5/8	100.00 - 110.00	1.0000	1.0000
T5	7	1 1/4	100.00 - 108.00	1.0000	1.0000
T5	8	1 5/8	100.00 - 120.00	1.0000	1.0000
T5	9	HYBRIFLEX 1-5/8"	100.00 - 120.00	1.0000	1.0000
T5	10	1 1/4	100.00 - 120.00	1.0000	1.0000
T5	11	RG6-Fiber	100.00 - 120.00	1.0000	1.0000
T5	12	#8 AWG Copper WIre	100.00 - 120.00	1.0000	1.0000
T5	13	1 5/8	100.00 - 120.00	1.0000	1.0000
T5	14	HYBRIFLEX 1-5/8"	100.00 - 120.00	1.0000	1.0000
T5	15	1 5/8	100.00 - 120.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	1	1/2	80.00 - 100.00	1.0000	1.0000
T6	2	7/8	80.00 - 100.00	1.0000	1.0000
T6	3	1 1/4	80.00 - 100.00	1.0000	1.0000
T6	4	7/8	80.00 - 100.00	1.0000	1.0000
T6	5	1 1/4	80.00 - 100.00	1.0000	1.0000
T6	6	1 5/8	80.00 - 100.00	1.0000	1.0000
T6	7	1 1/4	80.00 - 100.00	1.0000	1.0000
T6	8	1 5/8	80.00 - 100.00	1.0000	1.0000
T6	9	HYBRIFLEX 1-5/8"	80.00 - 100.00	1.0000	1.0000
T6	10	1 1/4	80.00 - 100.00	1.0000	1.0000
T6	11	RG6-Fiber	80.00 - 100.00	1.0000	1.0000
T6	12	#8 AWG Copper WIre	80.00 - 100.00	1.0000	1.0000
T6	13	1 5/8	80.00 - 100.00	1.0000	1.0000
T6	14	HYBRIFLEX 1-5/8"	80.00 - 100.00	1.0000	1.0000
T6	15	1 5/8	80.00 - 100.00	1.0000	1.0000
T7	1	1/2	60.00 - 80.00	1.0000	1.0000
T7	2	7/8	60.00 - 80.00	1.0000	1.0000
T7	3	1 1/4	60.00 - 80.00	1.0000	1.0000
T7	4	7/8	60.00 - 80.00	1.0000	1.0000
T7	5	1 1/4	60.00 - 80.00	1.0000	1.0000
T7	6	1 5/8	60.00 - 80.00	1.0000	1.0000
T7	7	1 1/4	60.00 - 80.00	1.0000	1.0000
T7	8	1 5/8	60.00 - 80.00	1.0000	1.0000
T7	9	HYBRIFLEX 1-5/8"	60.00 - 80.00	1.0000	1.0000
T7	10	1 1/4	60.00 - 80.00	1.0000	1.0000
T7	11	RG6-Fiber	60.00 - 80.00	1.0000	1.0000
T7	12	#8 AWG Copper WIre	60.00 - 80.00	1.0000	1.0000
T7	13	1 5/8	60.00 - 80.00	1.0000	1.0000
T7	14	HYBRIFLEX 1-5/8"	60.00 - 80.00	1.0000	1.0000
T7	15	1 5/8	60.00 - 80.00	1.0000	1.0000
T8	1	1/2	40.00 - 60.00	1.0000	1.0000
T8	2	7/8	40.00 - 60.00	1.0000	1.0000
T8	3	1 1/4	40.00 - 60.00	1.0000	1.0000
T8	4	7/8	40.00 - 60.00	1.0000	1.0000
T8	5	1 1/4	40.00 - 60.00	1.0000	1.0000
T8	6	1 5/8	40.00 - 60.00	1.0000	1.0000
T8	7	1 1/4	40.00 - 60.00	1.0000	1.0000
T8	8	1 5/8	40.00 - 60.00	1.0000	1.0000
T8	9	HYBRIFLEX 1-5/8"	40.00 - 60.00	1.0000	1.0000
T8	10	1 1/4	40.00 - 60.00	1.0000	1.0000
T8	11	RG6-Fiber	40.00 - 60.00	1.0000	1.0000
T8	12	#8 AWG Copper WIre	40.00 - 60.00	1.0000	1.0000
T8	13	1 5/8	40.00 - 60.00	1.0000	1.0000
T8	14	HYBRIFLEX 1-5/8"	40.00 - 60.00	1.0000	1.0000
T8	15	1 5/8	40.00 - 60.00	1.0000	1.0000
T9	1	1/2	20.00 - 40.00	1.0000	1.0000
T9	2	7/8	20.00 - 40.00	1.0000	1.0000
T9	3	1 1/4	20.00 - 40.00	1.0000	1.0000
T9	4	7/8	20.00 - 40.00	1.0000	1.0000
T9	5	1 1/4	20.00 - 40.00	1.0000	1.0000
T9	6	1 5/8	20.00 - 40.00	1.0000	1.0000
T9	7	1 1/4	20.00 - 40.00	1.0000	1.0000
T9	8	1 5/8	20.00 - 40.00	1.0000	1.0000
T9	9	HYBRIFLEX 1-5/8"	20.00 - 40.00	1.0000	1.0000
T9	10	1 1/4	20.00 - 40.00	1.0000	1.0000
T9	11	RG6-Fiber	20.00 - 40.00	1.0000	1.0000
T9	12	#8 AWG Copper WIre	20.00 - 40.00	1.0000	1.0000
T9	13	1 5/8	20.00 - 40.00	1.0000	1.0000
T9	14	HYBRIFLEX 1-5/8"	20.00 - 40.00	1.0000	1.0000
T9	15	1 5/8	20.00 - 40.00	1.0000	1.0000
T10	1	1/2	8.00 - 20.00	1.0000	1.0000
T10	2	7/8	8.00 - 20.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T10	3	1 1/4	8.00 - 20.00	1.0000	1.0000
T10	4	7/8	8.00 - 20.00	1.0000	1.0000
T10	5	1 1/4	8.00 - 20.00	1.0000	1.0000
T10	6	1 5/8	8.00 - 20.00	1.0000	1.0000
T10	7	1 1/4	8.00 - 20.00	1.0000	1.0000
T10	8	1 5/8	8.00 - 20.00	1.0000	1.0000
T10	9	HYBRIFLEX 1-5/8"	8.00 - 20.00	1.0000	1.0000
T10	10	1 1/4	8.00 - 20.00	1.0000	1.0000
T10	11	RG6-Fiber	8.00 - 20.00	1.0000	1.0000
T10	12	#8 AWG Copper WIre	8.00 - 20.00	1.0000	1.0000
T10	13	1 5/8	8.00 - 20.00	1.0000	1.0000
T10	14	HYBRIFLEX 1-5/8"	8.00 - 20.00	1.0000	1.0000
T10	15	1 5/8	8.00 - 20.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APX16DWV-16DWVS-E-A20 (T-Mobile)	A	From Leg	3.00 -5.00 0.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice	6.46 6.83 7.21	2.15 2.49 2.84	0.04 0.07 0.11
APX16DWV-16DWVS-E-A20 (T-Mobile)	B	From Leg	3.00 -5.00 0.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice	6.46 6.83 7.21	2.15 2.49 2.84	0.04 0.07 0.11
APX16DWV-16DWVS-E-A20 (T-Mobile)	C	From Leg	3.00 -5.00 0.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice	6.46 6.83 7.21	2.15 2.49 2.84	0.04 0.07 0.11
APXVAARR24-43 (T-Mobile - Proposed)	A	From Leg	3.00 5.00 0.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice	20.24 20.89 21.54	8.89 9.49 10.09	0.15 0.27 0.39
APXVAARR24-43 (T-Mobile - Proposed)	B	From Leg	3.00 5.00 0.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice	20.24 20.89 21.54	8.89 9.49 10.09	0.15 0.27 0.39
APXVAARR24-43 (T-Mobile - Proposed)	C	From Leg	3.00 5.00 0.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice	20.24 20.89 21.54	8.89 9.49 10.09	0.15 0.27 0.39
(2) KRY 112 TMA (T-Mobile)	A	From Leg	3.00 0.00 0.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice	0.78 0.90 1.03	0.49 0.59 0.70	0.03 0.03 0.04
(2) KRY 112 TMA (T-Mobile)	B	From Leg	3.00 0.00 0.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice	0.78 0.90 1.03	0.49 0.59 0.70	0.03 0.03 0.04
(2) KRY 112 TMA (T-Mobile)	C	From Leg	3.00 0.00 0.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice	0.78 0.90 1.03	0.49 0.59 0.70	0.03 0.03 0.04
Radio 4449 B71 B12 (T-Mobile - Proposed)	A	From Leg	3.00 0.00 0.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97	1.29 1.44 1.59	0.07 0.09 0.11
Radio 4449 B71 B12 (T-Mobile - Proposed)	B	From Leg	3.00 0.00	0.0000	188.00	No Ice 1/2" Ice	1.64 1.80	1.29 1.44	0.07 0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	1.97	1.59	0.11
Radio 4449 B71 B12	C	From Leg	3.00	0.0000	188.00	No Ice	1.64	1.29	0.07
(T-Mobile - Proposed)			0.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
Rohn 6'x10' Boom Gate	A	From Leg	2.00	0.0000	188.00	No Ice	14.00	9.00	0.51
(T-Mobile)			0.00			1/2" Ice	20.00	12.00	0.72
			0.00			1" Ice	26.00	15.00	0.93
Rohn 6'x10' Boom Gate	B	From Leg	2.00	0.0000	188.00	No Ice	14.00	9.00	0.51
(T-Mobile)			0.00			1/2" Ice	20.00	12.00	0.72
			0.00			1" Ice	26.00	15.00	0.93
Rohn 6'x10' Boom Gate	C	From Leg	2.00	0.0000	188.00	No Ice	14.00	9.00	0.51
(T-Mobile)			0.00			1/2" Ice	20.00	12.00	0.72
			0.00			1" Ice	26.00	15.00	0.93
7770.00	A	From Leg	4.00	0.0000	178.75	No Ice	5.51	2.93	0.04
(AT&T)			-5.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
HPA-65R-BUU-H8	A	From Leg	4.00	0.0000	178.75	No Ice	12.98	7.52	0.07
(AT&T)			-2.00			1/2" Ice	13.56	8.09	0.14
			0.00			1" Ice	14.15	8.67	0.22
TPA-65R-LCUUUU-H8	A	From Leg	4.00	0.0000	178.75	No Ice	13.30	8.82	0.08
(AT&T)			5.00			1/2" Ice	13.90	9.42	0.15
			0.00			1" Ice	14.50	10.03	0.24
7770.00	B	From Leg	4.00	0.0000	178.75	No Ice	5.51	2.93	0.04
(AT&T)			-5.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
HPA-65R-BUU-H8	B	From Leg	4.00	0.0000	178.75	No Ice	12.98	7.52	0.07
(AT&T)			-2.00			1/2" Ice	13.56	8.09	0.14
			0.00			1" Ice	14.15	8.67	0.22
TPA-65R-LCUUUU-H8	B	From Leg	4.00	0.0000	178.75	No Ice	13.30	8.82	0.08
(AT&T)			5.00			1/2" Ice	13.90	9.42	0.15
			0.00			1" Ice	14.50	10.03	0.24
7770.00	C	From Leg	4.00	0.0000	178.75	No Ice	5.51	2.93	0.04
(AT&T)			-5.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
HPA-65R-BUU-H8	C	From Leg	4.00	0.0000	178.75	No Ice	12.98	7.52	0.07
(AT&T)			-2.00			1/2" Ice	13.56	8.09	0.14
			0.00			1" Ice	14.15	8.67	0.22
QS66512-2	C	From Leg	4.00	0.0000	178.75	No Ice	8.13	6.80	0.11
(AT&T)			5.00			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
(2) TT19-08BP111-001 TMA	A	From Leg	4.00	0.0000	178.75	No Ice	0.55	0.45	0.02
(AT&T)			-5.00			1/2" Ice	0.65	0.53	0.02
			0.00			1" Ice	0.75	0.63	0.03
(2) TT19-08BP111-001 TMA	B	From Leg	4.00	0.0000	178.75	No Ice	0.55	0.45	0.02
(AT&T)			-5.00			1/2" Ice	0.65	0.53	0.02
			0.00			1" Ice	0.75	0.63	0.03
(2) TT19-08BP111-001 TMA	C	From Leg	4.00	0.0000	178.75	No Ice	0.55	0.45	0.02
(AT&T)			-5.00			1/2" Ice	0.65	0.53	0.02
			0.00			1" Ice	0.75	0.63	0.03
(2) DBCT108F1V92-1	A	From Leg	4.00	0.0000	178.75	No Ice	0.60	0.32	0.02
(AT&T)			-5.00			1/2" Ice	0.71	0.40	0.02
			0.00			1" Ice	0.81	0.49	0.03
(2) DBCT108F1V92-1	B	From Leg	4.00	0.0000	178.75	No Ice	0.60	0.32	0.02
(AT&T)			-5.00			1/2" Ice	0.71	0.40	0.02
			0.00			1" Ice	0.81	0.49	0.03
(2) DBCT108F1V92-1	C	From Leg	4.00	0.0000	178.75	No Ice	0.60	0.32	0.02
(AT&T)			-5.00			1/2" Ice	0.71	0.40	0.02

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 K
			0.00			1" Ice	0.81	0.49	0.03
RRUS-11	A	From Leg	4.00	0.0000	178.75	No Ice	2.57	1.07	0.05
(AT&T)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11	B	From Leg	4.00	0.0000	178.75	No Ice	2.57	1.07	0.05
(AT&T)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11	C	From Leg	4.00	0.0000	178.75	No Ice	2.57	1.07	0.05
(AT&T)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-12	A	From Leg	4.00	0.0000	178.75	No Ice	3.15	1.29	0.06
(AT&T)			0.00			1/2" Ice	3.36	1.44	0.08
			0.00			1" Ice	3.59	1.60	0.11
RRUS-12	B	From Leg	4.00	0.0000	178.75	No Ice	3.15	1.29	0.06
(AT&T)			0.00			1/2" Ice	3.36	1.44	0.08
			0.00			1" Ice	3.59	1.60	0.11
RRUS-12	C	From Leg	4.00	0.0000	178.75	No Ice	3.15	1.29	0.06
(AT&T)			0.00			1/2" Ice	3.36	1.44	0.08
			0.00			1" Ice	3.59	1.60	0.11
RRUS-32	A	From Leg	4.00	0.0000	178.75	No Ice	3.31	2.42	0.08
(AT&T)			0.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	B	From Leg	4.00	0.0000	178.75	No Ice	3.31	2.42	0.08
(AT&T)			0.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	C	From Leg	4.00	0.0000	178.75	No Ice	3.31	2.42	0.08
(AT&T)			0.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
4426 B66	A	From Leg	4.00	0.0000	178.75	No Ice	1.65	0.73	0.05
(AT&T)			0.00			1/2" Ice	1.81	0.84	0.06
			0.00			1" Ice	1.98	0.97	0.08
4426 B66	B	From Leg	4.00	0.0000	178.75	No Ice	1.65	0.73	0.05
(AT&T)			0.00			1/2" Ice	1.81	0.84	0.06
			0.00			1" Ice	1.98	0.97	0.08
4426 B66	C	From Leg	4.00	0.0000	178.75	No Ice	1.65	0.73	0.05
(AT&T)			0.00			1/2" Ice	1.81	0.84	0.06
			0.00			1" Ice	1.98	0.97	0.08
DC6-48-60-18-8F Surge	A	From Leg	4.00	0.0000	178.75	No Ice	1.91	1.91	0.02
Arrestor			0.00			1/2" Ice	2.10	2.10	0.04
(AT&T)			0.00			1" Ice	2.29	2.29	0.06
DC6-48-60-18-8F Surge	B	From Leg	4.00	0.0000	178.75	No Ice	1.91	1.91	0.02
Arrestor			0.00			1/2" Ice	2.10	2.10	0.04
(AT&T)			0.00			1" Ice	2.29	2.29	0.06
Rohn 6'x15' Boom Gate	A	From Leg	2.00	0.0000	177.50	No Ice	17.50	9.00	0.51
(AT&T)			0.00			1/2" Ice	23.50	12.00	0.72
			0.00			1" Ice	29.50	15.00	0.93
Rohn 6'x15' Boom Gate	B	From Leg	2.00	0.0000	177.50	No Ice	17.50	9.00	0.51
(AT&T)			0.00			1/2" Ice	23.50	12.00	0.72
			0.00			1" Ice	29.50	15.00	0.93
Rohn 6'x15' Boom Gate	C	From Leg	2.00	0.0000	177.50	No Ice	17.50	9.00	0.51
(AT&T)			0.00			1/2" Ice	23.50	12.00	0.72
			0.00			1" Ice	29.50	15.00	0.93
SBNHH-1D65B	A	From Leg	3.00	0.0000	169.00	No Ice	8.08	5.34	0.04
(Verizon)			-6.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B	A	From Leg	3.00	0.0000	169.00	No Ice	8.08	5.34	0.04
(Verizon)			-4.00			1/2" Ice	8.53	5.79	0.09

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 K
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B	A	From Leg	3.00	0.0000	169.00	No Ice	8.08	5.34	0.04
(Verizon)			4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
LPA-80080-4CF	A	From Leg	3.00	0.0000	169.00	No Ice	2.62	5.40	0.01
(Verizon)			6.00			1/2" Ice	2.92	5.73	0.05
			0.00			1" Ice	3.23	6.06	0.08
SBNHH-1D65B	B	From Leg	3.00	0.0000	169.00	No Ice	8.08	5.34	0.04
(Verizon)			-6.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B	B	From Leg	3.00	0.0000	169.00	No Ice	8.08	5.34	0.04
(Verizon)			-4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B	B	From Leg	3.00	0.0000	169.00	No Ice	8.08	5.34	0.04
(Verizon)			4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
LPA-80080-4CF	B	From Leg	3.00	0.0000	169.00	No Ice	2.62	5.40	0.01
(Verizon)			6.00			1/2" Ice	2.92	5.73	0.05
			0.00			1" Ice	3.23	6.06	0.08
SBNHH-1D65B	C	From Leg	3.00	0.0000	169.00	No Ice	8.08	5.34	0.04
(Verizon)			-6.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B	C	From Leg	3.00	0.0000	169.00	No Ice	8.08	5.34	0.04
(Verizon)			-4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B	C	From Leg	3.00	0.0000	169.00	No Ice	8.08	5.34	0.04
(Verizon)			4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
LPA-80080-4CF	C	From Leg	3.00	0.0000	169.00	No Ice	2.62	5.40	0.01
(Verizon)			6.00			1/2" Ice	2.92	5.73	0.05
			0.00			1" Ice	3.23	6.06	0.08
RRH4x45/2x90-AWS	A	From Leg	3.00	0.0000	169.00	No Ice	2.58	1.69	0.08
(Verizon)			-4.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS	B	From Leg	3.00	0.0000	169.00	No Ice	2.58	1.69	0.08
(Verizon)			-4.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS	C	From Leg	3.00	0.0000	169.00	No Ice	2.58	1.69	0.08
(Verizon)			-4.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH2x60-PCS	A	From Leg	3.00	0.0000	169.00	No Ice	0.00	1.55	0.06
(Verizon)			4.00			1/2" Ice	0.00	1.74	0.07
			0.00			1" Ice	0.00	1.94	0.09
RRH2x60-PCS	B	From Leg	3.00	0.0000	169.00	No Ice	0.00	1.55	0.06
(Verizon)			4.00			1/2" Ice	0.00	1.74	0.07
			0.00			1" Ice	0.00	1.94	0.09
RRH2x60-PCS	C	From Leg	3.00	0.0000	169.00	No Ice	0.00	1.55	0.06
(Verizon)			4.00			1/2" Ice	0.00	1.74	0.07
			0.00			1" Ice	0.00	1.94	0.09
RRH2x60-07-U	A	From Leg	3.00	0.0000	169.00	No Ice	2.10	1.41	0.05
(Verizon)			0.00			1/2" Ice	2.29	1.56	0.07
			0.00			1" Ice	2.48	1.74	0.09
RRH2x60-07-U	B	From Leg	3.00	0.0000	169.00	No Ice	2.10	1.41	0.05
(Verizon)			0.00			1/2" Ice	2.29	1.56	0.07
			0.00			1" Ice	2.48	1.74	0.09
RRH2x60-07-U	C	From Leg	3.00	0.0000	169.00	No Ice	2.10	1.41	0.05
(Verizon)			0.00			1/2" Ice	2.29	1.56	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	2.48	1.74	0.09
DB-T1-6Z-8AB-0Z	A	From Leg	1.50	0.0000	169.00	No Ice	0.00	2.33	0.04
(Verizon)			0.00			1/2" Ice	0.00	2.56	0.08
			0.00			1" Ice	0.00	2.79	0.12
DB-T1-6Z-8AB-0Z	B	From Leg	1.50	0.0000	169.00	No Ice	0.00	2.33	0.04
(Verizon)			0.00			1/2" Ice	0.00	2.56	0.08
			0.00			1" Ice	0.00	2.79	0.12
Pirod 15' T-Frame Sector	A	From Leg	2.00	0.0000	169.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Verizon)			0.00			1" Ice	26.20	26.20	0.80
Pirod 15' T-Frame Sector	B	From Leg	2.00	0.0000	169.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Verizon)			0.00			1" Ice	26.20	26.20	0.80
Pirod 15' T-Frame Sector	C	From Leg	2.00	0.0000	169.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Verizon)			0.00			1" Ice	26.20	26.20	0.80
APXV9ERR18-C-A20 w/	A	From Leg	3.00	0.0000	150.00	No Ice	8.72	8.59	0.12
Mount			-5.00			1/2" Ice	9.33	9.67	0.20
(Sprint)			0.00			1" Ice	9.92	10.63	0.30
APXV9ERR18-C-A20 w/	B	From Leg	3.00	0.0000	150.00	No Ice	8.72	8.59	0.12
Mount			-5.00			1/2" Ice	9.33	9.67	0.20
(Sprint)			0.00			1" Ice	9.92	10.63	0.30
APXV9ERR18-C-A20 w/	C	From Leg	3.00	0.0000	150.00	No Ice	8.72	8.59	0.12
Mount			-5.00			1/2" Ice	9.33	9.67	0.20
(Sprint)			0.00			1" Ice	9.92	10.63	0.30
APXVTM14	A	From Leg	3.00	0.0000	150.00	No Ice	6.34	3.61	0.06
(Sprint)			5.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	B	From Leg	3.00	0.0000	150.00	No Ice	6.34	3.61	0.06
(Sprint)			5.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	C	From Leg	3.00	0.0000	150.00	No Ice	6.34	3.61	0.06
(Sprint)			5.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
FD-RRH 4x40 1900	A	From Leg	3.00	0.0000	150.00	No Ice	2.24	2.32	0.06
(Sprint)			0.00			1/2" Ice	2.44	2.53	0.08
			0.00			1" Ice	2.65	2.74	0.11
FD-RRH 4x40 1900	B	From Leg	3.00	0.0000	150.00	No Ice	2.24	2.32	0.06
(Sprint)			0.00			1/2" Ice	2.44	2.53	0.08
			0.00			1" Ice	2.65	2.74	0.11
FD-RRH 4x40 1900	C	From Leg	3.00	0.0000	150.00	No Ice	2.24	2.32	0.06
(Sprint)			0.00			1/2" Ice	2.44	2.53	0.08
			0.00			1" Ice	2.65	2.74	0.11
FD-RRH 2x50 800	A	From Leg	3.00	0.0000	150.00	No Ice	2.06	1.93	0.06
(Sprint)			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800	B	From Leg	3.00	0.0000	150.00	No Ice	2.06	1.93	0.06
(Sprint)			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800	C	From Leg	3.00	0.0000	150.00	No Ice	2.06	1.93	0.06
(Sprint)			0.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
TD-RRH8x20-25	A	From Leg	3.00	0.0000	150.00	No Ice	4.05	1.53	0.07
(Sprint)			0.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	B	From Leg	3.00	0.0000	150.00	No Ice	4.05	1.53	0.07
(Sprint)			0.00			1/2" Ice	4.30	1.71	0.10

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 K
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	C	From Leg	3.00	0.0000	150.00	No Ice	4.05	1.53	0.07
(Sprint)			0.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
Rohn 6'x15' Boom Gate	A	From Leg	2.00	0.0000	150.50	No Ice	17.50	9.00	0.51
(Sprint)			0.00			1/2" Ice	23.50	12.00	0.72
			0.00			1" Ice	29.50	15.00	0.93
Rohn 6'x15' Boom Gate	B	From Leg	2.00	0.0000	150.50	No Ice	17.50	9.00	0.51
(Sprint)			0.00			1/2" Ice	23.50	12.00	0.72
			0.00			1" Ice	29.50	15.00	0.93
Rohn 6'x15' Boom Gate	C	From Leg	2.00	0.0000	150.50	No Ice	17.50	9.00	0.51
(Sprint)			0.00			1/2" Ice	23.50	12.00	0.72
			0.00			1" Ice	29.50	15.00	0.93
20' x 3" Dia Omni	B	From Leg	4.75	0.0000	188.75	No Ice	6.00	6.00	0.05
			0.00			1/2" Ice	8.03	8.03	0.09
			0.00			1" Ice	10.08	10.08	0.15
6' Standoff	B	From Leg	3.00	0.0000	178.00	No Ice	4.80	4.80	0.10
			0.00			1/2" Ice	6.40	6.40	0.14
			0.00			1" Ice	8.00	8.00	0.18
6' x 3" Dia Omni	A	From Leg	4.75	0.0000	180.00	No Ice	1.77	1.77	0.02
			0.00			1/2" Ice	2.13	2.13	0.03
			0.00			1" Ice	2.50	2.50	0.05
3' Standoff	A	From Leg	1.50	0.0000	178.00	No Ice	2.40	2.40	0.05
			0.00			1/2" Ice	3.20	3.20	0.07
			0.00			1" Ice	4.00	4.00	0.09
4 Bay Dipole	B	From Leg	4.75	0.0000	155.50	No Ice	1.65	1.65	0.02
			0.00			1/2" Ice	2.61	2.61	0.03
			0.00			1" Ice	3.60	3.60	0.05
3'-6" Standoff	B	From Leg	2.00	0.0000	151.00	No Ice	2.40	2.40	0.05
			0.00			1/2" Ice	3.20	3.20	0.07
			0.00			1" Ice	4.00	4.00	0.09
DB408	B	From Leg	4.75	0.0000	126.00	No Ice	1.65	1.65	0.02
			0.00			1/2" Ice	2.61	2.61	0.03
			0.00			1" Ice	3.60	3.60	0.05
3' Standoff	B	From Leg	1.50	0.0000	122.50	No Ice	3.00	3.00	0.05
			0.00			1/2" Ice	4.00	4.00	0.07
			0.00			1" Ice	5.00	5.00	0.09
PD220	A	From Leg	4.00	0.0000	121.00	No Ice	3.08	3.08	0.02
			0.00			1/2" Ice	5.30	5.30	0.05
			0.00			1" Ice	7.54	7.54	0.09
3'-6" Standoff	A	From Leg	2.00	0.0000	110.00	No Ice	2.40	2.40	0.05
			0.00			1/2" Ice	3.20	3.20	0.07
			0.00			1" Ice	4.00	4.00	0.09
PD220	B	From Leg	4.00	0.0000	121.00	No Ice	3.08	3.08	0.02
			0.00			1/2" Ice	5.30	5.30	0.05
			0.00			1" Ice	7.54	7.54	0.09
3'-6" Standoff	B	From Leg	2.00	0.0000	110.00	No Ice	2.40	2.40	0.05
			0.00			1/2" Ice	3.20	3.20	0.07
			0.00			1" Ice	4.00	4.00	0.09
Folded Dipole	C	From Leg	1.50	0.0000	111.00	No Ice	1.20	1.20	0.03
			0.00			1/2" Ice	2.40	2.40	0.04
			0.00			1" Ice	3.60	3.60	0.05
6'x3" Pipe Mount	C	From Leg	1.00	0.0000	111.00	No Ice	1.77	1.77	0.03
			0.00			1/2" Ice	2.13	2.13	0.05
			0.00			1" Ice	2.50	2.50	0.07
2' Standoff	B	From Leg	1.00	0.0000	105.00	No Ice	0.60	0.60	0.01
			0.00			1/2" Ice	0.80	0.80	0.02

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 K
2'x2" Omni	B	From Leg	0.00 2.00 0.00 0.00	0.0000	106.00	1" Ice No Ice 1/2" Ice 1" Ice	1.00 0.30 0.43 0.58	1.00 0.30 0.43 0.58	0.03 0.02 0.02 0.03

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 193.00-180.00	186.50	1.181	28	47.536	A	7.962	6.229	6.229	43.89	0.000	0.000
					B	7.962	6.229		43.89	23.760	0.000
					C	7.962	6.229		43.89	0.000	0.000
T2 180.00-160.00	170.00	1.15	28	73.132	A	15.735	9.583	9.583	37.85	0.000	0.000
					B	15.735	9.583		37.85	86.457	0.000
					C	15.735	9.583		37.85	35.200	0.000
T3 160.00-140.00	150.00	1.11	27	73.132	A	14.676	10.378	9.583	38.25	11.880	0.000
					B	14.676	10.378		38.25	117.060	0.000
					C	14.676	10.378		38.25	42.532	0.000
T4 140.00-120.00	130.00	1.065	26	73.132	A	0.067	18.157	9.583	52.59	23.760	0.000
					B	0.067	18.157		52.59	117.060	0.000
					C	0.067	18.157		52.59	45.858	0.000
T5 120.00-100.00	110.00	1.016	24	74.173	A	15.478	11.667	11.667	42.98	24.340	0.000
					B	15.478	11.667		42.98	117.060	0.000
					C	15.478	11.667		42.98	53.848	0.000
T6 100.00-80.00	90.00	0.959	23	74.173	A	0.067	20.100	11.667	57.85	26.080	0.000
					B	0.067	20.100		57.85	117.060	0.000
					C	0.067	20.100		57.85	59.668	0.000
T7 80.00-60.00	70.00	0.892	21	74.173	A	8.994	12.448	11.667	54.41	26.080	0.000
					B	8.994	12.448		54.41	117.060	0.000
					C	8.994	12.448		54.41	59.668	0.000
T8 60.00-40.00	50.00	0.811	19	74.173	A	0.067	20.100	11.667	57.85	26.080	0.000
					B	0.067	20.100		57.85	117.060	0.000
					C	0.067	20.100		57.85	59.668	0.000
T9 40.00-20.00	30.00	0.701	17	74.173	A	0.067	16.274	11.667	71.40	26.080	0.000
					B	0.067	16.274		71.40	117.060	0.000
					C	0.067	16.274		71.40	59.668	0.000
T10 20.00-5.00	12.50	0.7	17	55.630	A	0.067	12.389	8.750	70.25	15.648	0.000
					B	0.067	12.389		70.25	70.236	0.000
					C	0.067	12.389		70.25	35.801	0.000
T11 5.00-0.00	2.50	0.7	17	10.084	A	1.598	3.135	3.135	66.24	0.000	0.000
					B	1.598	3.135		66.24	0.000	0.000
					C	1.598	3.135		66.24	0.000	0.000

Tower Pressure - With Ice

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	186.50	1.181	6	1.7836	51.400	A	7.962	27.976	13.958	38.84	0.000	0.000
193.00-180.00						B	7.962	27.976		38.84	34.214	0.000
						C	7.962	27.976		38.84	0.000	0.000
T2	170.00	1.15	6	1.7672	79.022	A	15.735	49.206	21.365	32.90	0.000	0.000
180.00-160.00						B	15.735	49.206		32.90	130.403	0.000
						C	15.735	49.206		32.90	75.072	0.000
T3	150.00	1.11	6	1.7452	78.949	A	14.676	49.507	21.218	33.06	17.769	0.000
160.00-140.00						B	14.676	49.507		33.06	174.512	0.000
						C	14.676	49.507		33.06	93.233	0.000
T4	130.00	1.065	6	1.7204	78.866	A	0.067	49.442	21.053	42.52	35.364	0.000
140.00-120.00						B	0.067	49.442		42.52	173.742	0.000
						C	0.067	49.442		42.52	104.915	0.000
T5	110.00	1.016	6	1.6919	79.813	A	15.478	49.167	22.946	35.50	39.213	0.000
120.00-100.00						B	15.478	49.167		35.50	172.858	0.000
						C	15.478	49.167		35.50	130.363	0.000
T6 100.00-80.00	90.00	0.959	5	1.6583	79.701	A	0.067	49.945	22.722	45.43	50.889	0.000
						B	0.067	49.945		45.43	171.815	0.000
						C	0.067	49.945		45.43	148.270	0.000
T7 80.00-60.00	70.00	0.892	5	1.6171	79.564	A	8.994	41.552	22.448	44.41	50.313	0.000
						B	8.994	41.552		44.41	170.538	0.000
						C	8.994	41.552		44.41	146.484	0.000
T8 60.00-40.00	50.00	0.811	4	1.5636	79.385	A	0.067	48.241	22.091	45.73	49.564	0.000
						B	0.067	48.241		45.73	168.880	0.000
						C	0.067	48.241		45.73	144.164	0.000
T9 40.00-20.00	30.00	0.701	4	1.4858	79.126	A	0.067	35.434	21.572	60.76	48.475	0.000
						B	0.067	35.434		60.76	166.468	0.000
						C	0.067	35.434		60.76	140.788	0.000
T10 20.00-5.00	12.50	0.7	4	1.3612	59.033	A	0.067	25.918	15.556	59.87	28.040	0.000
						B	0.067	25.918		59.87	97.569	0.000
						C	0.067	25.918		59.87	81.236	0.000
T11 5.00-0.00	2.50	0.7	4	1.1589	11.104	A	1.598	6.494	5.212	64.41	0.000	0.000
						B	1.598	6.494		64.41	0.000	0.000
						C	1.598	6.494		64.41	0.000	0.000

Tower Pressure - Service

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	186.50	1.181	9	47.536	A	7.962	6.229	6.229	43.89	0.000	0.000
193.00-180.00					B	7.962	6.229		43.89	23.760	0.000
					C	7.962	6.229		43.89	0.000	0.000
T2	170.00	1.15	9	73.132	A	15.735	9.583	9.583	37.85	0.000	0.000
180.00-160.00					B	15.735	9.583		37.85	86.457	0.000
					C	15.735	9.583		37.85	35.200	0.000
T3	150.00	1.11	9	73.132	A	14.676	10.378	9.583	38.25	11.880	0.000
160.00-140.00					B	14.676	10.378		38.25	117.060	0.000
					C	14.676	10.378		38.25	42.532	0.000
T4	130.00	1.065	8	73.132	A	0.067	18.157	9.583	52.59	23.760	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
140.00-120.00					B	0.067	18.157		52.59	117.060	0.000
					C	0.067	18.157		52.59	45.858	0.000
T5	110.00	1.016	8	74.173	A	15.478	11.667	11.667	42.98	24.340	0.000
120.00-100.00					B	15.478	11.667		42.98	117.060	0.000
					C	15.478	11.667		42.98	53.848	0.000
T6	90.00	0.959	8	74.173	A	0.067	20.100	11.667	57.85	26.080	0.000
100.00-80.00					B	0.067	20.100		57.85	117.060	0.000
					C	0.067	20.100		57.85	59.668	0.000
T7 80.00-60.00	70.00	0.892	7	74.173	A	8.994	12.448	11.667	54.41	26.080	0.000
					B	8.994	12.448		54.41	117.060	0.000
					C	8.994	12.448		54.41	59.668	0.000
T8 60.00-40.00	50.00	0.811	6	74.173	A	0.067	20.100	11.667	57.85	26.080	0.000
					B	0.067	20.100		57.85	117.060	0.000
					C	0.067	20.100		57.85	59.668	0.000
T9 40.00-20.00	30.00	0.701	5	74.173	A	0.067	16.274	11.667	71.40	26.080	0.000
					B	0.067	16.274		71.40	117.060	0.000
					C	0.067	16.274		71.40	59.668	0.000
T10 20.00-5.00	12.50	0.7	5	55.630	A	0.067	12.389	8.750	70.25	15.648	0.000
					B	0.067	12.389		70.25	70.236	0.000
					C	0.067	12.389		70.25	35.801	0.000
T11 5.00-0.00	2.50	0.7	5	10.084	A	1.598	3.135	3.135	66.24	0.000	0.000
					B	1.598	3.135		66.24	0.000	0.000
					C	1.598	3.135		66.24	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.16	0.77	A	0.299	2.3	28	1	1	11.690	1.22	93.81	C
193.00-180.00			B	0.299	2.3		1	1	11.690			
			C	0.299	2.3		1	1	11.690			
T2	0.70	1.51	A	0.346	2.18	28	1	1	21.626	3.60*	180.07	C
180.00-160.00		TA 1.03	B	0.346	2.18		1	1	21.626			
			C	0.346	2.18		1	1	21.626			
T3	0.98	1.48	A	0.343	2.189	27	1	1	21.041	3.47*	173.75	C
160.00-140.00			B	0.343	2.189		1	1	21.041			
			C	0.343	2.189		1	1	21.041			
T4	1.06	0.85	A	0.249	2.44	26	1	1	10.685	3.34*	166.79	C
140.00-120.00			B	0.249	2.44		1	1	10.685			
			C	0.249	2.44		1	1	10.685			
T5	1.10	1.58	A	0.366	2.135	24	1	1	22.737	3.23*	161.28	C
120.00-100.00		TA 0.69	B	0.366	2.135		1	1	22.737			
			C	0.366	2.135		1	1	22.737			
T6	1.13	0.81	A	0.272	2.373	23	1	1	11.940	3.05*	152.29	C
100.00-80.00			B	0.272	2.373		1	1	11.940			
			C	0.272	2.373		1	1	11.940			
T7	1.13	1.08	A	0.289	2.325	21	1	1	16.408	2.83*	141.74	C
80.00-60.00		TA 0.51	B	0.289	2.325		1	1	16.408			
			C	0.289	2.325		1	1	16.408			
T8	1.13	1.01	A	0.272	2.373	19	1	1	11.940	2.57*	128.75	C
60.00-40.00			B	0.272	2.373		1	1	11.940			
			C	0.272	2.373		1	1	11.940			
T9	1.13	0.72	A	0.22	2.53	17	1	1	9.479	2.23*	111.26	C
40.00-20.00			B	0.22	2.53		1	1	9.479			
			C	0.22	2.53		1	1	9.479			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T10	0.68	0.63	A	0.224	2.518	17	1	1	7.241	1.67*	111.17	C
20.00-5.00			B	0.224	2.518		1	1	7.241			
			C	0.224	2.518		1	1	7.241			
T11 5.00-0.00	0.00	0.37	A	0.469	1.943	17	1	1	3.695	0.10	20.50	C
			B	0.469	1.943		1	1	3.695			
			C	0.469	1.943		1	1	3.695			
Sum Weight:	9.20	13.10			*2.1A_g limit					27.31		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.16	0.77	A	0.299	2.3	28	0.8	1	10.098	1.13	87.03	C
193.00-180.00			B	0.299	2.3		0.8	1	10.098			
			C	0.299	2.3		0.8	1	10.098			
T2	0.70	1.51	A	0.346	2.18	28	0.8	1	18.479	3.60*	180.07	C
180.00-160.00		TA 1.03	B	0.346	2.18		0.8	1	18.479			
			C	0.346	2.18		0.8	1	18.479			
T3	0.98	1.48	A	0.343	2.189	27	0.8	1	18.106	3.47*	173.75	C
160.00-140.00			B	0.343	2.189		0.8	1	18.106			
			C	0.343	2.189		0.8	1	18.106			
T4	1.06	0.85	A	0.249	2.44	26	0.8	1	10.672	3.34*	166.79	C
140.00-120.00			B	0.249	2.44		0.8	1	10.672			
			C	0.249	2.44		0.8	1	10.672			
T5	1.10	1.58	A	0.366	2.135	24	0.8	1	19.641	3.23*	161.28	C
120.00-100.00		TA 0.69	B	0.366	2.135		0.8	1	19.641			
			C	0.366	2.135		0.8	1	19.641			
T6	1.13	0.81	A	0.272	2.373	23	0.8	1	11.926	3.05*	152.29	C
100.00-80.00			B	0.272	2.373		0.8	1	11.926			
			C	0.272	2.373		0.8	1	11.926			
T7	1.13	1.08	A	0.289	2.325	21	0.8	1	14.609	2.83*	141.74	C
80.00-60.00		TA 0.51	B	0.289	2.325		0.8	1	14.609			
			C	0.289	2.325		0.8	1	14.609			
T8	1.13	1.01	A	0.272	2.373	19	0.8	1	11.926	2.57*	128.75	C
60.00-40.00			B	0.272	2.373		0.8	1	11.926			
			C	0.272	2.373		0.8	1	11.926			
T9	1.13	0.72	A	0.22	2.53	17	0.8	1	9.465	2.23*	111.26	C
40.00-20.00			B	0.22	2.53		0.8	1	9.465			
			C	0.22	2.53		0.8	1	9.465			
T10	0.68	0.63	A	0.224	2.518	17	0.8	1	7.228	1.67*	111.17	C
20.00-5.00			B	0.224	2.518		0.8	1	7.228			
			C	0.224	2.518		0.8	1	7.228			
T11 5.00-0.00	0.00	0.37	A	0.469	1.943	17	0.8	1	3.376	0.09	18.72	C
			B	0.469	1.943		0.8	1	3.376			
			C	0.469	1.943		0.8	1	3.376			
Sum Weight:	9.20	13.10			*2.1A_g limit					27.21		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.16	0.77	A	0.299	2.3	28	0.85	1	10.496	1.15	88.72	C
193.00-180.00			B	0.299	2.3		0.85	1	10.496			
			C	0.299	2.3		0.85	1	10.496			
T2	0.70	1.51	A	0.346	2.18	28	0.85	1	19.265	3.60*	180.07	C
180.00-160.00		TA 1.03	B	0.346	2.18		0.85	1	19.265			
			C	0.346	2.18		0.85	1	19.265			
T3	0.98	1.48	A	0.343	2.189	27	0.85	1	18.840	3.47*	173.75	C
160.00-140.00			B	0.343	2.189		0.85	1	18.840			
			C	0.343	2.189		0.85	1	18.840			
T4	1.06	0.85	A	0.249	2.44	26	0.85	1	10.675	3.34*	166.79	C
140.00-120.00			B	0.249	2.44		0.85	1	10.675			
			C	0.249	2.44		0.85	1	10.675			
T5	1.10	1.58	A	0.366	2.135	24	0.85	1	20.415	3.23*	161.28	C
120.00-100.00		TA 0.69	B	0.366	2.135		0.85	1	20.415			
			C	0.366	2.135		0.85	1	20.415			
T6	1.13	0.81	A	0.272	2.373	23	0.85	1	11.930	3.05*	152.29	C
100.00-80.00			B	0.272	2.373		0.85	1	11.930			
			C	0.272	2.373		0.85	1	11.930			
T7	1.13	1.08	A	0.289	2.325	21	0.85	1	15.059	2.83*	141.74	C
80.00-60.00		TA 0.51	B	0.289	2.325		0.85	1	15.059			
			C	0.289	2.325		0.85	1	15.059			
T8	1.13	1.01	A	0.272	2.373	19	0.85	1	11.930	2.57*	128.75	C
60.00-40.00			B	0.272	2.373		0.85	1	11.930			
			C	0.272	2.373		0.85	1	11.930			
T9	1.13	0.72	A	0.22	2.53	17	0.85	1	9.469	2.23*	111.26	C
40.00-20.00			B	0.22	2.53		0.85	1	9.469			
			C	0.22	2.53		0.85	1	9.469			
T10	0.68	0.63	A	0.224	2.518	17	0.85	1	7.231	1.67*	111.17	C
20.00-5.00			B	0.224	2.518		0.85	1	7.231			
			C	0.224	2.518		0.85	1	7.231			
T11 5.00-0.00	0.00	0.37	A	0.469	1.943	17	0.85	1	3.456	0.10	19.17	C
			B	0.469	1.943		0.85	1	3.456			
			C	0.469	1.943		0.85	1	3.456			
Sum Weight:	9.20	13.10			*2.1A_g limit					27.24		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.73	2.66	A	0.699	1.776	6	1	1	30.382	0.48	37.03	C
193.00-180.00			B	0.699	1.776		1	1	30.382			
			C	0.699	1.776		1	1	30.382			
T2	4.01	5.12	A	0.822	1.834	6	1	1	60.009	0.88*	44.12	C
180.00-160.00		TA 1.79	B	0.822	1.834		1	1	60.009			
			C	0.822	1.834		1	1	60.009			
T3	5.54	4.97	A	0.813	1.826	6	1	1	58.881	0.85*	42.53	C
160.00-140.00			B	0.813	1.826		1	1	58.881			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.813	1.826		1	1	58.881			
T4	6.00	2.93	A	0.628	1.789	6	1	1	37.612	0.82*	40.79	C
140.00-120.00			B	0.628	1.789		1	1	37.612			
			C	0.628	1.789		1	1	37.612			
T5	6.32	5.06	A	0.81	1.824	6	1	1	59.267	0.79*	39.35	C
120.00-100.00		TA 1.42	B	0.81	1.824		1	1	59.267			
			C	0.81	1.824		1	1	59.267			
T6	6.58	2.86	A	0.627	1.79	5	1	1	37.990	0.74*	37.11	C
100.00-80.00			B	0.627	1.79		1	1	37.990			
			C	0.627	1.79		1	1	37.990			
T7	6.45	3.43	A	0.635	1.786	5	1	1	40.742	0.69*	34.48	C
80.00-60.00		TA 1.08	B	0.635	1.786		1	1	40.742			
			C	0.635	1.786		1	1	40.742			
T8	6.28	2.88	A	0.609	1.799	4	1	1	36.107	0.62*	31.25	C
60.00-40.00			B	0.609	1.799		1	1	36.107			
			C	0.609	1.799		1	1	36.107			
T9	6.04	1.92	A	0.449	1.976	4	1	1	23.321	0.54*	26.91	C
40.00-20.00			B	0.449	1.976		1	1	23.321			
			C	0.449	1.976		1	1	23.321			
T10	3.40	1.45	A	0.44	1.99	4	1	1	16.955	0.40*	26.75	C
20.00-5.00			B	0.44	1.99		1	1	16.955			
			C	0.44	1.99		1	1	16.955			
T11 5.00-0.00	0.01	0.64	A	0.729	1.781	4	1	1	6.917	0.04	7.97	C
			B	0.729	1.781		1	1	6.917			
			C	0.729	1.781		1	1	6.917			
Sum Weight:	51.36	38.27			*2.1A_g limit					6.85		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.73	2.66	A	0.699	1.776	6	0.8	1	28.789	0.47	35.85	C
193.00-180.00			B	0.699	1.776		0.8	1	28.789			
			C	0.699	1.776		0.8	1	28.789			
T2	4.01	5.12	A	0.822	1.834	6	0.8	1	56.862	0.88*	44.12	C
180.00-160.00		TA 1.79	B	0.822	1.834		0.8	1	56.862			
			C	0.822	1.834		0.8	1	56.862			
T3	5.54	4.97	A	0.813	1.826	6	0.8	1	55.946	0.85*	42.53	C
160.00-140.00			B	0.813	1.826		0.8	1	55.946			
			C	0.813	1.826		0.8	1	55.946			
T4	6.00	2.93	A	0.628	1.789	6	0.8	1	37.598	0.82*	40.79	C
140.00-120.00			B	0.628	1.789		0.8	1	37.598			
			C	0.628	1.789		0.8	1	37.598			
T5	6.32	5.06	A	0.81	1.824	6	0.8	1	56.171	0.79*	39.35	C
120.00-100.00		TA 1.42	B	0.81	1.824		0.8	1	56.171			
			C	0.81	1.824		0.8	1	56.171			
T6	6.58	2.86	A	0.627	1.79	5	0.8	1	37.976	0.74*	37.11	C
100.00-80.00			B	0.627	1.79		0.8	1	37.976			
			C	0.627	1.79		0.8	1	37.976			
T7	6.45	3.43	A	0.635	1.786	5	0.8	1	38.943	0.69*	34.48	C
80.00-60.00		TA 1.08	B	0.635	1.786		0.8	1	38.943			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.635	1.786		0.8	1	38.943			
T8	6.28	2.88	A	0.609	1.799	4	0.8	1	36.094	0.62*	31.25	C
60.00-40.00			B	0.609	1.799		0.8	1	36.094			
			C	0.609	1.799		0.8	1	36.094			
T9	6.04	1.92	A	0.449	1.976	4	0.8	1	23.307	0.54*	26.91	C
40.00-20.00			B	0.449	1.976		0.8	1	23.307			
			C	0.449	1.976		0.8	1	23.307			
T10	3.40	1.45	A	0.44	1.99	4	0.8	1	16.941	0.40*	26.75	C
20.00-5.00			B	0.44	1.99		0.8	1	16.941			
			C	0.44	1.99		0.8	1	16.941			
T11 5.00-0.00	0.01	0.64	A	0.729	1.781	4	0.8	1	6.597	0.04	7.60	C
			B	0.729	1.781		0.8	1	6.597			
			C	0.729	1.781		0.8	1	6.597			
Sum Weight:	51.36	38.27			*2.1A_g limit					6.84		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.73	2.66	A	0.699	1.776	6	0.85	1	29.187	0.47	36.14	C
193.00-180.00			B	0.699	1.776		0.85	1	29.187			
			C	0.699	1.776		0.85	1	29.187			
T2	4.01	5.12	A	0.822	1.834	6	0.85	1	57.648	0.88*	44.12	C
180.00-160.00		TA 1.79	B	0.822	1.834		0.85	1	57.648			
			C	0.822	1.834		0.85	1	57.648			
T3	5.54	4.97	A	0.813	1.826	6	0.85	1	56.680	0.85*	42.53	C
160.00-140.00			B	0.813	1.826		0.85	1	56.680			
			C	0.813	1.826		0.85	1	56.680			
T4	6.00	2.93	A	0.628	1.789	6	0.85	1	37.602	0.82*	40.79	C
140.00-120.00			B	0.628	1.789		0.85	1	37.602			
			C	0.628	1.789		0.85	1	37.602			
T5	6.32	5.06	A	0.81	1.824	6	0.85	1	56.945	0.79*	39.35	C
120.00-100.00		TA 1.42	B	0.81	1.824		0.85	1	56.945			
			C	0.81	1.824		0.85	1	56.945			
T6	6.58	2.86	A	0.627	1.79	5	0.85	1	37.980	0.74*	37.11	C
100.00-80.00			B	0.627	1.79		0.85	1	37.980			
			C	0.627	1.79		0.85	1	37.980			
T7	6.45	3.43	A	0.635	1.786	5	0.85	1	39.393	0.69*	34.48	C
80.00-60.00		TA 1.08	B	0.635	1.786		0.85	1	39.393			
			C	0.635	1.786		0.85	1	39.393			
T8	6.28	2.88	A	0.609	1.799	4	0.85	1	36.097	0.62*	31.25	C
60.00-40.00			B	0.609	1.799		0.85	1	36.097			
			C	0.609	1.799		0.85	1	36.097			
T9	6.04	1.92	A	0.449	1.976	4	0.85	1	23.311	0.54*	26.91	C
40.00-20.00			B	0.449	1.976		0.85	1	23.311			
			C	0.449	1.976		0.85	1	23.311			
T10	3.40	1.45	A	0.44	1.99	4	0.85	1	16.944	0.40*	26.75	C
20.00-5.00			B	0.44	1.99		0.85	1	16.944			
			C	0.44	1.99		0.85	1	16.944			
T11 5.00-0.00	0.01	0.64	A	0.729	1.781	4	0.85	1	6.677	0.04	7.70	C
			B	0.729	1.781		0.85	1	6.677			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
Sum Weight:	51.36	38.27	C	0.729	1.781 *2.1A_g limit		0.85	1	6.677	6.84		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.16	0.77	A	0.299	2.3	9	1	1	11.690	0.40	30.63	C
193.00-180.00			B	0.299	2.3		1	1	11.690			
			C	0.299	2.3		1	1	11.690			
T2	0.70	1.51	A	0.346	2.18	9	1	1	21.626	1.18*	58.80	C
180.00-160.00		TA 1.03	B	0.346	2.18		1	1	21.626			
			C	0.346	2.18		1	1	21.626			
T3	0.98	1.48	A	0.343	2.189	9	1	1	21.041	1.13*	56.73	C
160.00-140.00			B	0.343	2.189		1	1	21.041			
			C	0.343	2.189		1	1	21.041			
T4	1.06	0.85	A	0.249	2.44	8	1	1	10.685	1.09*	54.46	C
140.00-120.00			B	0.249	2.44		1	1	10.685			
			C	0.249	2.44		1	1	10.685			
T5	1.10	1.58	A	0.366	2.135	8	1	1	22.737	1.05*	52.66	C
120.00-100.00		TA 0.69	B	0.366	2.135		1	1	22.737			
			C	0.366	2.135		1	1	22.737			
T6	1.13	0.81	A	0.272	2.373	8	1	1	11.940	0.99*	49.73	C
100.00-80.00			B	0.272	2.373		1	1	11.940			
			C	0.272	2.373		1	1	11.940			
T7	1.13	1.08	A	0.289	2.325	7	1	1	16.408	0.93*	46.28	C
80.00-60.00		TA 0.51	B	0.289	2.325		1	1	16.408			
			C	0.289	2.325		1	1	16.408			
T8	1.13	1.01	A	0.272	2.373	6	1	1	11.940	0.84*	42.04	C
60.00-40.00			B	0.272	2.373		1	1	11.940			
			C	0.272	2.373		1	1	11.940			
T9	1.13	0.72	A	0.22	2.53	5	1	1	9.479	0.73*	36.33	C
40.00-20.00			B	0.22	2.53		1	1	9.479			
			C	0.22	2.53		1	1	9.479			
T10	0.68	0.63	A	0.224	2.518	5	1	1	7.241	0.54*	36.30	C
20.00-5.00			B	0.224	2.518		1	1	7.241			
			C	0.224	2.518		1	1	7.241			
T11 5.00-0.00	0.00	0.37	A	0.469	1.943	5	1	1	3.695	0.03	6.69	C
			B	0.469	1.943		1	1	3.695			
			C	0.469	1.943		1	1	3.695			
Sum Weight:	9.20	13.10			*2.1A_g limit					8.92		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.16	0.77	A	0.299	2.3	9	0.8	1	10.098	0.37	28.42	C
193.00-180.00			B	0.299	2.3		0.8	1	10.098			
			C	0.299	2.3		0.8	1	10.098			
T2	0.70	1.51	A	0.346	2.18	9	0.8	1	18.479	1.18*	58.80	C
180.00-160.00		TA 1.03	B	0.346	2.18		0.8	1	18.479			
			C	0.346	2.18		0.8	1	18.479			
T3	0.98	1.48	A	0.343	2.189	9	0.8	1	18.106	1.13*	56.73	C
160.00-140.00			B	0.343	2.189		0.8	1	18.106			
			C	0.343	2.189		0.8	1	18.106			
T4	1.06	0.85	A	0.249	2.44	8	0.8	1	10.672	1.09*	54.46	C
140.00-120.00			B	0.249	2.44		0.8	1	10.672			
			C	0.249	2.44		0.8	1	10.672			
T5	1.10	1.58	A	0.366	2.135	8	0.8	1	19.641	1.05*	52.66	C
120.00-100.00		TA 0.69	B	0.366	2.135		0.8	1	19.641			
			C	0.366	2.135		0.8	1	19.641			
T6	1.13	0.81	A	0.272	2.373	8	0.8	1	11.926	0.99*	49.73	C
100.00-80.00			B	0.272	2.373		0.8	1	11.926			
			C	0.272	2.373		0.8	1	11.926			
T7	1.13	1.08	A	0.289	2.325	7	0.8	1	14.609	0.93*	46.28	C
80.00-60.00		TA 0.51	B	0.289	2.325		0.8	1	14.609			
			C	0.289	2.325		0.8	1	14.609			
T8	1.13	1.01	A	0.272	2.373	6	0.8	1	11.926	0.84*	42.04	C
60.00-40.00			B	0.272	2.373		0.8	1	11.926			
			C	0.272	2.373		0.8	1	11.926			
T9	1.13	0.72	A	0.22	2.53	5	0.8	1	9.465	0.73*	36.33	C
40.00-20.00			B	0.22	2.53		0.8	1	9.465			
			C	0.22	2.53		0.8	1	9.465			
T10	0.68	0.63	A	0.224	2.518	5	0.8	1	7.228	0.54*	36.30	C
20.00-5.00			B	0.224	2.518		0.8	1	7.228			
			C	0.224	2.518		0.8	1	7.228			
T11 5.00-0.00	0.00	0.37	A	0.469	1.943	5	0.8	1	3.376	0.03	6.11	C
			B	0.469	1.943		0.8	1	3.376			
			C	0.469	1.943		0.8	1	3.376			
Sum Weight:	9.20	13.10			*2.1A_g limit					8.89		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.16	0.77	A	0.299	2.3	9	0.85	1	10.496	0.38	28.97	C
193.00-180.00			B	0.299	2.3		0.85	1	10.496			
			C	0.299	2.3		0.85	1	10.496			
T2	0.70	1.51	A	0.346	2.18	9	0.85	1	19.265	1.18*	58.80	C
180.00-160.00		TA 1.03	B	0.346	2.18		0.85	1	19.265			
			C	0.346	2.18		0.85	1	19.265			
T3	0.98	1.48	A	0.343	2.189	9	0.85	1	18.840	1.13*	56.73	C
160.00-140.00			B	0.343	2.189		0.85	1	18.840			
			C	0.343	2.189		0.85	1	18.840			
T4	1.06	0.85	A	0.249	2.44	8	0.85	1	10.675	1.09*	54.46	C
140.00-120.00			B	0.249	2.44		0.85	1	10.675			
			C	0.249	2.44		0.85	1	10.675			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T5	1.10	1.58	A	0.366	2.135	8	0.85	1	20.415	1.05*	52.66	C
120.00-100.00		TA 0.69	B	0.366	2.135		0.85	1	20.415			
			C	0.366	2.135		0.85	1	20.415			
T6	1.13	0.81	A	0.272	2.373	8	0.85	1	11.930	0.99*	49.73	C
100.00-80.00			B	0.272	2.373		0.85	1	11.930			
			C	0.272	2.373		0.85	1	11.930			
T7	1.13	1.08	A	0.289	2.325	7	0.85	1	15.059	0.93*	46.28	C
80.00-60.00		TA 0.51	B	0.289	2.325		0.85	1	15.059			
			C	0.289	2.325		0.85	1	15.059			
T8	1.13	1.01	A	0.272	2.373	6	0.85	1	11.930	0.84*	42.04	C
60.00-40.00			B	0.272	2.373		0.85	1	11.930			
			C	0.272	2.373		0.85	1	11.930			
T9	1.13	0.72	A	0.22	2.53	5	0.85	1	9.469	0.73*	36.33	C
40.00-20.00			B	0.22	2.53		0.85	1	9.469			
			C	0.22	2.53		0.85	1	9.469			
T10	0.68	0.63	A	0.224	2.518	5	0.85	1	7.231	0.54*	36.30	C
20.00-5.00			B	0.224	2.518		0.85	1	7.231			
			C	0.224	2.518		0.85	1	7.231			
T11 5.00-0.00	0.00	0.37	A	0.469	1.943	5	0.85	1	3.456	0.03	6.26	C
			B	0.469	1.943		0.85	1	3.456			
			C	0.469	1.943		0.85	1	3.456			
Sum Weight:	9.20	13.10			*2.1A_g limit					8.89		

Force Totals (Does not include forces on guys)

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Torques kip-ft
Leg Weight	5.55			
Bracing Weight	7.51			
Total Member Self-Weight	13.06			
Gusset Weight	0.04			
Guy Weight	2.46			
Total Weight	36.11			
Wind 0 deg - No Ice		-0.01	-38.25	14.98
Wind 30 deg - No Ice		19.08	-33.06	12.97
Wind 60 deg - No Ice		33.03	-19.07	7.28
Wind 90 deg - No Ice		38.17	0.01	-0.42
Wind 120 deg - No Ice		33.12	19.13	-7.84
Wind 150 deg - No Ice		19.09	33.07	-13.39
Wind 180 deg - No Ice		0.01	38.16	-15.29
Wind 210 deg - No Ice		-19.08	33.06	-12.97
Wind 240 deg - No Ice		-33.12	19.12	-7.14
Wind 270 deg - No Ice		-38.17	-0.01	0.42
Wind 300 deg - No Ice		-33.04	-19.08	8.01
Wind 330 deg - No Ice		-19.09	-33.07	13.39
Member Ice	25.16			
Gusset Ice	0.06			
Guy Ice	11.81			
Total Weight Ice	136.41			
Wind 0 deg - Ice		-0.00	-10.85	3.30
Wind 30 deg - Ice		5.42	-9.38	3.26

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Torques kip-ft
Wind 60 deg - Ice		9.38	-5.42	2.32
Wind 90 deg - Ice		10.83	0.00	0.74
Wind 120 deg - Ice		9.39	5.42	-1.02
Wind 150 deg - Ice		5.42	9.38	-2.52
Wind 180 deg - Ice		0.00	10.83	-3.35
Wind 210 deg - Ice		-5.42	9.38	-3.26
Wind 240 deg - Ice		-9.39	5.42	-2.29
Wind 270 deg - Ice		-10.83	-0.00	-0.74
Wind 300 deg - Ice		-9.38	-5.42	1.03
Wind 330 deg - Ice		-5.42	-9.38	2.52
Total Weight	36.11			
Wind 0 deg - Service		-0.00	-12.49	4.89
Wind 30 deg - Service		6.23	-10.80	4.23
Wind 60 deg - Service		10.79	-6.23	2.38
Wind 90 deg - Service		12.46	0.00	-0.14
Wind 120 deg - Service		10.82	6.25	-2.56
Wind 150 deg - Service		6.23	10.80	-4.37
Wind 180 deg - Service		0.00	12.46	-4.99
Wind 210 deg - Service		-6.23	10.80	-4.23
Wind 240 deg - Service		-10.81	6.24	-2.33
Wind 270 deg - Service		-12.46	-0.00	0.14
Wind 300 deg - Service		-10.79	-6.23	2.62
Wind 330 deg - Service		-6.23	-10.80	4.37

Load Combinations

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

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	193 - 180	Leg	Max Tension	4	12.09	0.49	-0.18
			Max. Compression	6	-15.28	0.29	0.20
			Max. Mx	10	-12.13	-0.50	0.19
			Max. My	2	-14.98	-0.12	-0.53
			Max. Vy	10	-2.04	-0.33	0.13
			Max. Vx	2	-2.14	-0.08	-0.35
		Diagonal	Max Tension	8	2.80	0.00	0.00
			Max. Compression	2	-2.93	0.00	0.00
			Max. Mx	6	0.35	0.04	-0.00
			Max. My	8	-1.91	0.01	0.01
			Max. Vy	6	0.02	0.04	-0.00
			Max. Vx	8	-0.00	0.01	0.01
		Top Girt	Max Tension	6	0.12	0.00	0.00
			Max. Compression	8	-0.11	0.00	0.00
			Max. Mx	19	0.04	-0.02	0.00
			Max. My	3	0.01	0.00	0.00
			Max. Vy	19	-0.02	0.00	0.00
			Max. Vx	3	-0.00	0.00	0.00
		Bottom Girt	Max Tension	4	0.90	0.00	0.00
			Max. Compression	6	-0.83	0.00	0.00
			Max. Mx	19	-0.11	-0.02	0.00
			Max. My	3	0.03	0.00	0.00
			Max. Vy	19	-0.02	0.00	0.00
			Max. Vx	3	-0.00	0.00	0.00
T2	180 - 160	Leg	Max Tension	4	83.00	-1.13	0.69
			Max. Compression	6	-95.40	-1.15	-0.64
			Max. Mx	5	-4.42	-5.24	-0.45
			Max. My	3	-6.05	-2.39	5.02
			Max. Vy	5	5.21	-5.24	-0.45
			Max. Vx	8	-5.58	-0.03	-1.93
		Diagonal	Max Tension	8	10.20	0.02	-0.01
			Max. Compression	2	-10.94	0.00	0.00
			Max. Mx	3	-0.02	-0.20	-0.06
			Max. My	7	-6.82	-0.08	0.10
			Max. Vy	3	-0.10	0.00	0.00
			Max. Vx	7	0.05	-0.08	0.10
		Secondary Horizontal	Max Tension	4	5.81	-0.17	-0.01
			Max. Compression	2	-5.43	0.00	0.00
			Max. Mx	8	-0.99	-0.18	-0.01
			Max. My	4	-1.64	0.08	0.03

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	0.11	0.00	0.00
			Max. Vx	4	0.02	0.08	0.03
		Top Girt	Max Tension	2	0.81	0.00	0.00
			Max. Compression	12	-0.81	0.00	0.00
			Max. Mx	19	0.20	-0.02	0.00
			Max. My	3	0.01	0.00	0.00
			Max. Vy	19	0.02	0.00	0.00
			Max. Vx	3	-0.00	0.00	0.00
		Bottom Girt	Max Tension	6	6.77	0.00	0.00
			Max. Compression	4	-5.53	0.00	0.00
			Max. Mx	19	1.97	-0.02	0.00
			Max. My	2	-1.91	0.00	-0.00
			Max. Vy	19	0.02	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Guy A	Bottom Tension	9	31.05		
			Top Tension	9	31.24		
			Top Cable Vert	9	23.85		
			Top Cable Norm	9	20.17		
			Top Cable Tan	9	0.08		
			Bot Cable Vert	9	-23.43		
			Bot Cable Norm	9	20.37		
			Bot Cable Tan	9	0.29		
		Guy B	Bottom Tension	11	30.18		
			Top Tension	11	30.36		
			Top Cable Vert	11	23.19		
			Top Cable Norm	11	19.60		
			Top Cable Tan	11	0.08		
			Bot Cable Vert	11	-22.77		
			Bot Cable Norm	11	19.80		
			Bot Cable Tan	11	0.29		
		Guy C	Bottom Tension	3	31.13		
			Top Tension	3	31.31		
			Top Cable Vert	3	23.91		
			Top Cable Norm	3	20.22		
			Top Cable Tan	3	0.08		
			Bot Cable Vert	3	-23.49		
			Bot Cable Norm	3	20.42		
			Bot Cable Tan	3	0.29		
		Torque Arm Top	Max Tension	7	21.69	0.00	0.00
			Max. Compression	7	-10.73	0.00	0.00
			Max. Mx	7	0.77	-82.63	0.00
			Max. My	2	-8.10	-66.26	0.00
			Max. Vy	7	24.28	-82.63	0.00
			Max. Vx	2	0.00	-66.26	0.00
T3	160 - 140	Leg	Max Tension	4	35.19	1.64	-1.02
			Max. Compression	6	-88.52	1.66	1.07
			Max. Mx	10	-87.28	-1.67	1.00
			Max. My	2	-80.87	-0.06	-1.96
			Max. Vy	4	-4.73	-1.25	0.77
			Max. Vx	8	-5.53	-0.03	-1.47
		Diagonal	Max Tension	4	5.41	0.00	0.00
			Max. Compression	7	-6.97	0.04	-0.00
			Max. Mx	2	1.30	-0.09	-0.01
			Max. My	6	0.92	-0.09	-0.02
			Max. Vy	2	-0.05	0.00	0.00
			Max. Vx	6	-0.01	-0.09	-0.02
		Secondary Horizontal	Max Tension	6	2.74	-0.01	-0.01
			Max. Compression	4	-1.60	-0.02	0.00
			Max. Mx	9	-0.51	-0.04	-0.01
			Max. My	9	1.95	0.03	-0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	17	0.03	0.03	-0.01
			Max. Vx	9	-0.01	0.00	0.00
		Top Girt	Max Tension	3	0.76	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	19	0.34	0.01	0.00
			Max. My	2	0.66	0.00	-0.00
			Max. Vy	19	-0.02	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Bottom Girt	Max Tension	3	0.46	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	19	0.41	0.01	0.00
			Max. My	2	0.44	0.00	-0.00
			Max. Vy	19	-0.02	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
T4	140 - 120	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-68.40	-0.05	-0.00
			Max. Mx	10	-17.55	-0.37	0.04
			Max. My	2	-17.52	-0.13	-0.39
			Max. Vy	10	-1.91	-0.21	-0.01
			Max. Vx	2	-2.28	-0.11	-0.20
		Diagonal	Max Tension	8	2.30	0.00	0.00
			Max. Compression	2	-3.30	0.00	0.00
			Max. Mx	18	-0.68	0.02	0.00
			Max. My	2	0.15	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Top Girt	Max Tension	3	0.93	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	19	0.53	0.01	0.00
			Max. My	2	0.81	0.00	-0.00
			Max. Vy	19	-0.02	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Bottom Girt	Max Tension	7	1.08	0.00	0.00
			Max. Compression	2	-0.11	0.00	0.00
			Max. Mx	14	0.68	0.01	0.00
			Max. My	2	1.02	0.00	-0.00
			Max. Vy	14	-0.02	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
T5	120 - 100	Leg	Max Tension	4	25.79	-0.50	0.29
			Max. Compression	6	-104.61	1.89	1.05
			Max. Mx	11	-20.99	3.90	-0.91
			Max. My	3	-20.94	-1.33	4.05
			Max. Vy	11	-3.66	3.90	-0.91
			Max. Vx	3	-3.95	-1.33	4.05
		Diagonal	Max Tension	8	4.76	0.00	0.01
			Max. Compression	2	-6.91	0.00	0.00
			Max. Mx	7	-1.08	0.13	0.02
			Max. My	2	-2.84	-0.12	-0.04
			Max. Vy	7	-0.07	0.13	0.02
			Max. Vx	2	-0.02	-0.12	-0.04
		Secondary Horizontal	Max Tension	8	4.93	0.00	0.00
			Max. Compression	2	-3.04	0.03	0.01
			Max. Mx	3	-1.57	0.07	-0.01
			Max. My	7	-1.59	-0.06	-0.02
			Max. Vy	3	-0.05	0.07	-0.01
			Max. Vx	7	0.01	0.00	0.00
		Top Girt	Max Tension	19	0.61	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.59	-0.02	0.00
			Max. My	2	0.50	0.00	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	14	-0.02	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Bottom Girt	Max Tension	10	3.02	0.00	0.00
			Max. Compression	12	-1.44	0.00	0.00
			Max. Mx	14	1.00	-0.02	0.00
			Max. My	2	-0.03	0.00	-0.00
			Max. Vy	14	-0.02	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Guy A	Bottom Tension	9	15.61		
			Top Tension	9	15.69		
			Top Cable Vert	9	12.05		
			Top Cable Norm	9	10.05		
			Top Cable Tan	9	0.00		
			Bot Cable Vert	9	-11.86		
			Bot Cable Norm	9	10.14		
			Bot Cable Tan	9	0.10		
		Guy B	Bottom Tension	11	15.03		
			Top Tension	11	15.11		
			Top Cable Vert	11	11.61		
			Top Cable Norm	11	9.67		
			Top Cable Tan	11	0.00		
			Bot Cable Vert	11	-11.42		
			Bot Cable Norm	11	9.77		
			Bot Cable Tan	11	0.10		
		Guy C	Bottom Tension	3	15.60		
			Top Tension	3	15.68		
			Top Cable Vert	3	12.04		
			Top Cable Norm	3	10.05		
			Top Cable Tan	3	0.00		
			Bot Cable Vert	3	-11.86		
			Bot Cable Norm	3	10.14		
			Bot Cable Tan	3	0.10		
		Torque Arm Top	Max Tension	13	10.72	0.00	0.00
			Max. Compression	13	-5.47	0.00	0.00
			Max. Mx	13	1.03	-41.12	-0.00
			Max. My	2	-4.02	-31.10	0.00
			Max. Vy	13	12.10	-41.12	-0.00
			Max. Vx	2	0.00	-31.10	0.00
T6	100 - 80	Leg	Max Tension	4	1.36	-1.04	0.63
			Max. Compression	6	-101.84	0.22	0.15
			Max. Mx	5	-8.78	-1.05	0.34
			Max. My	8	1.16	-0.02	-1.21
			Max. Vy	4	-2.56	-1.04	0.63
			Max. Vx	8	-2.96	-0.02	-1.21
		Diagonal	Max Tension	7	2.11	0.00	0.00
			Max. Compression	7	-2.79	0.00	0.00
			Max. Mx	20	-0.79	0.01	0.00
			Max. My	2	-0.21	0.00	-0.00
			Max. Vy	20	-0.01	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Top Girt	Max Tension	2	0.69	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.60	0.01	0.00
			Max. My	2	0.65	0.00	-0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Bottom Girt	Max Tension	2	0.43	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.40	0.01	0.00
			Max. My	2	0.43	0.00	-0.00
			Max. Vy	14	-0.01	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	0.00	0.00	0.00
T7	80 - 60	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-88.17	0.68	0.29
			Max. Mx	11	-39.55	2.08	-0.35
			Max. My	2	-84.63	0.24	2.06
			Max. Vy	10	3.60	1.83	-0.95
			Max. Vx	2	4.01	0.24	2.06
		Diagonal	Max Tension	2	4.27	0.00	0.00
			Max. Compression	8	-5.71	0.00	0.00
			Max. Mx	13	0.83	0.07	-0.00
			Max. My	13	-5.11	0.00	0.03
			Max. Vy	13	-0.04	0.07	-0.00
			Max. Vx	13	0.01	0.00	0.00
		Top Girt	Max Tension	2	0.95	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.83	0.01	0.00
			Max. My	2	0.93	0.00	-0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Bottom Girt	Max Tension	2	1.91	0.00	0.00
			Max. Compression	4	-0.57	0.00	0.00
			Max. Mx	14	0.94	0.01	0.00
			Max. My	2	0.30	0.00	0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	2	-0.00	0.00	0.00
		Guy A	Bottom Tension	8	8.80		
			Top Tension	8	8.83		
			Top Cable Vert	8	5.21		
			Top Cable Norm	8	7.13		
			Top Cable Tan	8	0.00		
			Bot Cable Vert	8	-5.12		
			Bot Cable Norm	8	7.15		
			Bot Cable Tan	8	0.00		
		Guy B	Bottom Tension	13	8.71		
			Top Tension	13	8.75		
			Top Cable Vert	13	5.16		
			Top Cable Norm	13	7.06		
			Top Cable Tan	13	0.00		
			Bot Cable Vert	13	-5.07		
			Bot Cable Norm	13	7.09		
			Bot Cable Tan	13	0.04		
		Guy C	Bottom Tension	3	8.62		
			Top Tension	3	8.65		
			Top Cable Vert	3	5.11		
			Top Cable Norm	3	6.98		
			Top Cable Tan	3	0.01		
			Bot Cable Vert	3	-5.02		
			Bot Cable Norm	3	7.01		
			Bot Cable Tan	3	0.04		
		Torque Arm Top	Max Tension	13	8.02	0.00	0.00
			Max. Compression	13	-4.18	0.00	0.00
			Max. Mx	13	0.47	-17.02	-0.00
			Max. My	2	-3.68	-14.30	0.00
			Max. Vy	13	5.03	-17.02	-0.00
			Max. Vx	2	0.00	-14.30	0.00
T8	60 - 40	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-80.99	0.57	0.51
			Max. Mx	10	-80.79	1.53	-0.80
			Max. My	2	-80.94	0.18	1.73
			Max. Vy	10	3.62	1.53	-0.80
			Max. Vx	2	4.05	0.18	1.73

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	7	3.63	0.00	0.00
			Max. Compression	7	-5.03	0.00	0.00
			Max. Mx	21	0.39	0.01	0.00
			Max. My	8	0.26	0.00	0.00
			Max. Vy	21	0.01	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
		Top Girt	Max Tension	23	0.89	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.87	0.01	0.00
			Max. My	2	0.72	0.00	-0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Bottom Girt	Max Tension	9	1.24	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.86	0.01	0.00
			Max. My	2	0.74	0.00	-0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
T9	40 - 20	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	25	-72.50	-0.41	0.06
			Max. Mx	10	-46.33	0.81	-0.37
			Max. My	2	-46.49	0.33	0.84
			Max. Vy	10	1.56	0.81	-0.37
			Max. Vx	2	1.65	-0.33	0.82
		Diagonal	Max Tension	13	2.98	0.00	0.00
			Max. Compression	7	-3.38	0.00	0.00
			Max. Mx	22	-0.03	0.01	0.00
			Max. My	8	0.31	0.00	0.00
			Max. Vy	22	-0.01	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
		Top Girt	Max Tension	7	1.09	0.00	0.00
			Max. Compression	13	-0.76	0.00	0.00
			Max. Mx	14	0.19	0.01	0.00
			Max. My	2	0.47	0.00	-0.00
			Max. Vy	14	0.01	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Bottom Girt	Max Tension	13	0.45	0.00	0.00
			Max. Compression	8	-0.23	0.00	0.00
			Max. Mx	19	0.18	0.01	0.00
			Max. My	2	0.38	0.00	-0.00
			Max. Vy	19	0.01	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
T10	20 - 5	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	25	-72.58	-0.03	-0.10
			Max. Mx	25	-71.90	1.44	0.75
			Max. My	21	-71.70	-0.07	-1.61
			Max. Vy	5	7.62	-1.27	0.76
			Max. Vx	22	8.48	-0.06	-1.61
		Diagonal	Max Tension	9	3.07	0.00	0.00
			Max. Compression	11	-2.70	0.00	0.00
			Max. Mx	22	0.78	0.01	0.00
			Max. My	8	0.10	0.00	0.00
			Max. Vy	22	-0.01	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
		Top Girt	Max Tension	8	0.80	0.00	0.00
			Max. Compression	2	-0.21	0.00	0.00
			Max. Mx	19	0.31	0.01	0.00
			Max. My	2	-0.21	0.00	-0.00
			Max. Vy	19	-0.01	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Bottom Girt	Max Tension	26	4.49	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	19	4.46	0.01	0.00
			Max. My	13	2.96	0.00	0.00
			Max. Vy	19	-0.01	0.00	0.00
			Max. Vx	13	-0.00	0.00	0.00
T11	5 - 0	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	25	-77.73	0.16	-0.04
			Max. Mx	15	-74.81	-1.87	-0.00
			Max. My	12	-36.91	-1.26	-0.29
			Max. Vy	23	18.61	-1.74	-0.08
			Max. Vx	7	0.88	-1.57	-0.26
		Top Girt	Max Tension	26	12.20	0.25	-0.12
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	7	9.96	0.41	-0.12
			Max. My	9	8.75	0.21	-0.15
			Max. Vy	8	-0.13	0.40	-0.10
			Max. Vx	9	-0.03	0.07	-0.04
		Bottom Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	2	-3.30	0.75	-0.35
			Max. Mx	2	-3.19	0.96	-0.36
			Max. My	2	-3.19	0.96	-0.36
			Max. Vy	2	-2.11	0.96	-0.36
			Max. Vx	2	0.54	0.24	-0.18
		Mid Girt	Max Tension	10	0.10	0.00	0.00
			Max. Compression	25	-0.66	0.00	0.00
			Max. Mx	15	-0.66	-0.01	0.00
			Max. My	15	-0.62	0.00	-0.00
			Max. Vy	15	0.02	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Mast	Max. Vert	19	213.16	-0.33	-0.24
	Max. H_x	12	127.51	3.18	1.80
	Max. H_z	2	174.33	0.03	2.48
	Max. M_x	1	0.00	0.02	-0.01
	Max. M_z	1	0.00	0.02	-0.01
	Max. Torsion	1	0.00	0.02	-0.01
	Min. Vert	1	91.16	0.02	-0.01
	Min. H_x	4	127.52	-3.11	1.81
	Min. H_z	8	127.91	0.05	-3.63
	Min. M_x	1	0.00	0.02	-0.01
	Min. M_z	1	0.00	0.02	-0.01
	Min. Torsion	1	0.00	0.02	-0.01
Guy C @ 140 ft Elev 0 ft Azimuth 240 deg	Max. Vert	10	-0.45	-0.20	0.11
	Max. H_x	10	-0.45	-0.20	0.11
	Max. H_z	3	-44.59	-33.35	19.83
	Min. Vert	3	-44.59	-33.35	19.83
	Min. H_x	5	-44.58	-33.85	18.93
	Min. H_z	10	-0.45	-0.20	0.11
Guy B @ 140 ft Elev 0 ft	Max. Vert	6	-0.45	0.20	0.11

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Azimuth 120 deg					
	Max. H_x	11	-44.39	33.71	18.85
	Max. H_z	13	-44.44	33.20	19.82
	Min. Vert	13	-44.44	33.20	19.82
	Min. H_x	6	-0.45	0.20	0.11
	Min. H_z	6	-0.45	0.20	0.11
Guy A @ 140 ft Elev 0 ft	Max. Vert	2	-0.45	0.00	-0.23
Azimuth 0 deg					
	Max. H_x	10	-38.18	0.77	-33.13
	Max. H_z	2	-0.45	0.00	-0.23
	Min. Vert	7	-44.53	-0.56	-38.74
	Min. H_x	6	-38.26	-0.81	-33.20
	Min. H_z	7	-44.53	-0.56	-38.74
Guy C @ 88 ft Elev 0 ft	Max. Vert	10	-0.32	-0.17	0.10
Azimuth 240 deg					
	Max. H_x	10	-0.32	-0.17	0.10
	Max. H_z	3	-31.33	-27.53	16.09
	Min. Vert	5	-31.39	-27.78	15.77
	Min. H_x	5	-31.39	-27.78	15.77
	Min. H_z	10	-0.32	-0.17	0.10
Guy B @ 88 ft Elev 0 ft	Max. Vert	6	-0.32	0.17	0.10
Azimuth 120 deg					
	Max. H_x	11	-31.48	27.87	15.82
	Max. H_z	13	-31.53	27.64	16.33
	Min. Vert	13	-31.53	27.64	16.33
	Min. H_x	6	-0.32	0.17	0.10
	Min. H_z	6	-0.32	0.17	0.10
Guy A @ 88 ft Elev 0 ft	Max. Vert	2	-0.32	0.00	-0.20
Azimuth 0 deg					
	Max. H_x	11	-16.86	0.43	-16.89
	Max. H_z	2	-0.32	0.00	-0.20
	Min. Vert	7	-31.48	-0.32	-32.04
	Min. H_x	6	-27.05	-0.46	-27.36
	Min. H_z	7	-31.48	-0.32	-32.04

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	91.16	-0.02	0.01	0.00	0.00	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy	174.33	-0.03	-2.48	0.00	0.00	0.00
1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy	159.86	1.82	-2.27	0.00	0.00	0.00
1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy	127.52	3.11	-1.81	0.00	0.00	0.00
1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy	159.90	2.87	-0.46	0.00	0.00	0.00
1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy	174.38	2.12	1.25	0.00	0.00	0.00
1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy	159.93	1.01	2.76	0.00	0.00	0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy	127.91	-0.05	3.63	0.00	0.00	0.00
1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy	159.72	-1.08	2.75	0.00	0.00	0.00
1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy	174.18	-2.18	1.25	0.00	0.00	0.00
1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy	159.71	-2.93	-0.46	0.00	0.00	0.00
1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy	127.51	-3.18	-1.80	0.00	0.00	0.00
1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy	159.88	-1.89	-2.27	0.00	0.00	0.00
1.2 Dead+1.0 Ice+1.0 Temp+Guy	210.77	-0.11	-0.01	0.00	0.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy	213.03	-0.11	-0.53	0.00	0.00	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy	212.60	0.14	-0.46	0.00	0.00	0.00
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy	212.27	0.32	-0.27	0.00	0.00	0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	212.68	0.40	-0.01	0.00	0.00	0.00
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy	213.16	0.33	0.24	0.00	0.00	0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy	212.66	0.15	0.42	0.00	0.00	0.00
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	212.22	-0.11	0.49	0.00	0.00	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy	212.51	-0.38	0.42	0.00	0.00	0.00
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy	212.92	-0.56	0.25	0.00	0.00	0.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	212.47	-0.62	-0.00	0.00	0.00	0.00
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy	212.14	-0.55	-0.26	0.00	0.00	0.00
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy	212.54	-0.36	-0.46	0.00	0.00	0.00
Dead+Wind 0 deg - Service+Guy	91.56	-0.02	-0.80	0.00	0.00	0.00
Dead+Wind 30 deg - Service+Guy	91.50	0.38	-0.69	0.00	0.00	0.00
Dead+Wind 60 deg - Service+Guy	91.47	0.67	-0.39	0.00	0.00	0.00
Dead+Wind 90 deg - Service+Guy	91.50	0.78	0.01	0.00	0.00	0.00
Dead+Wind 120 deg - Service+Guy	91.56	0.67	0.41	0.00	0.00	0.00
Dead+Wind 150 deg - Service+Guy	91.50	0.38	0.70	0.00	0.00	0.00
Dead+Wind 180 deg - Service+Guy	91.47	-0.02	0.81	0.00	0.00	0.00
Dead+Wind 210 deg - Service+Guy	91.50	-0.43	0.70	0.00	0.00	0.00
Dead+Wind 240 deg - Service+Guy	91.55	-0.72	0.41	0.00	0.00	0.00
Dead+Wind 270 deg - Service+Guy	91.49	-0.83	0.01	0.00	0.00	0.00
Dead+Wind 300 deg - Service+Guy	91.47	-0.72	-0.39	0.00	0.00	0.00
Dead+Wind 330 deg -	91.50	-0.42	-0.69	0.00	0.00	0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Service+Guy						

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-36.11	0.00	0.00	36.11	0.00	0.004%
2	-0.01	-43.00	-64.66	0.01	43.00	64.66	0.002%
3	32.25	-42.84	-55.89	-32.25	42.84	55.89	0.001%
4	55.85	-42.67	-32.24	-55.84	42.67	32.24	0.003%
5	64.53	-42.84	0.01	-64.52	42.84	-0.01	0.002%
6	55.99	-43.00	32.34	-55.99	43.00	-32.34	0.002%
7	32.27	-42.84	55.90	-32.27	42.84	-55.90	0.001%
8	0.01	-42.67	64.50	-0.01	42.67	-64.50	0.003%
9	-32.25	-42.84	55.89	32.25	42.84	-55.89	0.003%
10	-55.98	-43.00	32.32	55.98	43.00	-32.32	0.002%
11	-64.53	-42.84	-0.01	64.52	42.84	0.01	0.002%
12	-55.86	-42.67	-32.26	55.86	42.67	32.26	0.003%
13	-32.27	-42.84	-55.90	32.27	42.84	55.90	0.001%
14	-0.00	-143.14	0.00	0.00	143.14	0.00	0.002%
15	-0.00	-143.28	-13.66	0.00	143.28	13.66	0.001%
16	6.82	-143.14	-11.82	-6.82	143.14	11.82	0.001%
17	11.82	-143.00	-6.82	-11.82	143.00	6.82	0.001%
18	13.65	-143.14	0.00	-13.65	143.14	0.00	0.001%
19	11.83	-143.28	6.83	-11.83	143.28	-6.83	0.001%
20	6.82	-143.14	11.82	-6.82	143.14	-11.82	0.001%
21	0.00	-143.00	13.65	0.00	143.00	-13.65	0.001%
22	-6.82	-143.14	11.82	6.82	143.14	-11.82	0.001%
23	-11.83	-143.28	6.83	11.83	143.28	-6.83	0.001%
24	-13.65	-143.14	-0.00	13.65	143.14	0.00	0.001%
25	-11.82	-143.00	-6.82	11.82	143.00	6.82	0.001%
26	-6.82	-143.14	-11.82	6.82	143.14	11.82	0.001%
27	-0.00	-36.14	-13.20	0.00	36.14	13.20	0.002%
28	6.58	-36.11	-11.41	-6.58	36.11	11.40	0.003%
29	11.40	-36.07	-6.58	-11.40	36.07	6.58	0.003%
30	13.17	-36.11	0.00	-13.17	36.11	-0.00	0.003%
31	11.43	-36.14	6.60	-11.43	36.14	-6.60	0.002%
32	6.59	-36.11	11.41	-6.59	36.11	-11.41	0.003%
33	0.00	-36.07	13.16	-0.00	36.07	-13.16	0.003%
34	-6.58	-36.11	11.41	6.58	36.11	-11.40	0.003%
35	-11.42	-36.14	6.60	11.42	36.14	-6.60	0.002%
36	-13.17	-36.11	-0.00	13.17	36.11	0.00	0.003%
37	-11.40	-36.07	-6.58	11.40	36.07	6.58	0.003%
38	-6.59	-36.11	-11.41	6.59	36.11	11.41	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	8	0.00000001	0.00006530
2	Yes	24	0.00002890	0.00009437
3	Yes	24	0.00000001	0.00005698

4	Yes	19	0.00008362	0.00005868
5	Yes	23	0.00004126	0.00007290
6	Yes	24	0.00002899	0.00007205
7	Yes	24	0.00000001	0.00006991
8	Yes	21	0.00009611	0.00009587
9	Yes	23	0.00004102	0.00009728
10	Yes	24	0.00002875	0.00006561
11	Yes	23	0.00004098	0.00007221
12	Yes	20	0.00008187	0.00006298
13	Yes	24	0.00000001	0.00007219
14	Yes	11	0.00010000	0.00008293
15	Yes	17	0.00000001	0.00005228
16	Yes	17	0.00000001	0.00003339
17	Yes	15	0.00000001	0.00004763
18	Yes	17	0.00000001	0.00003838
19	Yes	18	0.00000001	0.00002878
20	Yes	17	0.00000001	0.00003883
21	Yes	15	0.00000001	0.00004767
22	Yes	17	0.00000001	0.00002759
23	Yes	17	0.00000001	0.00004349
24	Yes	17	0.00000001	0.00002790
25	Yes	15	0.00000001	0.00004211
26	Yes	17	0.00000001	0.00003409
27	Yes	13	0.00000001	0.00005999
28	Yes	12	0.00000001	0.00009350
29	Yes	11	0.00000001	0.00008986
30	Yes	12	0.00000001	0.00008808
31	Yes	13	0.00000001	0.00005570
32	Yes	12	0.00000001	0.00009502
33	Yes	11	0.00000001	0.00009336
34	Yes	12	0.00000001	0.00008755
35	Yes	13	0.00000001	0.00005071
36	Yes	12	0.00000001	0.00008290
37	Yes	11	0.00000001	0.00008863
38	Yes	12	0.00000001	0.00009503

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	193 - 180	3.661	31	0.2472	0.1504
T2	180 - 160	2.989	31	0.2416	0.1461
T3	160 - 140	2.083	31	0.1640	0.1261
T4	140 - 120	1.530	27	0.1180	0.1247
T5	120 - 100	1.091	37	0.0978	0.1023
T6	100 - 80	0.751	37	0.0579	0.0810
T7	80 - 60	0.585	37	0.0331	0.0751
T8	60 - 40	0.484	37	0.0129	0.0671
T9	40 - 20	0.440	37	0.0221	0.0945
T10	20 - 5	0.287	37	0.0533	0.1546
T11	5 - 0	0.076	37	0.0697	0.1716

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.75	20' x 3" Dia Omni	31	3.440	0.2484	0.1498	155480
188.00	APX16DWV-16DWVS-E-A20	31	3.401	0.2485	0.1496	155480
180.00	6' x 3" Dia Omni	31	2.989	0.2416	0.1461	51623
178.75	7770.00	31	2.925	0.2388	0.1451	42697
178.00	6' Standoff	31	2.887	0.2368	0.1444	38133
177.50	Rohn 6'x15' Boom Gate	31	2.862	0.2354	0.1439	35442
169.00	SBNHH-1D65B	31	2.453	0.2029	0.1343	15189
162.50	Guy	31	2.177	0.1741	0.1277	10655
155.50	4 Bay Dipole	31	1.932	0.1486	0.1249	12172
151.00	3'-6" Standoff	31	1.801	0.1365	0.1250	17152
150.50	Rohn 6'x15' Boom Gate	31	1.788	0.1354	0.1251	17969
150.00	APXV9ERR18-C-A20 w/ Mount	31	1.774	0.1343	0.1252	18867
126.00	DB408	37	1.217	0.1052	0.1107	69877
122.50	3' Standoff	37	1.143	0.1013	0.1058	55713
121.00	PD220	37	1.112	0.0993	0.1037	50866
111.00	Folded Dipole	37	0.919	0.0806	0.0907	28942
110.00	3'-6" Standoff	37	0.901	0.0784	0.0896	27686
106.00	2'x2" Omni	37	0.835	0.0697	0.0855	23592
105.00	2' Standoff	37	0.820	0.0676	0.0846	22751
102.50	Guy	37	0.784	0.0625	0.0826	21075
62.50	Guy	37	0.492	0.0143	0.0671	46304

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	193 - 180	37.598	6	2.0289	1.2064
T2	180 - 160	32.073	6	2.0038	1.1853
T3	160 - 140	24.188	6	1.6290	1.0837
T4	140 - 120	18.053	6	1.3689	1.0538
T5	120 - 100	12.751	2	1.1407	0.9042
T6	100 - 80	8.595	10	0.7989	0.7771
T7	80 - 60	5.965	10	0.5289	0.6878
T8	60 - 40	4.209	10	0.3120	0.6248
T9	40 - 20	3.145	10	0.2752	0.7568
T10	20 - 5	1.857	10	0.3826	1.0322
T11	5 - 0	0.484	10	0.4498	1.0575

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.75	20' x 3" Dia Omni	6	35.784	2.0354	1.2035	33371
188.00	APX16DWV-16DWVS-E-A20	6	35.464	2.0358	1.2027	33371
180.00	6' x 3" Dia Omni	6	32.073	2.0038	1.1853	11006
178.75	7770.00	6	31.548	1.9904	1.1803	9068
178.00	6' Standoff	6	31.234	1.9810	1.1770	8080
177.50	Rohn 6'x15' Boom Gate	6	31.025	1.9743	1.1747	7499
169.00	SBNHH-1D65B	6	27.558	1.8183	1.1268	3177
162.50	Guy	6	25.081	1.6786	1.0928	2220

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
155.50	4 Bay Dipole	6	22.669	1.5520	1.0747	2436
151.00	3'-6" Standoff	6	21.250	1.4889	1.0715	3201
150.50	Rohn 6'x15' Boom Gate	6	21.098	1.4825	1.0712	3316
150.00	APXV9ERR18-C-A20 w/ Mount	6	20.946	1.4763	1.0710	3441
126.00	DB408	6	14.255	1.2213	0.9555	5340
122.50	3' Standoff	2	13.367	1.1763	0.9251	4631
121.00	PD220	2	12.995	1.1553	0.9124	4384
111.00	Folded Dipole	10	10.698	0.9907	0.8389	3270
110.00	3'-6" Standoff	10	10.487	0.9729	0.8326	3190
106.00	2'x2" Omni	10	9.680	0.9013	0.8088	2904
105.00	2' Standoff	10	9.489	0.8837	0.8032	2841
102.50	Guy	10	9.028	0.8403	0.7897	2709
62.50	Guy	10	4.382	0.3316	0.6255	5177

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	193	Leg	A325N	0.7500	4	0.00	29.82	0.000 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	2	1.46	12.43	0.118 ✔	1	Bolt Shear
		Top Girt	A325N	0.6250	2	0.06	12.43	0.005 ✔	1	Bolt Shear
		Bottom Girt	A325N	0.6250	2	0.45	12.43	0.036 ✔	1	Bolt Shear
T2	180	Leg	A325N	0.7500	4	3.03	29.82	0.102 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	2	5.47	12.43	0.440 ✔	1	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	5.81	10.44	0.556 ✔	1	Member Bearing
		Top Girt	A325N	0.6250	2	0.40	12.43	0.033 ✔	1	Bolt Shear
		Bottom Girt	A325N	0.6250	2	3.39	12.43	0.273 ✔	1	Bolt Shear
		Torque Arm Top@162.496	A325N	0.8750	4	5.42	24.35	0.223 ✔	1	Bolt Shear
T3	160	Leg	A325N	0.7500	4	8.80	29.82	0.295 ✔	1	Bolt Tension
		Diagonal	A325X	0.6250	1	5.41	10.44	0.518 ✔	1	Member Bearing
		Secondary Horizontal	A325N	0.6250	1	2.74	10.44	0.262 ✔	1	Member Bearing
		Top Girt	A325N	0.5000	1	0.76	7.95	0.096 ✔	1	Bolt Shear
		Bottom Girt	A325N	0.5000	1	0.46	7.95	0.057 ✔	1	Bolt Shear
T4	140	Leg	A325N	0.7500	4	4.71	29.82	0.158 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	3.30	7.95	0.415 ✔	1	Bolt Shear
		Top Girt	A325N	0.5000	1	0.93	7.95	0.117 ✔	1	Bolt Shear
		Bottom Girt	A325N	0.5000	1	1.08	7.95	0.135 ✔	1	Bolt Shear
T5	120	Leg	A325N	0.7500	4	5.70	29.82	0.191 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	2	3.46	12.43	0.278 ✔	1	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	4.93	10.44	0.472 ✔	1	Member Bearing
		Top Girt	A325N	0.6250	2	0.30	12.43	0.025 ✔	1	Bolt Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Bottom Girt	A325N	0.6250	2	1.51	12.43	0.122 ✔	1	Bolt Shear
		Torque Arm Top@102.496	A325N	0.8750	4	2.68	24.35	0.110 ✔	1	Bolt Shear
T6	100	Leg	A325N	0.7500	4	8.49	29.82	0.285 ✔	1	Bolt Tension
		Diagonal	A490X	0.5000	1	2.11	4.17	0.506 ✔	1	Member Bearing
		Top Girt	A325N	0.5000	1	0.69	4.17	0.166 ✔	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	0.43	4.17	0.104 ✔	1	Member Bearing
T7	80	Leg	A325N	0.7500	4	6.83	29.82	0.229 ✔	1	Bolt Tension
		Diagonal	A325X	0.6250	1	4.27	7.83	0.545 ✔	1	Member Bearing
		Top Girt	A325N	0.5000	1	0.95	7.95	0.120 ✔	1	Bolt Shear
		Bottom Girt	A325N	0.5000	1	1.91	7.95	0.240 ✔	1	Bolt Shear
		Torque Arm Top@62.4961	A325N	0.8750	4	2.01	24.35	0.082 ✔	1	Bolt Shear
T8	60	Leg	A325N	0.7500	4	6.75	29.82	0.226 ✔	1	Bolt Tension
		Diagonal	A325X	0.5000	1	5.03	9.72	0.517 ✔	1	Bolt Shear
		Top Girt	A325N	0.5000	1	0.89	7.95	0.111 ✔	1	Bolt Shear
		Bottom Girt	A325N	0.5000	1	1.24	7.95	0.156 ✔	1	Bolt Shear
T9	40	Leg	A325N	0.7500	4	5.75	29.82	0.193 ✔	1	Bolt Tension
		Diagonal	A490X	0.6250	1	2.98	5.26	0.566 ✔	1	Member Bearing
		Top Girt	A325N	0.5000	1	1.09	4.17	0.261 ✔	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	0.45	4.17	0.109 ✔	1	Member Bearing
T10	20	Leg	A325N	0.7500	4	6.04	29.82	0.203 ✔	1	Bolt Tension
		Diagonal	A490X	0.5000	1	3.07	8.62	0.356 ✔	1	Member Bearing
		Top Girt	A325N	0.5000	1	0.80	7.95	0.100 ✔	1	Bolt Shear
		Bottom Girt	A490X	0.6250	1	4.49	10.89	0.413 ✔	1	Member Bearing
T11	5	Leg	A325N	0.7500	4	5.83	29.82	0.196 ✔	1	Bolt Tension

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T_u K	Allowable ϕT_n K	Required S.F.	Actual S.F.
T2	162.50 (A) (594)	3/4 EHS	5.83	58.30	31.24	34.98	1.000	1.120 ✔
	162.50 (A) (595)	3/4 EHS	5.83	58.30	29.76	34.98	1.000	1.175 ✔
	162.50 (B) (590)	3/4 EHS	5.83	58.30	29.70	34.98	1.000	1.178 ✔
	162.50 (B) (591)	3/4 EHS	5.83	58.30	30.36	34.98	1.000	1.152 ✔
	162.50 (C) (586)	3/4 EHS	5.83	58.30	30.50	34.98	1.000	1.147 ✔
	162.50 (C)	3/4 EHS	5.83	58.30	31.31	34.98	1.000	1.117 ✔

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T_u K	Allowable ϕT_n K	Required S.F.	Actual S.F.
	(587)							
T5	102.50 (A) (606)	5/8 EHS	4.24	42.40	15.69	25.44	1.000	1.622 ✔
	102.50 (A) (607)	5/8 EHS	4.24	42.40	14.37	25.44	1.000	1.770 ✔
	102.50 (B) (602)	5/8 EHS	4.24	42.40	14.39	25.44	1.000	1.768 ✔
	102.50 (B) (603)	5/8 EHS	4.24	42.40	15.11	25.44	1.000	1.684 ✔
	102.50 (C) (598)	5/8 EHS	4.24	42.40	15.09	25.44	1.000	1.686 ✔
	102.50 (C) (599)	5/8 EHS	4.24	42.40	15.68	25.44	1.000	1.622 ✔
T7	62.50 (A) (618)	1/2 EHS	2.69	26.90	8.83	16.14	1.000	1.828 ✔
	62.50 (A) (619)	1/2 EHS	2.69	26.90	7.57	16.14	1.000	2.133 ✔
	62.50 (B) (614)	1/2 EHS	2.69	26.90	8.06	16.14	1.000	2.002 ✔
	62.50 (B) (615)	1/2 EHS	2.69	26.90	8.75	16.14	1.000	1.846 ✔
	62.50 (C) (610)	1/2 EHS	2.69	26.90	8.19	16.14	1.000	1.970 ✔
	62.50 (C) (611)	1/2 EHS	2.69	26.90	8.65	16.14	1.000	1.865 ✔

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	Mast Stability Index	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 180	P2.5x.276	13.00	2.57	33.3 K=1.00	2.2535	1.00	-15.28	93.50	0.163 [1] ✔
T2	180 - 160	ROHN 2.5 EH w/plate	20.00	1.21	16.0 K=1.00	2.6593	1.00	-95.40	117.46	0.812 [1] ✔
T3	160 - 140	ROHN 2.5 EH w/plate	20.00	1.21	16.0 K=1.00	2.6593	0.98	-88.52	114.64	0.772 [1] ✔
T4	140 - 120	P2.5x.276	20.00	2.41	31.3 K=1.00	2.2535	0.98	-68.40	92.49	0.740 [1] ✔
T5	120 - 100	P3x.3	20.00	1.21	12.7 K=1.00	3.0159	0.97	-104.61	130.67	0.801 [1] ✔
T6	100 - 80	P3x.3	20.00	2.41	25.5 K=1.00	3.0159	1.00	-101.85	128.86	0.790 [1] ✔
T7	80 - 60	P3x.3	20.00	2.41	25.5 K=1.00	3.0159	0.99	-88.17	128.73	0.685 [1] ✔
T8	60 - 40	P3x.3	20.00	2.41	25.5 K=1.00	3.0159	0.95	-80.99	123.58	0.655 [1] ✔
T9	40 - 20	P3x.3	20.00	2.41	51.0 K=2.00	3.0159	1.00	-72.50	112.25	0.646 [1] ✔
T10	20 - 5	P3x.3	15.00	2.38	50.3	3.0159	1.00	-72.58	112.76	0.644 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	Mast Stability Index	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T11	5 - 0	P3x.3	5.38	1.55	K=2.00 16.4 K=1.00	3.0159	0.88	-77.73	116.71	0.666 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 180	L2x2x1/4	4.27	1.79	71.2 K=1.30	0.9380	-2.93	23.28	0.126 [1]
T2	180 - 160	L2x2x1/4	4.18	1.75	70.2 K=1.31	0.9380	-10.94	23.44	0.467 [1]
T3	160 - 140	L2x2x1/4	4.18	1.83	72.0 K=1.29	0.9380	-6.97	23.13	0.301 [1]
T4	140 - 120	ROHN TS1.5x11 ga	4.18	3.89	95.3 K=1.00	0.5202	-3.30	11.26	0.293 [1]
T5	120 - 100	L2x2x1/4	4.18	1.72	69.5 K=1.32	0.9380	-6.91	23.57	0.293 [1]
T6	100 - 80	ROHN TS1.5x16 ga	4.18	3.83	90.0 K=1.00	0.2627	-2.79	6.04	0.462 [1]
T7	80 - 60	L1 3/4x1 3/4x3/16	4.18	1.79	77.0 K=1.23	0.6211	-5.71	14.73	0.388 [1]
T8	60 - 40	ROHN TS1.5x11 ga	4.18	3.83	93.7 K=1.00	0.5202	-5.03	10.61	0.474 [1]
T9	40 - 20	ROHN TS1.5x16 ga	4.18	3.83	90.0 K=1.00	0.2627	-3.38	6.04	0.559 [1]
T10	20 - 5	ROHN TS1.5x11 ga	4.17	3.81	93.4 K=1.00	0.5202	-2.70	11.51	0.235 [1]

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	180 - 160	L2x2x1/4	3.42	2.94	88.9 K=1.54	0.9380	-5.43	20.04	0.271 [1]
T3	160 - 140	L2x2x1/4	3.42	2.94	88.9 K=1.54	0.9380	-1.60	20.04	0.080 [1]
T5	120 - 100	L2x2x1/4	3.42	2.89	88.4 K=1.56	0.9380	-3.04	20.14	0.151 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 180	L2x2x1/4	3.42	2.78	102.7 K=1.20	0.9380	-0.11	17.45	0.006 [1] ✔
T2	180 - 160	L2x2x1/4	3.42	2.78	102.7 K=1.20	0.9380	-0.81	17.45	0.046 [1] ✔
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.5 K=1.00	0.2627	-0.76	7.13	0.107 [1] ✔
T10	20 - 5	ROHN TS1.5x11 ga	3.42	3.13	76.6 K=1.00	0.5202	-0.21	13.72	0.015 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 180	L2x2x1/4	3.42	2.78	102.7 K=1.20	0.9380	-0.83	17.45	0.048 [1] ✔
T2	180 - 160	L2x2x1/4	3.42	2.78	102.7 K=1.20	0.9380	-5.53	17.45	0.317 [1] ✔
T4	140 - 120	ROHN TS1.5x11 ga	3.42	3.18	77.9 K=1.00	0.5202	-0.11	13.55	0.008 [1] ✔
T5	120 - 100	L2x2x1/4	3.42	2.73	101.9 K=1.22	0.9380	-1.44	17.60	0.082 [1] ✔
T7	80 - 60	ROHN TS1.5x11 ga	3.42	3.13	76.6 K=1.00	0.5202	-0.57	13.72	0.042 [1] ✔
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.5 K=1.00	0.2627	-0.23	7.13	0.033 [1] ✔
T11	5 - 0	L3x3x1/2	0.34	0.05	60.5 K=58.86	2.7500	-3.30	73.48	0.045 [1] ✔

[1] P_u / ϕP_n controls

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T11	5 - 0	L3x3x1/2	2.32	2.02	80.8 K=1.94	2.7500	-0.66	63.19	0.011 [1] ✔

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

[1] P_u / ϕP_n controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	180 - 160 (588)	C15x50	3.42	3.30	45.6 K=1.00	14.7000	-0.28	426.82	0.001
T2	180 - 160 (589)	C15x50	3.42	3.30	45.6 K=1.00	14.7000	-9.72	426.82	0.023
T2	180 - 160 (592)	C15x50	3.42	3.30	45.6 K=1.00	14.7000	-10.23	426.82	0.024
T2	180 - 160 (593)	C15x50	3.42	3.30	45.6 K=1.00	14.7000	-10.27	426.82	0.024
T2	180 - 160 (596)	C15x50	3.42	3.30	45.6 K=1.00	14.7000	-10.71	426.82	0.025
T2	180 - 160 (597)	C15x50	3.42	3.30	45.6 K=1.00	14.7000	-10.73	426.82	0.025
T5	120 - 100 (600)	C15x33.9	3.42	3.27	43.4 K=1.00	9.9600	-4.73	292.21	0.016
T5	120 - 100 (601)	C15x33.9	3.42	3.27	43.4 K=1.00	9.9600	-4.74	292.21	0.016
T5	120 - 100 (604)	C15x33.9	3.42	3.27	43.4 K=1.00	9.9600	-5.08	292.21	0.017
T5	120 - 100 (605)	C15x33.9	3.42	3.27	43.4 K=1.00	9.9600	-5.06	292.21	0.017
T5	120 - 100 (608)	C15x33.9	3.42	3.27	43.4 K=1.00	9.9600	-5.47	292.21	0.019
T5	120 - 100 (609)	C15x33.9	3.42	3.27	43.4 K=1.00	9.9600	-5.45	292.21	0.019
T7	80 - 60 (612)	C12x25	3.42	3.27	50.3 K=1.00	7.3500	-0.42	208.41	0.002
T7	80 - 60 (613)	C12x25	3.42	3.27	50.3 K=1.00	7.3500	-2.32	208.41	0.011
T7	80 - 60 (616)	C12x25	3.42	3.27	50.3 K=1.00	7.3500	-3.77	208.41	0.018
T7	80 - 60 (617)	C12x25	3.42	3.27	50.3 K=1.00	7.3500	-3.75	208.41	0.018
T7	80 - 60 (620)	C12x25	3.42	3.27	50.3 K=1.00	7.3500	-4.18	208.41	0.020
T7	80 - 60 (621)	C12x25	3.42	3.27	50.3 K=1.00	7.3500	-4.17	208.41	0.020

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T2	180 - 160 (588)	C15x50	-80.41	184.14	0.437	-0.00	15.31	0.000
T2	180 - 160 (589)	C15x50	-77.15	184.14	0.419	-0.00	15.31	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T2	180 - 160 (592)	C15x50	-78.97	184.14	0.429	0.00	15.31	0.000
T2	180 - 160 (593)	C15x50	-79.35	184.14	0.431	-0.00	15.31	0.000
T2	180 - 160 (596)	C15x50	-80.95	184.14	0.440	0.00	15.31	0.000
T2	180 - 160 (597)	C15x50	-81.11	184.14	0.440	-0.00	15.31	0.000
T5	120 - 100 (600)	C15x33.9	-35.99	136.08	0.265	0.00	12.60	0.000
T5	120 - 100 (601)	C15x33.9	-36.01	136.08	0.265	-0.00	12.60	0.000
T5	120 - 100 (604)	C15x33.9	-37.60	136.08	0.276	0.00	12.60	0.000
T5	120 - 100 (605)	C15x33.9	-37.56	136.08	0.276	-0.00	12.60	0.000
T5	120 - 100 (608)	C15x33.9	-39.47	136.08	0.290	0.00	12.60	0.000
T5	120 - 100 (609)	C15x33.9	-39.42	136.08	0.290	-0.00	12.60	0.000
T7	80 - 60 (612)	C12x25	-15.74	78.77	0.200	0.00	7.61	0.000
T7	80 - 60 (613)	C12x25	-14.93	78.77	0.190	-0.00	7.61	0.000
T7	80 - 60 (616)	C12x25	-15.31	78.77	0.194	0.00	7.61	0.000
T7	80 - 60 (617)	C12x25	-15.26	78.77	0.194	-0.00	7.61	0.000
T7	80 - 60 (620)	C12x25	-16.55	78.77	0.210	0.00	7.61	0.000
T7	80 - 60 (621)	C12x25	-16.52	78.77	0.210	-0.00	7.61	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	180 - 160 (588)	C15x50	0.001	0.437	0.000	0.437 ✔	1.000	4.8.1 ✔
T2	180 - 160 (589)	C15x50	0.023	0.419	0.000	0.430 ✔	1.000	4.8.1 ✔
T2	180 - 160 (592)	C15x50	0.024	0.429	0.000	0.441 ✔	1.000	4.8.1 ✔
T2	180 - 160 (593)	C15x50	0.024	0.431	0.000	0.443 ✔	1.000	4.8.1 ✔
T2	180 - 160 (596)	C15x50	0.025	0.440	0.000	0.452 ✔	1.000	4.8.1 ✔
T2	180 - 160 (597)	C15x50	0.025	0.440	0.000	0.453 ✔	1.000	4.8.1 ✔
T5	120 - 100 (600)	C15x33.9	0.016	0.265	0.000	0.273 ✔	1.000	4.8.1 ✔
T5	120 - 100 (601)	C15x33.9	0.016	0.265	0.000	0.273 ✔	1.000	4.8.1 ✔
T5	120 - 100 (604)	C15x33.9	0.017	0.276	0.000	0.285 ✔	1.000	4.8.1 ✔
T5	120 - 100 (605)	C15x33.9	0.017	0.276	0.000	0.285 ✔	1.000	4.8.1 ✔
T5	120 - 100 (608)	C15x33.9	0.019	0.290	0.000	0.299 ✔	1.000	4.8.1 ✔
T5	120 - 100 (609)	C15x33.9	0.019	0.290	0.000	0.299 ✔	1.000	4.8.1 ✔
T7	80 - 60 (612)	C12x25	0.002	0.200	0.000	0.201 ✔	1.000	4.8.1 ✔
T7	80 - 60 (613)	C12x25	0.011	0.190	0.000	0.195 ✔	1.000	4.8.1 ✔
T7	80 - 60 (616)	C12x25	0.018	0.194	0.000	0.203 ✔	1.000	4.8.1 ✔

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T7	80 - 60 (617)	C12x25	0.018	0.194	0.000	0.203 ✔	1.000	4.8.1 ✔
T7	80 - 60 (620)	C12x25	0.020	0.210	0.000	0.220 ✔	1.000	4.8.1 ✔
T7	80 - 60 (621)	C12x25	0.020	0.210	0.000	0.220 ✔	1.000	4.8.1 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 180	P2.5x.276	13.00	2.57	33.3	2.2535	12.09	101.41	0.119 [1] ✔
T2	180 - 160	ROHN 2.5 EH w/plate	20.00	1.21	16.0	2.6593	83.00	119.67	0.694 [1] ✔
T3	160 - 140	ROHN 2.5 EH w/plate	20.00	1.21	16.0	2.6593	35.19	119.67	0.294 [1] ✔
T5	120 - 100	P3x.3	20.00	1.21	12.7	3.0159	25.79	135.72	0.190 [1] ✔
T6	100 - 80	P3x.3	20.00	2.41	25.5	3.0159	1.36	135.72	0.010 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 180	L2x2x1/4	4.27	1.79	39.2	0.5629	2.80	24.49	0.114 [1] ✔
T2	180 - 160	L2x2x1/4	4.18	1.75	38.3	0.5629	10.20	24.49	0.417 [1] ✔
T3	160 - 140	L2x2x1/4	4.18	1.83	38.3	0.5629	5.41	24.49	0.221 [1] ✔
T4	140 - 120	ROHN TS1.5x11 ga	4.18	3.89	95.3	0.5202	2.30	19.67	0.117 [1] ✔
T5	120 - 100	L2x2x1/4	4.18	1.72	37.7	0.5629	4.76	24.49	0.194 [1] ✔
T6	100 - 80	ROHN TS1.5x16 ga	4.18	3.83	90.0	0.2627	2.11	9.93	0.212 [1] ✔
T7	80 - 60	L1 3/4x1 3/4x3/16	4.18	1.79	42.8	0.3604	4.27	15.68	0.272 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	60 - 40	ROHN TS1.5x11 ga	4.18	3.83	93.7	0.5202	3.63	16.86	0.216 [1]
T9	40 - 20	ROHN TS1.5x16 ga	4.18	3.83	90.0	0.2627	2.98	9.93	0.300 [1]
T10	20 - 5	ROHN TS1.5x11 ga	4.17	3.81	93.4	0.5202	3.07	19.67	0.156 [1]

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	180 - 160	L2x2x1/4	3.42	2.94	62.6	0.5629	5.81	24.49	0.237 [1]
T3	160 - 140	L2x2x1/4	3.42	2.94	62.6	0.5629	2.74	24.49	0.112 [1]
T5	120 - 100	L2x2x1/4	3.42	2.89	61.6	0.5629	4.93	24.49	0.201 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 180	L2x2x1/4	3.42	2.78	62.6	0.5629	0.12	24.49	0.005 [1]
T2	180 - 160	L2x2x1/4	3.42	2.78	62.6	0.5629	0.81	24.49	0.033 [1]
T3	160 - 140	ROHN TS1.5x11 ga	3.42	3.18	77.9	0.5202	0.76	19.67	0.039 [1]
T4	140 - 120	ROHN TS1.5x11 ga	3.42	3.18	77.9	0.5202	0.93	19.67	0.047 [1]
T5	120 - 100	L2x2x1/4	3.42	2.73	61.6	0.5629	0.61	24.49	0.025 [1]
T6	100 - 80	ROHN TS1.5x16 ga	3.42	3.13	73.5	0.2627	0.69	9.93	0.069 [1]
T7	80 - 60	ROHN TS1.5x11 ga	3.42	3.13	76.6	0.5202	0.95	19.67	0.048 [1]
T8	60 - 40	ROHN TS1.5x11 ga	3.42	3.13	76.6	0.5202	0.89	19.67	0.045 [1]
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.5	0.2627	1.09	9.93	0.110 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T10	20 - 5	ROHN TS1.5x11 ga	3.42	3.13	76.6	0.5202	0.80	19.67	0.041 [1]
T11	5 - 0	L3x3x1/2	3.30	3.01	40.2	2.7500	12.20	89.10	0.137 [1]

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 180	L2x2x1/4	3.42	2.78	62.6	0.5629	0.90	24.49	0.037 [1]
T2	180 - 160	L2x2x1/4	3.42	2.78	62.6	0.5629	6.77	24.49	0.277 [1]
T3	160 - 140	ROHN TS1.5x11 ga	3.42	3.18	77.9	0.5202	0.46	19.67	0.023 [1]
T4	140 - 120	ROHN TS1.5x11 ga	3.42	3.18	77.9	0.5202	1.08	19.67	0.055 [1]
T5	120 - 100	L2x2x1/4	3.42	2.73	61.6	0.5629	3.02	24.49	0.124 [1]
T6	100 - 80	ROHN TS1.5x16 ga	3.42	3.13	73.5	0.2627	0.43	9.93	0.044 [1]
T7	80 - 60	ROHN TS1.5x11 ga	3.42	3.13	76.6	0.5202	1.91	19.67	0.097 [1]
T8	60 - 40	ROHN TS1.5x11 ga	3.42	3.13	76.6	0.5202	1.24	19.67	0.063 [1]
T9	40 - 20	ROHN TS1.5x16 ga	3.42	3.13	73.5	0.2627	0.45	9.93	0.046 [1]
T10	20 - 5	ROHN TS1.5x11 ga	3.42	3.13	76.6	0.5202	4.49	19.67	0.228 [1]

[1] P_u / ϕP_n controls

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T11	5 - 0	L3x3x1/2	1.33	1.04	13.9	2.7500	0.10	89.10	0.001 [1]

[1] P_u / ϕP_n controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	180 - 160 (588)	C15x50	3.42	3.30	45.6	14.7000	8.45	476.28	0.018
T2	180 - 160 (589)	C15x50	3.42	3.30	45.6	14.7000	0.77	476.28	0.002
T2	180 - 160 (592)	C15x50	3.42	3.30	45.6	14.7000	0.77	476.28	0.002
T2	180 - 160 (593)	C15x50	3.42	3.30	45.6	14.7000	7.77	476.28	0.016
T2	180 - 160 (596)	C15x50	3.42	3.30	45.6	14.7000	9.64	476.28	0.020
T2	180 - 160 (597)	C15x50	3.42	3.30	45.6	14.7000	8.32	476.28	0.017
T5	120 - 100 (600)	C15x33.9	3.42	3.27	43.4	9.9600	0.18	322.70	0.001
T5	120 - 100 (601)	C15x33.9	3.42	3.27	43.4	9.9600	1.04	322.70	0.003
T5	120 - 100 (604)	C15x33.9	3.42	3.27	43.4	9.9600	1.03	322.70	0.003
T5	120 - 100 (605)	C15x33.9	3.42	3.27	43.4	9.9600	3.53	322.70	0.011
T5	120 - 100 (608)	C15x33.9	3.42	3.27	43.4	9.9600	0.17	322.70	0.001
T5	120 - 100 (609)	C15x33.9	3.42	3.27	43.4	9.9600	4.02	322.70	0.012
T7	80 - 60 (612)	C12x25	3.42	3.27	50.3	7.3500	2.35	238.14	0.010
T7	80 - 60 (613)	C12x25	3.42	3.27	50.3	7.3500	0.47	238.14	0.002
T7	80 - 60 (616)	C12x25	3.42	3.27	50.3	7.3500	0.47	238.14	0.002
T7	80 - 60 (617)	C12x25	3.42	3.27	50.3	7.3500	1.99	238.14	0.008
T7	80 - 60 (620)	C12x25	3.42	3.27	50.3	7.3500	3.25	238.14	0.014
T7	80 - 60 (621)	C12x25	3.42	3.27	50.3	7.3500	2.51	238.14	0.011

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T2	180 - 160 (588)	C15x50	-69.21	184.14	0.376	0.00	15.31	0.000
T2	180 - 160 (589)	C15x50	-82.63	184.14	0.449	0.00	15.31	0.000
T2	180 - 160 (592)	C15x50	-82.49	184.14	0.448	-0.00	15.31	0.000
T2	180 - 160 (593)	C15x50	-67.65	184.14	0.367	-0.00	15.31	0.000
T2	180 - 160 (596)	C15x50	-71.51	184.14	0.388	0.00	15.31	0.000
T2	180 - 160 (597)	C15x50	-68.77	184.14	0.373	0.00	15.31	0.000
T5	120 - 100 (600)	C15x33.9	-38.75	136.08	0.285	0.00	12.60	0.000
T5	120 - 100 (601)	C15x33.9	-41.05	136.08	0.302	0.00	12.60	0.000
T5	120 - 100 (604)	C15x33.9	-41.12	136.08	0.302	-0.00	12.60	0.000
T5	120 - 100 (605)	C15x33.9	-32.62	136.08	0.240	-0.00	12.60	0.000
T5	120 - 100 (608)	C15x33.9	-38.78	136.08	0.285	-0.00	12.60	0.000
T5	120 - 100 (609)	C15x33.9	-34.07	136.08	0.250	0.00	12.60	0.000
T7	80 - 60 (612)	C12x25	-13.05	78.77	0.166	0.00	7.61	0.000
T7	80 - 60 (613)	C12x25	-16.98	78.77	0.216	0.00	7.61	0.000
T7	80 - 60 (616)	C12x25	-17.02	78.77	0.216	-0.00	7.61	0.000
T7	80 - 60 (617)	C12x25	-12.49	78.77	0.159	-0.00	7.61	0.000
T7	80 - 60 (620)	C12x25	-14.45	78.77	0.183	0.00	7.61	0.000
T7	80 - 60 (621)	C12x25	-13.31	78.77	0.169	0.00	7.61	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	180 - 160 (588)	C15x50	0.018	0.376	0.000	0.385 ✔	1.000	4.8.1 ✔
T2	180 - 160 (589)	C15x50	0.002	0.449	0.000	0.450 ✔	1.000	4.8.1 ✔
T2	180 - 160 (592)	C15x50	0.002	0.448	0.000	0.449 ✔	1.000	4.8.1 ✔
T2	180 - 160 (593)	C15x50	0.016	0.367	0.000	0.376 ✔	1.000	4.8.1 ✔
T2	180 - 160 (596)	C15x50	0.020	0.388	0.000	0.398 ✔	1.000	4.8.1 ✔
T2	180 - 160 (597)	C15x50	0.017	0.373	0.000	0.382 ✔	1.000	4.8.1 ✔
T5	120 - 100 (600)	C15x33.9	0.001	0.285	0.000	0.285 ✔	1.000	4.8.1 ✔
T5	120 - 100 (601)	C15x33.9	0.003	0.302	0.000	0.303 ✔	1.000	4.8.1 ✔
T5	120 - 100 (604)	C15x33.9	0.003	0.302	0.000	0.304 ✔	1.000	4.8.1 ✔
T5	120 - 100 (605)	C15x33.9	0.011	0.240	0.000	0.245 ✔	1.000	4.8.1 ✔
T5	120 - 100 (608)	C15x33.9	0.001	0.285	0.000	0.285 ✔	1.000	4.8.1 ✔
T5	120 - 100 (609)	C15x33.9	0.012	0.250	0.000	0.257 ✔	1.000	4.8.1 ✔
T7	80 - 60 (612)	C12x25	0.010	0.166	0.000	0.171 ✔	1.000	4.8.1 ✔
T7	80 - 60 (613)	C12x25	0.002	0.216	0.000	0.217 ✔	1.000	4.8.1 ✔
T7	80 - 60 (616)	C12x25	0.002	0.216	0.000	0.217 ✔	1.000	4.8.1 ✔
T7	80 - 60 (617)	C12x25	0.008	0.159	0.000	0.163 ✔	1.000	4.8.1 ✔
T7	80 - 60 (620)	C12x25	0.014	0.183	0.000	0.190 ✔	1.000	4.8.1 ✔
T7	80 - 60 (621)	C12x25	0.011	0.169	0.000	0.174 ✔	1.000	4.8.1 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	193 - 180	Leg	P2.5x.276	2	-15.28	93.50	16.3	Pass
T2	180 - 160	Leg	ROHN 2.5 EH w/plate	41	-95.40	117.46	81.2	Pass
T3	160 - 140	Leg	ROHN 2.5 EH w/plate	122	-88.52	114.64	77.2	Pass
T4	140 - 120	Leg	P2.5x.276	203	-68.40	92.49	74.0	Pass
T5	120 - 100	Leg	P3x.3	260	-104.61	130.67	80.1	Pass
T6	100 - 80	Leg	P3x.3	341	-101.85	128.86	79.0	Pass
T7	80 - 60	Leg	P3x.3	398	-88.17	128.73	68.5	Pass
T8	60 - 40	Leg	P3x.3	455	-80.99	123.58	65.5	Pass
T9	40 - 20	Leg	P3x.3	512	-72.50	112.25	64.6	Pass
T10	20 - 5	Leg	P3x.3	545	-72.58	112.76	64.4	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T11	5 - 0	Leg	P3x.3	572	-77.73	116.71	66.6	Pass
T1	193 - 180	Diagonal	L2x2x1/4	13	-2.93	23.28	12.6	Pass
T2	180 - 160	Diagonal	L2x2x1/4	70	-10.94	23.44	46.7	Pass
T3	160 - 140	Diagonal	L2x2x1/4	196	-6.97	23.13	30.1	Pass
							51.8 (b)	
T4	140 - 120	Diagonal	ROHN TS1.5x11 ga	214	-3.30	11.26	29.3	Pass
							41.5 (b)	
T5	120 - 100	Diagonal	L2x2x1/4	289	-6.91	23.57	29.3	Pass
T6	100 - 80	Diagonal	ROHN TS1.5x16 ga	394	-2.79	6.04	46.2	Pass
							50.6 (b)	
T7	80 - 60	Diagonal	L1 3/4x1 3/4x3/16	409	-5.71	14.73	38.8	Pass
							54.5 (b)	
T8	60 - 40	Diagonal	ROHN TS1.5x11 ga	508	-5.03	10.61	47.4	Pass
							51.7 (b)	
T9	40 - 20	Diagonal	ROHN TS1.5x16 ga	542	-3.38	6.04	55.9	Pass
							56.6 (b)	
T10	20 - 5	Diagonal	ROHN TS1.5x11 ga	553	-2.70	11.51	23.5	Pass
							35.6 (b)	
T2	180 - 160	Secondary Horizontal	L2x2x1/4	64	-5.43	20.04	27.1	Pass
							55.6 (b)	
T3	160 - 140	Secondary Horizontal	L2x2x1/4	200	2.74	24.49	11.2	Pass
							26.2 (b)	
T5	120 - 100	Secondary Horizontal	L2x2x1/4	283	4.93	24.49	20.1	Pass
							47.2 (b)	
T1	193 - 180	Top Girt	L2x2x1/4	4	-0.11	17.45	0.6	Pass
T2	180 - 160	Top Girt	L2x2x1/4	45	-0.81	17.45	4.6	Pass
T3	160 - 140	Top Girt	ROHN TS1.5x11 ga	125	0.76	19.67	3.9	Pass
							9.6 (b)	
T4	140 - 120	Top Girt	ROHN TS1.5x11 ga	206	0.93	19.67	4.7	Pass
							11.7 (b)	
T5	120 - 100	Top Girt	L2x2x1/4	263	0.61	24.49	2.5	Pass
T6	100 - 80	Top Girt	ROHN TS1.5x16 ga	344	0.69	9.93	6.9	Pass
							16.6 (b)	
T7	80 - 60	Top Girt	ROHN TS1.5x11 ga	401	0.95	19.67	4.8	Pass
							12.0 (b)	
T8	60 - 40	Top Girt	ROHN TS1.5x11 ga	458	0.89	19.67	4.5	Pass
							11.1 (b)	
T9	40 - 20	Top Girt	ROHN TS1.5x16 ga	515	1.09	9.93	11.0	Pass
							26.1 (b)	
T10	20 - 5	Top Girt	ROHN TS1.5x11 ga	549	0.80	19.67	4.1	Pass
							10.0 (b)	
T11	5 - 0	Top Girt	L3x3x1/2	574	12.20	89.10	13.7	Pass
T1	193 - 180	Bottom Girt	L2x2x1/4	9	-0.83	17.45	4.8	Pass
T2	180 - 160	Bottom Girt	L2x2x1/4	47	-5.53	17.45	31.7	Pass
T3	160 - 140	Bottom Girt	ROHN TS1.5x11 ga	129	0.46	19.67	2.3	Pass
							5.7 (b)	
T4	140 - 120	Bottom Girt	ROHN TS1.5x11 ga	208	1.08	19.67	5.5	Pass
							13.5 (b)	
T5	120 - 100	Bottom Girt	L2x2x1/4	266	3.02	24.49	12.4	Pass
T6	100 - 80	Bottom Girt	ROHN TS1.5x16 ga	348	0.43	9.93	4.4	Pass
							10.4 (b)	
T7	80 - 60	Bottom Girt	ROHN TS1.5x11 ga	403	1.91	19.67	9.7	Pass
							24.0 (b)	
T8	60 - 40	Bottom Girt	ROHN TS1.5x11 ga	461	1.24	19.67	6.3	Pass
							15.6 (b)	
T9	40 - 20	Bottom Girt	ROHN TS1.5x16 ga	517	0.45	9.93	4.6	Pass
							10.9 (b)	
T10	20 - 5	Bottom Girt	ROHN TS1.5x11 ga	550	4.49	19.67	22.8	Pass
							41.3 (b)	
T11	5 - 0	Bottom Girt	L3x3x1/2	579	-3.25	73.48	7.2	Pass
T11	5 - 0	Mid Girt	L3x3x1/2	583	-0.66	63.19	1.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T2	180 - 160	Guy A@162.496	3/4	594	31.24	34.98	89.3	Pass
T5	120 - 100	Guy A@102.496	5/8	606	15.69	25.44	61.7	Pass
T7	80 - 60	Guy A@62.4961	1/2	618	8.83	16.14	54.7	Pass
T2	180 - 160	Guy B@162.496	3/4	591	30.36	34.98	86.8	Pass
T5	120 - 100	Guy B@102.496	5/8	603	15.11	25.44	59.4	Pass
T7	80 - 60	Guy B@62.4961	1/2	615	8.75	16.14	54.2	Pass
T2	180 - 160	Guy C@162.496	3/4	587	31.31	34.98	89.5	Pass
T5	120 - 100	Guy C@102.496	5/8	599	15.68	25.44	61.7	Pass
T7	80 - 60	Guy C@62.4961	1/2	611	8.65	16.14	53.6	Pass
T2	180 - 160	Torque Arm Top@162.496	C15x50	597	-10.73	426.82	45.3	Pass
T5	120 - 100	Torque Arm Top@102.496	C15x33.9	604	-5.08	292.21	30.4	Pass
T7	80 - 60	Torque Arm Top@62.4961	C12x25	620	-4.18	208.41	22.0	Pass
							Summary	
						Leg (T2)	81.2	Pass
						Diagonal (T9)	56.6	Pass
						Secondary Horizontal (T2)	55.6	Pass
						Top Girt (T9)	26.1	Pass
						Bottom Girt (T10)	41.3	Pass
						Mid Girt (T11)	1.1	Pass
						Guy A (T2)	89.3	Pass
						Guy B (T2)	86.8	Pass
						Guy C (T2)	89.5	Pass
						Torque Arm Top (T2)	45.3	Pass
						Bolt Checks	56.6	Pass
						RATING =	**89.5**	**Pass**

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

Job :	T-Mobile ~ CTNL023C: 193-ft Guyed Lattice Tower	Project No.	19027.72	Sheet	1	of	2
Address:	57 Cook Drive Montville, CT	Computed by	TJL	Date		6/10/19	
Description:	Guy Anchor Evaluation	Checked by	CAG	Date			

CHECK UPLIFT RESISTANCE

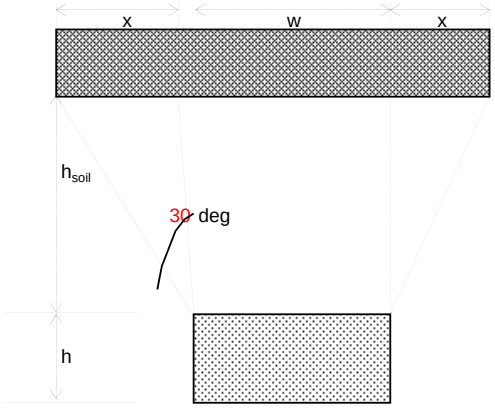
ANCHOR (C) AT 140ft RADIUS

RESULTS FROM COMPUTER ANALYSIS:

Uplift =	45	kips
Sliding =	39	kips
Wdepth =	6	ft

CONCRETE PARAMETERS:

γ_{conc} =	150	pcf
$\gamma_{conc.sub}$ =	87.6	pcf
w =	5	ft
h =	2	ft
d =	9	ft
Vol. =	0.00	ft^3
Vol.sub =	90.00	ft^3
Wc =	*7.88*	kips
Ø =	*0.90*	
	7.10	



Foundation Section

SOIL PARAMETERS:

γ_{soil} =	120	pcf
$\gamma_{soil.sub}$ =	57.6	pcf
h_{soil} =	8	ft
x =	*4.62*	ft

Soil Weight (Wr):

B1 =	45.00	
B2 =	82.66	
B3 =	259.66	
W.soil =	117.32	kips
W.soil.sub =	7.24	kips
Total =	*124.56*	kips
Ø =	*0.75*	
	93.42	

SF AGAINST SLIDING

2.23 **>** *1* ***OK***

GUY ANCHORS AGAINST UPLIFT ARE ADEQUATE

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Job :	T-Mobile ~ CTNL023C: 193-ft Guyed Lattice Tower	Project No.	19027.72	Sheet	2	of	2
Address:	57 Cook Drive Montville, CT	Computed by	TJL	Date		6/10/19	
Description:	Guy Anchor Evaluation	Checked by	CFC	Date			

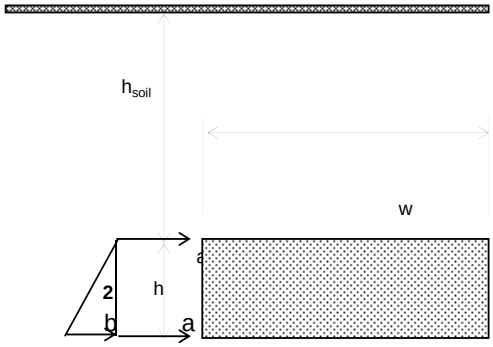
CHECK SLIDING RESISTANCE

SOIL PARAMETERS

$\gamma soil$ =	120	pcf
$\gamma soil$ =	57.6	pcf
h_{soil} =	8	ft
h =	2	ft
ϕ =	30	degrees

ANCHOR PARAMETERS

w =	5.0	ft
h =	2.0	ft
d =	9.0	ft



Foundation Elevation View

K_p = 3.00

HORIZONTAL FORCES

	2.51	ksf
	2.85	ksf
RESIST TO SLIDING =	48.21	k

SOIL & CONCRETE WEIGHT =	Wr + Wc =	100.52	k
UPLIFT REACTIONS =		-45	k
SUM =		55.52	k

COEF. OF FRICTION, (0.45) =	24.98	k
RESIST TO SLIDING =	48.21	k
SUM =	73.19	k

SF AGAINST SLIDING

SF = 1.9 > 1 OK

GUY ANCHORS AGAINST SLIDING NEED REINFORCEMENT

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Job :	T-Mobile ~ CTNL023C: 193-ft Guyed Lattice Tower	Project No.	19027.72	Sheet	1	of	2
Address:	57 Cook Drive Montville, CT	Computed by	TJL	Date		6/10/19	
Description:	Guy Anchor Evaluation	Checked by	CAG	Date			

CHECK UPLIFT RESISTANCE

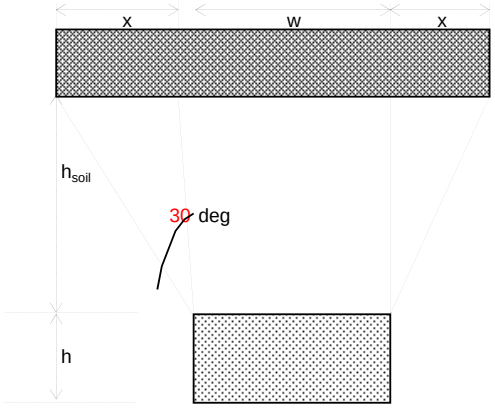
ANCHOR (B) AT 88ft RADIUS

RESULTS FROM COMPUTER ANALYSIS:

Uplift =	32	kips
Sliding =	32	kips
Wdepth =	6	ft

CONCRETE PARAMETERS:

γ_{conc} =	150	pcf
$\gamma_{conc.sub}$ =	87.6	pcf
w =	6	ft
h =	4	ft
d =	12	ft
Vol. =	144.00	ft^3
Vol.sub =	144.00	ft^3
Wc =	*34.21*	kips
Ø =	*0.90*	
	30.79	



Foundation Section

SOIL PARAMETERS:

γ_{soil} =	120	pcf
$\gamma_{soil.sub}$ =	57.6	pcf
h_{soil} =	4	ft
x =	*2.31*	ft

Soil Weight (Wr):

B1 =	72.00	
B2 =	72.00	
B3 =	176.47	
W.soil =	57.79	kips
W.soil.sub =	0.00	kips
Total =	*57.79*	kips
Ø =	*0.75*	
	43.34	

SF AGAINST SLIDING

2.32 **>** *1* ***OK***

GUY ANCHORS AGAINST UPLIFT ARE ADEQUATE

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Job :	T-Mobile ~ CTNL023C: 193-ft Guyed Lattice Tower	Project No.	19027.72	Sheet	2	of	2
Address:	57 Cook Drive Montville, CT	Computed by	TJL	Date		6/10/19	
Description:	Guy Anchor Evaluation	Checked by	CFC	Date			

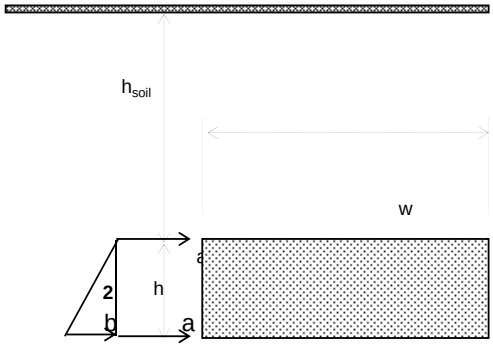
CHECK SLIDING RESISTANCE

SOIL PARAMETERS

$\gamma soil$ =	120	pcf
$\gamma soil$ =	57.6	pcf
h_{soil} =	4	ft
h =	4	ft
ϕ =	30	degrees

ANCHOR PARAMETERS

w =	6.0	ft
h =	4.0	ft
d =	12.0	ft



Foundation Elevation View

K_p = 3.00

HORIZONTAL FORCES

		1.44	ksf
		2.51	ksf
RESIST TO SLIDING =		94.69	k
SOIL & CONCRETE WEIGHT =	Wr + Wc =	74.14	k
UPLIFT REACTIONS =		-32	k
SUM =		42.14	k
COEF. OF FRICTION, (0.45) =		18.96	k
RESIST TO SLIDING =		94.69	k
SUM =		113.66	k

SF AGAINST SLIDING

SF = 3.6 > 1 OK

GUY ANCHORS AGAINST SLIDING ARE ADEQUATE

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Subject:	Base Foundation Analysis
Location:	193-ft Guyed Lattice Tower Montville, CT
Rev. 0: 6/10/19	Prepared by: T.J.L. Checked by: C.A.G. Job No. 19027.72

Guyed Tower Base Foundation:

Input Data:

Tower Data

Shear Force =	$Shear := 1 \cdot kip$	(User Input from tnxTower)	
Axial Force =	$Axial := 213 \cdot kip$	(User Input from tnxTower)	
Tower Height =	$H_t := 193 \cdot ft$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 5.0 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 3.75 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Width of Pier =	$W_p := 2.5 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 1.75 \cdot ft$	(User Input)	
Width of Footing =	$W_{f1} := 7 \cdot ft$	(User Input)	
Length of Footing =	$W_{f2} := 7 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 3000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Ultimate Soil Bearing Capacity =	$q_s := 12000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 120 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 1$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Calculated Factors:

Coefficient of Lateral Soil Pressure =

$$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$$

Load Factor =

$$LF := \begin{cases} 1.333 & \text{if } H_t \le 700 \cdot ft \\ 1.7 & \text{if } H_t \ge 1200 \cdot ft \\ 1.333 + \left(\frac{H_t - 700ft}{1200ft - 700ft}\right) \cdot 0.4 & \text{otherwise} \end{cases} = 1.333$$

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := if\left(Bouyancy = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}\right) = 87.6 \cdot pcf$

Adjusted Soil Unit Weight = $\gamma_s := if\left(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}\right) = 57.6 \cdot pcf$

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

$P_{pt} := K_p \cdot \gamma_s \cdot \left(D_f - T_f\right) + c \cdot 2 \cdot \sqrt{K_p} = 0.562 \cdot ksf$

$P_{top} := if\left[n < \left(D_f - T_f\right), P_{pt}, P_{pn}\right] = 0.562 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 0.864 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 0.713 \cdot ksf$

$T_p := if\left[n < \left(D_f - T_f\right), T_f, \left(D_f - n\right)\right] = 1.75$

$A_p := W_{f1} \cdot T_p = 12.25$

Soil Shear Resistance = $Sl_1 := P_{ave} \cdot A_p = 8.73 \cdot kip$

Weight of Concrete = $WT_c := \left[\left(W_{f1} \cdot W_{f2} \cdot T_f\right) + W_p^2 L_p\right] \cdot \gamma_c = 9.56 \cdot kip$

Total Weight = $WT_{tot} := WT_c + Axial = 222.56 \cdot kip$

Soil/Concrete Friction Resistance = $Sl_2 := \mu \cdot WT_{tot} = 100.15 \cdot kips$

Total Sliding Resistance = $Sl_{tot} := Sl_1 + Sl_2 = 108.89 \cdot kips$

Sliding Resistance Ratio = $Sliding\_Resistance_{ratio} := \frac{0.75 Sl_{tot}}{Shear} = 81.66$

$Sliding\_Resistance\_Check := if\left[\left(\frac{Shear}{0.75 Sl_{tot}} < 1.0\right), "Okay", "No Good"\right]$

Sliding_Resistance_Check = "Okay"

Bearing Pressure Caused by Footing:

Area of the Mat = $A_{mat} := W_{f1} \cdot W_{f2} = 49$

Maximum Pressure in Mat = $P_{max} := \frac{WT_{tot}}{A_{mat}} = 4.54 \cdot ksf$

$Max\_Pressure\_Check := if\left(P_{max} < 0.6 q_s, "Okay", "No Good"\right)$

Max_Pressure_Check = "Okay"

RAN Template:	A&L Template:	Power System Template:
67D04B Hybrid	67D04B_1QP+1OP	Custom

Section 1 - Site Information

Site ID: CTNL023C
Status: Draft
Version: 3.1
Project Type: L600
Approved: Not Approved
Approved By: Not Approved
Last Modified: 4/22/2019 9:33:35 PM
Last Modified By: GSM1900\AMurill9

Site Name: CT023/Montville CookSt MP
Site Class: Self Support Tower
Site Type: Structure Non Building
Plan Year: 2019
Market: CONNECTICUT
Vendor: Ericsson
Landlord: Wireless Solutions

Latitude: 41.4748874700
Longitude: -72.1055295000
Address: 57 Cook St
City, State: Montville, CT
Region: NORTHEAST

RAN Template: 67D04B Hybrid			AL Template: 67D04B_1QP+1OP	
Sector Count: 3	**Antenna Count:** 6	**Coax Line Count:** 12	**TMA Count:** 6	**RRU Count:** 3

Section 2 - Existing Template Images

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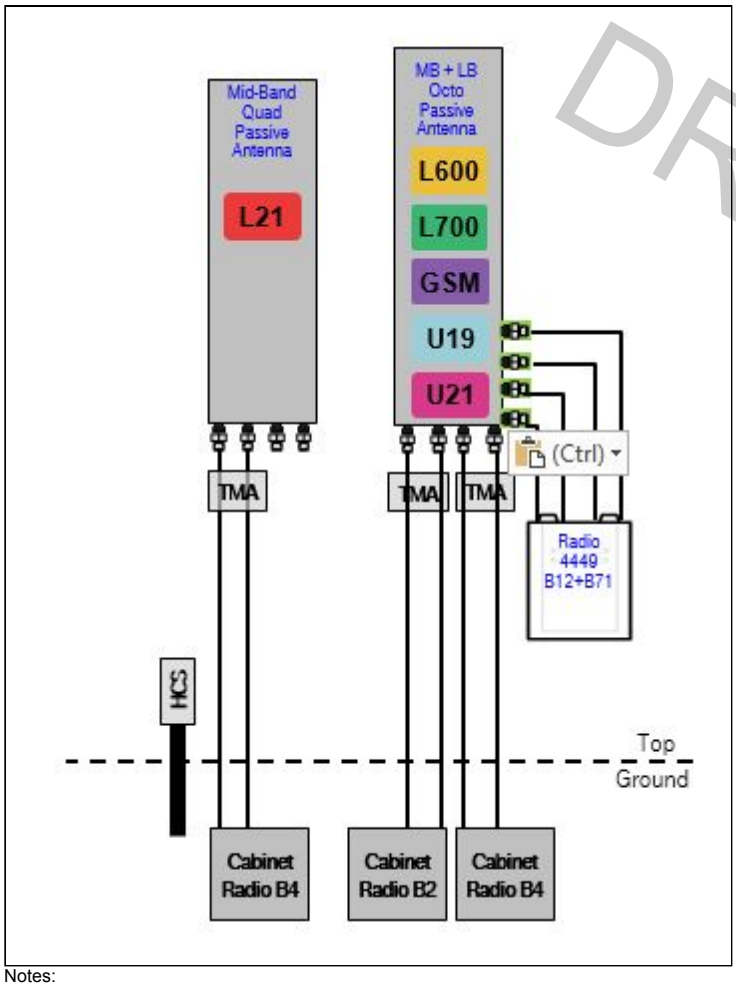
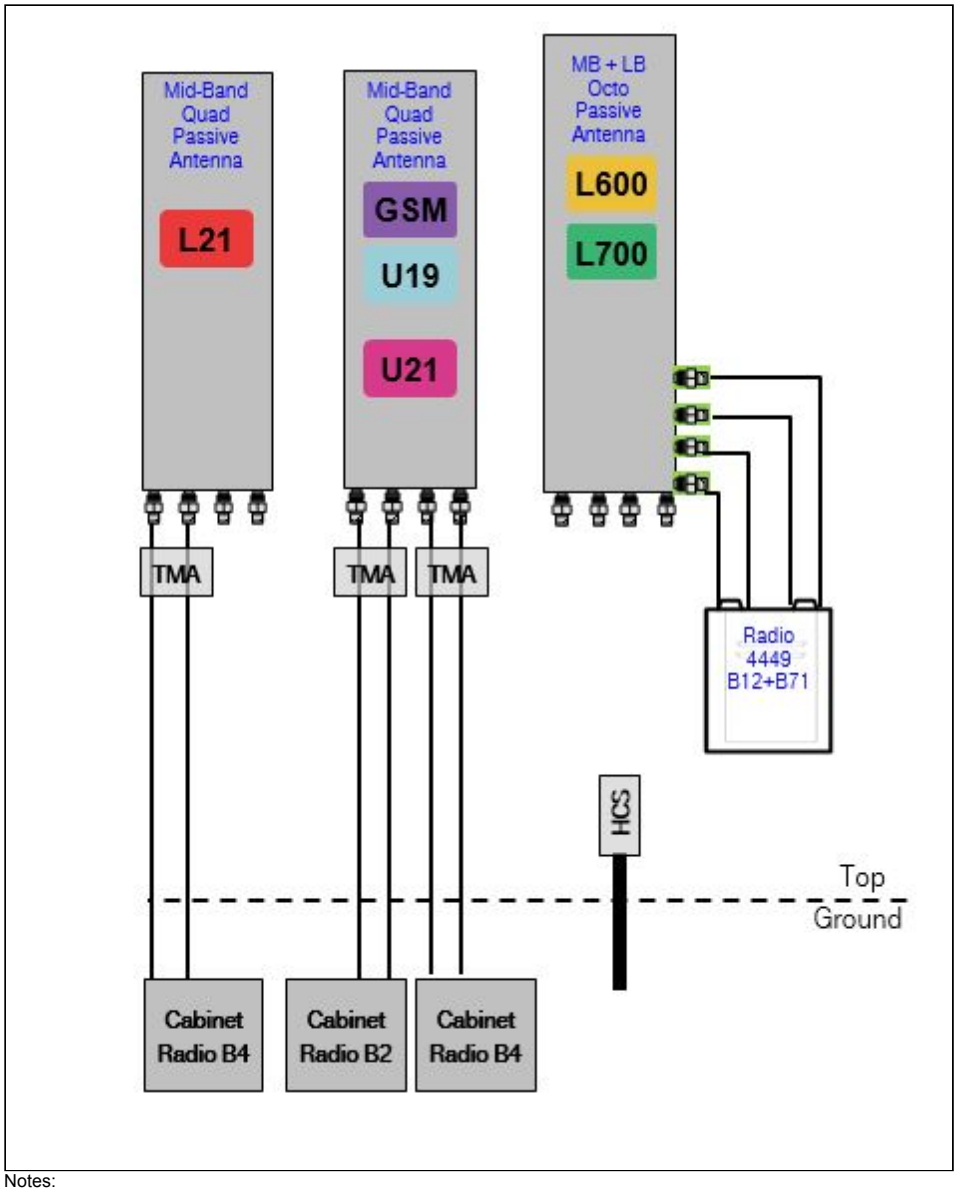
Section 3 - Proposed Template Images

67D04B.JPG



Notes:

67D04B_2QP+1OP.JPG


Mid-Band
Quad
Passive
Antenna
L21
Mid-Band
Quad
Passive
Antenna
GSM
U19
U21
MB + LB
Octo
Passive
Antenna
L600
L700
TMA
TMA
TMA
Radio
4449
B12+B71
HCS
Top
Ground
Cabinet
Radio B4
Cabinet
Radio B2
Cabinet
Radio B4

Notes:

Section 4 - Siteplan Images

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

RAN Template:	A&L Template:	Power System Template:
67D04B Hybrid	67D04B_1QP+1OP	Custom

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 704Bu

Enclosure	1	2
Enclosure Type	RBS 6102	S12000 Outdoor
Baseband	DUW30 (U1900); DUW30 (U2100 (DECOMMISSIONED)); DUG20 (G1900); DUS41 (L2100, L700)	
Multiplexer	XMU	
Radio	RUS01 B2 (x3) (G1900); RUS01 B2 (x3) (U1900); RUS01 B4 (x6) (L2100)	

Proposed RAN Equipment

Template: 67D04B Hybrid

Enclosure	1	2
Enclosure Type	RBS 6102	S12000 Outdoor
Baseband	DUW30 (U1900); DUW30 (U2100 (DECOMMISSIONED)); DUG20 (G1900); BB 6630 (L2100, L700, L600); BB 6630 (N600 (DARK))	
Hybrid Cable System	Ericsson 6x12 HCS *Select Length & AWG* (x3)	
Radio	RUS01 B2 (x3) (G1900); RUS01 B2 (x3) (U1900); RUS01 B4 (x6) (L2100)	

RAN Scope of Work:

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

Add (3) 6X12 HCS.
Existing: (18) Coaxial Lines.
Remove (6) Coaxial Lines.

RAN Template:	A&L Template:	Power System Template:
67D04B Hybrid	67D04B_1QP+1OP	Custom

Section 6 - A&L Equipment

Existing Template: 704Bu
Proposed Template: 67D04B_1QP+1OP

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro			
Antenna	**1**	**2**	**3**	
Antenna Model	Andrew - LNX-6515DS-A1M (Dual)	Empty Antenna Mount (Empty mount)	RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	60		60	
M. Tilt	0		0	
Height	188		190	
Ports	**P1**		**P2**	**P3**
Active Tech.	L700		U1900 G1900	L2100
Dark Tech.				
Restricted Tech.				
Decomm. Tech.				U2100
E. Tilt	2		2	2
Cables	1-5/8" Coax - 212 ft. **(x2)**		1-5/8" Coax - 212 ft. **(x2)**	1-5/8" Coax - 212 ft. **(x2)**
TMAs			Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)
Diplexers / Combiners				
Radio	RRUS11 B12 (At Antenna)			
Sector Equipment				

Unconnected Equipment:

Scope of Work:

*** Existing: Three Mounts Per Sector. LNX in Position 1. Position 2 is Empty. Quad in Position 3 ***

RAN Template:	A&L Template:	Power System Template:
67D04B Hybrid	67D04B_1QP+1OP	Custom

CTNL023C_L600_3.1_draft

Sector 1 (Proposed) view from behind								
Coverage Type	A - Outdoor Macro							
Antenna	1				2	3		
Antenna Model	RFS - APXVAARR24_43-U-NA20 (Octo)				Empty Antenna Mount (Empty mount)	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		
Azimuth	60					60		
M. Tilt	0					0		
Height	188					190		
Ports	P1	P2	P3	P4		P5	P6	
Active Tech.	L700 L600	L700 L600		U1900 G1900			L2100	
Dark Tech.								
Restricted Tech.								
Decomm. Tech.							U2100	
E. Tilt	2					2	2	
Cables	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)**		1-5/8" Coax - 212 ft. **(x2)**			1-5/8" Coax - 212 ft. **(x2)**	
TMAs				Generic Twin Style 1A - PCS (AtAntenna)			Generic Twin Style 1B - AWS (AtAntenna)	
Diplexers / Combiners								
Radio	Radio 4449 B71+B12 (At Antenna)	SHARED Radio 4449 B71+B12 (At Antenna)						
Sector Equipment								

Unconnected Equipment:

Scope of Work:

*** Existing: Three Mounts Per Sector. LNX in Position 1. position 2 is Empty. Quad in Position 3 ***
Replace LB Dual in Position 1 with (1) LB/MB Octo.
Replace RRUS11 B12 in Position 1 with (1) Radio 4449 B71+B12 for L600 and L700.
Move PCS Technologies to Mid-Band Ports of Octo and leave L2100 on Quad
Remove (2) Coaxial Lines.

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

RAN Template:	A&L Template:	Power System Template:
67D04B Hybrid	67D04B_1QP+1OP	Custom

CTNL023C_L600_3.1_draft

Sector 2 (Existing) view from behind				
Coverage Type	A - Outdoor Macro			
Antenna	1	2	3	
Antenna Model	Andrew - LNX-6515DS-A1M (Dual)	Empty Antenna Mount (Empty mount)	RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	170		170	
M. Tilt	0		0	
Height	188		190	
Ports	P1		P2	P3
Active Tech.	L700		U1900 G1900	L2100
Dark Tech.				
Restricted Tech.				
Decomm. Tech.				U2100
E. Tilt	2		2	2
Cables	1-5/8" Coax - 212 ft. **(x2)**		1-5/8" Coax - 212 ft. **(x2)**	1-5/8" Coax - 212 ft. **(x2)**
TMAs			Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)
Diplexers / Combiners				
Radio	RRUS11 B12 (At Antenna)			
Sector Equipment				

Unconnected Equipment:

Scope of Work:

*** Existing: Three Mounts Per Sector. LNX in Position 1. Position 2 is Empty. Quad in Position 3 ***

RAN Template:	A&L Template:	Power System Template:
67D04B Hybrid	67D04B_1QP+1OP	Custom

CTNL023C_L600_3.1_draft

Sector 2 (Proposed) view from behind								
Coverage Type	A - Outdoor Macro							
Antenna	1				2	3		
Antenna Model	RFS - APXVAARR24_43-U-NA20 (Octo)				Empty Antenna Mount (Empty mount)	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		
Azimuth	170					170		
M. Tilt	0					0		
Height	188					190		
Ports	P1	P2	P3	P4		P5	P6	
Active Tech.	L700 L600	L700 L600		U1900 G1900			L2100	
Dark Tech.								
Restricted Tech.								
Decomm. Tech.							U2100	
E. Tilt	2					2	2	
Cables	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)**		1-5/8" Coax - 212 ft. **(x2)**			1-5/8" Coax - 212 ft. **(x2)**	
TMAs				Generic Twin Style 1A - PCS (AtAntenna)			Generic Twin Style 1B - AWS (AtAntenna)	
Diplexers / Combiners								
Radio	Radio 4449 B71+B12 (At Antenna)	SHARED Radio 4449 B71+B12 (At Antenna)						
Sector Equipment								

Unconnected Equipment:

Scope of Work:

*** Existing: Three Mounts Per Sector. LNX in Position 1. position 2 is Empty. Quad in Position 3 ***
Replace LB Dual in Position 1 with (1) LB/MB Octo.
Replace RRUS11 B12 in Position 1 with (1) Radio 4449 B71+B12 for L600 and L700.
Move PCS Technologies to Mid-Band Ports of Octo and leave L2100 on Quad
Remove (2) Coaxial Lines.

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

RAN Template:	A&L Template:	Power System Template:
67D04B Hybrid	67D04B_1QP+1OP	Custom

CTNL023C_L600_3.1_draft

Sector 3 (Existing) view from behind				
Coverage Type	A - Outdoor Macro			
Antenna	1	2	3	
Antenna Model	Andrew - LNX-6515DS-A1M (Dual)	Empty Antenna Mount (Empty mount)	RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	330		330	
M. Tilt	0			
Height	188		190	
Ports	P1		P2	P3
Active Tech.	L700		U1900 G1900	L2100
Dark Tech.				
Restricted Tech.				
Decomm. Tech.				U2100
E. Tilt	2		2	2
Cables	1-5/8" Coax - 212 ft. **(x2)**		1-5/8" Coax - 212 ft. **(x2)**	1-5/8" Coax - 212 ft. **(x2)**
TMAs			Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)
Diplexers / Combiners				
Radio	RRUS11 B12 (At Antenna)			
Sector Equipment				

Unconnected Equipment:

Scope of Work:

*** Existing: Three Mounts Per Sector. LNX in Position 1. Position 2 is Empty. Quad in Position 3 ***

RAN Template:	A&L Template:	Power System Template:
67D04B Hybrid	67D04B_1QP+1OP	Custom

CTNL023C_L600_3.1_draft

Sector 3 (Proposed) view from behind								
Coverage Type	A - Outdoor Macro							
Antenna	1				2	3		
Antenna Model	RFS - APXVAARR24_43-U-NA20 (Octo)				Empty Antenna Mount (Empty mount)	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		
Azimuth	330					330		
M. Tilt	0					0		
Height	188					190		
Ports	P1	P2	P3	P4		P5	P6	
Active Tech.	L700 L600	L700 L600		U1900 G1900			L2100	
Dark Tech.								
Restricted Tech.								
Decomm. Tech.							U2100	
E. Tilt	2					2	2	
Cables	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)**		1-5/8" Coax - 212 ft. **(x2)**			1-5/8" Coax - 212 ft. **(x2)**	
TMAs				Generic Twin Style 1A - PCS (AtAntenna)			Generic Twin Style 1B - AWS (AtAntenna)	
Diplexers / Combiners								
Radio	Radio 4449 B71+B12 (At Antenna)	SHARED Radio 4449 B71+B12 (At Antenna)						
Sector Equipment								

Unconnected Equipment:

Scope of Work:

*** Existing: Three Mounts Per Sector. LNX in Position 1. position 2 is Empty. Quad in Position 3 ***
*** Existing RRUS11 B12 are at Ground ***
Replace LB Dual in Position 1 with (1) LB/MB Octo.
Replace RRUS11 B12 in Position 1 with (1) Radio 4449 B71+B12 for L600 and L700.
Move PCS Technologies to Mid-Band Ports of Octo and leave L2100 on Quad
Remove (2) Coaxial Lines.

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

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

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

Proposed Power Systems Equipment

Product Data Sheet **APX16DWV-16DWVS-E-A20**

Optimizer® Side-by-Side Dual Polarized Antenna, 1710-2200, 65deg, 18.4dBi, 1.4m, VET, 0-10deg RET

Product Description

A combination of two X-Polarized antennas in a single radome, this pair of variable tilt antennas provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features a wide downtilt range. This antenna is optimized for performance across the entire frequency band (1710-2200 MHz). The antenna comes pre-connected with two antenna control units (ACU).

Features/Benefits

- **Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.**
- **High Suppression of all Upper Sidelobes (Typically <-20dB).**
- **Gain tracking – difference between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz) <1dB.**
- **Two X-Polarised panels in a single radome.**
- **Azimuth horizontal beamwidth difference <4deg between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz).**
- **Low profile for low visual impact.**
- **Dual polarization; Broadband design.**
- **Includes (2) AISG 2.0 Compatible ACU-A20-N antenna control units.**

Technical Specifications

Electrical Specifications

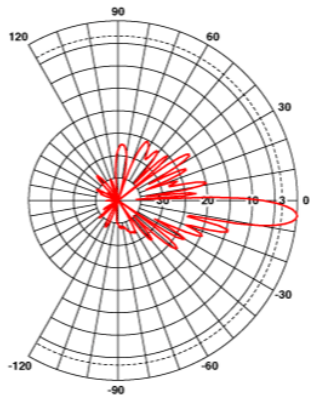
Frequency Range, MHz	1710-2200
Horizontal Beamwidth, deg	65
Vertical Beamwidth, deg	5.9 to 7.7
Electrical Downtilt, deg	0-10
Gain, dBi (dBd)	18.4 (16.3)
1st Upper Sidelobe Suppression, dB	> 18 (typically > 20)
Upper Sidelobe Suppression, dB	> 18 all (typically > 20)
Front-To-Back Ratio, dB	>26 (typically 28)
Polarization	Dual pol +/-45°
VSWR	< 1.5:1
Isolation between Ports, dB	> 30
3rd Order IMP @ 2 x 43 dBm, dBc	> 150 (155 Typical)
Impedance, Ohms	50
Maximum Power Input, W	300
Lightning Protection	Direct Ground
Connector Type	(4) 7-16 Long Neck Female

Mechanical Specifications

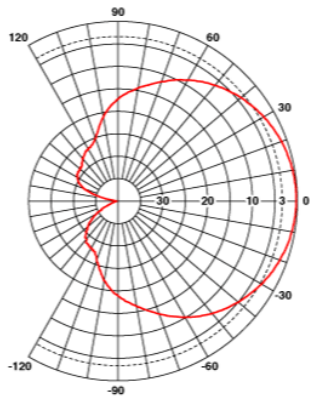
Dimensions - HxWxD, mm (in)	1420 x 331 x 80 (55.9 x 13 x 3.15)
Weight w/o Mtg Hardware, kg (lb)	18.5 (40.7)
Survival Wind Speed, km/h (mph)	200 (125)
Rated Wind Speed, km/h (mph)	160 (100)
Max Wind Loading Area, m² (ft²)	0.47 (5.03)
Front Thrust @ Rated Wind, N (lbf)	756 (170)
Maximum Thrust @ Rated Wind, N (lbf)	756 (170)
Wind Load - Side @ Rated Wind, N (lbf)	231 (52)
Wind Load - Rear @ Rated Wind, N (lbf)	408 (92)
Radome Material	Fiberglass
Radome Color	Light Grey RAL7035
Mounting Hardware Material	Diecasted Aluminum
Shipping Weight, kg (lb)	24.5 (53.9)
Packing Dimensions, HxWxD, mm (in)	1520 x 408 x 198 (59.8 x 16 x 7.8)

Ordering Information

Mounting Hardware	APM40-2 + APM40-E2



Vertical Pattern



Horizontal Pattern

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600MHz, 700MHz, AWS & PCS applications.

- **24 Inch Width For Easier Zoning**
- **Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality**
- **Superior elevation pattern performance across the entire electrical down tilt range**
- **Includes three AISG RET motors - Includes 0.5m AISG jumper for optional diasy chain of two high band RET motors for one single AISG point of high band tilt control.**
- **Low band arrays driven by a single RET motor**

Technical Features

LOW BAND LEFT ARRAY (617-746 MHZ) [R1]

Frequency Band	MHz	617-698	698-746
Gain	dBi	15.1	15.5
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.4
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	24
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

LOW BAND RIGHT ARRAY (617-746 MHZ) [R2]

Frequency Band	MHz	617-698	698-746
Gain	dBi	14.8	15.1
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.3
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	23
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

ELECTRICAL SPECIFICATIONS

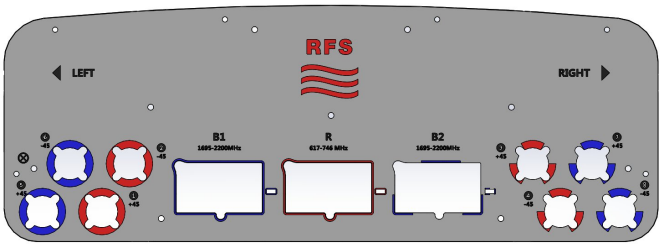
Impedance	Ohm	50.0
Polarization	Deg	±45°

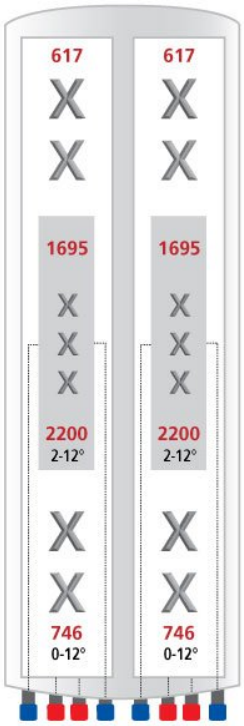
MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	2436 x 609 x 222 (95.9 x 24 x 8.7)
Weight (Antenna Only)	kg (lb)	58 (128)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	80 (176)
Connector type		8 x 4.3-10 female at bottom + 6 AISG connectors (3 male, 3 female)
Adjustment mechanism		Integrated RET solution AISG compliant (Field Replaceable) + Manual Override + External Tilt Indicator
Mounting Hardware Material		Galvanized steel
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		IEC 61000-4-5
Survival/Rated Wind Velocity	km/h	241 (150)
Environmental		ETSI 300-019-2-4 Class 4.1E





ORDERING INFORMATION

Order No.	Configuration	Mounting Hardware	Mounting pipe Diameter	Shipping Weight
APXVAARR24_43-U-NA20	Field Replace RET included (3)	APM40-5E Beam tilt kit (included)	60-120mm	80 Kg

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

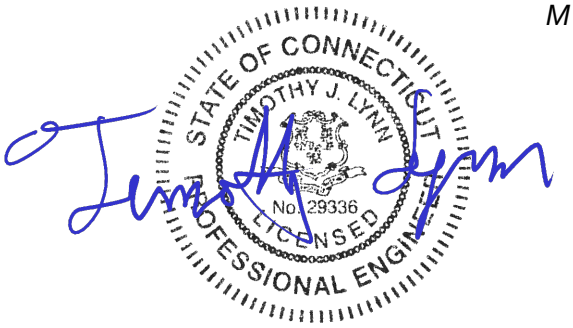
T-Mobile Site #: CTNL023C

57 Cook Drive
Montville, CT

Centek Project No. 19027.72

Date: June 10, 2019

Max Stress Ratio =84.9%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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- STRUCTURE LOADING
- CONCLUSION

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- WIND LOAD ON APPURTENANCES
- RISA3D OUTPUT REPORT

SECTION 3 – REFERENCE MATERIALS (NOT INCLUDED WITHIN REPORT)

- RF DATA SHEET, DATED 04/22/2019

CENTEK engineering

Centered on Solutions℠

June 10, 2019

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

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CTNL023C
57 Cook Drive
Montville, CT 06382

Centek Project No. 19027.72

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 one (1) V-Frame to support the equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- T-Mobile:
  V-Frame: Three (3) RFS- APXVAARR24_43-U-NA20 panel antennas, three (3) RFS-APX16DWV-16DWV-S-E-A20 panel antennas, six (6) Ericsson KRY 112 TMAs and three (3) Ericsson 4449 B71_B12 remote radio units mounted on three (3) V-Frames with a RAD center elevation of 190-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 105 mph for Montville 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 equipment upgrade, it is our opinion that the existing antenna V-Frames are structurally adequate to support the proposed antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

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

Prepared by:

Fernando J. Palacios
Engineer

Section 2 - Calculations

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

Subject: Loads on Equipment

Location: Montville, CT

Rev. 0: 06/10/19

Prepared by: F.J.P Checked by: C.A.G.
Job No. 19027.72

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

Wind Speeds

Basic Wind Speed	$V := 105$	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 =	$h := 190$	ft	(User Input)
Height to Center of Antennas =	$z := 190$	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 =	$G_H = 1.11$		(User Input)

Output

Wind Direction Probability Factor =

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

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

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

Importance Factors =

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

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

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

$$K_{iz} := \left(\frac{z}{33}\right)^{0.1} = 1.191$$

Velocity Pressure Coefficient Antennas =

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.787$$

$$Kz := 2.01 \cdot \left(\left(\frac{z}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.449$$

Velocity Pressure w/o Ice Antennas = $qz := 0.00256 \cdot K_d \cdot Kz \cdot V^2 \cdot I_{Wind} = 34.756$ psf

Velocity Pressure with Ice Antennas = $qz_{ice} := 0.00256 \cdot K_d \cdot Kz \cdot V_i^2 \cdot I_{Wind} = 7.881$ psf

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAARR24_43-U-NA20		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 153.3$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 781$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 283$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 19$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 211$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.5$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 94$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 153$	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 =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 442$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 442$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APX16DWV-16DWVS-E-A20		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 13$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 40.7$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$	sf
Total Antenna Wind Force Front =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 249$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.2$	sf
Total Antenna Wind Force Side =	$F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 60$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.8$	sf
Total Antenna Wind Force w/ Ice Front =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 77$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 2.8$	sf
Total Antenna Wind Force w/ Ice Side =	$Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 31$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 41$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 4339$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 141$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 141$	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 =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 63$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 50$	lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.2$	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 =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.8$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 19$	lbs

Gravity Load (without ice)

Weight of All RRUSs =	$WT_{RRUS} \cdot N_{RRUS} = 74$	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 =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2285$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 74$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 74$	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 =	$F_{TMA} := qz \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAF} = 14$	lbs
Surface Area for One TMA =	$SA_{TMAS} := \frac{L_{TMA} \cdot T_{TMA}}{144} = 0.1$	sf
Total TMA Wind Force =	$F_{TMA} := qz \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAS} = 6$	lbs

Wind Load (with ice)

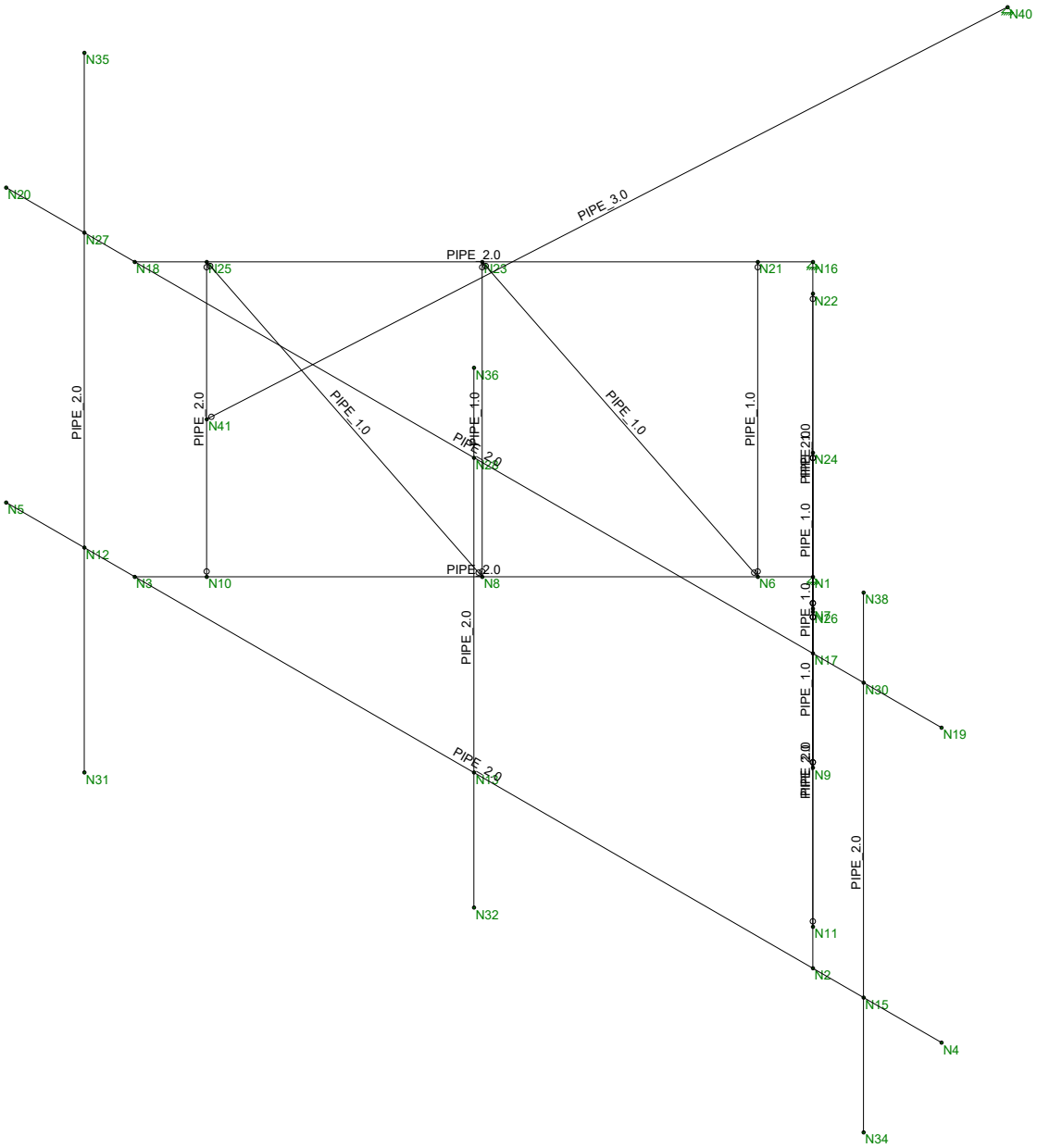
Surface Area for One TMA w/ Ice =	$SA_{ICETMAF} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz})}{144} = 0.7$	sf
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAF} = 7$	lbs
Surface Area for One TMA w/ Ice =	$SA_{ICETMAS} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz})}{144} = 0.5$	sf
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAS} = 5$	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 =	$V_{ice} := (L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz}) - V_{TMA} = 528$	cu in
Weight of Ice on Each TMA =	$W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 17$	lbs
Weight of Ice on All TMAs =	$W_{ICETMA} \cdot N_{TMA} = 17$	lbs



Centek		
THC	CTNL023C_AMA	June 10, 2019 at 2:09 PM
19027.72	Member Framing	CTNL023C_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: ASD
Aluminum Code	AA ADM1-15: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

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

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E..	Density[k/ft...	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[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Outrigger	6.152			Lbyy						Lateral
2	M2	Outrigger	6.152			Lbyy						Lateral
3	M3	Outrigger	12			Lbyy						Lateral
4	M4	Outrigger	6.152			Lbyy						Lateral
5	M5	Outrigger	6.152			Lbyy						Lateral
6	M6	Outrigger	12			Lbyy						Lateral
7	M7	Antenna Mast	8			Lbyy						Lateral
8	M8	Antenna Mast	6			Lbyy						Lateral
9	M10	Antenna Mast	6			Lbyy						Lateral
10	M11	1" Pipe	3.5			Lbyy						Lateral
11	M13	2" Pipe	3.5			Lbyy						Lateral
12	M14	1" Pipe	3.5			Lbyy						Lateral
13	M15	1" Pipe	3.5			Lbyy						Lateral
14	M16	2" Pipe	3.5			Lbyy						Lateral
15	M21	Stabilizer	9.735			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
16	M18	1" Pipe	4.301			Lbyy						Lateral
17	M19	1" Pipe	4.301			Lbyy						Lateral
18	M20	1" Pipe	4.301			Lbyy						Lateral
19	M19A	1" Pipe	3.5			Lbyy						Lateral
20	M20A	1" Pipe	4.301			Lbyy						Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Antenna ...	PIPE_2.0	Column	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
2	2" Pipe	PIPE_2.0	Column	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
3	1" Pipe	PIPE_1.0	VBrace	Pipe	A53 Grade B	Typical	.469	.083	.083	.166
4	Outrigger	PIPE_2.0	Column	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
5	Stabilizer	PIPE_3.0	Beam	Pipe	A53 Grade B	Typical	2.07	2.85	2.85	5.69

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotat...	Section/...	Type	Design L...	Material	Design Rules
1	M1	N1	N3			Outrigger	Colu...	Pipe	A53 Grade B	Typical
2	M2	N1	N2			Outrigger	Colu...	Pipe	A53 Grade B	Typical
3	M3	N5	N4			Outrigger	Colu...	Pipe	A53 Grade B	Typical
4	M4	N16	N18			Outrigger	Colu...	Pipe	A53 Grade B	Typical
5	M5	N16	N17			Outrigger	Colu...	Pipe	A53 Grade B	Typical
6	M6	N20	N19			Outrigger	Colu...	Pipe	A53 Grade B	Typical
7	M7	N31	N35			Antenna ...	Colu...	Pipe	A53 Grade B	Typical
8	M8	N32	N36			Antenna ...	Colu...	Pipe	A53 Grade B	Typical
9	M10	N34	N38			Antenna ...	Colu...	Pipe	A53 Grade B	Typical
10	M11	N22	N7			1" Pipe	VBra...	Pipe	A53 Grade B	Typical
11	M13	N26	N11			2" Pipe	Colu...	Pipe	A53 Grade B	Typical
12	M14	N21	N6			1" Pipe	VBra...	Pipe	A53 Grade B	Typical
13	M15	N23	N8			1" Pipe	VBra...	Pipe	A53 Grade B	Typical
14	M16	N25	N10			2" Pipe	Colu...	Pipe	A53 Grade B	Typical
15	M21	N41	N40			Stabilizer	Beam	Pipe	A53 Grade B	Typical
16	M18	N7	N24			1" Pipe	VBra...	Pipe	A53 Grade B	Typical
17	M19	N6	N23			1" Pipe	VBra...	Pipe	A53 Grade B	Typical
18	M20	N8	N25			1" Pipe	VBra...	Pipe	A53 Grade B	Typical
19	M19A	N24	N9			1" Pipe	VBra...	Pipe	A53 Grade B	Typical
20	M20A	N9	N26			1" Pipe	VBra...	Pipe	A53 Grade B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0	0	0	0	
2	N2	4.35	0	4.35	0	
3	N3	-4.35	0	4.35	0	
4	N4	6	0	4.35	0	
5	N5	-6	0	4.35	0	
6	N6	-0.353553	0	0.353553	0	
7	N7	0.353553	0	0.353553	0	
8	N8	-2.12132	0	2.12132	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
9	N9	2.12132	0	2.12132	0	
10	N10	-3.889087	0	3.889087	0	
11	N11	3.889087	0	3.889087	0	
12	N12	-5	0	4.35	0	
13	N13	0	0	4.35	0	
14	N15	5	0	4.35	0	
15	N16	0	3.5	0	0	
16	N17	4.35	3.5	4.35	0	
17	N18	-4.35	3.5	4.35	0	
18	N19	6	3.5	4.35	0	
19	N20	-6	3.5	4.35	0	
20	N21	-0.353553	3.5	0.353553	0	
21	N22	0.353553	3.5	0.353553	0	
22	N23	-2.12132	3.5	2.12132	0	
23	N24	2.12132	3.5	2.12132	0	
24	N25	-3.889087	3.5	3.889087	0	
25	N26	3.889087	3.5	3.889087	0	
26	N27	-5	3.5	4.35	0	
27	N28	0	3.5	4.35	0	
28	N30	5	3.5	4.35	0	
29	N31	-5	-2.5	4.35	0	
30	N32	0	-1.5	4.35	0	
31	N34	5	-1.5	4.35	0	
32	N35	-5	5.5	4.35	0	
33	N36	0	4.5	4.35	0	
34	N38	5	4.5	4.35	0	
35	N40	-3.33	1.75	-5.83	0	
36	N41	-3.889087	1.75	3.889087	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			
2	N16	Reaction	Reaction	Reaction			
3	N40	Reaction	Reaction	Reaction			

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M10	Y	-.021	6
2	M10	Y	-.021	1.35
3	M10	Y	-.011	3
4	M7	Y	-.076	8
5	M7	Y	-.076	0
6	M7	Y	-.074	3
7	M7	Y	-.011	5

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M10	Y	-.07	1.35

Member Point Loads (BLC 3 : Ice Weight) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
2	M10	Y	-.07	6
3	M10	Y	-.017	3
4	M7	Y	-.221	0
5	M7	Y	-.221	8
6	M7	Y	-.074	3
7	M7	Y	-.017	5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M10	X	.015	1.35
2	M10	X	.015	6
3	M10	X	.005	3
4	M7	X	.047	0
5	M7	X	.047	8
6	M7	X	.019	3
7	M7	X	.005	5

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M10	X	.03	1.35
2	M10	X	.03	6
3	M10	X	.006	3
4	M7	X	.141	0
5	M7	X	.141	8
6	M7	X	.05	3
7	M7	X	.006	5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M10	Z	.038	6
2	M10	Z	.038	1.35
3	M10	Z	.007	3
4	M7	Z	.105	8
5	M7	Z	.105	0
6	M7	Z	.023	3
7	M7	Z	.007	5

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M10	Z	.124	6
2	M10	Z	.124	1.35
3	M10	Z	.014	3
4	M7	Z	.391	8
5	M7	Z	.391	0
6	M7	Z	.063	3
7	M7	Z	.014	5

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
No Data to Print ...			

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,...	End Location[ft,%]
1	M10	X	.002	.002	0	1.35
2	M8	X	.002	.002	0	0
3	M16	X	.002	.002	0	0
4	M20	X	.002	.002	0	0
5	M15	X	.002	.002	0	0
6	M4	X	.002	.002	0	0
7	M1	X	.002	.002	0	0
8	M19	X	.002	.002	0	0
9	M14	X	.002	.002	0	0
10	M11	X	.002	.002	0	0
11	M18	X	.002	.002	0	0
12	M19A	X	.002	.002	0	0
13	M20A	X	.002	.002	0	0
14	M13	X	.002	.002	0	0
15	M21	X	.002	.002	0	0
16	M5	X	.002	.002	0	0
17	M2	X	.002	.002	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,...	End Location[ft,%]
1	M10	X	.007	.007	0	1.35
2	M21	X	.007	.007	0	0
3	M16	X	.007	.007	0	0
4	M20	X	.007	.007	0	0
5	M15	X	.007	.007	0	0
6	M19	X	.007	.007	0	0
7	M14	X	.007	.007	0	0
8	M11	X	.007	.007	0	0
9	M18	X	.007	.007	0	0
10	M19A	X	.007	.007	0	0
11	M20A	X	.007	.007	0	0
12	M13	X	.007	.007	0	0
13	M4	X	.007	.007	0	0
14	M1	X	.007	.007	0	0
15	M5	X	.007	.007	0	0
16	M2	X	.007	.007	0	0
17	M8	X	.007	.007	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,...	End Location[ft,%]
1	M10	Z	.002	.002	0	1.35
2	M4	Z	.002	.002	0	0
3	M1	Z	.002	.002	0	0
4	M16	Z	.002	.002	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,...	End Location[ft,%]
5	M20	Z	.002	.002	0	0
6	M15	Z	.002	.002	0	0
7	M19	Z	.002	.002	0	0
8	M6	Z	.002	.002	0	0
9	M3	Z	.002	.002	0	0
10	M8	Z	.002	.002	0	0
11	M14	Z	.002	.002	0	0
12	M11	Z	.002	.002	0	0
13	M18	Z	.002	.002	0	0
14	M19A	Z	.002	.002	0	0
15	M20A	Z	.002	.002	0	0
16	M13	Z	.002	.002	0	0
17	M5	Z	.002	.002	0	0
18	M2	Z	.002	.002	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,...	End Location[ft,%]
1	M3	Z	.007	.007	0	0
2	M6	Z	.007	.007	0	0
3	M4	Z	.007	.007	0	0
4	M1	Z	.007	.007	0	0
5	M5	Z	.007	.007	0	0
6	M2	Z	.007	.007	0	0
7	M20	Z	.007	.007	0	0
8	M19	Z	.007	.007	0	0
9	M18	Z	.007	.007	0	0
10	M20A	Z	.007	.007	0	0
11	M8	Z	.007	.007	0	0
12	M16	Z	.007	.007	0	0
13	M15	Z	.007	.007	0	0
14	M14	Z	.007	.007	0	0
15	M10	Z	.007	.007	0	1.35
16	M11	Z	.007	.007	0	0
17	M19A	Z	.007	.007	0	0
18	M13	Z	.007	.007	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	DL		-1						
2	Equipment Weight	None					7			
3	Ice Weight	None					7			
4	Wind w/ Ice X	None					7	17		
5	Wind X	None					7	17		
6	Wind w/ Ice Z	None					7	18		
7	Wind Z	None					7	18		

Load Combinations

	Description	S...	PDelta	S...	B...	Fa...	B...	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	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	2	1.2	3	1	4	1														
4	1.2D + 1.6W (Z-direction)	Yes	Y		1	1.2	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	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	-.316	5	.822	6	1.824	3	0	6	0	6	0	6
2		min	-1.234	1	.352	2	-.272	5	0	1	0	1	0	1
3	N16	max	.905	6	.676	3	.055	2	0	6	0	6	0	6
4		min	-.452	2	-.045	5	-1.811	6	0	1	0	1	0	1
5	N40	max	.071	4	.041	4	-.211	6	0	6	0	6	0	6
6		min	.007	3	.031	2	-1.361	1	0	1	0	1	0	1
7	Totals:	max	0	6	1.496	6	0	3						
8		min	-1.574	1	.604	2	-2.884	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	2.773e-03	3	4.535e-03	1	1.724e-03	6
2		min	0	1	0	1	0	1	8.412e-04	5	6.995e-04	6	6.027e-04	2
3	N2	max	.207	4	-.006	5	-.046	6	1.109e-03	3	3.315e-03	4	2.653e-04	4
4		min	.045	6	-.02	3	-.205	4	1.666e-04	5	5.893e-04	6	-1.347e-05	3
5	N3	max	.209	4	0	5	.21	4	5.368e-04	3	9.162e-03	5	4.158e-03	4
6		min	.046	6	-.065	3	.044	6	-9.874e-03	5	1.084e-03	3	1.122e-03	2
7	N4	max	.207	4	.002	5	-.055	6	9.254e-04	3	2.745e-03	1	4.501e-04	4
8		min	.045	6	-.017	3	-.26	4	1.124e-04	5	4.646e-04	6	2.e-04	3
9	N5	max	.209	4	-.063	2	.418	4	-6.014e-05	3	1.065e-02	5	3.855e-03	4
10		min	.046	6	-.115	6	.066	3	-1.461e-02	5	9.823e-04	3	2.363e-03	3
11	N6	max	.019	1	-.007	2	.018	1	2.273e-03	3	4.221e-03	1	1.535e-03	6
12		min	.003	6	-.019	6	.003	6	1.03e-04	5	6.457e-04	6	5.435e-04	2
13	N7	max	.02	1	0	5	-.003	6	2.577e-03	6	4.714e-03	1	1.593e-03	6
14		min	.003	6	-.005	3	-.02	1	1.005e-03	2	7.535e-04	6	5.547e-04	2
15	N8	max	.096	1	-.012	2	.093	1	-4.248e-04	1	3.106e-03	1	3.651e-03	5
16		min	.017	6	-.035	6	.015	6	-3.061e-03	5	6.606e-04	6	-7.031e-05	3
17	N9	max	.116	1	-.003	5	-.022	6	1.306e-03	6	4.388e-03	4	1.458e-03	3
18		min	.022	6	-.01	3	-.116	1	5.304e-04	2	9.791e-04	6	5.637e-04	5
19	N10	max	.172	1	-.015	2	.168	1	5.303e-04	3	7.615e-03	4	5.307e-03	4
20		min	.037	6	-.049	6	.035	6	-7.226e-03	5	1.055e-03	3	8.916e-04	2
21	N11	max	.186	1	-.005	5	-.042	6	1.188e-03	3	3.992e-03	4	2.743e-04	1
22		min	.042	6	-.014	3	-.187	1	3.726e-04	5	7.156e-04	3	1.792e-04	5
23	N12	max	.209	4	-.029	2	.29	4	-6.014e-05	3	1.063e-02	5	3.848e-03	4
24		min	.046	6	-.086	6	.054	3	-1.461e-02	5	9.823e-04	3	2.356e-03	3
25	N13	max	.208	4	-.015	2	-.012	3	3.848e-04	3	3.685e-03	1	3.182e-04	3
26		min	.046	6	-.024	6	-.039	4	-2.066e-03	5	6.485e-04	6	-3.543e-04	5
27	N15	max	.207	4	-.004	5	-.05	6	9.254e-04	3	2.745e-03	1	4.57e-04	4
28		min	.045	6	-.02	3	-.228	4	1.124e-04	5	4.673e-04	6	2.069e-04	3

Envelope Joint Displacements (Continued)

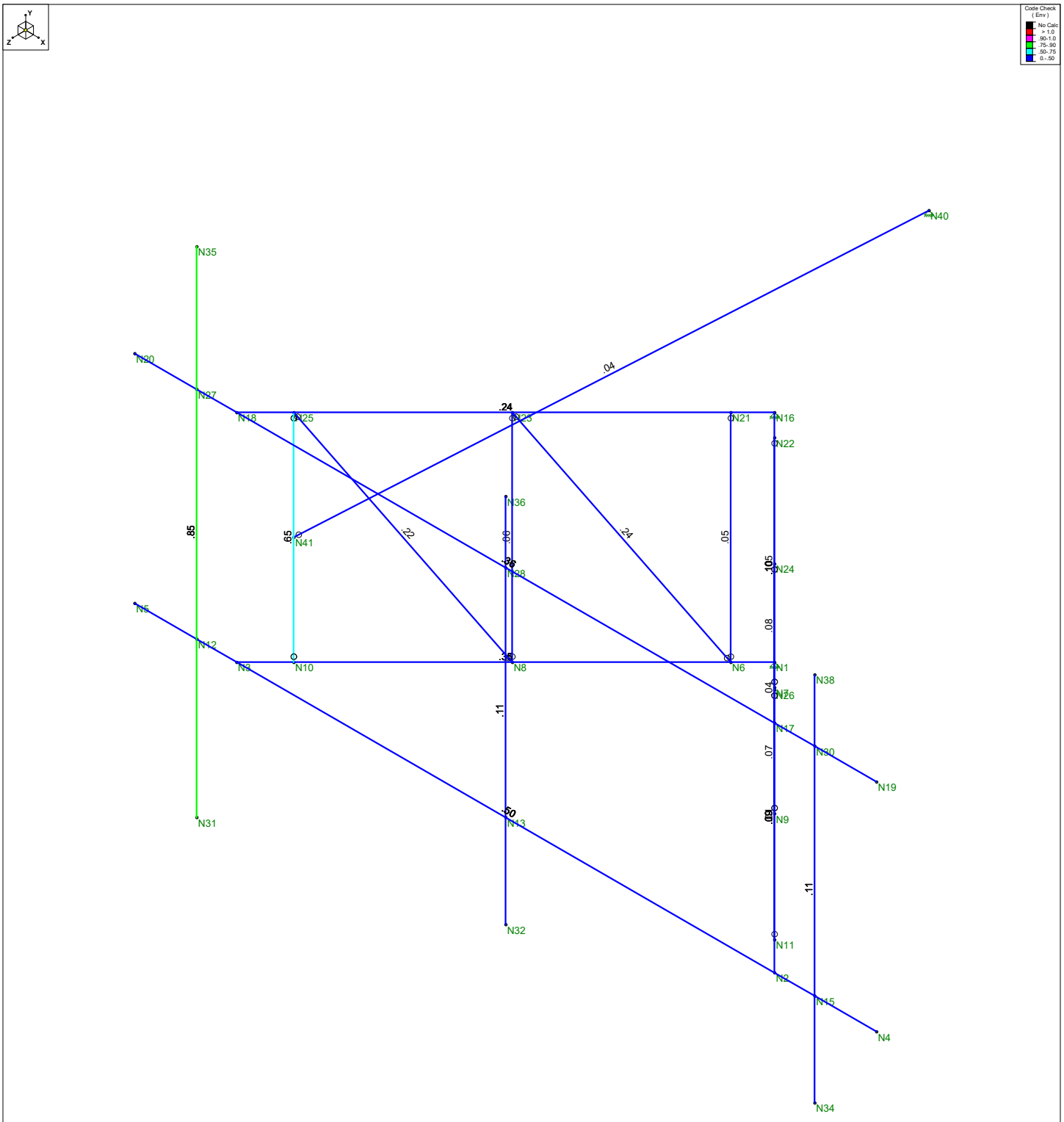
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
29	N16	max	0	6	0	6	0	6	2.475e-03	6	4.063e-03	2	1.469e-03	6
30		min	0	1	0	1	0	1	9.855e-04	2	-3.175e-06	6	4.9e-04	2
31	N17	max	.185	2	-.007	2	-.012	6	2.271e-03	4	2.726e-03	5	7.777e-04	4
32		min	.014	6	-.02	6	-.184	2	4.766e-04	2	1.975e-04	6	-4.132e-05	3
33	N18	max	.184	2	-.029	2	.182	2	8.567e-03	4	8.187e-03	5	2.394e-03	3
34		min	.014	6	-.07	6	.02	6	1.109e-03	3	9.847e-04	3	-1.901e-03	5
35	N19	max	.185	2	.008	5	-.014	6	2.711e-03	4	2.566e-03	2	9.776e-04	4
36		min	.014	6	-.018	3	-.235	2	4.463e-04	2	1.175e-04	6	6.001e-05	2
37	N20	max	.184	2	-.015	2	.36	5	1.194e-02	4	9.744e-03	4	1.606e-03	6
38		min	.014	6	-.105	6	.049	3	3.533e-04	3	1.087e-03	3	-1.439e-03	5
39	N21	max	.017	2	-.006	2	.017	2	2.098e-03	6	3.782e-03	2	1.209e-03	3
40		min	0	6	-.016	6	0	6	8.781e-04	2	-3.719e-05	6	2.437e-05	5
41	N22	max	.018	2	-.002	5	0	6	2.3e-03	6	4.26e-03	2	1.45e-03	6
42		min	0	6	-.004	3	-.018	2	8.998e-04	2	4.62e-05	6	5.126e-04	2
43	N23	max	.085	2	-.01	2	.084	2	2.256e-03	4	2.822e-03	2	-1.902e-04	3
44		min	-.003	6	-.03	6	.001	6	-3.177e-04	3	1.046e-04	6	-3.047e-03	4
45	N24	max	.106	2	-.002	5	-.003	6	1.324e-03	6	3.696e-03	2	1.461e-03	6
46		min	.005	6	-.008	3	-.106	2	5.313e-04	2	3.209e-04	6	5.658e-04	2
47	N25	max	.156	2	-.016	2	.155	2	6.431e-03	4	6.879e-03	5	2.152e-03	3
48		min	.007	6	-.047	6	.013	6	1.111e-03	3	8.805e-04	3	-2.949e-03	5
49	N26	max	.171	2	-.005	5	-.011	6	1.889e-03	4	3.461e-03	5	1.075e-03	4
50		min	.013	6	-.014	3	-.17	2	4.926e-04	2	3.486e-04	6	2.125e-04	3
51	N27	max	.184	2	-.028	2	.244	5	1.194e-02	4	9.725e-03	4	1.599e-03	6
52		min	.014	6	-.086	6	.033	6	3.533e-04	3	1.087e-03	3	-1.444e-03	5
53	N28	max	.184	2	-.015	2	0	3	2.363e-03	4	3.405e-03	2	1.138e-03	4
54		min	.014	6	-.024	4	-.033	5	4.32e-04	2	1.422e-04	6	3.315e-04	2
55	N30	max	.185	2	-.004	5	-.013	6	2.711e-03	4	2.566e-03	2	9.845e-04	4
56		min	.014	6	-.02	3	-.204	2	4.463e-04	2	1.202e-04	6	6.516e-05	2
57	N31	max	.432	1	-.029	2	1.117	5	-5.955e-05	3	1.063e-02	5	9.976e-03	1
58		min	.118	6	-.086	6	.056	3	-3.388e-02	5	9.823e-04	3	2.395e-03	6
59	N32	max	.203	1	-.015	2	0	5	3.848e-04	3	3.685e-03	1	3.273e-04	3
60		min	.05	6	-.024	6	-.036	1	-2.131e-03	5	6.485e-04	6	-3.543e-04	5
61	N34	max	.215	4	-.004	5	-.065	6	9.248e-04	3	2.745e-03	1	4.569e-04	4
62		min	.049	6	-.02	3	-.234	1	2.574e-05	5	4.673e-04	6	2.177e-04	3
63	N35	max	.284	2	-.028	2	.73	4	2.435e-02	4	9.725e-03	4	1.609e-03	6
64		min	-.024	6	-.086	6	.044	3	3.556e-04	3	1.087e-03	3	-5.618e-03	2
65	N36	max	.181	2	-.015	2	.008	6	2.382e-03	4	3.405e-03	2	1.138e-03	4
66		min	.008	6	-.024	4	-.026	2	4.32e-04	2	1.422e-04	6	3.124e-04	2
67	N38	max	.186	2	-.004	5	.004	6	3.698e-03	4	2.566e-03	2	9.846e-04	4
68		min	.01	6	-.02	3	-.199	2	4.463e-04	2	1.202e-04	6	-1.724e-04	2
69	N40	max	0	6	0	6	0	6	1.075e-03	6	2.522e-03	2	9.985e-04	4
70		min	0	1	0	1	0	1	6.422e-04	2	2.019e-04	6	4.179e-04	2
71	N41	max	.181	2	-.016	2	.014	2	-2.944e-04	2	7.246e-03	5	9.008e-04	4
72		min	.024	6	-.048	6	.002	6	-8.279e-04	4	9.676e-04	3	3.64e-04	2

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	...	...	phi*P...	phi*P...	phi*M...	phi*M.....		Eqn
1	M1	PIPE_2.0	.350	6.152	4	.165	5.511		4	20.41	32.13	1.872	1.872	...	H1-1b
2	M2	PIPE_2.0	.087	6.152	4	.048	0		6	20.41	32.13	1.872	1.872	...	H1-1b
3	M3	PIPE_2.0	.500	1.625	4	.523	1.625		4	6.831	32.13	1.872	1.872	...	H3-6

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	...	...	phi*P...	phi*P...	phi*M...	phi*M.....		Eqn
4	M4	PIPE_2.0	.244	6.152	5	.105	5.511		5	20.41	32.13	1.872	1.872	...	H1-1b
5	M5	PIPE_2.0	.100	6.152	5	.035	0		3	20.41	32.13	1.872	1.872	...	H1-1b
6	M6	PIPE_2.0	.360	1.625	5	.378	1.625		5	6.831	32.13	1.872	1.872	...	H3-6
7	M7	PIPE_2.0	.849	2.5	4	.080	6		5	14.916	32.13	1.872	1.872	...	H1-1b
8	M8	PIPE_2.0	.109	1.5	4	.017	5		4	20.867	32.13	1.872	1.872	...	H1-1b
9	M10	PIPE_2.0	.109	5	4	.031	1.5		4	20.867	32.13	1.872	1.872	...	H1-1b
10	M11	PIPE_1.0	.049	1.75	5	.013	0		4	8.87	14.774	.465	.465	1	H1-1b
11	M13	PIPE_2.0	.012	1.75	4	.011	0		4	27.741	32.13	1.872	1.872	1	H1-1b
12	M14	PIPE_1.0	.047	1.75	1	.012	0		4	8.87	14.774	.465	.465	...	H1-1b
13	M15	PIPE_1.0	.064	1.75	4	.011	0		4	8.87	14.774	.465	.465	1	H1-1b
14	M16	PIPE_2.0	.645	1.75	2	.078	1.75		4	27.741	32.13	1.872	1.872	...	H1-1b
15	M21	PIPE_3.0	.040	4.868	1	.004	9.735		1	39.26	65.205	5.749	5.749	...	H1-1b
16	M18	PIPE_1.0	.077	2.151	1	.014	4.301		1	6.837	14.774	.465	.465	...	H1-1b
17	M19	PIPE_1.0	.241	2.106	6	.027	4.301		5	6.837	14.774	.465	.465	...	H1-1a
18	M20	PIPE_1.0	.220	2.106	6	.030	0		5	6.837	14.774	.465	.465	...	H1-1a
19	M19A	PIPE_1.0	.045	1.75	1	.013	0		4	8.87	14.774	.465	.465	...	H1-1b
20	M20A	PIPE_1.0	.072	2.151	1	.016	4.301		1	6.837	14.774	.465	.465	...	H1-1b



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
THC	CTNL023C_AMA	June 10, 2019 at 2:11 PM
19027.72	Member Unity Check	CTNL023C_AMA.r3d

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: CTNL023C

CT023/Montville CookSt MP
57 Cook Street
Montville, Connecticut 06382

June 13, 2019

EBI Project Number: 62190002312

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**10.63%**

EBI Consulting

environmental | engineering | due diligence

June 13, 2019

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

Emissions Analysis for Site: CTNL023C - CT023/Montville CookSt MP

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **57 Cook Street** in **Montville, 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 57 Cook Street in Montville, 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 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

5) 2 LTE channels (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 1900 MHz / 1900 MHz / 600 MHz / 700 MHz channel(s), the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s) in Sector A, the RFS APXVAARR24_43-U-NA20 for the 1900 MHz / 1900 MHz / 600 MHz / 700 MHz channel(s), the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s) in Sector B, the RFS APXVAARR24_43-U-NA20 for the 1900 MHz / 1900 MHz / 600 MHz / 700 MHz channel(s), the RFS APX16DWV-16DWV-S-E-A20 for the 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 centerlines of the proposed antennas are 188 and 190 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:	1900 MHz / 1900 MHz / 600 MHz / 700 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 600 MHz / 700 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 600 MHz / 700 MHz
Gain:	15.65 dBd / 15.65 dBd / 12.95 dBd / 13.35 dBd	Gain:	15.65 dBd / 15.65 dBd / 12.95 dBd / 13.35 dBd	Gain:	15.65 dBd / 15.65 dBd / 12.95 dBd / 13.35 dBd
Height (AGL):	188 feet	Height (AGL):	188 feet	Height (AGL):	188 feet
Channel Count:	10	Channel Count:	10	Channel Count:	10
Total TX Power (W):	300 Watts	Total TX Power (W):	300 Watts	Total TX Power (W):	300 Watts
ERP (W):	9,092.17	ERP (W):	9,092.17	ERP (W):	9,092.17
Antenna A1 MPE %:	**1.26%**	Antenna B1 MPE %:	**1.26%**	Antenna C1 MPE %:	**1.26%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20
Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	190 feet	Height (AGL):	190 feet	Height (AGL):	190 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A3 MPE %:	**0.46%**	Antenna B3 MPE %:	**0.46%**	Antenna C3 MPE %:	**0.46%**

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	1.72%
AT&T	3.19%
Clearwire	0.47%
Nextel	0.46%
Verizon	2.32%
Sprint	2.47%
Site Total MPE % :	10.63%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	1.72%
T-Mobile Sector B Total:	1.72%
T-Mobile Sector C Total:	1.72%
Site Total MPE % :	10.63%

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 1900 MHz GSM	4	1101.85	188.0	4.48	1900 MHz GSM	1000	0.45%
T-Mobile 1900 MHz UMTS	2	1101.85	188.0	2.24	1900 MHz UMTS	1000	0.22%
T-Mobile 600 MHz LTE	2	591.73	188.0	1.20	600 MHz LTE	400	0.30%
T-Mobile 700 MHz LTE	2	648.82	188.0	1.32	700 MHz LTE	467	0.28%
T-Mobile 2100 MHz LTE	2	2334.27	190.0	4.65	2100 MHz LTE	1000	0.46%
						Total:	**1.72%**

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

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	1.72%
Sector B:	1.72%
Sector C:	1.72%
T-Mobile Maximum MPE % (Sector A):	1.72%
Site Total:	10.63%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **10.63%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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