



Crown Castle  
3 Corporate Park Drive, Suite 101  
Clifton Park, NY 12065

March 18, 2021

Melanie A. Bachman  
Executive Director  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051

RE: **Notice of Exempt Modification for T-Mobile: 876338**  
**41 Manitock Hill Road, Waterford, CT 06385**  
**Latitude: 41° 21' 16.70" / Longitude: -72° 09' 1.60"**

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 117-foot mount level on the existing 136-foot self-support tower, located at 41 Manitock Hill Road, Waterford, CT. The property is owned by The City of New London. The tower is owned by Crown Castle. T-Mobile now intends to add three (3) new antennas and ancillary equipment at the 117-ft level. T-Mobile to also to replace the antenna mount at the same level. This modification/proposal includes hardware that is both 4G (LTE) and 5G capable through remote software configuration and either or both services may be turned on or off at various times.

Panned Modification:  
Tower:

Installed New:

- (3) RFS/Celwave – APXVAARR24\_43-U-NA20
- (3) Ericsson-Radio 4449 B12/B71
- (3) HYBRID 6x12 HCS fiber
- (1) Sitepro1 Antenna Mount

Remove:

- (6) 1 5/8" Coaxial Cables
- (1) Existing antenna mount

Ground:

Install New:

- (2) BB 6630

Remove:

- (1) DUS41

Melanie A. Bachman

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The facility was approved by the Town of Waterford Planning & Zoning on September 29, 1997 via grant of Special Permit#97-112/304.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Mr. Rob Brule, First Selectman, Town of Waterford, Ms. Abby Piersall, Planning Director, Town of Waterford and the property owner, City of New London, CT. Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification 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 Communication 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-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Sincerely,



Jeffrey Barbadora  
Site Acquisition Specialist  
1800 W. Park Drive  
Westborough, MA 01581  
(781) 970-0053  
Jeff.Barbadora@crowncastle.com

Attachments

cc:

First Selectman, Mr. Rob Brule, 15 Rope Ferry Road, Waterford, CT 06438 (860)-444-5834 (*via email to [firstsel@waterfordct.org](mailto:firstsel@waterfordct.org)*).

Town Planner, Ms Abby Piersall, 15 Rope Ferry Road, Waterford, CT 06438 (860)-444-5813 (*via email to [permits@waterfordct.org](mailto:permits@waterfordct.org)*).

Property Owner, City of New London, 181 State Street, Treasurer's Office, New London, CT 06320 (*via email to [drinehart@ci.new-london.ct.us](mailto:drinehart@ci.new-london.ct.us)*).

Crown Castle, Tower Owner.

## **Barbadora, Jeff**

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**From:** Barbadora, Jeff  
**Sent:** Thursday, March 18, 2021 2:51 PM  
**To:** firstsel@waterfordct.org  
**Subject:** Connecticut Siting Council 41 Manitock Hill Road  
**Attachments:** 41 Manitock Hill Road, Waterford, CT\_T-Mobile\_Notice\_of\_Exempt\_Modification.pdf

Good Afternoon Mr. Brule,

Attached please find T-Mobile's exempt modification filing package for 41 Manitock Hill Road, Waterford, CT. The filing is being sent to the Council today.

Please let me know if you have any question.

Thanks,

**Jeffrey Barbadora**  
Site Acquisition Specialist  
781-970-0053

**Crown Castle**  
1800 W. Park Drive  
Westborough, MA 01581

## **Barbadora, Jeff**

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**From:** Barbadora, Jeff  
**Sent:** Thursday, March 18, 2021 2:51 PM  
**To:** permits@waterfordct.org  
**Subject:** Connecticut Siting Council 41 Manitock Hill Road  
**Attachments:** 41 Manitock Hill Road, Waterford, CT\_T-Mobile\_Notice\_of\_Exempt\_Modification.pdf

Good Afternoon Ms. Piersall,

Attached please find T-Mobile's exempt modification filing package for 41 Manitock Hill Road, Waterford, CT. The filing is being sent to the Council today.

Please let me know if you have any question.

Thanks,

**Jeffrey Barbadora**  
Site Acquisition Specialist  
781-970-0053

**Crown Castle**  
1800 W. Park Drive  
Westborough, MA 01581



## **Barbadora, Jeff**

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**From:** Barbadora, Jeff  
**Sent:** Thursday, March 18, 2021 2:51 PM  
**To:** drinehart@ci.new-london.ct.us  
**Subject:** Connecticut Siting Council 41 Manitock Hill Road  
**Attachments:** 41 Manitock Hill Road, Waterford, CT\_T-Mobile\_Notice\_of\_Exempt\_Modification.pdf

Good Afternoon Treasurer's Office,

Attached please find T-Mobile's exempt modification filing package for 41 Manitock Hill Road, Waterford, CT. The filing is being sent to the Council today.

Please let me know if you have any question.

Thanks,

**Jeffrey Barbadora**  
Site Acquisition Specialist  
781-970-0053

**Crown Castle**  
1800 W. Park Drive  
Westborough, MA 01581

NOTICE OF GRANT OF A SPECIAL PERMIT

This is to certify that on September 29, 1997 the Waterford Planning & Zoning Commission granted Special Permit #97-112/304.

Owner of Record: City of New London

Address: 41 Manitock Hill Road

Description of Premises:

As recorded in Volume 173, Page 256 of the Waterford Land Records.

Nature of Special Permit: Special Permit granted for the construction of a 140 foot lattice design communications tower by Sprint. Co-location for additional carriers is provided for on this tower.

Applicable Zoning Regulations: Section 3.6, 5.2.1, 5.2.3 and 23.

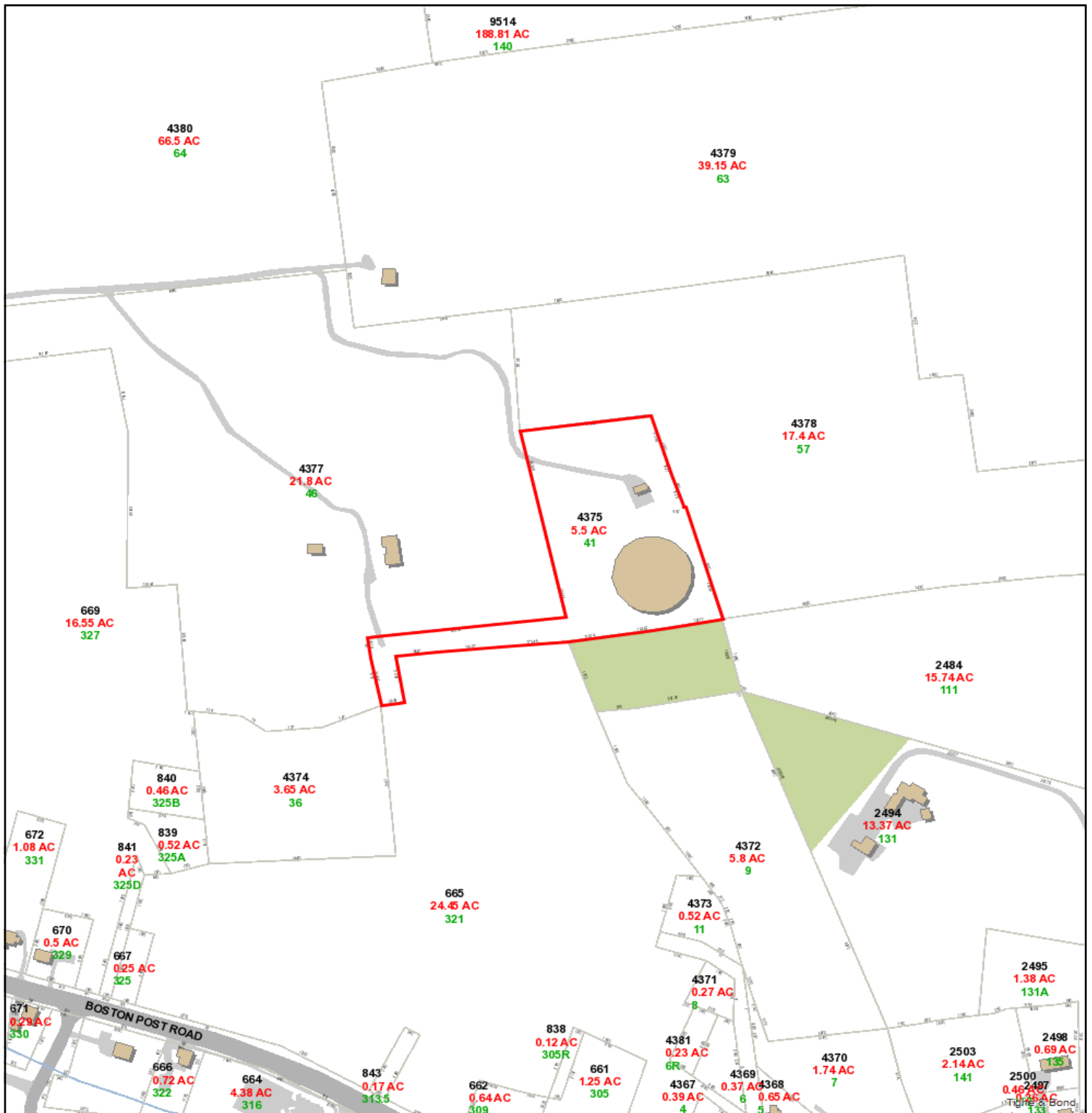
Permit findings, stipulations and conditions are filed in the office of the Town Clerk as stated in the minutes of the Planning & Zoning Commission meeting of September 29, 1997.

PLANNING & ZONING COMMISSION

By: Pam Hagerman  
Pamela Hagerman  
Recording Secretary  
Planning & Zoning Commission

This notice is to be recorded on the land records of the Town of Waterford, indexed in the Grantor's Index under the name of the record owner.

RECEIVED FOR RECORD March 16 . 1999  
4:02 P M. ATTEST [Signature]  
TOWN CLERK



# 41 MANITOCK HILL

3/16/2021 3:40:44

1"=333'

## Property Information

AV PID	undefined
Street Address	undefined
Total Appraised Parcel	undefined



The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

# 41 MANITOCK HILL ROAD

**Location** 41 MANITOCK HILL ROAD

**Mblu** 117 / / 4375 / /

**Acct#** 00395700

**Owner** NEW LONDON CITY OF

**Assessment** \$9,180

**Appraisal** \$13,110

**PID** 4375

**Building Count** 1

## Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2017	\$2,250	\$10,860	\$13,110

Assessment			
Valuation Year	Improvements	Land	Total
2017	\$1,580	\$7,600	\$9,180

## Parcel Addresses

Additional Addresses
No Additional Addresses available for this parcel

## Owner of Record

**Owner** NEW LONDON CITY OF  
**Co-Owner** WATER DEPT

**Sale Price** \$0  
**Certificate**  
**Book & Page** 0173/0256  
**Sale Date** 06/11/1968  
**Instrument** 00

## Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
NEW LONDON CITY OF	\$0		0173/0256	00	06/11/1968

## Building Information

**Building 1 : Section 1**

**Year Built:**

**Living Area:** 0

**Replacement Cost:** \$0

**Building Percent Good:**

Building Attributes	
Field	Description
Style	Outbuildings
Model	
Grade:	
Stories	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Percent	
Total Bedrooms:	
Full Bthrms:	
Half Baths:	
Extra Fixtures	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Num Kitchens	
Fireplace(s)	
Extra Opening(s)	
Gas Fireplace(s)	
% Attic Fin	
LF Dormer	
Foundation	
Bsmt Gar(s)	
Bsmt %	
SF FBM	
SF Rec Rm	

**Building Photo**



(<http://images.vgsi.com/photos/WaterfordCTPhotos//default.jpg>)

**Building Layout**

Building Layout

([http://images.vgsi.com/photos/WaterfordCTPhotos//Sketches/4375\\_4375.j](http://images.vgsi.com/photos/WaterfordCTPhotos//Sketches/4375_4375.j))

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

Fin Bsmt Qual	
Bsmt Access	
Usrflid 300	
Usrflid 301	

### Extra Features

Extra Features	<u>Legend</u>
No Data for Extra Features	

### Land

#### Land Use

**Use Code** 109  
**Description** Vacant W/ OB  
**Zone** R-40  
**Neighborhood** 600  
**Alt Land Appr** No  
**Category**

#### Land Line Valuation

**Size (Acres)** 5.5  
**Frontage** 0  
**Depth** 0  
**Assessed Value** \$7,600  
**Appraised Value** \$10,860

### Outbuildings

Outbuildings						<u>Legend</u>
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
SHD1	Shed	FR	Frame	200.00 S.F.	\$2,250	1

### Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2020	\$2,250	\$10,860	\$13,110
4000	\$2,250	\$10,860	\$13,110

Assessment			
Valuation Year	Improvements	Land	Total
2020	\$1,580	\$7,600	\$9,180
4000	\$1,580	\$7,600	\$9,180



Date: **February 24, 2021**

Denice Nicholson  
Crown Castle  
3 Corporate Dr  
Clifton Park, NY 12065



Crown Castle  
2000 Corporate Dr.  
Canonsburg, PA  
(724) 416-2000

**Subject:** **Structural Analysis Report**

**Carrier Designation:** **T-Mobile Co-Locate**  
**Carrier Site Number:** CT11381C  
**Carrier Site Name:** WATERFORD SOUTH/RT 1

**Crown Castle Designation:** **Crown Castle BU Number:** 876338  
**Crown Castle Site Name:** WATERFORD  
**Crown Castle JDE Job Number:** 559325  
**Crown Castle Work Order Number:** 1902370  
**Crown Castle Order Number:** 479831 Rev. 2

**Engineering Firm Designation:** **Crown Castle Project Number:** 1902370

**Site Data:** **41 Manitock Hill Road, Waterford, New London County, CT**  
**Latitude 41° 21' 16.7", Longitude -72° 9' 1.6"**  
**136 Foot - Self Support Tower**

Dear Denice Nicholson,

Crown Castle is pleased to submit this “**Structural Analysis Report**” to determine the structural integrity of the above-mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration

**Sufficient Capacity (71.5%)**

This analysis utilizes an ultimate 3-second gust wind speed of 135 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Alexander Greguric, E.I.T.

Respectfully submitted by:

A handwritten signature in blue ink that reads 'Maribel Dentinger'.

Maribel Dentinger, P.E.  
Senior Project Engineer

Maribel  
Dentinger

Digitally signed by  
Maribel Dentinger  
Date: 2021.03.02  
08:25:57 -05'00'



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## 1) INTRODUCTION

This tower is a 136 ft Self Support tower designed by PIROD MANUFACTURES INC. The tower has been modified per reinforcement drawings prepared by Vertical Structures, Inc. in January 2009. Reinforcement consists of secondary horizontal members between the elevations 90' and 95' and 1-1/4" tie-rod assemblies for tower legs from 80' to 90'.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	135 mph
<b>Exposure Category:</b>	B
<b>Topographic Factor:</b>	1
<b>Ice Thickness:</b>	1.5 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	60 mph

**Table 1 - Proposed Equipment Configuration**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
117.0	119.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	9	1-5/8
		3	ericsson	ERICSSON AIR 21 B2P B4A w/ Mount Pipe		
		3	ericsson	KRY 112 144/1		
		3	ericsson	RADIO 4449 B12/B71		
	3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe			
	117.0	1	tower mounts	SitePro1 VFA12-HD		

**Table 2 - Other Considered Equipment**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
136.0	137.0	3	alcatel lucent	TD-RRH8x20-25	4	1-1/4
		3	rfs celwave_cfd	APXVSPP18-C-A20 w/ Mount Pipe		
		3	rfs celwave_cfd	APXVTM14-C-120 w/ Mount Pipe		
	136.0	3	rfs celwave	IBC1900BB-1		
		3	rfs celwave	IBC1900HG-2A		
		1	tower mounts	Platform Mount [LP 405-1]		
134.0	134.0	3	alcatel lucent	1900MHz RRH (65MHz)	-	-
		1	tower mounts	Side Arm Mount [SO 104-3]		
	133.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER		
127.0	127.0	12	decibel	DB844H90E-XY w/ Mount Pipe	12	1-1/4
		1	tower mounts	Pipe Mount [PM 601-3]		
		1	tower mounts	Sector Mount [SM 411-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
107.0	107.0	3	alcatel lucent	B66A RRH4X45	14	1-5/8
		3	alcatel lucent	RRH2X60-PCS		
		3	alcatel lucent	RRH2x60-700		
		3	antel	BXA-70063-6CF-2 w/ Mount Pipe		
		3	antel	BXA-80063/4CF		
		2	commscope	RC2DC-3315-PF-48		
		6	commscope	SBNHH-1D65B w/ Mount Pipe		
		6	rfs celwave	FD9R6004/2C-3L		
		1	tower mounts	Sector Mount [SM 403-3]		
97.0	97.0	1	cci antennas	DMP65R-BU4D w/ Mount Pipe	6	3/8 5/8 7/8 1-1/4
		1	cci antennas	DMP65R-BU6D w/ Mount Pipe		
		1	cci antennas	DMP65R-BU8D w/ Mount Pipe		
		1	cci antennas	OPA65R-BU4D w/ Mount Pipe		
		1	cci antennas	OPA65R-BU6D w/ Mount Pipe		
		1	cci antennas	OPA65R-BU8B w/ Mount Pipe		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14_CCIV2		
		3	ericsson	RRUS 8843 B2/B66A_CCIV2		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		1	raycap	DC6-48-60-18-8F		
		1	raycap	DC9-48-60-24-8C-EV		
		1	tower mounts	Sector Mount [SM 504-3]		
87.0	89.0	3	kathrein	800 10504 w/ Mount Pipe	6	7/8
		3	kathrein	860 10118		
	87.0	1	tower mounts	Sector Mount [SM 104-3]		
80.0	81.0	1	gps	GPS_A	1	1/2
	80.0	1	tower mounts	Side Arm Mount [SO 701-1]		
72.0	72.0	2	gps	GPS_A	2	1/2
		2	tower mounts	Side Arm Mount [SO 701-1]		

**3) ANALYSIS PROCEDURE**

**Table 3 - Documents Provided**

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	SEA	2035622	CCISITES
4-POST-MODIFICATION INSPECTION	VSI	2376132	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Pirod	2068030	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod	1441523	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	VSI	2125417	CCISITES

### 3.1) Analysis Method

tnxTower (version 8.0.7.5), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

### 3.2) Assumptions

- 1) Tower and structures were maintained in accordance with the TIA-222 Standard.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

## 4) ANALYSIS RESULTS

**Table 4 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	136 - 132.813	Leg	1 1/2	2	-2.96	46.31	6.4	Pass
T2	132.813 - 130	Leg	1 1/2	14	-5.12	48.62	10.5	Pass
T3	130 - 110	Leg	2	29	-38.85	116.92	33.2	Pass
T4	110 - 94.9434	Leg	2 1/4	87	-82.74	156.33	52.9	Pass
T5	94.9434 - 92.5938	Leg	2 1/4	129	-91.37	179.34	51.0	Pass
T6	92.5938 - 90	Leg	2 1/4	141	-104.14	185.75	56.1	Pass
T7	90 - 80	Leg	PiRod 105244 w/ (2) 1-1/4" Tie Rod	156	-112.15	249.48	45.0	Pass
T8	80 - 60	Leg	PiRod 105217	163	-155.98	225.60	69.1	Pass
T9	60 - 40	Leg	PiRod 105218	178	-192.94	315.72	61.1	Pass
T10	40 - 20	Leg	PiRod 105218	193	-225.43	315.72	71.4	Pass
T11	20 - 0	Leg	PiRod 105219	208	-255.41	419.86	60.8	Pass
T1	136 - 132.813	Diagonal	7/8	9	-1.60	9.18	17.5	Pass
T2	132.813 - 130	Diagonal	3/4	24	-1.43	5.80	24.7	Pass
T3	130 - 110	Diagonal	7/8	39	-3.93	9.72	40.4	Pass
T4	110 - 94.9434	Diagonal	1	96	-5.69	14.70	38.7	Pass
T5	94.9434 - 92.5938	Diagonal	1	135	-6.06	14.41	42.0	Pass
T6	92.5938 - 90	Diagonal	1	150	-7.07	14.87	47.6	Pass
T7	90 - 80	Diagonal	L3x3x3/16	161	-7.83	25.34	30.9 67.8 (b)	Pass
T8	80 - 60	Diagonal	L2 1/2x2 1/2x3/16	171	-6.63	14.57	45.5 62.1 (b)	Pass
T9	60 - 40	Diagonal	L3x3x3/16	181	-6.21	20.18	30.8 51.2 (b)	Pass
T10	40 - 20	Diagonal	L3x3x3/16	196	-6.48	16.11	40.2 49.8 (b)	Pass
T11	20 - 0	Diagonal	L3x3x5/16	211	-8.71	20.97	41.6	Pass
T5	94.9434 - 92.5938	Secondary Horizontal	1 1/2	137	-1.58	36.90	4.3	Pass
T6	92.5938 - 90	Secondary Horizontal	1 1/2	153	-1.72	36.21	4.8	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail	
T1	136 - 132.813	Top Girt	6x3/8	5	-1.08	5.14	21.1	Pass	
T2	132.813 - 130	Top Girt	7/8	16	0.21	28.41	0.7	Pass	
T3	130 - 110	Top Girt	7/8	32	-0.56	6.51	8.6	Pass	
T4	110 - 94.9434	Top Girt	1	88	-1.36	8.78	15.5	Pass	
T2	132.813 - 130	Bottom Girt	7/8	20	-0.51	6.44	7.9	Pass	
T3	130 - 110	Bottom Girt	7/8	34	-1.73	5.16	33.5	Pass	
T6	92.5938 - 90	Bottom Girt	1	142	-0.79	7.17	11.0	Pass	
							Summary		
							Leg (T10)	71.4	Pass
							Diagonal (T7)	67.8	Pass
							Secondary Horizontal (T6)	4.8	Pass
							Top Girt (T1)	21.1	Pass
							Bottom Girt (T3)	33.5	Pass
							Bolt Checks	67.8	Pass
							Rating =	71.4	Pass

**Table 5 - Tower Component Stresses vs. Capacity - LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	18.1	Pass
1	Base Foundation (Structure)	0	21.0	Pass
1	Base Foundation (Soil Interaction)	0	71.5	Pass

<b>Structure Rating (max from all components) =</b>	<b>71.5%</b>
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Notes:  
 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

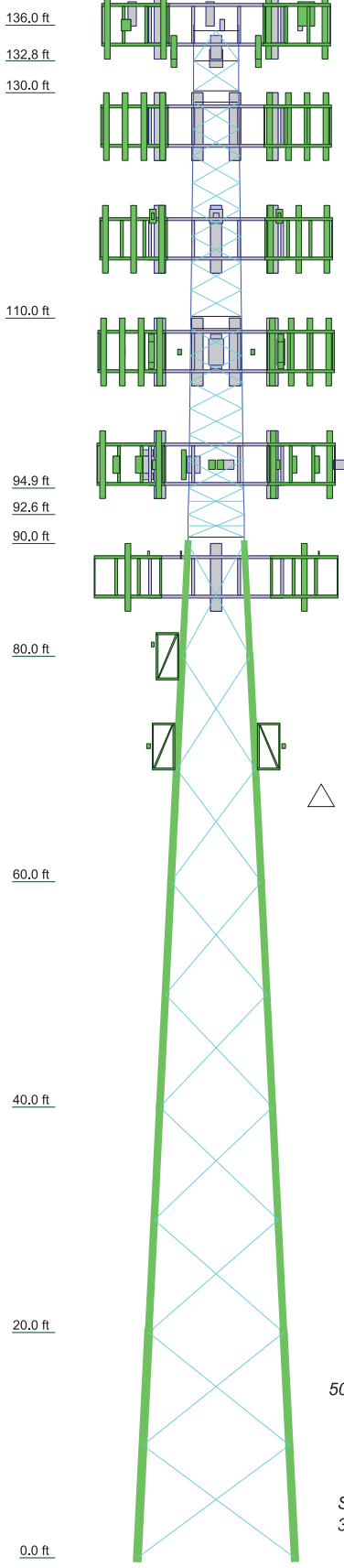
**4.1) Recommendations**

The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.



**APPENDIX A**  
**TNXTOWER OUTPUT**

Section	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	PiRod 105219	PiRod 105218	PiRod 105217	A	SR 2 1/4	SR 2	SR 1 1/2	SR 1 1/4	SR 2	SR 1 1/2	SR 1 1/2
Leg Grade	L3x3x5/16	L3x3x3/16	L3x3x3/16	L2 1/2x2 1/2x3/16	A572-50	A572-50	A572-50	SR 1	SR 7/8	C	B
Diagonals	L3x3x5/16	L3x3x3/16	L3x3x3/16	L2 1/2x2 1/2x3/16	A572-50	A572-50	A572-50	SR 1	SR 7/8	C	B
Diagonal Grade	A36	A36	A36	A36	A572-50	A572-50	A572-50	SR 1	SR 7/8	C	B
Top Girts	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	SR 1	SR 7/8	6x3/8	6x3/8
Bottom Girts	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	SR 7/8	SR 7/8	N.A.
Sec. Horizontals	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Face Width (ft)	14	10	8	6	6	6	6	4.5	4.5	4.5	4
# Panels @ (ft)	4.5	2.9	2.8	2.3	1.4	0.3	0.3	1.2	1.2	1.2	0.1
Weight (K)	17.1	2.9	2.8	2.3	1.4	0.3	0.3	1.2	1.2	1.2	0.2



**SYMBOL LIST**

MARK	SIZE	MARK	SIZE
A	PiRod 105244 w/ (2) 1-1/4" Tie Rod	D	SR 1
B	SR 7/8	E	1 @ 2.01042
C	SR 3/4		

**MATERIAL STRENGTH**

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

**TOWER DESIGN NOTES**

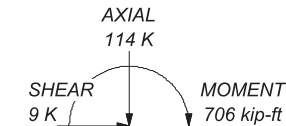
1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 135 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 71.4%

ALL REACTIONS  
ARE FACTORED

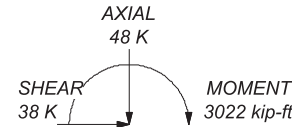
MAX. CORNER REACTIONS AT BASE:

DOWN: 265 K  
SHEAR: 26 K

UPLIFT: -235 K  
SHEAR: 23 K



TORQUE 2 kip-ft  
50 mph WIND - 1.500 in ICE



TORQUE 11 kip-ft  
REACTIONS - 135 mph WIND

 <b>CROWN CASTLE</b> Tha Pathway to Possible	<b>Crown Castle</b> 2000 Corporate Dr. Canonsburg, PA Phone: (724) 416-2000 FAX:		Job: <b>BU 876338</b>	
	Project:		Client: Crown Castle	Drawn by: AGreguric
	Code: TIA-222-H		Date: 11/29/20	App'd:
	Path:		Scale: NTS	Dwg No. E-1

## Tower Input Data

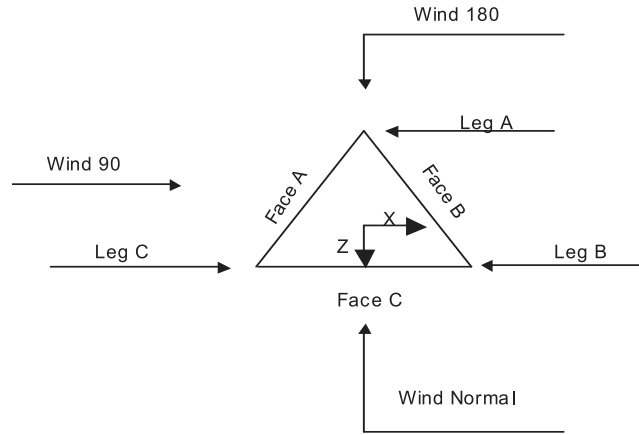
The main tower is a 3x free standing tower with an overall height of 136.00 ft above the ground line.  
 The base of the tower is set at an elevation of 0.00 ft above the ground line.  
 The face width of the tower is 4.000 ft at the top and 14.000 ft at the base.  
 This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- 3) Tower is located in New London County, Connecticut.
- 4) Tower base elevation above sea level: 242.00 ft.
- 5) Basic wind speed of 135 mph.
- 6) Risk Category II.
- 7) Exposure Category B.
- 8) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- 9) Topographic Category: 1.
- 10) Crest Height: 0.00 ft.
- 11) Nominal ice thickness of 1.500 in.
- 12) Ice thickness is considered to increase with height.
- 13) Ice density of 56 pcf.
- 14) A wind speed of 50 mph is used in combination with ice.
- 15) Temperature drop of 50 °F.
- 16) Deflections calculated using a wind speed of 60 mph.
- 17) Pressures are calculated at each section.
- 18) Tower analysis based on target reliabilities in accordance with Annex S.
- 19) Load Modification Factors used:  $K_{es}(F_w) = 0.95$ ,  $K_{es}(t_i) = 0.85$ .
- 20) Stress ratio used in tower member design is 1.05.
- 21) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <br/> <li>√ Include Bolts In Member Capacity</li> <br/> <li>Leg Bolts Are At Top Of Section</li> <li>√ Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>√ SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>√ Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <br/> <li>Autocalc Torque Arm Areas</li> <br/> <li>Add IBC .6D+W Combination</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> <li>Ignore KL/ry For 60 Deg. Angle Legs</li> </ul> | <ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>√ Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>√ SR Leg Bolts Resist Compression</li> <li>All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feed Line Torque</li> <li>√ Include Angle Block Shear Check</li> <li>Use TIA-222-H Bracing Resist.</li> <li>Exemption</li> <li>Use TIA-222-H Tension Splice</li> <li>Exemption</li> <br/> <li style="text-align: center;"><b>Poles</b></li> <li>Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> <li>Pole Without Linear Attachments</li> <li>Pole With Shroud Or No</li> <li>Appurtenances</li> <li>Outside and Inside Corner Radii Are</li> <li>Known</li> </ul> |
|--|---|--|



**Triangular Tower**

**Tower Section Geometry**

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	136.00-132.81			4.000	1	3.19
T2	132.81-130.00			4.000	1	2.81
T3	130.00-110.00			4.000	1	20.00
T4	110.00-94.94			4.500	1	15.06
T5	94.94-92.59			4.876	1	2.35
T6	92.59-90.00			4.935	1	2.59
T7	90.00-80.00			5.000	1	10.00
T8	80.00-60.00			6.000	1	20.00
T9	60.00-40.00			8.000	1	20.00
T10	40.00-20.00			10.000	1	20.00
T11	20.00-0.00			12.000	1	20.00

**Tower Section Geometry (cont'd)**

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	136.00-132.81	2.688	K Brace Down	No	Yes	6.000	0.000
T2	132.81-130.00	2.688	X Brace	No	No	0.000	1.500
T3	130.00-110.00	2.380	X Brace	No	No	10.000	1.500
T4	110.00-94.94	2.350	X Brace	No	No	11.500	0.000
T5	94.94-92.59	2.350	X Brace	No	Yes	0.000	0.000
T6	92.59-90.00	2.010	X Brace	No	Yes	0.000	7.000
T7	90.00-80.00	10.000	X Brace	No	No	0.000	0.000
T8	80.00-60.00	10.000	X Brace	No	No	0.000	0.000
T9	60.00-40.00	10.000	X Brace	No	No	0.000	0.000
T10	40.00-20.00	10.000	X Brace	No	No	0.000	0.000
T11	20.00-0.00	10.000	X Brace	No	No	0.000	0.000

**Tower Section Geometry (cont'd)**

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 136.00-132.81	Solid Round	1 1/2	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 132.81-130.00	Solid Round	1 1/2	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 130.00-110.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T4 110.00-94.94	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T5 94.94-92.59	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T6 92.59-90.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T7 90.00-80.00	Truss Leg	PiRod 105244 w/ (2) 1-1/4" Tie Rod	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T8 80.00-60.00	Truss Leg	PiRod 105217	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T9 60.00-40.00	Truss Leg	PiRod 105218	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T10 40.00-20.00	Truss Leg	PiRod 105218	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T11 20.00-0.00	Truss Leg	PiRod 105219	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)

**Tower Section Geometry (cont'd)**

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 136.00-132.81	Flat Bar	6x3/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T2 132.81-130.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T3 130.00-110.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T4 110.00-94.94	Solid Round	1	A572-50 (50 ksi)	Solid Round		A572-50 (50 ksi)
T6 92.59-90.00	Solid Round		A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)

**Tower Section Geometry (cont'd)**

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 136.00-132.81	None	Flat Bar		A36 (36 ksi)	Flat Bar	3 x 3/8	A36 (36 ksi)

**Tower Section Geometry (cont'd)**

Tower Elevation	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
ft						
T5 94.94-92.59	Solid Round	1 1/2	A572-50 (50 ksi)	Solid Round		A572-50 (50 ksi)
T6 92.59-90.00	Solid Round	1 1/2	A572-50 (50 ksi)	Solid Round		A572-50 (50 ksi)

### Tower Section Geometry (cont'd)

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor $A_r$	Adjust. Factor $A_r$	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontal	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
T1 136.00-132.81	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000	36.000
T2 132.81-130.00	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000	36.000
T3 130.00-110.00	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000	36.000
T4 110.00-94.94	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000	36.000
T5 94.94-92.59	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000	36.000
T6 92.59-90.00	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000	36.000
T7 90.00-80.00	0.00	0.500	A36 (36 ksi)	1.03	1	1.05	36.000	36.000	36.000
T8 80.00-60.00	0.00	0.500	A36 (36 ksi)	1.03	1	1.05	36.000	36.000	36.000
T9 60.00-40.00	0.00	0.500	A36 (36 ksi)	1.03	1	1.05	36.000	36.000	36.000
T10 40.00-20.00	0.00	0.500	A36 (36 ksi)	1.03	1	1.05	36.000	36.000	36.000
T11 20.00-0.00	0.00	0.500	A36 (36 ksi)	1.03	1	1.05	36.000	36.000	36.000

### Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors <sup>1</sup>						
				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
ft										
T1 136.00-132.81	No	Yes	1	1	1	1	1	1	1	1
T2 132.81-130.00	Yes	Yes	1	1	1	1	1	1	1	1
T3 130.00-110.00	Yes	Yes	1	1	1	1	1	1	1	1
T4 110.00-94.94	Yes	Yes	1	1	1	1	1	1	1	1
T5 94.94-92.59	Yes	Yes	1	1	1	1	1	1	1	1
T6 92.59-90.00	Yes	Yes	1	1	1	1	1	0.5	1	1
T7 90.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1
T8 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1
T9 60.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1



Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors <sup>1</sup>								
			Legs	X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace	
				X Y	X Y						X Y
40.00				1	1	1	1	1	1	1	1
T10 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T11 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1

<sup>1</sup>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	Truss-Leg K Factors					
	Truss-Legs Used As Leg Members			Truss-Legs Used As Inner Members		
	Leg Panels	X Brace Diagonals	Z Brace Diagonals	Leg Panels	X Brace Diagonals	Z Brace Diagonals
T7 90.00-80.00	1.289	0.5	0.85	1	1	1
T8 80.00-60.00	1	0.5	0.85	1	1	1
T9 60.00-40.00	1	0.5	0.85	1	1	1
T10 40.00-20.00	1	0.5	0.85	1	1	1
T11 20.00-0.00	1	0.5	0.85	1	0.5	0.85

### 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 136.00-132.81	0.000	1	0.000	1	0.000	1	0.000	1	0.000	0.75	0.000	1	0.000	1
T2 132.81-130.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	0.75	0.000	1	0.000	1
T3 130.00-110.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T4 110.00-94.94	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T5 94.94-92.59	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T6 92.59-90.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T7 90.00-80.00	0.000	1	0.000	0.75	0.000	0.75	0.000	1	0.000	1	0.000	1	0.000	1
T8 80.00-60.00	0.000	1	0.000	0.75	0.000	0.75	0.000	1	0.000	1	0.000	1	0.000	1
T9 60.00-40.00	0.000	1	0.000	0.75	0.000	0.75	0.000	1	0.000	1	0.000	1	0.000	1
T10 40.00-20.00	0.000	1	0.000	0.75	0.000	0.75	0.000	1	0.000	1	0.000	1	0.000	1
T11 20.00-0.00	0.000	1	0.000	0.75	0.000	0.75	0.000	1	0.000	1	0.000	1	0.000	1

### 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 136.00-132.81	Flange	0.625 A325N	0	1.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T2 132.81-130.00	Sleeve DS	0.625 A325N	5	1.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T3 130.00-110.00	Sleeve DS	0.750 A325N	5	1.000 A325N	0	0.500 A325N	0	0.000 A325N	0	0.500 A325N	0	0.500 A325N	0	0.500 A325N	0
T4 110.00-94.94	Flange	0.750 A325N	0	1.000 A325N	0	0.500 A325N	0	0.000 A325N	0	0.500 A325N	0	0.500 A325N	0	0.500 A325N	0
T5 94.94-92.59	Flange	1.000 A325N	0	1.000 A325N	0	0.500 A325N	0	0.000 A325N	0	0.500 A325N	0	0.500 A325N	0	0.500 A325N	0
T6 92.59-90.00	Flange	1.000 A325N	6	1.000 A325N	0	0.500 A325N	0	0.000 A325N	0	0.500 A325N	0	0.500 A325N	0	0.500 A325N	0
T7 90.00-80.00	Flange	1.000 A325N	0	1.000 A325N	1	0.500 A325N	0	0.000 A325N	0	0.500 A325N	0	0.500 A325N	0	0.500 A325N	0
T8 80.00-60.00	Flange	1.000 A325N	6	1.000 A325N	1	0.500 A325N	0	0.000 A325N	0	0.500 A325N	0	0.500 A325N	0	0.500 A325N	0
T9 60.00-40.00	Flange	1.000 A325N	6	1.000 A325N	1	0.500 A325N	0	0.000 A325N	0	0.500 A325N	0	0.500 A325N	0	0.500 A325N	0
T10 40.00-20.00	Flange	1.000 A325N	6	1.000 A325N	1	0.500 A325N	0	0.000 A325N	0	0.500 A325N	0	0.500 A325N	0	0.500 A325N	0
T11 20.00-0.00	Flange	1.250 A-687	0	1.250 A325N	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Shield Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	# Rows	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
<b>**Inside B leg**</b>													
WR-VG82ST-BRDA( 5/8")	B	No	No	Ar (CaAa)	97.00 - 0.00	-9.000	0.35	2	1	0.500	0.645		0.307
FB-L98-002-XXX( 3/8)	B	No	No	Ar (CaAa)	97.00 - 0.00	-10.000	0.35	1	1	0.394	0.394		0.065
LDF6-50A(1-1/4)	B	No	No	Ar (CaAa)	97.00 - 0.00	-9.000	0.4	6	6	0.500	1.550		0.600
HB114-21U3M12-XXXF(1-1/4)	C	No	No	Ar (CaAa)	97.00 - 0.00	-5.000	-0.4	6	6	0.500	1.540		1.220
((4) 1-1/4 + (2) 7/8)													
HB114-21U3M12-XXXF(1-1/4)	C	No	No	Ar (CaAa)	136.00 - 97.00	-5.000	-0.4	4	4	0.500	1.540		1.220
FB-L98-002-XXX( 3/8)	C	No	No	Ar (CaAa)	97.00 - 0.00	-6.000	-0.37	1	1	0.394	0.394		0.065
FLC 12-50J(1/2")	C	No	No	Ar (CaAa)	80.00 - 0.00	-5.000	-0.47	1	1	0.500	0.640		0.170
LDF7-50A(1-5/8")	B	No	No	Ar (CaAa)	107.00 - 0.00	-4.000	0.37	14	7	0.500	1.980		0.820
T-Brackets	B	No	No	Af (CaAa)	136.00 - 0.00	-7.000	0.4	1	1	1.000	1.000		8.400
<b>**Inside A leg**</b>													

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
LDF6-50A(1-1/4)	B	No	No	Ar (CaAa)	127.00 - 0.00	-5.000	-0.4	6	6	0.500	1.550		0.600
LDF6-50A(1-1/4)	A	No	No	Ar (CaAa)	127.00 - 0.00	-5.000	0.4	6	6	0.500	1.550		0.600
LDF4-50A(1/2")	A	No	No	Ar (CaAa)	72.00 - 0.00	-9.000	0.4	2	2	0.500	0.630		0.150
T-Brackets	A	No	No	Af (CaAa)	127.00 - 0.00	-7.000	0.4	1	1	1.000	1.000		8.400
**Inside C leg**													
LDF7-50A(1-5/8")	C	No	No	Ar (CaAa)	117.00 - 0.00	-5.000	0.4	7	7	0.500	1.980		0.820
LDF7-50A(1-5/8")	A	No	No	Ar (CaAa)	117.00 - 0.00	-5.000	-0.4	2	2	0.500	1.980		0.820
LDF7-50A(1-5/8")	A	No	No	Ar (CaAa)	117.00 - 0.00	-3.000	-0.45	1	1	0.500	1.980		0.820
T-Brackets	C	No	No	Af (CaAa)	117.00 - 0.00	-5.000	0.4	1	1	1.000	1.000		8.400
**A face**													
FXL 780 PE(7/8)	A	No	No	Ar (CaAa)	87.00 - 0.00	0.000	0	6	6	1.000	1.090		0.250
Feed Line Ladder	A	No	No	Af (CaAa)	87.00 - 0.00	0.000	0	1	1	3.000	3.000		4.000
**Safety**													
Safety Line 3/8	C	No	No	Ar (CaAa)	90.00 - 0.00	0.000	0.48	1	1	0.375	0.375		0.220
Safety Line 3/8	C	No	No	Ar (CaAa)	136.00 - 90.00	0.000	0	1	1	0.375	0.375		0.220
Ladder Rung SR 3/4 (48"w 26"s)	C	No	No	Af (CaAa)	136.00 - 90.00	0.000	0	1	1	1.350	1.350		2.706

**Feed Line/Linear Appurtenances - Entered As Area**

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	CAAA ft <sup>2</sup> /ft	Weight plf
***								

**Feed Line/Linear Appurtenances Section Areas**

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	CAAA In Face ft <sup>2</sup>	CAAA Out Face ft <sup>2</sup>	Weight K
T1	136.00-132.81	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.319	0.000	0.03
		C	0.000	0.000	2.800	0.000	0.02
T2	132.81-130.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.281	0.000	0.02
		C	0.000	0.000	2.471	0.000	0.02
T3	130.00-110.00	A	0.000	0.000	21.668	0.000	0.22
		B	0.000	0.000	17.810	0.000	0.23
		C	0.000	0.000	27.972	0.000	0.26
T4	110.00-94.94	A	0.000	0.000	24.452	0.000	0.22
		B	0.000	0.000	51.188	0.000	0.33
		C	0.000	0.000	36.316	0.000	0.34

Tower Section	Tower Elevation	Face	A <sub>R</sub>	A <sub>F</sub>	C <sub>AA</sub> <sub>In Face</sub>	C <sub>AA</sub> <sub>Out Face</sub>	Weight
n	ft		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	K
T5	94.94-92.59	A	0.000	0.000	3.816	0.000	0.03
		B	0.000	0.000	11.514	0.000	0.07
		C	0.000	0.000	6.372	0.000	0.06
T6	92.59-90.00	A	0.000	0.000	4.212	0.000	0.04
		B	0.000	0.000	12.710	0.000	0.07
		C	0.000	0.000	7.034	0.000	0.06
T7	90.00-80.00	A	0.000	0.000	24.318	0.000	0.18
		B	0.000	0.000	49.004	0.000	0.28
		C	0.000	0.000	24.869	0.000	0.22
T8	80.00-60.00	A	0.000	0.000	57.072	0.000	0.40
		B	0.000	0.000	98.007	0.000	0.56
		C	0.000	0.000	51.017	0.000	0.44
T9	60.00-40.00	A	0.000	0.000	58.080	0.000	0.41
		B	0.000	0.000	98.007	0.000	0.56
		C	0.000	0.000	51.017	0.000	0.44
T10	40.00-20.00	A	0.000	0.000	58.080	0.000	0.41
		B	0.000	0.000	98.007	0.000	0.56
		C	0.000	0.000	51.017	0.000	0.44
T11	20.00-0.00	A	0.000	0.000	58.080	0.000	0.41
		B	0.000	0.000	98.007	0.000	0.56
		C	0.000	0.000	51.017	0.000	0.44

**Feed Line/Linear Appurtenances Section Areas - With Ice**

Tower Section	Tower Elevation	Face or Leg	Ice Thickness	A <sub>R</sub>	A <sub>F</sub>	C <sub>AA</sub> <sub>In Face</sub>	C <sub>AA</sub> <sub>Out Face</sub>	Weight
n	ft		in	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	K
T1	136.00-132.81	A	1.467	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	1.254	0.000	0.04
		C		0.000	0.000	7.290	0.000	0.10
T2	132.81-130.00	A	1.464	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	1.105	0.000	0.04
		C		0.000	0.000	6.425	0.000	0.09
T3	130.00-110.00	A	1.451	0.000	0.000	50.419	0.000	0.73
		B		0.000	0.000	40.444	0.000	0.64
		C		0.000	0.000	66.041	0.000	0.92
T4	110.00-94.94	A	1.428	0.000	0.000	58.395	0.000	0.80
		B		0.000	0.000	72.400	0.000	1.19
		C		0.000	0.000	79.673	0.000	1.15
T5	94.94-92.59	A	1.415	0.000	0.000	9.082	0.000	0.12
		B		0.000	0.000	18.495	0.000	0.28
		C		0.000	0.000	14.026	0.000	0.20
T6	92.59-90.00	A	1.412	0.000	0.000	10.015	0.000	0.14
		B		0.000	0.000	20.399	0.000	0.30
		C		0.000	0.000	15.469	0.000	0.22
T7	90.00-80.00	A	1.402	0.000	0.000	56.971	0.000	0.75
		B		0.000	0.000	78.476	0.000	1.16
		C		0.000	0.000	54.445	0.000	0.77
T8	80.00-60.00	A	1.375	0.000	0.000	137.379	0.000	1.74
		B		0.000	0.000	156.040	0.000	2.29
		C		0.000	0.000	115.016	0.000	1.58
T9	60.00-40.00	A	1.329	0.000	0.000	141.275	0.000	1.73
		B		0.000	0.000	154.501	0.000	2.23
		C		0.000	0.000	113.732	0.000	1.54
T10	40.00-20.00	A	1.263	0.000	0.000	138.747	0.000	1.65
		B		0.000	0.000	152.266	0.000	2.15
		C		0.000	0.000	111.865	0.000	1.48
T11	20.00-0.00	A	1.132	0.000	0.000	133.739	0.000	1.51
		B		0.000	0.000	147.840	0.000	1.99
		C		0.000	0.000	108.167	0.000	1.36

**Feed Line Center of Pressure**

Section	Elevation	CP <sub>x</sub>	CP <sub>z</sub>	CP <sub>x</sub> Ice	CP <sub>z</sub> Ice
	ft	in	in	in	in
T1	136.00-132.81	3.068	1.367	3.293	2.496
T2	132.81-130.00	5.089	2.238	2.758	1.973
T3	130.00-110.00	-0.021	-6.821	0.486	-3.104
T4	110.00-94.94	-1.386	-1.680	-1.433	-0.298
T5	94.94-92.59	1.348	0.860	1.164	1.612
T6	92.59-90.00	1.344	0.833	1.034	1.407
T7	90.00-80.00	0.179	-0.215	0.010	0.413
T8	80.00-60.00	0.173	-0.982	0.343	-0.194
T9	60.00-40.00	0.358	-1.609	0.596	-0.850
T10	40.00-20.00	0.521	-2.103	0.800	-1.289
T11	20.00-0.00	0.663	-2.532	0.922	-1.792

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
T1	6	HB114-21U3M12-XXXF(1-1/4)	132.81 - 136.00	0.6000	0.4758
T1	11	T-Brackets	132.81 - 136.00	0.6000	0.4758
T1	27	Safety Line 3/8	132.81 - 136.00	0.6000	0.4758
T1	28	Ladder Rung SR 3/4 (48"w 26"s)	132.81 - 136.00	0.6000	0.4758
T2	6	HB114-21U3M12-XXXF(1-1/4)	130.00 - 132.81	0.6000	0.3983
T2	11	T-Brackets	130.00 - 132.81	0.6000	0.3983
T2	27	Safety Line 3/8	130.00 - 132.81	0.6000	0.3983
T2	28	Ladder Rung SR 3/4 (48"w 26"s)	130.00 - 132.81	0.6000	0.3983
T3	6	HB114-21U3M12-XXXF(1-1/4)	110.00 - 130.00	0.6000	0.5436
T3	11	T-Brackets	110.00 - 130.00	0.6000	0.5436
T3	13	LDF6-50A(1-1/4)	110.00 - 127.00	0.6000	0.5436
T3	14	LDF6-50A(1-1/4)	110.00 - 127.00	0.6000	0.5436
T3	16	T-Brackets	110.00 - 127.00	0.6000	0.5436
T3	18	LDF7-50A(1-5/8")	110.00 - 117.00	0.6000	0.5436
T3	19	LDF7-50A(1-5/8")	110.00 - 117.00	0.6000	0.5436
T3	20	LDF7-50A(1-5/8")	110.00 - 117.00	0.6000	0.5436
T3	21	T-Brackets	110.00 - 117.00	0.6000	0.5436
T3	27	Safety Line 3/8	110.00 - 130.00	0.6000	0.5436
T3	28	Ladder Rung SR 3/4 (48"w 26"s)	110.00 - 130.00	0.6000	0.5436
T4	2	WR-VG82ST-BRDA( 5/8")	94.94 - 97.00	0.6000	0.5628
T4	3	FB-L98-002-XXX( 3/8)	94.94 - 97.00	0.6000	0.5628
T4	4	LDF6-50A(1-1/4)	94.94 - 97.00	0.6000	0.5628
T4	5	HB114-21U3M12-XXXF(1-	94.94 -	0.6000	0.5628

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
T4	6	HB114-21U3M12-XXXF(1-1/4)	97.00 - 97.00	0.6000	0.5628
T4	8	FB-L98-002-XXX( 3/8)	110.00 - 94.94	0.6000	0.5628
T4	10	LDF7-50A(1-5/8")	97.00 - 94.94	0.6000	0.5628
T4	11	T-Brackets	107.00 - 94.94	0.6000	0.5628
T4	13	LDF6-50A(1-1/4)	110.00 - 94.94	0.6000	0.5628
T4	14	LDF6-50A(1-1/4)	110.00 - 94.94	0.6000	0.5628
T4	16	T-Brackets	110.00 - 94.94	0.6000	0.5628
T4	18	LDF7-50A(1-5/8")	110.00 - 94.94	0.6000	0.5628
T4	19	LDF7-50A(1-5/8")	110.00 - 94.94	0.6000	0.5628
T4	20	LDF7-50A(1-5/8")	110.00 - 94.94	0.6000	0.5628
T4	21	T-Brackets	110.00 - 94.94	0.6000	0.5628
T4	27	Safety Line 3/8	110.00 - 94.94	0.6000	0.5628
T4	28	Ladder Rung SR 3/4 (48"w 26"s)	110.00 - 94.94	0.6000	0.5628
T5	2	WR-VG82ST-BRDA( 5/8")	92.59 - 94.94	0.6000	0.4384
T5	3	FB-L98-002-XXX( 3/8)	92.59 - 94.94	0.6000	0.4384
T5	4	LDF6-50A(1-1/4)	92.59 - 94.94	0.6000	0.4384
T5	5	HB114-21U3M12-XXXF(1-1/4)	92.59 - 94.94	0.6000	0.4384
T5	8	FB-L98-002-XXX( 3/8)	92.59 - 94.94	0.6000	0.4384
T5	10	LDF7-50A(1-5/8")	92.59 - 94.94	0.6000	0.4384
T5	11	T-Brackets	92.59 - 94.94	0.6000	0.4384
T5	13	LDF6-50A(1-1/4)	92.59 - 94.94	0.6000	0.4384
T5	14	LDF6-50A(1-1/4)	92.59 - 94.94	0.6000	0.4384
T5	16	T-Brackets	92.59 - 94.94	0.6000	0.4384
T5	18	LDF7-50A(1-5/8")	92.59 - 94.94	0.6000	0.4384
T5	19	LDF7-50A(1-5/8")	92.59 - 94.94	0.6000	0.4384
T5	20	LDF7-50A(1-5/8")	92.59 - 94.94	0.6000	0.4384
T5	21	T-Brackets	92.59 - 94.94	0.6000	0.4384
T5	27	Safety Line 3/8	92.59 - 94.94	0.6000	0.4384
T5	28	Ladder Rung SR 3/4 (48"w 26"s)	92.59 - 94.94	0.6000	0.4384
T6	2	WR-VG82ST-BRDA( 5/8")	90.00 - 92.59	0.6000	0.3761
T6	3	FB-L98-002-XXX( 3/8)	90.00 - 92.59	0.6000	0.3761
T6	4	LDF6-50A(1-1/4)	90.00 - 92.59	0.6000	0.3761
T6	5	HB114-21U3M12-XXXF(1-1/4)	90.00 - 92.59	0.6000	0.3761
T6	8	FB-L98-002-XXX( 3/8)	90.00 - 92.59	0.6000	0.3761



Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
T6	10	LDF7-50A(1-5/8")	90.00 - 92.59	0.6000	0.3761
T6	11	T-Brackets	90.00 - 92.59	0.6000	0.3761
T6	13	LDF6-50A(1-1/4)	90.00 - 92.59	0.6000	0.3761
T6	14	LDF6-50A(1-1/4)	90.00 - 92.59	0.6000	0.3761
T6	16	T-Brackets	90.00 - 92.59	0.6000	0.3761
T6	18	LDF7-50A(1-5/8")	90.00 - 92.59	0.6000	0.3761
T6	19	LDF7-50A(1-5/8")	90.00 - 92.59	0.6000	0.3761
T6	20	LDF7-50A(1-5/8")	90.00 - 92.59	0.6000	0.3761
T6	21	T-Brackets	90.00 - 92.59	0.6000	0.3761
T6	27	Safety Line 3/8	90.00 - 92.59	0.6000	0.3761
T6	28	Ladder Rung SR 3/4 (48"w 26"s)	90.00 - 92.59	0.6000	0.3761
T7	2	WR-VG82ST-BRDA( 5/8")	80.00 - 90.00	0.6000	0.3989
T7	3	FB-L98-002-XXX( 3/8)	80.00 - 90.00	0.6000	0.3989
T7	4	LDF6-50A(1-1/4)	80.00 - 90.00	0.6000	0.3989
T7	5	HB114-21U3M12-XXXF(1-1/4)	80.00 - 90.00	0.6000	0.3989
T7	8	FB-L98-002-XXX( 3/8)	80.00 - 90.00	0.6000	0.3989
T7	10	LDF7-50A(1-5/8")	80.00 - 90.00	0.6000	0.3989
T7	11	T-Brackets	80.00 - 90.00	0.6000	0.3989
T7	13	LDF6-50A(1-1/4)	80.00 - 90.00	0.6000	0.3989
T7	14	LDF6-50A(1-1/4)	80.00 - 90.00	0.6000	0.3989
T7	16	T-Brackets	80.00 - 90.00	0.6000	0.3989
T7	18	LDF7-50A(1-5/8")	80.00 - 90.00	0.6000	0.3989
T7	19	LDF7-50A(1-5/8")	80.00 - 90.00	0.6000	0.3989
T7	20	LDF7-50A(1-5/8")	80.00 - 90.00	0.6000	0.3989
T7	21	T-Brackets	80.00 - 90.00	0.6000	0.3989
T7	23	FXL 780 PE(7/8)	80.00 - 87.00	0.6000	0.3989
T7	24	Feed Line Ladder	80.00 - 87.00	0.6000	0.3989
T7	26	Safety Line 3/8	80.00 - 90.00	0.6000	0.3989
T8	2	WR-VG82ST-BRDA( 5/8")	60.00 - 80.00	0.6000	0.4754
T8	3	FB-L98-002-XXX( 3/8)	60.00 - 80.00	0.6000	0.4754
T8	4	LDF6-50A(1-1/4)	60.00 - 80.00	0.6000	0.4754
T8	5	HB114-21U3M12-XXXF(1-1/4)	60.00 - 80.00	0.6000	0.4754
T8	8	FB-L98-002-XXX( 3/8)	60.00 - 80.00	0.6000	0.4754
T8	9	FLC 12-50J(1/2")	60.00 - 80.00	0.6000	0.4754
T8	10	LDF7-50A(1-5/8")	60.00 -	0.6000	0.4754

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
			80.00		
T8	11	T-Brackets	60.00 - 80.00	0.6000	0.4754
T8	13	LDF6-50A(1-1/4)	60.00 - 80.00	0.6000	0.4754
T8	14	LDF6-50A(1-1/4)	60.00 - 80.00	0.6000	0.4754
T8	15	LDF4-50A(1/2")	60.00 - 72.00	0.6000	0.4754
T8	16	T-Brackets	60.00 - 80.00	0.6000	0.4754
T8	18	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.4754
T8	19	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.4754
T8	20	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.4754
T8	21	T-Brackets	60.00 - 80.00	0.6000	0.4754
T8	23	FXL 780 PE(7/8)	60.00 - 80.00	0.6000	0.4754
T8	24	Feed Line Ladder	60.00 - 80.00	0.6000	0.4754
T8	26	Safety Line 3/8	60.00 - 80.00	0.6000	0.4754
T9	2	WR-VG82ST-BRDA( 5/8")	40.00 - 60.00	0.6000	0.5541
T9	3	FB-L98-002-XXX( 3/8)	40.00 - 60.00	0.6000	0.5541
T9	4	LDF6-50A(1-1/4)	40.00 - 60.00	0.6000	0.5541
T9	5	HB114-21U3M12-XXXF(1-1/4)	40.00 - 60.00	0.6000	0.5541
T9	8	FB-L98-002-XXX( 3/8)	40.00 - 60.00	0.6000	0.5541
T9	9	FLC 12-50J(1/2")	40.00 - 60.00	0.6000	0.5541
T9	10	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.5541
T9	11	T-Brackets	40.00 - 60.00	0.6000	0.5541
T9	13	LDF6-50A(1-1/4)	40.00 - 60.00	0.6000	0.5541
T9	14	LDF6-50A(1-1/4)	40.00 - 60.00	0.6000	0.5541
T9	15	LDF4-50A(1/2")	40.00 - 60.00	0.6000	0.5541
T9	16	T-Brackets	40.00 - 60.00	0.6000	0.5541
T9	18	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.5541
T9	19	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.5541
T9	20	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.5541
T9	21	T-Brackets	40.00 - 60.00	0.6000	0.5541
T9	23	FXL 780 PE(7/8)	40.00 - 60.00	0.6000	0.5541
T9	24	Feed Line Ladder	40.00 - 60.00	0.6000	0.5541
T9	26	Safety Line 3/8	40.00 - 60.00	0.6000	0.5541
T10	2	WR-VG82ST-BRDA( 5/8")	20.00 - 40.00	0.6000	0.6000
T10	3	FB-L98-002-XXX( 3/8)	20.00 - 40.00	0.6000	0.6000
T10	4	LDF6-50A(1-1/4)	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
T10	5	HB114-21U3M12-XXXF(1-1/4)	20.00 - 40.00	0.6000	0.6000
T10	8	FB-L98-002-XXX( 3/8)	20.00 - 40.00	0.6000	0.6000
T10	9	FLC 12-50J(1/2")	20.00 - 40.00	0.6000	0.6000
T10	10	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T10	11	T-Brackets	20.00 - 40.00	0.6000	0.6000
T10	13	LDF6-50A(1-1/4)	20.00 - 40.00	0.6000	0.6000
T10	14	LDF6-50A(1-1/4)	20.00 - 40.00	0.6000	0.6000
T10	15	LDF4-50A(1/2")	20.00 - 40.00	0.6000	0.6000
T10	16	T-Brackets	20.00 - 40.00	0.6000	0.6000
T10	18	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T10	19	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T10	20	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T10	21	T-Brackets	20.00 - 40.00	0.6000	0.6000
T10	23	FXL 780 PE(7/8)	20.00 - 40.00	0.6000	0.6000
T10	24	Feed Line Ladder	20.00 - 40.00	0.6000	0.6000
T10	26	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T11	2	WR-VG82ST-BRDA( 5/8")	0.00 - 20.00	0.6000	0.6000
T11	3	FB-L98-002-XXX( 3/8)	0.00 - 20.00	0.6000	0.6000
T11	4	LDF6-50A(1-1/4)	0.00 - 20.00	0.6000	0.6000
T11	5	HB114-21U3M12-XXXF(1-1/4)	0.00 - 20.00	0.6000	0.6000
T11	8	FB-L98-002-XXX( 3/8)	0.00 - 20.00	0.6000	0.6000
T11	9	FLC 12-50J(1/2")	0.00 - 20.00	0.6000	0.6000
T11	10	LDF7-50A(1-5/8")	0.00 - 20.00	0.6000	0.6000
T11	11	T-Brackets	0.00 - 20.00	0.6000	0.6000
T11	13	LDF6-50A(1-1/4)	0.00 - 20.00	0.6000	0.6000
T11	14	LDF6-50A(1-1/4)	0.00 - 20.00	0.6000	0.6000
T11	15	LDF4-50A(1/2")	0.00 - 20.00	0.6000	0.6000
T11	16	T-Brackets	0.00 - 20.00	0.6000	0.6000
T11	18	LDF7-50A(1-5/8")	0.00 - 20.00	0.6000	0.6000
T11	19	LDF7-50A(1-5/8")	0.00 - 20.00	0.6000	0.6000
T11	20	LDF7-50A(1-5/8")	0.00 - 20.00	0.6000	0.6000
T11	21	T-Brackets	0.00 - 20.00	0.6000	0.6000
T11	23	FXL 780 PE(7/8)	0.00 - 20.00	0.6000	0.6000
T11	24	Feed Line Ladder	0.00 - 20.00	0.6000	0.6000
T11	26	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000

**Discrete Tower Loads**

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Azimuth Adjustmen t	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight
			ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
			ft					
			ft					

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Lateral						ft
**136**										
APXVSP18-C-A20 w/ Mount Pipe	A	From Centroid-Face	4.00	8.000	0.000	136.00	No Ice	4.60	4.01	0.10
			1.000				1/2"	5.05	4.45	0.16
							Ice	5.50	4.89	0.23
							1" Ice	6.44	5.82	0.42
							2" Ice			
APXVSP18-C-A20 w/ Mount Pipe	B	From Centroid-Face	4.00	8.000	20.000	136.00	No Ice	4.60	4.01	0.10
			1.000				1/2"	5.05	4.45	0.16
							Ice	5.50	4.89	0.23
							1" Ice	6.44	5.82	0.42
							2" Ice			
APXVSP18-C-A20 w/ Mount Pipe	C	From Centroid-Face	4.00	8.000	40.000	136.00	No Ice	4.60	4.01	0.10
			1.000				1/2"	5.05	4.45	0.16
							Ice	5.50	4.89	0.23
							1" Ice	6.44	5.82	0.42
							2" Ice			
APXVTM14-C-120 w/ Mount Pipe	A	From Centroid-Face	4.00	-8.000	20.000	136.00	No Ice	4.09	2.86	0.08
			1.000				1/2"	4.48	3.23	0.13
							Ice	4.88	3.61	0.19
							1" Ice	5.71	4.40	0.33
							2" Ice			
APXVTM14-C-120 w/ Mount Pipe	B	From Centroid-Face	4.00	-8.000	20.000	136.00	No Ice	4.09	2.86	0.08
			1.000				1/2"	4.48	3.23	0.13
							Ice	4.88	3.61	0.19
							1" Ice	5.71	4.40	0.33
							2" Ice			
APXVTM14-C-120 w/ Mount Pipe	C	From Centroid-Face	4.00	-8.000	20.000	136.00	No Ice	4.09	2.86	0.08
			1.000				1/2"	4.48	3.23	0.13
							Ice	4.88	3.61	0.19
							1" Ice	5.71	4.40	0.33
							2" Ice			
TD-RRH8x20-25	A	From Centroid-Face	4.00	-8.000	20.000	136.00	No Ice	4.05	1.53	0.07
			1.000				1/2"	4.30	1.71	0.10
							Ice	4.56	1.90	0.13
							1" Ice	5.10	2.30	0.20
							2" Ice			
TD-RRH8x20-25	B	From Centroid-Face	4.00	-8.000	20.000	136.00	No Ice	4.05	1.53	0.07
			1.000				1/2"	4.30	1.71	0.10
							Ice	4.56	1.90	0.13
							1" Ice	5.10	2.30	0.20
							2" Ice			
TD-RRH8x20-25	C	From Centroid-Face	4.00	-8.000	20.000	136.00	No Ice	4.05	1.53	0.07
			1.000				1/2"	4.30	1.71	0.10
							Ice	4.56	1.90	0.13
							1" Ice	5.10	2.30	0.20
							2" Ice			
IBC1900HG-2A	A	From Centroid-Face	4.00	8.000	0.000	136.00	No Ice	0.97	0.46	0.02
			0.000				1/2"	1.09	0.56	0.03
							Ice	1.22	0.66	0.04
							1" Ice	1.51	0.89	0.06
							2" Ice			
IBC1900HG-2A	B	From Centroid-Face	4.00	8.000	20.000	136.00	No Ice	0.97	0.46	0.02
			0.000				1/2"	1.09	0.56	0.03
							Ice	1.22	0.66	0.04
							1" Ice	1.51	0.89	0.06
							2" Ice			
IBC1900HG-2A	C	From Centroid-Face	4.00	8.000	40.000	136.00	No Ice	0.97	0.46	0.02
			0.000				1/2"	1.09	0.56	0.03
							Ice	1.22	0.66	0.04
							1" Ice	1.51	0.89	0.06
							2" Ice			
IBC1900BB-1	A	From Centroid-Face	4.00	8.000	0.000	136.00	No Ice	0.97	0.46	0.02
			0.000				1/2"	1.09	0.56	0.03
							Ice	1.22	0.66	0.04
							1" Ice	1.51	0.89	0.06
							2" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
IBC1900BB-1	B	From Centroid-Face	4.00 8.000 0.000	20.000	136.00	2" Ice			
						No Ice	0.97	0.46	0.02
						1/2" Ice	1.09	0.56	0.03
						1" Ice	1.22	0.66	0.04
						1" Ice	1.51	0.89	0.06
IBC1900BB-1	C	From Centroid-Face	4.00 8.000 0.000	40.000	136.00	2" Ice			
						No Ice	0.97	0.46	0.02
						1/2" Ice	1.09	0.56	0.03
						1" Ice	1.22	0.66	0.04
						1" Ice	1.51	0.89	0.06
2.4" Dia x 6-ft Pipe	A	From Centroid-Face	4.00 0.000 0.000	0.000	136.00	2" Ice			
						No Ice	1.43	1.43	0.02
						1/2" Ice	1.93	1.93	0.03
						1" Ice	2.30	2.30	0.05
						1" Ice	3.06	3.06	0.09
2.4" Dia x 6-ft Pipe	B	From Centroid-Face	4.00 0.000 0.000	0.000	136.00	2" Ice			
						No Ice	1.43	1.43	0.02
						1/2" Ice	1.93	1.93	0.03
						1" Ice	2.30	2.30	0.05
						1" Ice	3.06	3.06	0.09
2.4" Dia x 6-ft Pipe	C	From Centroid-Face	4.00 0.000 0.000	0.000	136.00	2" Ice			
						No Ice	1.43	1.43	0.02
						1/2" Ice	1.93	1.93	0.03
						1" Ice	2.30	2.30	0.05
						1" Ice	3.06	3.06	0.09
Platform Mount [LP 405-1]	C	None		0.000	136.00	2" Ice			
						No Ice	20.88	20.88	1.80
						1/2" Ice	28.89	28.89	2.28
						1" Ice	37.04	37.04	2.87
						1" Ice	53.73	53.73	4.39
**134** 800MHz 2X50W RRH W/FILTER	A	From Leg	2.00 0.000 -1.000	0.000	134.00	2" Ice			
						No Ice	2.06	1.93	0.06
						1/2" Ice	2.24	2.11	0.09
						1" Ice	2.43	2.29	0.11
						1" Ice	2.83	2.68	0.17
800MHz 2X50W RRH W/FILTER	B	From Leg	2.00 0.000 -1.000	0.000	134.00	2" Ice			
						No Ice	2.06	1.93	0.06
						1/2" Ice	2.24	2.11	0.09
						1" Ice	2.43	2.29	0.11
						1" Ice	2.83	2.68	0.17
800MHz 2X50W RRH W/FILTER	C	From Leg	2.00 0.000 -1.000	0.000	134.00	2" Ice			
						No Ice	2.06	1.93	0.06
						1/2" Ice	2.24	2.11	0.09
						1" Ice	2.43	2.29	0.11
						1" Ice	2.83	2.68	0.17
1900MHz RRH (65MHz)	A	From Leg	2.00 0.000 0.000	0.000	134.00	2" Ice			
						No Ice	2.31	2.38	0.06
						1/2" Ice	2.52	2.58	0.08
						1" Ice	2.73	2.79	0.11
						1" Ice	3.17	3.24	0.18
1900MHz RRH (65MHz)	B	From Leg	2.00 0.000 0.000	0.000	134.00	2" Ice			
						No Ice	2.31	2.38	0.06
						1/2" Ice	2.52	2.58	0.08
						1" Ice	2.73	2.79	0.11
						1" Ice	3.17	3.24	0.18
1900MHz RRH (65MHz)	C	From Leg	2.00 0.000 0.000	0.000	134.00	2" Ice			
						No Ice	2.31	2.38	0.06
						1/2" Ice	2.52	2.58	0.08
						1" Ice	2.73	2.79	0.11
						1" Ice	3.17	3.24	0.18
(2) 2.4" Dia x 4-ft Mount Pipe	A	From Leg	2.00 0.000 0.000	0.000	134.00	2" Ice			
						No Ice	0.87	0.87	0.01
						1/2" Ice	1.12	1.12	0.02
						1" Ice	1.37	1.37	0.03

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C <sub>AA</sub> <sub>Front</sub>	C <sub>AA</sub> <sub>Side</sub>	Weight
			Horz	Lateral	Vert					
			ft	ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
							1" Ice	1.91	1.91	0.06
							2" Ice			
(2) 2.4" Dia x 4-ft Mount Pipe	B	From Leg	2.00		0.000	0.000	No Ice	0.87	0.87	0.01
			0.000				1/2"	1.12	1.12	0.02
			0.000				Ice	1.37	1.37	0.03
							1" Ice	1.91	1.91	0.06
							2" Ice			
(2) 2.4" Dia x 4-ft Mount Pipe	C	From Leg	2.00		0.000	0.000	No Ice	0.87	0.87	0.01
			0.000				1/2"	1.12	1.12	0.02
			0.000				Ice	1.37	1.37	0.03
							1" Ice	1.91	1.91	0.06
							2" Ice			
Side Arm Mount [SO 104-3]	C	None				0.000	No Ice	2.62	2.62	0.29
							1/2"	3.30	3.30	0.41
							Ice	3.98	3.98	0.53
							1" Ice	5.35	5.35	0.77
							2" Ice			
**127**										
(4) DB844H90E-XY w/ Mount Pipe (Abandoned)	A	From Face	4.00		0.000	-10.000	No Ice	2.24	3.34	0.04
			0.000				1/2"	2.61	3.73	0.08
			0.000				Ice	2.99	4.13	0.12
							1" Ice	3.78	4.97	0.23
							2" Ice			
(4) DB844H90E-XY w/ Mount Pipe (Abandoned)	B	From Face	4.00		0.000	-10.000	No Ice	2.24	3.34	0.04
			0.000				1/2"	2.61	3.73	0.08
			0.000				Ice	2.99	4.13	0.12
							1" Ice	3.78	4.97	0.23
							2" Ice			
(4) DB844H90E-XY w/ Mount Pipe (Abandoned)	C	From Face	4.00		0.000	-10.000	No Ice	2.24	3.34	0.04
			0.000				1/2"	2.61	3.73	0.08
			0.000				Ice	2.99	4.13	0.12
							1" Ice	3.78	4.97	0.23
							2" Ice			
HSS 4"x4"x4'	A	From Face	0.50		0.000	0.000	No Ice	2.09	0.00	0.04
			0.000				1/2"	2.39	0.00	0.05
			1.000				Ice	2.70	0.00	0.07
							1" Ice	3.33	0.00	0.12
							2" Ice			
HSS 4"x4"x4'	A	From Face	0.50		0.000	0.000	No Ice	2.09	0.00	0.04
			0.000				1/2"	2.39	0.00	0.05
			-1.000				Ice	2.70	0.00	0.07
							1" Ice	3.33	0.00	0.12
							2" Ice			
HSS 4"x4"x4'	B	From Face	0.50		0.000	0.000	No Ice	2.09	0.00	0.04
			0.000				1/2"	2.39	0.00	0.05
			1.000				Ice	2.70	0.00	0.07
							1" Ice	3.33	0.00	0.12
							2" Ice			
HSS 4"x4"x4'	B	From Face	0.50		0.000	0.000	No Ice	2.09	0.00	0.04
			0.000				1/2"	2.39	0.00	0.05
			-1.000				Ice	2.70	0.00	0.07
							1" Ice	3.33	0.00	0.12
							2" Ice			
HSS 4"x4"x4'	C	From Face	0.50		0.000	0.000	No Ice	2.09	0.00	0.04
			0.000				1/2"	2.39	0.00	0.05
			1.000				Ice	2.70	0.00	0.07
							1" Ice	3.33	0.00	0.12
							2" Ice			
HSS 4"x4"x4'	C	From Face	0.50		0.000	0.000	No Ice	2.09	0.00	0.04
			0.000				1/2"	2.39	0.00	0.05
			-1.000				Ice	2.70	0.00	0.07
							1" Ice	3.33	0.00	0.12
							2" Ice			
Sector Mount [SM 411-3]	C	None				0.000	No Ice	20.53	20.53	1.07
							1/2"	28.62	28.62	1.46

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
						Ice	36.63	36.63	1.97
						1" Ice	52.73	52.73	3.37
						2" Ice			
**117**									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.000 2.000	80.000	117.00	No Ice	6.33	5.64	0.11
						1/2"	6.78	6.43	0.17
						Ice	7.21	7.13	0.23
						1" Ice	8.12	8.59	0.38
						2" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.000 2.000	80.000	117.00	No Ice	6.33	5.64	0.11
						1/2"	6.78	6.43	0.17
						Ice	7.21	7.13	0.23
						1" Ice	8.12	8.59	0.38
						2" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0.000 2.000	80.000	117.00	No Ice	6.33	5.64	0.11
						1/2"	6.78	6.43	0.17
						Ice	7.21	7.13	0.23
						1" Ice	8.12	8.59	0.38
						2" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0.000 2.000	80.000	117.00	No Ice	6.33	5.64	0.11
						1/2"	6.78	6.43	0.17
						Ice	7.21	7.13	0.23
						1" Ice	8.12	8.59	0.38
						2" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0.000 2.000	80.000	117.00	No Ice	6.33	5.64	0.11
						1/2"	6.78	6.43	0.17
						Ice	7.21	7.13	0.23
						1" Ice	8.12	8.59	0.38
						2" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0.000 2.000	80.000	117.00	No Ice	6.33	5.64	0.11
						1/2"	6.78	6.43	0.17
						Ice	7.21	7.13	0.23
						1" Ice	8.12	8.59	0.38
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	A	From Leg	4.00 0.000 2.000	80.000	117.00	No Ice	14.69	6.87	0.19
						1/2"	15.46	7.55	0.31
						Ice	16.23	8.25	0.46
						1" Ice	17.82	9.67	0.79
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	B	From Leg	4.00 0.000 2.000	80.000	117.00	No Ice	14.69	6.87	0.19
						1/2"	15.46	7.55	0.31
						Ice	16.23	8.25	0.46
						1" Ice	17.82	9.67	0.79
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	C	From Leg	4.00 0.000 2.000	80.000	117.00	No Ice	14.69	6.87	0.19
						1/2"	15.46	7.55	0.31
						Ice	16.23	8.25	0.46
						1" Ice	17.82	9.67	0.79
						2" Ice			
RADIO 4449 B12/B71 (P)	A	From Leg	4.00 0.000 2.000	80.000	117.00	No Ice	1.65	1.16	0.07
						1/2"	1.81	1.30	0.09
						Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
RADIO 4449 B12/B71 (P)	B	From Leg	4.00 0.000 2.000	80.000	117.00	No Ice	1.65	1.16	0.07
						1/2"	1.81	1.30	0.09
						Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
RADIO 4449 B12/B71 (P)	C	From Leg	4.00 0.000 2.000	80.000	117.00	No Ice	1.65	1.16	0.07
						1/2"	1.81	1.30	0.09
						Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
KRY 112 144/1	A	From Leg	4.00	80.000	117.00	No Ice	0.35	0.17	0.01

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> <sub>Front</sub>	C <sub>AA</sub> <sub>Side</sub>	Weight	
			Horz	Lateral						ft
				0.000			1/2"	0.43	0.23	0.01
				2.000			Ice	0.51	0.30	0.02
							1" Ice	0.70	0.46	0.03
							2" Ice			
KRY 112 144/1	B	From Leg	4.00		80.000	117.00	No Ice	0.35	0.17	0.01
			0.000				1/2"	0.43	0.23	0.01
			2.000				Ice	0.51	0.30	0.02
							1" Ice	0.70	0.46	0.03
							2" Ice			
KRY 112 144/1	C	From Leg	4.00		80.000	117.00	No Ice	0.35	0.17	0.01
			0.000				1/2"	0.43	0.23	0.01
			2.000				Ice	0.51	0.30	0.02
							1" Ice	0.70	0.46	0.03
							2" Ice			
Sector Mount [SM 411-3]	C	None			0.000	117.00	No Ice	20.53	20.53	1.07
							1/2"	28.62	28.62	1.46
							Ice	36.63	36.63	1.97
							1" Ice	52.73	52.73	3.37
							2" Ice			
**107**										
BXA-80063/4CF	A	From Leg	4.00		0.000	107.00	No Ice	4.71	2.25	0.01
			0.000				1/2"	5.03	2.55	0.04
			0.000				Ice	5.35	2.85	0.07
							1" Ice	6.02	3.49	0.15
							2" Ice			
BXA-80063/4CF	B	From Leg	4.00		0.000	107.00	No Ice	4.71	2.25	0.01
			0.000				1/2"	5.03	2.55	0.04
			0.000				Ice	5.35	2.85	0.07
							1" Ice	6.02	3.49	0.15
							2" Ice			
BXA-80063/4CF	C	From Leg	4.00		0.000	107.00	No Ice	4.71	2.25	0.01
			0.000				1/2"	5.03	2.55	0.04
			0.000				Ice	5.35	2.85	0.07
							1" Ice	6.02	3.49	0.15
							2" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00		0.000	107.00	No Ice	4.09	3.30	0.07
			0.000				1/2"	4.49	3.68	0.13
			0.000				Ice	4.89	4.07	0.20
							1" Ice	5.72	4.87	0.39
							2" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00		0.000	107.00	No Ice	4.09	3.30	0.07
			0.000				1/2"	4.49	3.68	0.13
			0.000				Ice	4.89	4.07	0.20
							1" Ice	5.72	4.87	0.39
							2" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00		0.000	107.00	No Ice	4.09	3.30	0.07
			0.000				1/2"	4.49	3.68	0.13
			0.000				Ice	4.89	4.07	0.20
							1" Ice	5.72	4.87	0.39
							2" Ice			
BXA-70063-6CF-2 w/ Mount Pipe	A	From Leg	4.00		0.000	107.00	No Ice	7.81	5.80	0.04
			0.000				1/2"	8.36	6.95	0.10
			0.000				Ice	8.87	7.82	0.17
							1" Ice	9.93	9.60	0.34
							2" Ice			
BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.00		0.000	107.00	No Ice	7.81	5.80	0.04
			0.000				1/2"	8.36	6.95	0.10
			0.000				Ice	8.87	7.82	0.17
							1" Ice	9.93	9.60	0.34
							2" Ice			
BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.00		0.000	107.00	No Ice	7.81	5.80	0.04
			0.000				1/2"	8.36	6.95	0.10
			0.000				Ice	8.87	7.82	0.17
							1" Ice	9.93	9.60	0.34
							2" Ice			



Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>Front</sub>	C <sub>A</sub> A <sub>Side</sub>	Weight	
			Horz	Lateral						ft
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
B66A RRH4X45	A	From Leg	4.00	0.000	0.000	107.00	No Ice	2.58	1.63	0.07
			0.000	0.000			1/2"	2.79	1.81	0.09
			0.000	0.000			Ice	3.01	2.00	0.11
							1" Ice	3.48	2.40	0.17
							2" Ice			
B66A RRH4X45	B	From Leg	4.00	0.000	0.000	107.00	No Ice	2.58	1.63	0.07
			0.000	0.000			1/2"	2.79	1.81	0.09
			0.000	0.000			Ice	3.01	2.00	0.11
							1" Ice	3.48	2.40	0.17
							2" Ice			
B66A RRH4X45	C	From Leg	4.00	0.000	0.000	107.00	No Ice	2.58	1.63	0.07
			0.000	0.000			1/2"	2.79	1.81	0.09
			0.000	0.000			Ice	3.01	2.00	0.11
							1" Ice	3.48	2.40	0.17
							2" Ice			
RRH2x60-700	A	From Leg	4.00	0.000	0.000	107.00	No Ice	3.50	1.82	0.06
			0.000	0.000			1/2"	3.76	2.05	0.08
			0.000	0.000			Ice	4.03	2.29	0.11
							1" Ice	4.58	2.79	0.17
							2" Ice			
RRH2x60-700	B	From Leg	4.00	0.000	0.000	107.00	No Ice	3.50	1.82	0.06
			0.000	0.000			1/2"	3.76	2.05	0.08
			0.000	0.000			Ice	4.03	2.29	0.11
							1" Ice	4.58	2.79	0.17
							2" Ice			
RRH2x60-700	C	From Leg	4.00	0.000	0.000	107.00	No Ice	3.50	1.82	0.06
			0.000	0.000			1/2"	3.76	2.05	0.08
			0.000	0.000			Ice	4.03	2.29	0.11
							1" Ice	4.58	2.79	0.17
							2" Ice			
RRH2X60-PCS	A	From Leg	4.00	0.000	0.000	107.00	No Ice	2.20	1.72	0.06
			0.000	0.000			1/2"	2.39	1.90	0.08
			0.000	0.000			Ice	2.59	2.09	0.10
							1" Ice	3.01	2.48	0.16
							2" Ice			
RRH2X60-PCS	B	From Leg	4.00	0.000	0.000	107.00	No Ice	2.20	1.72	0.06
			0.000	0.000			1/2"	2.39	1.90	0.08
			0.000	0.000			Ice	2.59	2.09	0.10
							1" Ice	3.01	2.48	0.16
							2" Ice			
RRH2X60-PCS	C	From Leg	4.00	0.000	0.000	107.00	No Ice	2.20	1.72	0.06
			0.000	0.000			1/2"	2.39	1.90	0.08
			0.000	0.000			Ice	2.59	2.09	0.10
							1" Ice	3.01	2.48	0.16
							2" Ice			
RC2DC-3315-PF-48	A	From Leg	4.00	0.000	0.000	107.00	No Ice	3.79	2.51	0.03
			0.000	0.000			1/2"	4.04	2.72	0.06
			0.000	0.000			Ice	4.30	2.94	0.10
							1" Ice	4.84	3.41	0.18
							2" Ice			
RC2DC-3315-PF-48	B	From Leg	4.00	0.000	0.000	107.00	No Ice	3.79	2.51	0.03
			0.000	0.000			1/2"	4.04	2.72	0.06
			0.000	0.000			Ice	4.30	2.94	0.10
							1" Ice	4.84	3.41	0.18
							2" Ice			
(2) FD9R6004/2C-3L	A	From Leg	4.00	0.000	0.000	107.00	No Ice	0.31	0.08	0.00
			0.000	0.000			1/2"	0.39	0.12	0.01
			0.000	0.000			Ice	0.47	0.17	0.01
							1" Ice	0.65	0.29	0.02
							2" Ice			
(2) FD9R6004/2C-3L	B	From Leg	4.00	0.000	0.000	107.00	No Ice	0.31	0.08	0.00
			0.000	0.000			1/2"	0.39	0.12	0.01
			0.000	0.000			Ice	0.47	0.17	0.01
							1" Ice	0.65	0.29	0.02
							2" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
(2) FD9R6004/2C-3L	C	From Leg	4.00 0.000 0.000	0.000	107.00	No Ice 1/2" Ice 1" 2"	0.31 0.39 0.47 0.65	0.08 0.12 0.17 0.29	0.00 0.01 0.01 0.02
Sector Mount [SM 403-3]	C	None		0.000	107.00	No Ice 1/2" Ice 1" 2"	19.40 27.20 34.93 50.18	19.40 27.20 34.93 50.18	0.87 1.24 1.74 3.13
**97**									
7770.00 w/ Mount Pipe	A	From Leg	4.00 6.000 0.000	-40.000	97.00	No Ice 1/2" Ice 1" 2"	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	B	From Leg	4.00 6.000 0.000	-40.000	97.00	No Ice 1/2" Ice 1" 2"	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	C	From Leg	4.00 -6.000 0.000	90.000	97.00	No Ice 1/2" Ice 1" 2"	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
DMP65R-BU4D w/ Mount Pipe	A	From Leg	4.00 -6.000 0.000	85.000	97.00	No Ice 1/2" Ice 1" 2"	7.53 8.04 8.57 9.68	3.79 4.23 4.68 5.63	0.09 0.16 0.22 0.39
DMP65R-BU6D w/ Mount Pipe	B	From Leg	4.00 -6.000 0.000	-85.000	97.00	No Ice 1/2" Ice 1" 2"	11.96 12.70 13.46 15.02	5.97 6.63 7.30 8.69	0.11 0.20 0.30 0.53
DMP65R-BU8D w/ Mount Pipe	C	From Leg	4.00 6.000 0.000	-85.000	97.00	No Ice 1/2" Ice 1" 2"	15.89 16.81 17.76 19.70	7.89 8.74 9.60 11.37	0.14 0.25 0.38 0.68
OPA65R-BU4D w/ Mount Pipe	A	From Leg	4.00 -2.000 0.000	85.000	97.00	No Ice 1/2" Ice 1" 2"	8.10 8.65 9.21 10.39	4.03 4.50 4.98 5.98	0.08 0.14 0.21 0.38
OPA65R-BU6D w/ Mount Pipe	B	From Leg	4.00 -2.000 0.000	-85.000	97.00	No Ice 1/2" Ice 1" 2"	12.25 13.00 13.76 15.34	6.05 6.71 7.39 8.79	0.09 0.18 0.27 0.51
OPA65R-BU8B w/ Mount Pipe	C	From Leg	4.00 2.000 0.000	-85.000	97.00	No Ice 1/2" Ice 1" 2"	8.87 9.68 10.51 12.21	7.93 8.73 9.55 11.24	0.11 0.19 0.29 0.53
(2) LGP21401	A	From Leg	4.00 6.000 0.000	-40.000	97.00	No Ice 1/2" Ice 1" 2"	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21401	B	From Leg	4.00 6.000 0.000	-40.000	97.00	No Ice 1/2" Ice 1"	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
(2) LGP21401	C	From Leg	4.00 -6.000 0.000	90.000	97.00	2" Ice No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
DC6-48-60-18-8F	A	From Leg	4.00 -6.000 0.000	85.000	97.00	2" Ice No Ice 1/2" Ice 1" Ice	1.21 1.89 2.11 2.57	1.21 1.89 2.11 2.57	0.02 0.04 0.07 0.13
RRUS 4449 B5/B12	A	From Leg	4.00 -6.000 0.000	85.000	97.00	2" Ice No Ice 1/2" Ice 1" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	B	From Leg	4.00 -6.000 0.000	-85.000	97.00	2" Ice No Ice 1/2" Ice 1" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	C	From Leg	4.00 6.000 0.000	-85.000	97.00	2" Ice No Ice 1/2" Ice 1" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A_CCIV2	A	From Leg	4.00 -6.000 0.000	85.000	97.00	2" Ice No Ice 1/2" Ice 1" Ice	1.98 2.16 2.34 2.73	1.70 1.86 2.04 2.41	0.08 0.10 0.12 0.18
RRUS 8843 B2/B66A_CCIV2	B	From Leg	4.00 -6.000 0.000	-85.000	97.00	2" Ice No Ice 1/2" Ice 1" Ice	1.98 2.16 2.34 2.73	1.70 1.86 2.04 2.41	0.08 0.10 0.12 0.18
RRUS 8843 B2/B66A_CCIV2	C	From Leg	4.00 6.000 0.000	-85.000	97.00	2" Ice No Ice 1/2" Ice 1" Ice	1.98 2.16 2.34 2.73	1.70 1.86 2.04 2.41	0.08 0.10 0.12 0.18
RRUS 4478 B14_CCIV2	A	From Leg	4.00 -2.000 0.000	85.000	97.00	2" Ice No Ice 1/2" Ice 1" Ice	2.02 2.20 2.39 2.78	1.25 1.40 1.55 1.89	0.06 0.08 0.10 0.15
RRUS 4478 B14_CCIV2	B	From Leg	4.00 -2.000 0.000	-85.000	97.00	2" Ice No Ice 1/2" Ice 1" Ice	2.02 2.20 2.39 2.78	1.25 1.40 1.55 1.89	0.06 0.08 0.10 0.15
RRUS 4478 B14_CCIV2	C	From Leg	4.00 2.000 0.000	-85.000	97.00	2" Ice No Ice 1/2" Ice 1" Ice	2.02 2.20 2.39 2.78	1.25 1.40 1.55 1.89	0.06 0.08 0.10 0.15
DC9-48-60-24-8C-EV	C	From Leg	4.00 -6.000 0.000	90.000	97.00	2" Ice No Ice 1/2" Ice 1" Ice	1.14 1.79 2.00 2.45	1.14 1.79 2.00 2.45	0.03 0.05 0.07 0.13
2.4" Dia. x 7-ft	A	From Leg	4.00 2.000 0.000	0.000	97.00	2" Ice No Ice 1/2" Ice 1" Ice	1.66 2.39 2.83 3.71	1.66 2.39 2.83 3.71	0.03 0.04 0.06 0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
2.4" Dia. x 7-ft	B	From Leg	4.00 2.000 0.000	0.000	97.00	2" Ice			
						No Ice	1.66	1.66	0.03
						1/2"	2.39	2.39	0.04
						Ice	2.83	2.83	0.06
						1" Ice	3.71	3.71	0.10
2.4" Dia. x 7-ft	C	From Leg	4.00 -2.000 0.000	0.000	97.00	2" Ice			
						No Ice	1.66	1.66	0.03
						1/2"	2.39	2.39	0.04
						Ice	2.83	2.83	0.06
						1" Ice	3.71	3.71	0.10
Sector Mount [SM 504-3]	C	None		0.000	97.00	2" Ice			
						No Ice	34.25	34.25	1.71
						1/2"	48.98	48.98	2.29
						Ice	63.71	63.71	2.86
						1" Ice	93.17	93.17	4.02
**87** 800 10504 w/ Mount Pipe	A	From Leg	4.00 -6.000 2.000	-80.000	87.00	2" Ice			
						No Ice	2.69	2.26	0.04
						1/2"	3.12	2.68	0.07
						Ice	3.56	3.12	0.11
						1" Ice	4.49	4.03	0.21
800 10504 w/ Mount Pipe	B	From Leg	4.00 -6.000 2.000	70.000	87.00	2" Ice			
						No Ice	2.69	2.26	0.04
						1/2"	3.12	2.68	0.07
						Ice	3.56	3.12	0.11
						1" Ice	4.49	4.03	0.21
800 10504 w/ Mount Pipe	C	From Leg	4.00 -6.000 2.000	70.000	87.00	2" Ice			
						No Ice	2.69	2.26	0.04
						1/2"	3.12	2.68	0.07
						Ice	3.56	3.12	0.11
						1" Ice	4.49	4.03	0.21
860 10118	A	From Leg	4.00 -6.000 2.000	-80.000	87.00	2" Ice			
						No Ice	0.15	0.13	0.00
						1/2"	0.21	0.18	0.00
						Ice	0.27	0.24	0.00
						1" Ice	0.42	0.39	0.01
860 10118	B	From Leg	4.00 -6.000 2.000	70.000	87.00	2" Ice			
						No Ice	0.15	0.13	0.00
						1/2"	0.21	0.18	0.00
						Ice	0.27	0.24	0.00
						1" Ice	0.42	0.39	0.01
860 10118	C	From Leg	4.00 -6.000 2.000	70.000	87.00	2" Ice			
						No Ice	0.15	0.13	0.00
						1/2"	0.21	0.18	0.00
						Ice	0.27	0.24	0.00
						1" Ice	0.42	0.39	0.01
2.4" x 6-ft pipe	A	From Leg	4.00 6.000 0.000	0.000	87.00	2" Ice			
						No Ice	1.43	1.43	0.02
						1/2"	1.92	1.92	0.03
						Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
2.4" x 6-ft pipe	B	From Leg	4.00 6.000 0.000	0.000	87.00	2" Ice			
						No Ice	1.43	1.43	0.02
						1/2"	1.92	1.92	0.03
						Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
2.4" x 6-ft pipe	C	From Leg	4.00 6.000 0.000	0.000	87.00	2" Ice			
						No Ice	1.44	1.44	0.02
						1/2"	1.93	1.93	0.03
						Ice	2.30	2.30	0.05
						1" Ice	3.07	3.07	0.09
Sector Mount [SM 104-3]	C	None		0.000	87.00	2" Ice			
						No Ice	30.21	30.21	0.95
						1/2"	38.12	38.12	1.43
						Ice	46.01	46.01	2.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
						1" Ice 2" Ice	62.03 62.03	3.58	
**80** GPS_A	C	From Leg	3.00 0.000 1.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.26 0.32 0.39 0.56	0.26 0.32 0.39 0.56	0.00 0.00 0.01 0.02
Side Arm Mount [SO 701-1]	C	From Leg	1.50 0.000 0.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.85 1.14 1.43 2.01	1.67 2.34 3.01 4.35	0.07 0.08 0.09 0.12
**72** GPS_A	B	From Leg	3.00 0.000 0.000	0.000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.26 0.32 0.39 0.56	0.26 0.32 0.39 0.56	0.00 0.00 0.01 0.02
GPS_A	C	From Leg	3.00 0.000 0.000	0.000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.26 0.32 0.39 0.56	0.26 0.32 0.39 0.56	0.00 0.00 0.01 0.02
Side Arm Mount [SO 701-1]	B	From Leg	1.50 0.000 0.000	0.000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.85 1.14 1.43 2.01	1.67 2.34 3.01 4.35	0.07 0.08 0.09 0.12
Side Arm Mount [SO 701-1]	C	From Leg	1.50 0.000 0.000	0.000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.85 1.14 1.43 2.01	1.67 2.34 3.01 4.35	0.07 0.08 0.09 0.12
***									

### Truss-Leg Properties

Section Designation	Area in <sup>2</sup>	Area Ice in <sup>2</sup>	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in <sup>2</sup>
PiRod 105244 w/ (2) 1-1/4" Tie Rod	1076.395	2615.031	0.73	0.50	7.475	18.160	6.136
PiRod 105217	2307.763	5959.026	0.59	0.81	8.013	20.691	5.301
PiRod 105218	2436.919	5998.674	0.73	0.79	8.462	20.829	7.216
PiRod 105218	2436.919	5951.592	0.73	0.73	8.462	20.665	7.216
PiRod 105219	2597.910	5930.127	1.09	0.63	9.021	20.591	9.425

### Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice

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

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	136 - 132.813	Leg	Max Tension	2	0.00	0.00	0.00
			Max. Compression	31	-3.00	-0.01	-0.00
			Max. Mx	20	-1.08	0.36	-0.00
			Max. My	3	-0.66	-0.01	0.35
			Max. Vy	20	-0.73	0.36	-0.00
			Max. Vx	3	-0.70	-0.01	0.35
		Diagonal	Max Tension	13	1.52	0.00	0.00
			Max. Compression	12	-1.60	0.00	0.00
			Max. Mx	26	-0.10	0.01	0.00
			Max. Vy	26	-0.01	0.00	0.00
		Top Girt	Max Tension	23	1.08	0.00	0.00
			Max. Compression	10	-1.08	-0.06	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T2	132.813 - 130	Leg	Max. Mx	33	-0.12	-0.11	0.00
			Max. My	2	0.55	-0.04	-0.00
			Max. Vy	33	0.08	-0.11	0.00
			Max. Vx	19	-0.00	0.00	0.00
			Max Tension	7	3.79	0.21	-0.12
		Diagonal	Max. Compression	10	-6.52	0.09	0.06
			Max. Mx	20	-5.81	-0.24	0.01
			Max. My	2	-6.38	-0.01	-0.25
			Max. Vy	20	-1.07	-0.11	0.00
			Max. Vx	2	-1.12	-0.00	-0.11
			Max Tension	25	1.30	0.00	0.00
			Max. Compression	12	-1.43	0.00	0.00
			Max. Mx	30	0.15	-0.00	0.00
			Max. My	24	1.27	-0.00	0.00
			Max. Vy	30	0.01	-0.00	0.00
		Top Girt	Max. Vx	24	0.00	0.00	0.00
			Max Tension	27	0.21	0.00	0.00
			Max. Compression	15	-0.01	0.00	0.00
			Max. Mx	26	0.19	0.01	0.00
			Max. Vy	26	0.01	0.00	0.00
Bottom Girt	Max Tension	6	0.60	0.00	0.00		
	Max. Compression	19	-0.51	0.00	0.00		
	Max. Mx	26	0.12	0.01	0.00		
	Max. Vy	26	0.01	0.00	0.00		
	Max. Vx	20	2.57	0.00	0.79		
T3	130 - 110	Leg	Max Tension	7	35.03	1.31	-0.02
			Max. Compression	10	-42.20	-0.93	-0.02
			Max. Mx	14	30.71	1.32	-0.01
			Max. My	20	-3.87	0.01	1.11
			Max. Vy	2	-3.05	-0.94	0.01
		Diagonal	Max. Vx	20	2.57	0.00	0.79
			Max Tension	25	3.88	0.00	0.00
			Max. Compression	12	-3.93	0.00	0.00
			Max. Mx	32	0.88	-0.01	0.00
			Max. My	24	-3.05	-0.00	0.00
			Max. Vy	32	0.01	-0.01	0.00
			Max. Vx	24	-0.00	0.00	0.00
			Max Tension	18	0.57	0.00	0.00
			Max. Compression	7	-0.56	0.00	0.00
			Max. Mx	26	0.01	0.01	0.00
		Bottom Girt	Max. Vy	26	-0.01	0.00	0.00
			Max Tension	14	1.77	0.00	0.00
			Max. Compression	3	-1.73	0.00	0.00
			Max. Mx	26	0.07	0.02	0.00
			Max. Vy	26	-0.01	0.00	0.00
T4	110 - 94.9434	Leg	Max Tension	7	70.87	-0.20	0.00
			Max. Compression	2	-82.74	0.01	0.01
			Max. Mx	2	-42.18	1.99	-0.02
			Max. My	20	-3.98	0.00	-1.69
			Max. Vy	2	-3.06	1.99	-0.02
		Diagonal	Max. Vx	20	2.58	0.00	-1.69
			Max Tension	17	5.65	0.00	0.00
			Max. Compression	16	-5.69	0.00	0.00
			Max. Mx	27	1.06	-0.01	-0.00
			Max. My	12	-4.37	-0.00	-0.00
		Top Girt	Max. Vy	27	0.01	-0.01	-0.00
			Max. Vx	12	0.00	-0.00	-0.00
			Max Tension	2	1.39	0.00	0.00
			Max. Compression	15	-1.36	0.00	0.00
			Max. Mx	26	0.04	0.02	0.00
T5	94.9434 - 92.5938	Leg	Max. Vy	26	-0.02	0.00	0.00
			Max Tension	7	78.20	-0.03	0.01
			Max. Compression	2	-91.37	-0.24	-0.00
			Max. Mx	2	-91.36	0.31	-0.00
			Max. My	24	-7.24	-0.01	0.24
			Max. Vy	2	0.47	0.31	-0.00
			Max. Vx	24	0.26	-0.01	0.24

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft	
T6	92.5938 - 90	Diagonal	Max Tension	17	5.96	-0.00	0.00	
			Max. Compression	16	-6.06	0.00	0.00	
			Max. Mx	27	1.15	-0.01	0.00	
			Max. My	18	4.78	-0.01	0.00	
			Max. Vy	27	0.01	-0.01	0.00	
			Max. Vx	18	-0.00	0.00	0.00	
		Secondary Horizontal	Max Tension	2	1.58	0.00	0.00	
			Max. Compression	2	-1.58	-0.00	0.00	
			Max. Mx	36	0.30	-0.01	-0.00	
			Max. My	4	-0.41	-0.00	-0.00	
			Max. Vy	38	0.02	-0.01	-0.00	
			Max. Vx	4	-0.00	0.00	0.00	
			Leg	Max Tension	7	90.52	1.22	-0.01
				Max. Compression	2	-104.14	3.20	0.04
				Max. Mx	18	-103.71	3.22	-0.01
				Max. My	20	-7.77	0.03	-1.38
				Max. Vy	18	-7.60	3.22	-0.01
				Max. Vx	8	-3.20	0.04	1.38
		Diagonal	Max Tension	17	6.92	-0.00	0.00	
			Max. Compression	16	-7.07	0.00	0.00	
			Max. Mx	27	0.97	-0.01	0.00	
			Max. My	8	-3.30	-0.00	-0.00	
			Max. Vy	27	0.01	-0.01	0.00	
			Max. Vx	8	-0.00	-0.00	-0.00	
			Secondary Horizontal	Max Tension	2	1.72	0.00	0.00
				Max. Compression	2	-1.72	-0.01	0.00
				Max. Mx	27	-0.31	-0.01	-0.00
				Max. My	4	-1.54	-0.01	-0.00
Max. Vy	27	0.02		-0.01	-0.00			
Max. Vx	4	0.00		0.00	0.00			
Bottom Girt	Max Tension	22	0.84	0.00	0.00			
	Max. Compression	3	-0.79	0.00	0.00			
	Max. Mx	26	0.07	0.02	0.00			
	Max. Vy	26	-0.02	0.00	0.00			
	Max. Mx	7	98.38	-3.15	0.01			
	Max. Compression	2	-112.15	3.49	-0.03			
T7	90 - 80	Leg	Max. Mx	6	95.88	-4.08	-0.01	
			Max. My	4	-7.85	-0.32	-7.00	
			Max. Vy	22	0.34	-4.07	-0.01	
			Max. Vx	4	0.83	-0.32	-7.00	
			Max Tension	15	7.24	0.11	-0.03	
			Max. Compression	2	-7.83	0.00	0.00	
		Diagonal	Max. Mx	6	7.05	0.11	0.02	
			Max. My	4	-7.08	-0.08	0.03	
			Max. Vy	37	0.03	0.04	0.00	
			Max. Vx	4	-0.01	0.00	0.00	
T8	80 - 60	Leg	Max Tension	7	138.27	-6.03	-0.01	
			Max. Compression	18	-155.98	5.98	0.05	
			Max. Mx	18	-136.94	6.18	0.02	
			Max. My	4	-8.98	-0.32	-7.00	
			Max. Vy	2	-0.39	6.17	0.01	
			Max. Vx	24	0.28	-0.31	6.91	
		Diagonal	Max Tension	16	6.95	0.07	0.01	
			Max. Compression	17	-6.77	0.00	0.00	
			Max. Mx	18	6.16	0.09	0.00	
			Max. My	38	1.22	0.05	0.01	
			Max. Vy	27	-0.03	0.06	-0.01	
			Max. Vx	38	-0.00	0.00	0.00	
T9	60 - 40	Leg	Max Tension	7	171.83	-5.71	-0.02	
			Max. Compression	18	-192.94	5.67	0.02	
			Max. Mx	6	153.41	-6.00	-0.05	
			Max. My	4	-10.49	-0.03	-5.86	
			Max. Vy	22	-0.14	-5.87	0.00	
			Max. Vx	16	0.20	-0.04	5.85	
		Diagonal	Max Tension	16	6.28	0.00	0.00	
			Max. Compression	16	-6.29	0.00	0.00	
			Max. Mx	18	5.44	0.11	0.01	



Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T10	40 - 20	Leg	Max. My	34	-0.86	0.05	0.01
			Max. Vy	29	0.04	0.07	-0.01
			Max. Vx	34	-0.00	0.00	0.00
			Max Tension	7	200.87	-5.04	-0.01
			Max. Compression	18	-225.43	7.08	0.11
			Max. Mx	18	-225.43	7.08	0.11
			Max. My	4	-12.80	-0.20	-6.17
		Diagonal	Max. Vy	37	0.42	-3.92	-0.00
			Max. Vx	4	-0.29	-0.20	-6.17
			Max Tension	7	6.11	0.00	0.00
			Max. Compression	18	-6.48	0.00	0.00
			Max. Mx	18	4.84	0.10	0.01
			Max. My	28	1.71	0.08	-0.01
			Max. Vy	29	0.05	0.08	-0.01
T11	20 - 0	Leg	Max. Vx	28	0.00	0.00	0.00
			Max Tension	7	226.55	-5.28	-0.01
			Max. Compression	18	-255.40	0.00	0.00
			Max. Mx	18	-241.59	7.08	0.11
			Max. My	4	-15.07	-0.46	-9.40
			Max. Vy	37	-0.72	-3.92	-0.00
			Max. Vx	4	-1.07	-0.46	-9.40
		Diagonal	Max Tension	7	8.04	0.00	0.00
			Max. Compression	18	-8.71	0.00	0.00
			Max. Mx	18	4.62	0.14	0.02
			Max. My	4	6.75	0.12	-0.02
			Max. Vy	29	0.06	0.13	-0.01
			Max. Vx	28	0.00	0.00	0.00

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	265.09	22.93	-12.87
	Max. H <sub>x</sub>	18	265.09	22.93	-12.87
	Max. H <sub>z</sub>	7	-234.61	-20.50	11.47
	Min. Vert	7	-234.61	-20.50	11.47
	Min. H <sub>x</sub>	7	-234.61	-20.50	11.47
	Min. H <sub>z</sub>	18	265.09	22.93	-12.87
Leg B	Max. Vert	10	255.50	-21.64	-12.54
	Max. H <sub>x</sub>	23	-224.23	19.20	11.13
	Max. H <sub>z</sub>	23	-224.23	19.20	11.13
	Min. Vert	23	-224.23	19.20	11.13
	Min. H <sub>x</sub>	10	255.50	-21.64	-12.54
	Min. H <sub>z</sub>	10	255.50	-21.64	-12.54
Leg A	Max. Vert	2	259.88	-0.01	25.55
	Max. H <sub>x</sub>	20	15.78	0.52	1.35
	Max. H <sub>z</sub>	2	259.88	-0.01	25.55
	Min. Vert	15	-229.32	0.02	-22.74
	Min. H <sub>x</sub>	9	11.93	-0.51	1.01
	Min. H <sub>z</sub>	15	-229.32	0.02	-22.74

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	39.88	0.00	0.00	1.23	-2.62	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	47.86	0.00	-36.87	-2957.42	-3.81	-0.52
0.9 Dead+1.0 Wind 0 deg -	35.89	0.00	-36.87	-2957.79	-3.02	-0.52

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
No Ice						
1.2 Dead+1.0 Wind 30 deg - No Ice	47.86	18.88	-32.72	-2614.92	-1514.78	10.84
0.9 Dead+1.0 Wind 30 deg - No Ice	35.89	18.88	-32.72	-2615.29	-1513.99	10.84
1.2 Dead+1.0 Wind 60 deg - No Ice	47.86	32.35	-18.69	-1492.36	-2591.05	7.76
0.9 Dead+1.0 Wind 60 deg - No Ice	35.89	32.35	-18.69	-1492.73	-2590.27	7.76
1.2 Dead+1.0 Wind 90 deg - No Ice	47.86	36.69	-0.00	0.81	-2945.89	-3.28
0.9 Dead+1.0 Wind 90 deg - No Ice	35.89	36.69	-0.00	0.44	-2945.10	-3.28
1.2 Dead+1.0 Wind 120 deg - No Ice	47.86	31.18	18.01	1451.12	-2515.83	-0.91
0.9 Dead+1.0 Wind 120 deg - No Ice	35.89	31.18	18.01	1450.75	-2515.04	-0.91
1.2 Dead+1.0 Wind 150 deg - No Ice	47.86	17.86	30.96	2515.18	-1454.72	5.99
0.9 Dead+1.0 Wind 150 deg - No Ice	35.89	17.86	30.96	2514.81	-1453.94	5.99
1.2 Dead+1.0 Wind 180 deg - No Ice	47.86	-0.00	36.11	2925.82	-2.48	0.52
0.9 Dead+1.0 Wind 180 deg - No Ice	35.89	-0.00	36.11	2925.45	-1.69	0.52
1.2 Dead+1.0 Wind 210 deg - No Ice	47.86	-18.88	32.72	2617.88	1508.50	-10.84
0.9 Dead+1.0 Wind 210 deg - No Ice	35.89	-18.88	32.72	2617.51	1509.28	-10.84
1.2 Dead+1.0 Wind 240 deg - No Ice	47.86	-33.00	19.06	1512.60	2614.70	-7.76
0.9 Dead+1.0 Wind 240 deg - No Ice	35.89	-33.00	19.06	1512.23	2615.48	-7.76
1.2 Dead+1.0 Wind 270 deg - No Ice	47.86	-36.69	0.00	2.14	2939.61	3.28
0.9 Dead+1.0 Wind 270 deg - No Ice	35.89	-36.69	0.00	1.78	2940.39	3.28
1.2 Dead+1.0 Wind 300 deg - No Ice	47.86	-30.52	-17.63	-1430.88	2479.62	0.91
0.9 Dead+1.0 Wind 300 deg - No Ice	35.89	-30.52	-17.63	-1431.25	2480.40	0.91
1.2 Dead+1.0 Wind 330 deg - No Ice	47.86	-17.86	-30.96	-2512.22	1448.44	-5.99
0.9 Dead+1.0 Wind 330 deg - No Ice	35.89	-17.86	-30.96	-2512.59	1449.22	-5.99
1.2 Dead+1.0 Ice+1.0 Temp	113.98	0.00	0.00	5.30	-10.03	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	113.98	0.00	-8.81	-696.15	-10.15	-0.02
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	113.98	4.41	-7.65	-603.47	-361.50	1.89
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	113.98	7.63	-4.41	-344.84	-616.23	1.41
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	113.98	8.75	-0.00	5.18	-704.99	-0.34
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	113.98	7.56	4.37	352.14	-610.75	-0.11
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	113.98	4.33	7.51	605.47	-356.38	1.03
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	113.98	-0.00	8.73	703.14	-9.90	0.02
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	113.98	-4.41	7.65	614.08	341.44	-1.89
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	113.98	-7.70	4.45	357.25	599.31	-1.41
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	113.98	-8.75	0.00	5.43	684.94	0.34
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	113.98	-7.49	-4.33	-339.72	587.57	0.11
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	113.98	-4.33	-7.51	-594.86	336.33	-1.03

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	39.88	0.00	-7.67	-614.00	-2.76	-0.11
Dead+Wind 30 deg - Service	39.88	3.93	-6.80	-542.79	-316.93	2.25
Dead+Wind 60 deg - Service	39.88	6.73	-3.89	-309.38	-540.71	1.61
Dead+Wind 90 deg - Service	39.88	7.63	-0.00	1.09	-614.49	-0.68
Dead+Wind 120 deg - Service	39.88	6.48	3.74	302.65	-525.07	-0.19
Dead+Wind 150 deg - Service	39.88	3.71	6.44	523.90	-304.44	1.25
Dead+Wind 180 deg - Service	39.88	-0.00	7.51	609.28	-2.48	0.11
Dead+Wind 210 deg - Service	39.88	-3.93	6.80	545.25	311.69	-2.25
Dead+Wind 240 deg - Service	39.88	-6.86	3.96	315.44	541.70	-1.61
Dead+Wind 270 deg - Service	39.88	-7.63	0.00	1.37	609.26	0.68
Dead+Wind 300 deg - Service	39.88	-6.35	-3.67	-296.59	513.62	0.19
Dead+Wind 330 deg - Service	39.88	-3.71	-6.44	-521.43	299.21	-1.25

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-39.88	0.00	0.00	39.88	0.00	0.000%
2	0.00	-47.86	-36.87	-0.00	47.86	36.87	0.000%
3	0.00	-35.89	-36.87	-0.00	35.89	36.87	0.000%
4	18.88	-47.86	-32.72	-18.88	47.86	32.72	0.000%
5	18.88	-35.89	-32.72	-18.88	35.89	32.72	0.000%
6	32.35	-47.86	-18.69	-32.35	47.86	18.69	0.000%
7	32.35	-35.89	-18.69	-32.35	35.89	18.69	0.000%
8	36.69	-47.86	-0.00	-36.69	47.86	0.00	0.000%
9	36.69	-35.89	-0.00	-36.69	35.89	0.00	0.000%
10	31.18	-47.86	18.01	-31.18	47.86	-18.01	0.000%
11	31.18	-35.89	18.01	-31.18	35.89	-18.01	0.000%
12	17.86	-47.86	30.96	-17.86	47.86	-30.96	0.000%
13	17.86	-35.89	30.96	-17.86	35.89	-30.96	0.000%
14	-0.00	-47.86	36.11	0.00	47.86	-36.11	0.000%
15	-0.00	-35.89	36.11	0.00	35.89	-36.11	0.000%
16	-18.88	-47.86	32.72	18.88	47.86	-32.72	0.000%
17	-18.88	-35.89	32.72	18.88	35.89	-32.72	0.000%
18	-33.00	-47.86	19.06	33.00	47.86	-19.06	0.000%
19	-33.00	-35.89	19.06	33.00	35.89	-19.06	0.000%
20	-36.69	-47.86	0.00	36.69	47.86	-0.00	0.000%
21	-36.69	-35.89	0.00	36.69	35.89	-0.00	0.000%
22	-30.52	-47.86	-17.63	30.52	47.86	17.63	0.000%
23	-30.52	-35.89	-17.63	30.52	35.89	17.63	0.000%
24	-17.86	-47.86	-30.96	17.86	47.86	30.96	0.000%
25	-17.86	-35.89	-30.96	17.86	35.89	30.96	0.000%
26	0.00	-113.98	0.00	0.00	113.98	0.00	0.000%
27	0.00	-113.98	-8.81	-0.00	113.98	8.81	0.000%
28	4.41	-113.98	-7.65	-4.41	113.98	7.65	0.000%
29	7.63	-113.98	-4.41	-7.63	113.98	4.41	0.000%
30	8.75	-113.98	-0.00	-8.75	113.98	0.00	0.000%
31	7.56	-113.98	4.37	-7.56	113.98	-4.37	0.000%
32	4.33	-113.98	7.51	-4.33	113.98	-7.51	0.000%
33	-0.00	-113.98	8.73	0.00	113.98	-8.73	0.000%
34	-4.41	-113.98	7.65	4.41	113.98	-7.65	0.000%
35	-7.70	-113.98	4.45	7.70	113.98	-4.45	0.000%
36	-8.75	-113.98	0.00	8.75	113.98	-0.00	0.000%
37	-7.49	-113.98	-4.33	7.49	113.98	4.33	0.000%
38	-4.33	-113.98	-7.51	4.33	113.98	7.51	0.000%
39	0.00	-39.88	-7.67	-0.00	39.88	7.67	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
40	3.93	-39.88	-6.80	-3.93	39.88	6.80	0.000%
41	6.73	-39.88	-3.89	-6.73	39.88	3.89	0.000%
42	7.63	-39.88	-0.00	-7.63	39.88	0.00	0.000%
43	6.48	-39.88	3.74	-6.48	39.88	-3.74	0.000%
44	3.71	-39.88	6.44	-3.71	39.88	-6.44	0.000%
45	-0.00	-39.88	7.51	0.00	39.88	-7.51	0.000%
46	-3.93	-39.88	6.80	3.93	39.88	-6.80	0.000%
47	-6.86	-39.88	3.96	6.86	39.88	-3.96	0.000%
48	-7.63	-39.88	0.00	7.63	39.88	-0.00	0.000%
49	-6.35	-39.88	-3.67	6.35	39.88	3.67	0.000%
50	-3.71	-39.88	-6.44	3.71	39.88	6.44	0.000%

**Maximum Tower Deflections - Service Wind**

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	136 - 132.813	3.743	40	0.241	0.015
T2	132.813 - 130	3.574	40	0.241	0.014
T3	130 - 110	3.429	40	0.240	0.014
T4	110 - 94.9434	2.425	40	0.221	0.011
T5	94.9434 - 92.5938	1.737	40	0.189	0.009
T6	92.5938 - 90	1.642	40	0.182	0.009
T7	90 - 80	1.539	40	0.173	0.008
T8	80 - 60	1.183	40	0.151	0.008
T9	60 - 40	0.632	40	0.100	0.006
T10	40 - 20	0.272	40	0.063	0.003
T11	20 - 0	0.066	47	0.027	0.001

**Critical Deflections and Radius of Curvature - Service Wind**

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
136.00	APXVSP18-C-A20 w/ Mount Pipe	40	3.743	0.241	0.015	34703
134.00	800MHz 2X50W RRH W/FILTER	40	3.636	0.241	0.014	34703
127.00	(4) DB844H90E-XY w/ Mount Pipe	40	3.276	0.238	0.014	194784
117.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	40	2.770	0.230	0.012	80565
107.00	BXA-80063/4CF	40	2.280	0.216	0.010	35832
97.00	7770.00 w/ Mount Pipe	40	1.823	0.195	0.009	18083
87.00	800 10504 w/ Mount Pipe	40	1.425	0.165	0.008	17891
80.00	GPS_A	40	1.183	0.151	0.008	22498
72.00	GPS_A	40	0.938	0.132	0.007	23601

**Maximum Tower Deflections - Design Wind**

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	136 - 132.813	17.964	4	1.156	0.071
T2	132.813 - 130	17.151	4	1.155	0.067
T3	130 - 110	16.457	4	1.150	0.066

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T4	110 - 94.9434	11.643	4	1.060	0.052
T5	94.9434 - 92.5938	8.346	4	0.907	0.043
T6	92.5938 - 90	7.890	4	0.873	0.042
T7	90 - 80	7.396	4	0.832	0.040
T8	80 - 60	5.686	4	0.727	0.037
T9	60 - 40	3.038	4	0.481	0.027
T10	40 - 20	1.307	4	0.302	0.017
T11	20 - 0	0.318	19	0.129	0.006

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
136.00	APXVSP18-C-A20 w/ Mount Pipe	4	17.964	1.156	0.071	7244
134.00	800MHz 2X50W RRH W/FILTER	4	17.451	1.156	0.068	7244
127.00	(4) DB844H90E-XY w/ Mount Pipe	4	15.724	1.142	0.065	41771
117.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	4	13.301	1.103	0.060	17197
107.00	BXA-80063/4CF	4	10.947	1.037	0.048	7524
97.00	7770.00 w/ Mount Pipe	4	8.760	0.934	0.043	3796
87.00	800 10504 w/ Mount Pipe	4	6.850	0.793	0.039	3745
80.00	GPS_A	4	5.686	0.727	0.037	4700
72.00	GPS_A	4	4.510	0.635	0.033	4922

### 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
T2	132.813	Leg	A325N	0.625	5	1.30	27.61	0.047	1.05	Bolt DS
T3	130	Leg	A325N	0.750	5	8.44	39.76	0.212	1.05	Bolt DS
T6	92.5938	Leg	A325N	1.000	6	15.09	54.52	0.277	1.05	Bolt Tension
T7	90	Diagonal	A325N	1.000	1	7.24	10.16	0.712	1.05	Member Block Shear
T8	80	Leg	A325N	1.000	6	23.04	54.52	0.423	1.05	Bolt Tension
		Diagonal	A325N	1.000	1	6.95	10.66	0.652	1.05	Member Block Shear
T9	60	Leg	A325N	1.000	6	28.64	54.52	0.525	1.05	Bolt Tension
		Diagonal	A325N	1.000	1	6.28	11.68	0.538	1.05	Member Block Shear
T10	40	Leg	A325N	1.000	6	33.48	54.52	0.614	1.05	Bolt Tension
		Diagonal	A325N	1.000	1	6.11	11.68	0.523	1.05	Member Block Shear
T11	20	Diagonal	A325N	1.250	1	8.04	23.70	0.339	1.05	Member Block Shear

### Compression Checks

### Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T1	136 - 132.813	1 1/2	3.19	2.69	86.0 K=1.00	1.767	-2.96	46.31	0.064 <sup>1</sup>
T2	132.813 - 130	1 1/2	2.81	2.69	86.0 K=1.00	1.767	-5.12	46.31	0.110 <sup>1</sup>
T3	130 - 110	2	20.00	2.38	57.1 K=1.00	3.142	-38.85	111.36	0.349 <sup>1</sup>
T4	110 - 94.9434	2 1/4	15.06	2.35	50.1 K=1.00	3.976	-82.74	148.89	0.556 <sup>1</sup>
T5	94.9434 - 92.5938	2 1/4	2.35	1.18	25.2 K=1.00	3.976	-91.37	170.80	0.535 <sup>1</sup>
T6	92.5938 - 90	2 1/4	2.59	0.58	12.4 K=1.00	3.976	-104.14	176.91	0.589 <sup>1</sup>
T7	90 - 80	PiRod 105244 w/ (2) 1-1/4" Tie Rod	10.02	10.02	45.3 K=1.00	6.136	-112.15	237.60	0.472 <sup>1</sup>
T8	80 - 60	PiRod 105217	20.03	10.02	37.8 K=1.00	5.301	-155.98	214.86	0.726 <sup>1</sup>
T9	60 - 40	PiRod 105218	20.03	10.02	32.4 K=1.00	7.216	-192.94	300.68	0.642 <sup>1</sup>
T10	40 - 20	PiRod 105218	20.03	10.02	32.4 K=1.00	7.216	-225.43	300.68	0.750 <sup>1</sup>
T11	20 - 0	PiRod 105219	20.03	10.02	28.4 K=1.00	9.425	-255.41	399.87	0.639 <sup>1</sup>

\* DL controls

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L <sub>d</sub> ft	Kl/r	φP <sub>n</sub> K	A in <sup>2</sup>	V <sub>u</sub> K	φV <sub>n</sub> K	Stress Ratio
T7	90 - 80	0.5	1.35	109.8	276.12	0.196	0.83	3.48	0.239
T8	80 - 60	0.5	1.47	120.0	238.57	0.196	0.39	3.34	0.118
T9	60 - 40	0.5	1.46	119.0	324.71	0.196	0.20	3.38	0.060
T10	40 - 20	0.5	1.46	119.0	324.71	0.196	0.42	3.38	0.123
T11	20 - 0	0.625	1.45	94.4	424.12	0.307	1.08	6.96	0.155

### Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T1	136 - 132.813	7/8	3.35	3.25	124.6 K=0.70	0.601	-1.60	8.75	0.183 <sup>1</sup>
T2	132.813 - 130	3/4	4.82	2.33	134.4 K=0.90	0.442	-1.43	5.52	0.260 <sup>1</sup>
T3	130 - 110	7/8	5.06	2.45	121.1 K=0.90	0.601	-3.93	9.26	0.424 <sup>1</sup>
T4	110 - 94.9434	1	5.39	2.61	112.6 K=0.90	0.785	-5.69	14.00	0.406 <sup>1</sup>
T5	94.9434 - 92.5938	1	5.44	2.63	113.7 K=0.90	0.785	-6.06	13.72	0.441 <sup>1</sup>
T6	92.5938 - 90	1	5.35	2.59	111.8 K=0.90	0.785	-7.07	14.17	0.499 <sup>1</sup>
T7	90 - 80	L3x3x3/16	11.42	5.26	109.4 K=1.03	1.090	-7.83	24.13	0.325 <sup>1</sup>
T8	80 - 60	L2 1/2x2 1/2x3/16	12.50	5.63	136.4 K=1.00	0.902	-6.63	13.87	0.478 <sup>1</sup>

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T9	60 - 40	L3x3x3/16	13.80	6.33	127.4 K=1.00	1.090	-6.21	19.22	0.323 <sup>1</sup>
T10	40 - 20	L3x3x3/16	15.24	7.08	142.6 K=1.00	1.090	-6.48	15.35	0.422 <sup>1</sup>
T11	20 - 0	L3x3x5/16	16.80	7.84	159.7 K=1.00	1.780	-8.71	19.97	0.436 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T5	94.9434 - 92.5938	1 1/2	4.91	4.72	105.7 K=0.70	1.767	-1.58	35.14	0.045 <sup>1</sup>
T6	92.5938 - 90	1 1/2	4.96	4.77	106.9 K=0.70	1.767	-1.72	34.48	0.050 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T1	136 - 132.813	6x3/8	4.00	2.91	322.2 K=1.00	2.250	-1.08	4.90	0.221 <sup>1</sup>
T2	132.813 - 130	7/8	4.00	3.88	148.8 K=0.70	0.601	-0.01	6.14	0.002 <sup>1</sup>
T3	130 - 110	7/8	4.02	3.85	148.0 K=0.70	0.601	-0.56	6.20	0.090 <sup>1</sup>
T4	110 - 94.9434	1	4.52	4.34	145.7 K=0.70	0.785	-1.36	8.36	0.163 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T2	132.813 - 130	7/8	4.00	3.88	148.8 K=0.70	0.601	-0.51	6.14	0.083 <sup>1</sup>
T3	130 - 110	7/8	4.50	4.33	166.3 K=0.70	0.601	-1.73	4.91	0.352 <sup>1</sup>
T6	92.5938 - 90	1	4.99	4.80	161.2 K=0.70	0.785	-0.79	6.83	0.115 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Tension Checks

### Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T2	132.813 - 130	1 1/2	2.81	0.13	4.0	1.767	3.79	79.52	0.048 <sup>1</sup>
T3	130 - 110	2	20.00	0.13	3.0	2.188	35.03	106.69	0.328 <sup>1</sup> #
T4	110 - 94.9434	2 1/4	15.06	2.35	50.1	3.976	70.87	178.92	0.396 <sup>1</sup>
T5	94.9434 - 92.5938	2 1/4	2.35	1.17	24.9	3.976	78.20	178.92	0.437 <sup>1</sup>
T6	92.5938 - 90	2 1/4	2.59	0.58	12.4	3.976	90.52	178.92	0.506 <sup>1</sup>
T7	90 - 80	PiRod 105244 w/ (2) 1-1/4" Tie Rod	10.02	10.02	45.3	6.136	98.38	276.12	0.356 <sup>1</sup>
T8	80 - 60	PiRod 105217	20.03	10.02	37.8	5.301	138.27	238.57	0.580 <sup>1</sup>
T9	60 - 40	PiRod 105218	20.03	10.02	32.4	7.216	171.83	324.71	0.529 <sup>1</sup>
T10	40 - 20	PiRod 105218	20.03	10.02	32.4	7.216	200.87	324.71	0.619 <sup>1</sup>
T11	20 - 0	PiRod 105219	20.03	10.02	28.4	9.425	226.55	424.12	0.534 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

# Based on net area of leg in section below

### Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L <sub>d</sub> ft	Kl/r	φP <sub>n</sub> K	A in <sup>2</sup>	V <sub>u</sub> K	φV <sub>n</sub> K	Stress Ratio
T7	90 - 80	0.5	1.35	109.8	276.12	0.196	0.83	3.48	0.239
T8	80 - 60	0.5	1.47	120.0	238.57	0.196	0.39	3.34	0.118
T9	60 - 40	0.5	1.46	119.0	324.71	0.196	0.20	3.38	0.060
T10	40 - 20	0.5	1.46	119.0	324.71	0.196	0.42	3.38	0.123
T11	20 - 0	0.625	1.45	94.4	424.12	0.307	1.08	6.96	0.155

### Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
T1	136 - 132.813	7/8	3.35	3.25	178.0	0.601	1.52	27.06	0.056 <sup>1</sup>
T2	132.813 - 130	3/4	4.82	2.33	149.4	0.442	1.30	19.88	0.065 <sup>1</sup>
T3	130 - 110	7/8	5.06	2.45	134.6	0.601	3.88	27.06	0.144 <sup>1</sup>
T4	110 - 94.9434	1	5.39	2.61	125.1	0.785	5.65	35.34	0.160 <sup>1</sup>
T5	94.9434 - 92.5938	1	5.44	2.63	126.3	0.785	5.96	35.34	0.169 <sup>1</sup>
T6	92.5938 - 90	1	5.35	2.59	124.2	0.785	6.92	35.34	0.196 <sup>1</sup>
T7	90 - 80	L3x3x3/16	11.42	5.26	69.3	0.659	7.24	28.68	0.252 <sup>1</sup>
T8	80 - 60	L2 1/2x2 1/2x3/16	11.93	5.38	86.2	0.518	6.95	22.55	0.308 <sup>1</sup>
T9	60 - 40	L3x3x3/16	13.13	6.02	79.5	0.659	6.28	28.68	0.219 <sup>1</sup>
T10	40 - 20	L3x3x3/16	15.24	7.08	93.2	0.659	6.11	28.68	0.213 <sup>1</sup>
T11	20 - 0	L3x3x5/16	16.80	7.84	105.3	1.013	8.04	44.05	0.182 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Secondary Horizontal Design Data (Tension)



Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KI/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio P <sub>u</sub> / φP <sub>n</sub>
T5	94.9434 - 92.5938	1 1/2	4.91	4.72	151.0	1.767	1.58	79.52	0.020 <sup>1</sup>
T6	92.5938 - 90	1 1/2	4.96	4.77	152.7	1.767	1.72	79.52	0.022 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KI/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio P <sub>u</sub> / φP <sub>n</sub>
T1	136 - 132.813	6x3/8	4.00	2.91	322.2	2.250	1.08	72.90	0.015 <sup>1</sup>
T2	132.813 - 130	7/8	4.00	3.88	212.6	0.601	0.21	27.06	0.008 <sup>1</sup>
T3	130 - 110	7/8	4.02	3.85	211.4	0.601	0.57	27.06	0.021 <sup>1</sup>
T4	110 - 94.9434	1	4.52	4.34	208.1	0.785	1.39	35.34	0.039 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KI/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio P <sub>u</sub> / φP <sub>n</sub>
T2	132.813 - 130	7/8	4.00	3.88	212.6	0.601	0.60	27.06	0.022 <sup>1</sup>
T3	130 - 110	7/8	4.50	4.33	237.5	0.601	1.77	27.06	0.066 <sup>1</sup>
T6	92.5938 - 90	1	4.99	4.80	230.3	0.785	0.84	35.34	0.024 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

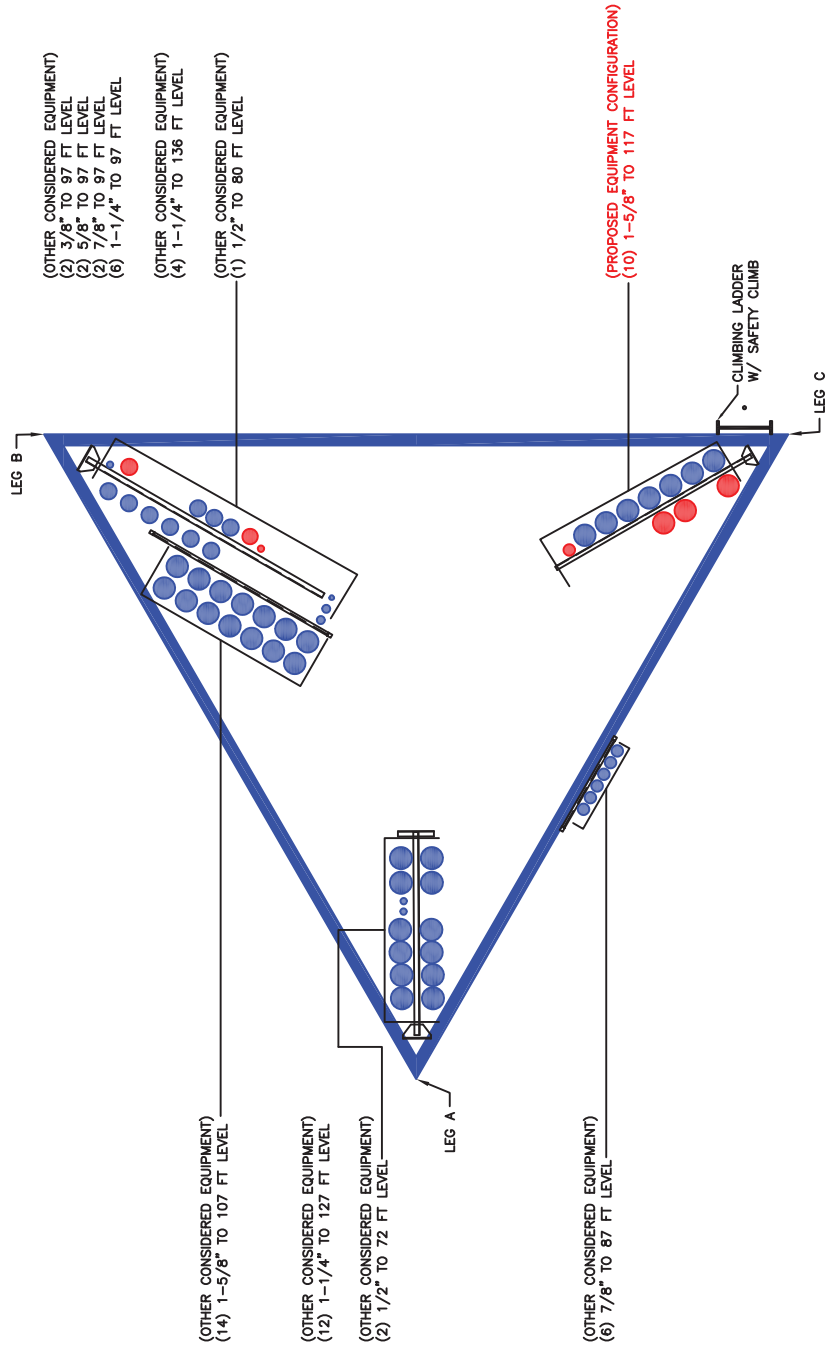
### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	φP <sub>allow</sub> K	% Capacity	Pass Fail
T1	136 - 132.813	Leg	1 1/2	2	-2.96	46.31	6.4	Pass
T2	132.813 - 130	Leg	1 1/2	14	-5.12	48.62	10.5	Pass
T3	130 - 110	Leg	2	29	-38.85	116.92	33.2	Pass
T4	110 - 94.9434	Leg	2 1/4	87	-82.74	156.33	52.9	Pass
T5	94.9434 - 92.5938	Leg	2 1/4	129	-91.37	179.34	51.0	Pass
T6	92.5938 - 90	Leg	2 1/4	141	-104.14	185.75	56.1	Pass
T7	90 - 80	Leg	PiRod 105244 w/ (2) 1-1/4" Tie Rod	156	-112.15	249.48	45.0	Pass
T8	80 - 60	Leg	PiRod 105217	163	-155.98	225.60	69.1	Pass
T9	60 - 40	Leg	PiRod 105218	178	-192.94	315.72	61.1	Pass
T10	40 - 20	Leg	PiRod 105218	193	-225.43	315.72	71.4	Pass
T11	20 - 0	Leg	PiRod 105219	208	-255.41	419.86	60.8	Pass
T1	136 - 132.813	Diagonal	7/8	9	-1.60	9.18	17.5	Pass
T2	132.813 - 130	Diagonal	3/4	24	-1.43	5.80	24.7	Pass
T3	130 - 110	Diagonal	7/8	39	-3.93	9.72	40.4	Pass
T4	110 - 94.9434	Diagonal	1	96	-5.69	14.70	38.7	Pass
T5	94.9434 - 92.5938	Diagonal	1	135	-6.06	14.41	42.0	Pass
T6	92.5938 - 90	Diagonal	1	150	-7.07	14.87	47.6	Pass
T7	90 - 80	Diagonal	L3x3x3/16	161	-7.83	25.34	30.9	Pass

67.8 (b)

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail	
T8	80 - 60	Diagonal	L2 1/2x2 1/2x3/16	171	-6.63	14.57	45.5	Pass	
T9	60 - 40	Diagonal	L3x3x3/16	181	-6.21	20.18	62.1 (b) 30.8	Pass	
T10	40 - 20	Diagonal	L3x3x3/16	196	-6.48	16.11	51.2 (b) 40.2	Pass	
T11	20 - 0	Diagonal	L3x3x5/16	211	-8.71	20.97	49.8 (b) 41.6	Pass	
T5	94.9434 - 92.5938	Secondary Horizontal	1 1/2	137	-1.58	36.90	4.3	Pass	
T6	92.5938 - 90	Secondary Horizontal	1 1/2	153	-1.72	36.21	4.8	Pass	
T1	136 - 132.813	Top Girt	6x3/8	5	-1.08	5.14	21.1	Pass	
T2	132.813 - 130	Top Girt	7/8	16	0.21	28.41	0.7	Pass	
T3	130 - 110	Top Girt	7/8	32	-0.56	6.51	8.6	Pass	
T4	110 - 94.9434	Top Girt	1	88	-1.36	8.78	15.5	Pass	
T2	132.813 - 130	Bottom Girt	7/8	20	-0.51	6.44	7.9	Pass	
T3	130 - 110	Bottom Girt	7/8	34	-1.73	5.16	33.5	Pass	
T6	92.5938 - 90	Bottom Girt	1	142	-0.79	7.17	11.0	Pass	
							Summary		
							Leg (T10)	71.4	Pass
							Diagonal (T7)	67.8	Pass
							Secondary Horizontal (T6)	4.8	Pass
							Top Girt (T1)	21.1	Pass
							Bottom Girt (T3)	33.5	Pass
							Bolt Checks	67.8	Pass
							<b>RATING =</b>	<b>71.4</b>	<b>Pass</b>

**APPENDIX B**  
**BASE LEVEL DRAWING**



**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

**Truss Leg Reinforcement**



BU # :	876338
Site Name:	Waterford
Order:	479861 rev 2
Elevation:	80-90

TIA-222 Revision: H

Existing Tie Rods	
Diameter, de:	1.25 in
Unbraced Length, Le:	14.18 in
Yield Strength, Fye:	50 ksi

New Tie Rods	
Diameter, dn:	1.25 in
Unbraced Length, Ln:	14.18 in
Offset, X:	0.625 in
Yield Strength, Fyn:	50 ksi

Truss Leg	
Width, w:	12 in
Unbraced Length, Lleg:	10 ft

Reactions from tnx	
Compression, C:	112.15 kip
Tension, T:	98.38 kip

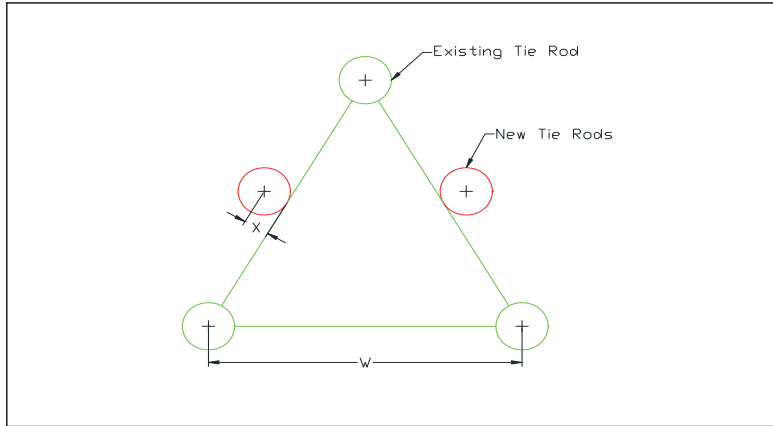
Output from tnx	
KL/r Modified Leg, KLtnx:	35.2

Length Factors	
Length Factor of Existing Tie Rods, Ke:	1
Length Factor of New Tie Rods, Kn:	1
Length Factor of the Leg, Kleg:	1

Results				
	Demand	Capacity	Rating*	Check
Compression (Existing Tie Rods), kip:	22.43	47.51	45.0%	Pass
Compression (New Tie Rods), kip:	22.43	47.51	45.0%	Pass
Compression (Modified Tie Rods), kip:	112.15	257.98	41.4%	Pass
Tension (Existing Tie Rods), kip:	19.68	55.22	33.9%	Pass
Tension (New Tie Rods), kip:	19.68	55.22	33.9%	Pass
Tension (Modified Tie Rods), kip:	98.38	276.12	33.9%	Pass

\*Section 15.5 Applied

Adjustments for tnx		
Diameter of modified truss leg, Deq:	1.614	in
Leg K Factor Adjustment, K:	1.289	



# Self Support Anchor Rod Capacity



Site Info	
BU #	876338
Site Name	Waterford
Order #	479831 rev 2

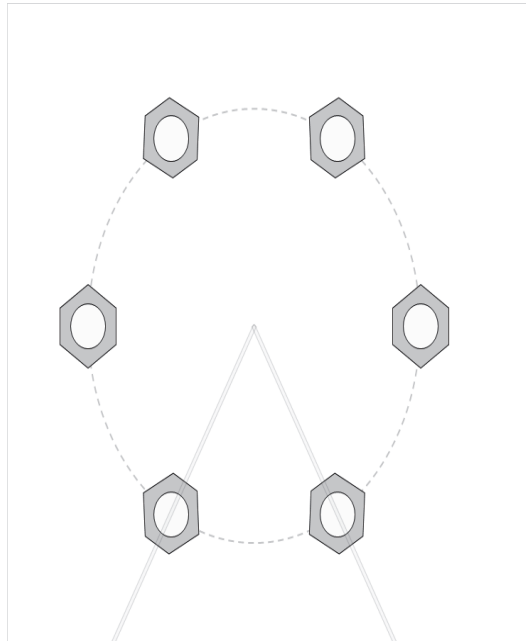
Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes
$l_{ar}$ (in)	1.25

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	265.00	235.00
Shear Force (kips)	26.00	23.00

\*TIA-222-H Section 15.5 Applied

Considered Eccentricity	
Leg Mod Eccentricity (in)	0.000
Anchor Rod N.A Shift (in)	0.000
Total Eccentricity (in)	0.000

\*Anchor Rod Eccentricity Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
(6) 1-1/4" $\phi$ bolts (A687 N; Fy=105 ksi, Fu=125 ksi)
$l_{ar}$ (in): 1.25

Anchor Rod Summary		(units of kips, kip-in)
$Pu_t = 39.17$	$\phi Pn_t = 90.84$	<b>Stress Rating</b>
$Vu = 3.83$	$\phi Vn = 57.52$	<b>18.1%</b>
$Mu = n/a$	$\phi Mn = n/a$	<b>Pass</b>

# SST Unit Base Foundation



BU #: 876338  
 Site Name: Waterford  
 App. Number: 479831 rev 2

TIA-222 Revision: H

Top & Bot. Pad Rein. Different?:	<input type="checkbox"/>
Tower Centroid Offset?:	<input type="checkbox"/>
Block Foundation?:	<input type="checkbox"/>
Rectangular Pad?:	<input type="checkbox"/>

Superstructure Analysis Reactions		
Global Moment, <b>M</b> :	3022	ft-kips
Global Axial, <b>P</b> :	48	kips
Global Shear, <b>V</b> :	38	kips
Leg Compression, <b>P<sub>comp</sub></b> :	265	kips
Leg Comp. Shear, <b>V<sub>u,comp</sub></b> :	26	kips
Leg Uplift, <b>P<sub>uplift</sub></b> :	235	kips
Leg Uplift. Shear, <b>V<sub>u,uplift</sub></b> :	23	kips
Tower Height, <b>H</b> :	136	ft
Base Face Width, <b>BW</b> :	14	ft
BP Dist. Above Fdn, <b>bp<sub>dist</sub></b> :	2.5	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	249.37	38.00	14.5%	Pass
Bearing Pressure (ksf)	6.00	2.62	43.7%	Pass
Overturning (kip*ft)	4583.64	3276.92	71.5%	Pass
Pier Flexure (Comp.) (kip*ft)	856.77	84.50	9.4%	Pass
Pier Flexure (Tension) (kip*ft)	487.98	74.75	14.6%	Pass
Pier Compression (kip)	3374.26	269.14	7.6%	Pass
Pad Flexure (kip*ft)	6695.87	929.71	13.2%	Pass
Pad Shear - 1-way (kips)	777.96	144.55	17.7%	Pass
Pad Shear - Comp 2-way (ksi)	0.164	0.036	21.0%	Pass
Flexural 2-way (Comp) (kip*ft)	5260.90	50.70	0.9%	Pass
Pad Shear - Tension 2-way (ksi)	0.164	0.036	20.9%	Pass
Flexural 2-way (Tension) (kip*ft)	5260.90	44.85	0.8%	Pass

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, <b>dpier</b> :	3.0	ft
Ext. Above Grade, <b>E</b> :	0.50	ft
Pier Rebar Size, <b>Sc</b> :	8	
Pier Rebar Quantity, <b>mc</b> :	15	
Pier Tie/Spiral Size, <b>St</b> :	4	
Pier Tie/Spiral Quantity, <b>mt</b> :	7	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, <b>cc<sub>pier</sub></b> :	3	in

\*Rating per TIA-222-H Section 15.5

Soil Rating*:	71.5%
Structural Rating*:	21.0%

Pad Properties		
Depth, <b>D</b> :	6.00	ft
Pad Width, <b>W<sub>1</sub></b> :	23.00	ft
Pad Thickness, <b>T</b> :	3.25	ft
Pad Rebar Size (Bottom dir. 2), <b>Sp<sub>2</sub></b> :	9	
Pad Rebar Quantity (Bottom dir. 2), <b>mp<sub>2</sub></b> :	46	
Pad Clear Cover, <b>cc<sub>pad</sub></b> :	3	in

Material Properties		
Rebar Grade, <b>Fy</b> :	60	ksi
Concrete Compressive Strength, <b>F'c</b> :	3	ksi
Dry Concrete Density, <b>δc</b> :	150	pcf

Soil Properties		
Total Soil Unit Weight, <b>γ</b> :	125	pcf
Ultimate Gross Bearing, <b>Qult</b> :	8.000	ksf
Cohesion, <b>Cu</b> :	0.000	ksf
Friction Angle, <b>φ</b> :	36	degrees
SPT Blow Count, <b>N<sub>blows</sub></b> :	25	
Base Friction, <b>μ</b> :		
Neglected Depth, <b>N</b> :	3.3	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, <b>gw</b> :	N/A	ft

<-- Toggle between Gross and Net

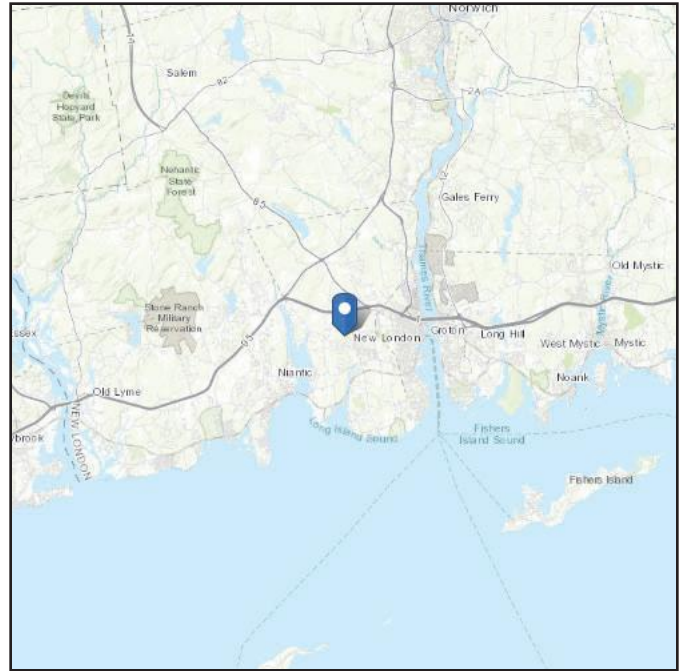
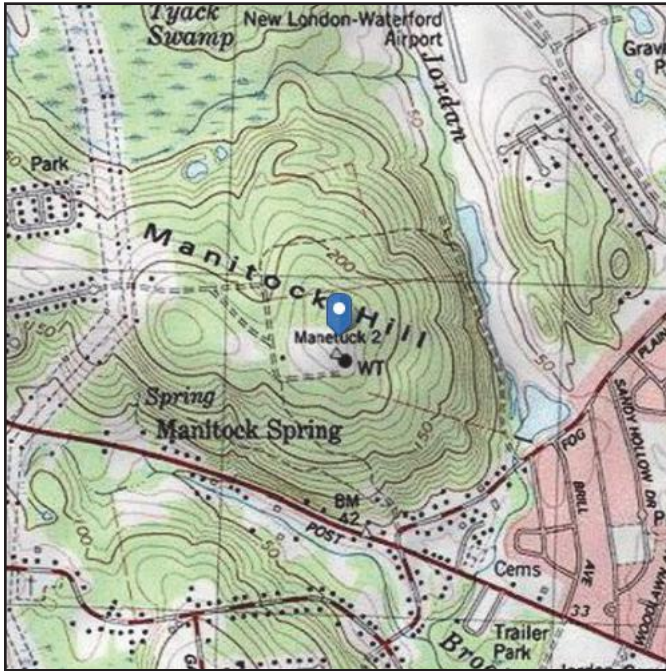


# ASCE 7 Hazards Report

**Address:**  
No Address at This  
Location

**Standard:** ASCE/SEI 7-10  
**Risk Category:** II  
**Soil Class:** D - Stiff Soil

**Elevation:** 242 ft (NAVD 88)  
**Latitude:** 41.354639  
**Longitude:** -72.150444

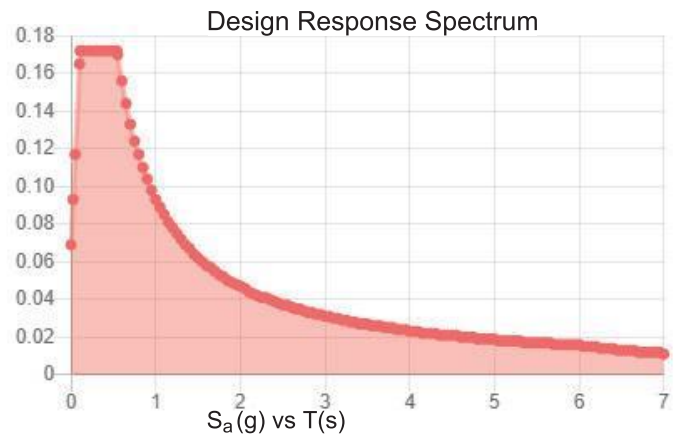
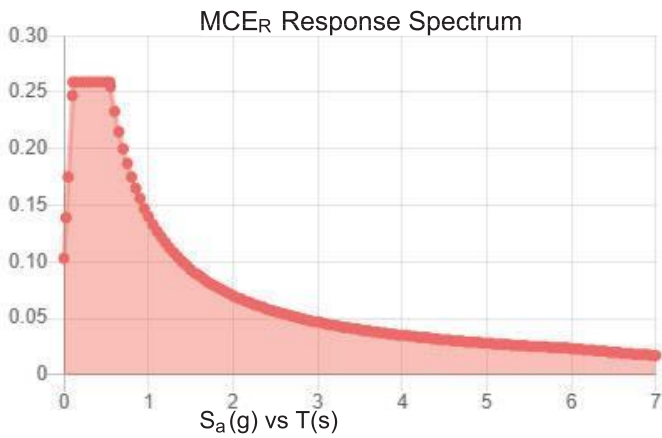


**Site Soil Class:** D - Stiff Soil

**Results:**

$S_s$ :	0.162	$S_{DS}$ :	0.172
$S_1$ :	0.058	$S_{D1}$ :	0.093
$F_a$ :	1.6	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.081
$S_{MS}$ :	0.259	PGA <sub>M</sub> :	0.129
$S_{M1}$ :	0.14	$F_{PGA}$ :	1.6
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:**

Mon Nov 23 2020

**Date Source:**

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

## Ice

---

### Results:

Ice Thickness: 0.75 in.

Concurrent Temperature: 15 F

Gust Speed: 50 mph

**Data Source:** Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

**Date Accessed:** Mon Nov 23 2020

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

---

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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Date: June 13, 2019

Charles McGuirt  
Crown Castle  
3530 Toringdon Way  
Charlotte, NC 28277

Paul J Ford and Company  
250 E. Broad Street, Suite 600  
Columbus, OH 43215  
614.221.6679

**Subject:** Mount Replacement Report

**Carrier Designation:** T-Mobile Equipment Change-out  
**Carrier Site Number:** CT11381C  
**Carrier Site Name:** WATERFOR SOUTH/RT 1

**Crown Castle Designation:** Crown Castle BU Number: 876338  
Crown Castle Site Name: Waterford  
Crown Castle JDE Job Number: 559325  
Crown Castle Purchase Order Number: 1398265  
Crown Castle Order Number: 479831 Rev. 2

**Engineering Firm Designation:** Paul J Ford and Company Project Number: A37519-1579.003.8190

**Site Data:** 41 Manitock Hill Road, Waterford, New London County, CT  
Latitude 41.354639°, Longitude -72.150444°

**Structure Information:** Tower Height & Type: 136 Foot Self Support  
Mount Elevation: 117 Foot  
Mount Type: (3) 12.5 Foot Sector Frame

Dear Charles McGuirt,

Paul J Ford and Company is pleased to submit this "Mount Replacement Report" to determine the structural integrity of the T-Mobile antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

**12.5' Sector Frame (typical)**

**SUFFICIENT\***

**90.1%**

\*The mount has sufficient capacity once the changes, as described in Section 4.1 Recommendations of this report, are completed.

This analysis utilizes an ultimate 3-second gust wind speed of 135 mph as required by the 2018 Connecticut State Building Code and Appendix N. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully submitted by:



Angela Sage, E.I.  
Structural Designer  
[asage@pauljford.com](mailto:asage@pauljford.com)

BMD



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MANUFACTURER DRAWINGS (FOR REFERENCE ONLY)

**1) INTRODUCTION**

The proposed mounts under consideration are (3) 12.5' Sector Frame mounts designated as a SitePro1 VFA12-HD.

**2) ANALYSIS CRITERIA**

**TIA-222 Revision:** TIA-222-H  
**Risk Category:** II  
**Ultimate Wind Speed:** 135 mph  
**Exposure Category:** B  
**Topographic Factor at Base:** 1  
**Topographic Factor at Mount:** 1  
**Ice Thickness:** 1.5 in  
**Wind Speed with Ice:** 50 mph  
**Live Loading Wind Speed:** 30 mph  
**Man Live Load at Mid/End-Points:** 250 lb  
**Man Live Load at Mount Pipes:** 500 lb

**Table 1 - Proposed Equipment Configuration**

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
117	119	3	ERICSSON	ERICSSON AIR 21 B2A B4P	(3) 12.5' SitePro1 VFA12-HD
		3	ERICSSON	ERICSSON AIR 21 B4A B2P	
		3	RFS CELWAVE	APXVAARR24_43-U-NA20	
		3	ERICSSON	KRY 112 144/1	
		3	ERICSSON	RADIO 4449 B12/B71	

### 3) ANALYSIS PROCEDURE

**Table 2 - Documents Provided**

Document	Remarks	Reference	Source
Mount Manufacturer Drawings	SitePro1 VFA12-HD Dated: 12/13/2017	-	SitePro1
Order	ID: 479831 Rev. 2 Dated: 04/15/2019	-	CCISites

#### 3.1) Analysis Method

RISA-3D (version 17.0.2), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision C).

#### 3.2) Assumptions

- 1) *The analysis of the existing tower or the effect of the mount attachment to the tower is not within the current scope of work.*
- 2) *The antenna mounting system was properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications and all bolts are tightened as specified by the manufacturer and AISC requirements.*
- 3) *The configuration of antennas, mounts, and other appurtenances are as specified in Table 1.*
- 4) *All member connections have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report. All U-Bolt connections have been properly tightened. This analysis will be required to be revised if the existing conditions in the field differ from those shown in the above referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.*
- 5) *Steel grades are as follows, unless noted otherwise:*

a) Channel, Solid Round, Angle, Plate, Unistrut	ASTM A36 (GR 36)
b) Pipe	ASTM A53 (GR 35)
c) HSS (Rectangular)	ASTM 500 (GR B-46)
d) HSS (Round)	ASTM 500 (GR B-42)
e) Threaded Rods	ASTM F1554 (GR 36)
f) Connection Bolts	ASTM A325
g) U-Bolts	SAE J429 (GR 2)
- 6) *Proposed equipment is to be installed in the locations specified in Appendix A. Any changes to the proposed equipment locations will render this report invalid.*

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the mount.

#### 4) ANALYSIS RESULTS

**Table 3 - Mount Component Capacity**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1, 2	Face Horizontals	117	45.8	Pass
1, 2	Standoff Members		30.8	Pass
1, 2	Tie Backs		7.0	Pass
1, 2	Bracing Members		90.1	Pass
1, 2	Mount Pipes		78.7	Pass
1, 2	Mount to Tower Connection		22.0	Pass

<b>Mount Rating (max from all components) =</b>	<b>90.1%</b>
---	--------------

Notes:

- 1) See additional documentation in "Appendix C – Software Analysis Output" for calculations supporting the % capacity consumed.
- 2) All sectors are typical.

**Table 4 - Tieback Connection Data Table**

Tower Connection Node No.	Existing / Proposed	Resultant End Reaction (lb)	Connected Member Type	Connected Member Size	Member Compressive Capacity (lb) <sup>2</sup>	Notes
N59B	Proposed	660	Leg	SR 2	5568	1
N59A	Proposed	748	Leg	SR 2	5568	1

Notes:

- 1) Tieback connection point WILL be within 25% of either end of the connected tower member
- 2) Reduced member compressive capacity according to CED-STD-10294 *Standard for Installation of Mounts and Appurtenances*

#### 4.1) Recommendations

The existing mount does not have sufficient capacity to support the existing and proposed loading. In order for the results of the analysis to be considered valid, the mount listed below shall be installed to support the proposed loading configuration.

- SitePro1 VFA12-HD

**Tiebacks must be installed as shown in Appendix A.**



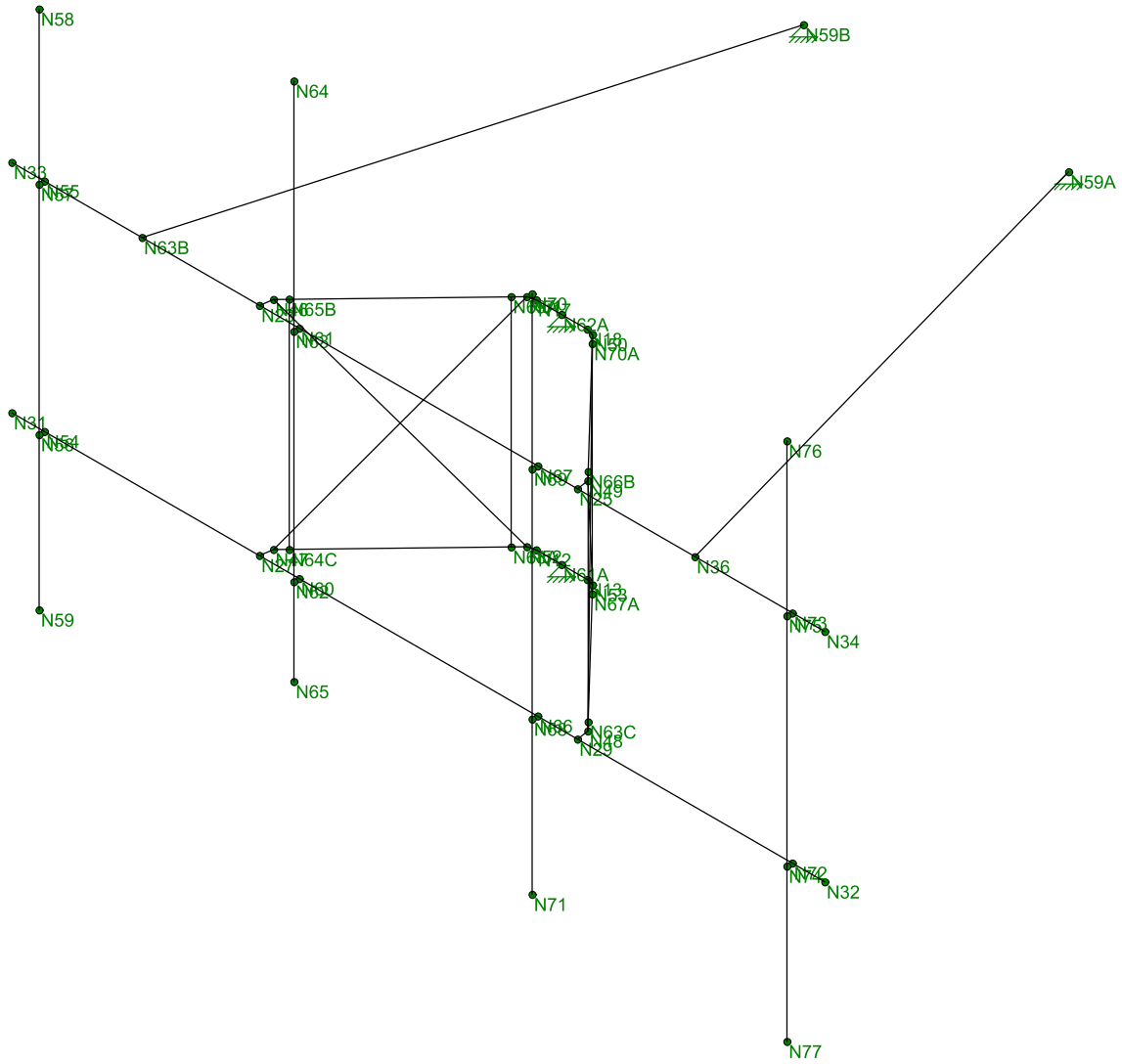
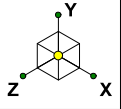
**STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING  
SERVICES ON EXISTING MOUNTS BY PAUL J. FORD AND COMPANY**

- 1) It is the responsibility of the client to ensure that the information provided to Paul J. Ford and Company is accurate and complete. Paul J. Ford and Company will rely on the accuracy and completeness of such information in performing or furnishing services under this project.
- 2) If the existing conditions are not as represented on the referenced drawings and/or documents, Paul J. Ford and Company should be contacted immediately to evaluate the significance of the deviation.
- 3) The mount has been analyzed according to the minimum design loads recommended by the Reference Standard. If additional design loads are required, Paul J. Ford and Company should be made aware of this prior to the start of the project.
- 4) The standard of care for all Professional Engineering Services performed or furnished by Paul J. Ford and Company under this project will be the skill and care used by members of the Consultant's profession practicing under similar circumstances at the same time and in the same locality.
- 5) All Services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Paul J. Ford and Company is not responsible for the conclusions, opinions and/or recommendations made by others based on the information supplied herein.

\*\*\*\*\*

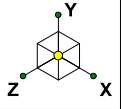
# **APPENDIX A**

## **WIRE FRAME AND RENDERED MODELS**



Envelope Only Solution

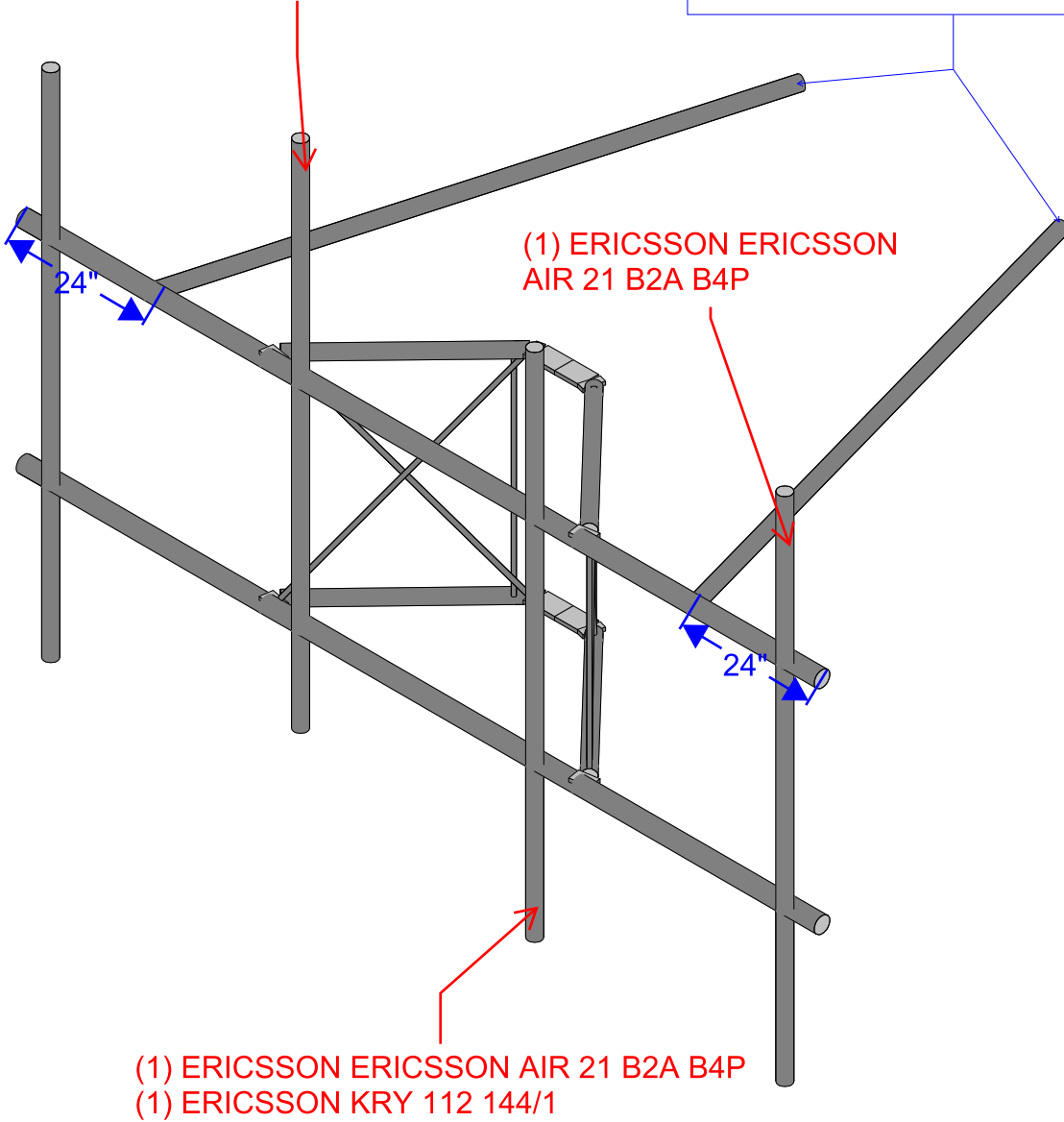
Paul J. Ford and Company	876338 - Waterford	SK - 1
AMS		June 13, 2019 at 9:11 AM
37519-1579.003.8190		37519-1579.003.8190_Wind Load....



LOADING CONFIGURATION DIFFERS PER SECTOR.  
 MOST CONSERVATIVE CASE REPORTED.

TIEBACKS SHALL BE CONNECTED  
 WITHIN 25% OF EITHER END OF  
 THE ADJACENT TOWER LEG  
 MEMBER'S LENGTH.

(1) RFS CELWAVE APXVAARR24\_U-NA20  
 (1) ERICSSON RADIO 4449 B12/B71



Envelope Only Solution

Paul J. Ford and Company	876338 - Waterford	SK - 2
AMS		June 13, 2019 at 9:12 AM
37519-1579.003.8190		37519-1579.003.8190_Wind Load....

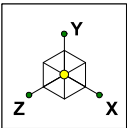
# **APPENDIX B**

## **SOFTWARE INPUT CALCULATION**

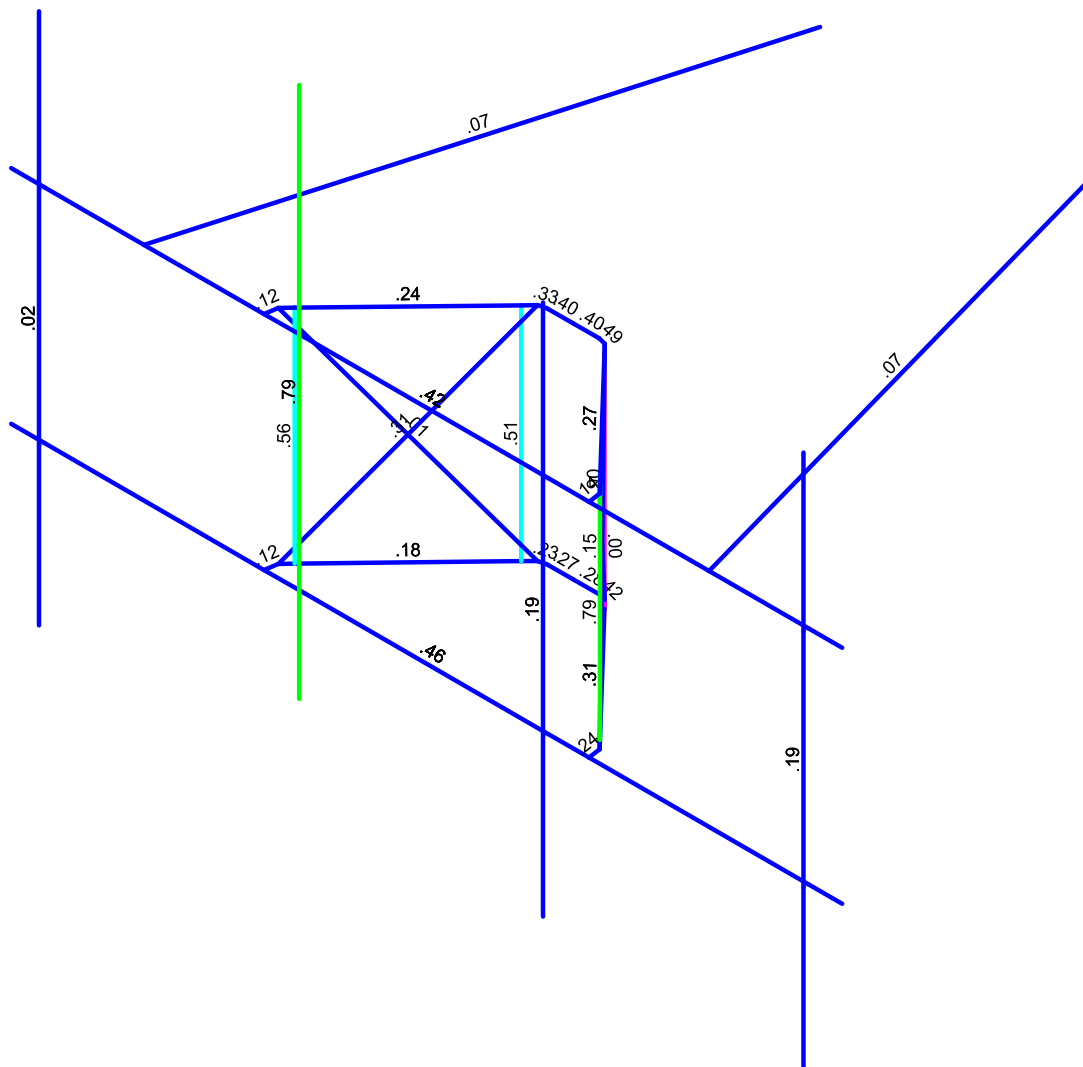


# **APPENDIX C**

## **SOFTWARE ANALYSIS OUTPUT**



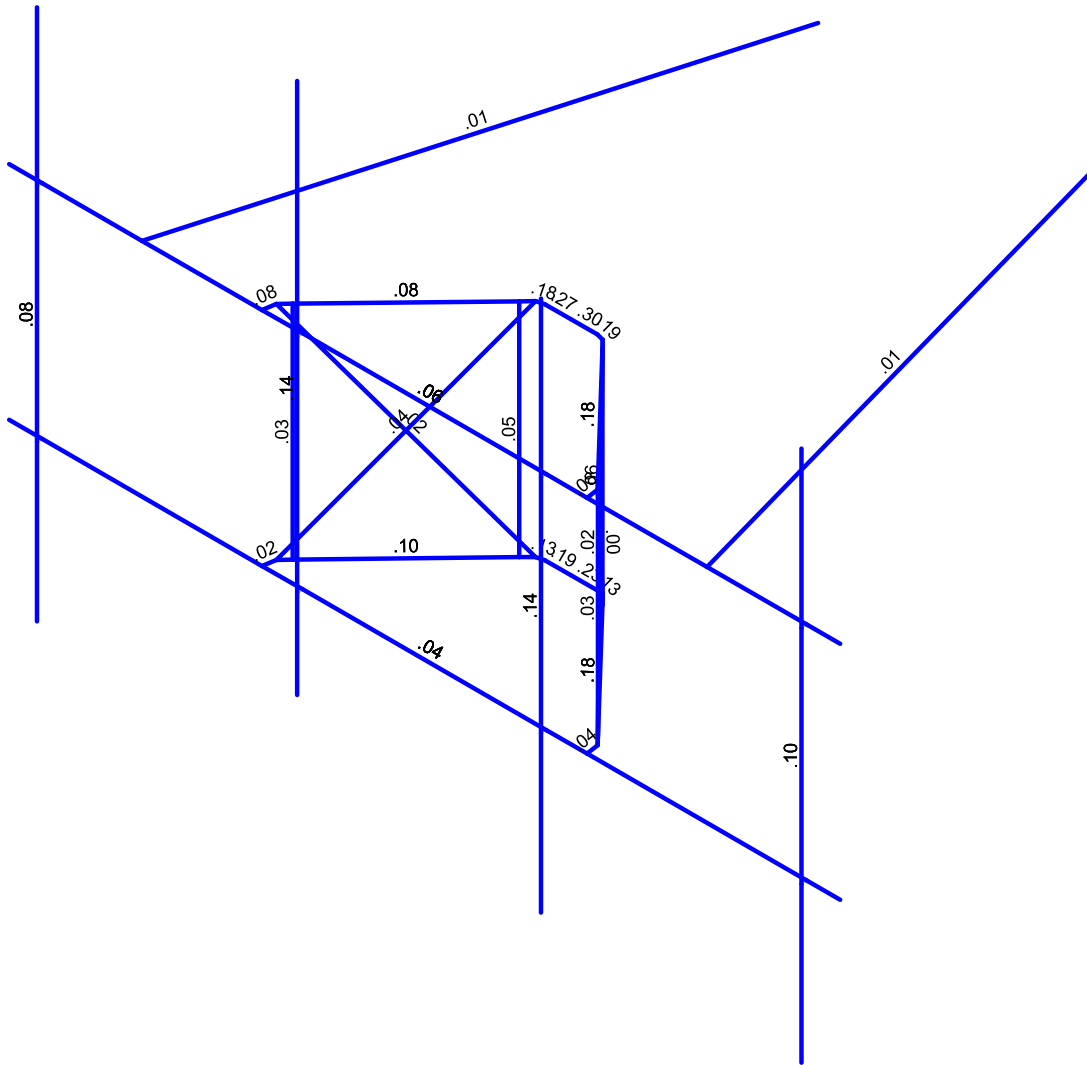
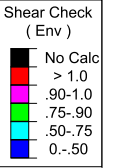
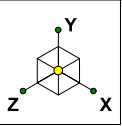
Code Check ( Env )	
Black	No Calc
Red	> 1.0
Pink	.90-1.0
Green	.75-.90
Cyan	.50-.75
Blue	0.-.50



Member Code Checks Displayed (Enveloped)  
Envelope Only Solution

Paul J. Ford and Company	876338 - Waterford	SK - 3
AMS		June 13, 2019 at 9:14 AM
37519-1579.003.8190		37519-1579.003.8190_Wind Load....



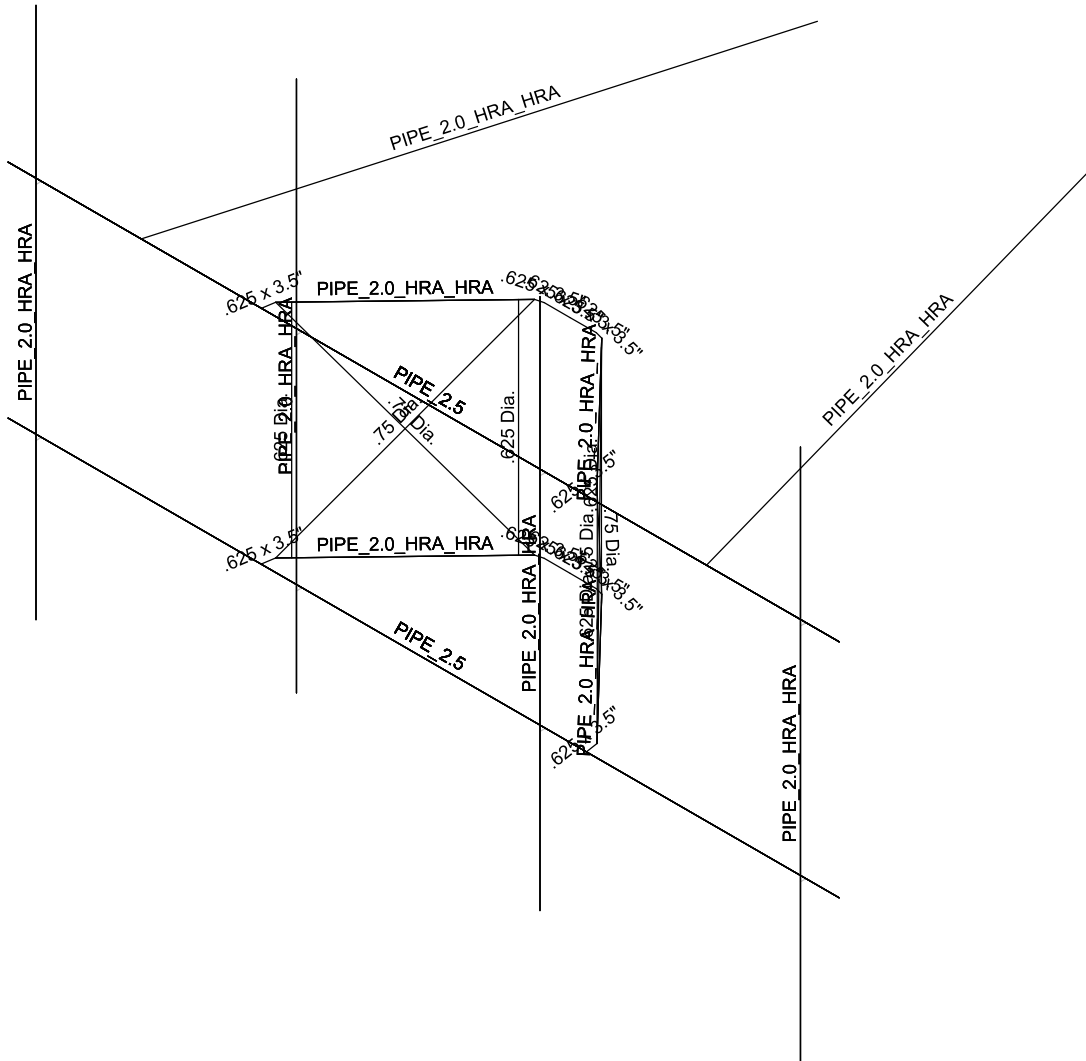
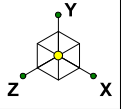


Member Shear Checks Displayed (Enveloped)  
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AMS
37519-1579.003.8190

876338 - Waterford

SK - 4
June 13, 2019 at 9:14 AM
37519-1579.003.8190_Wind Load....



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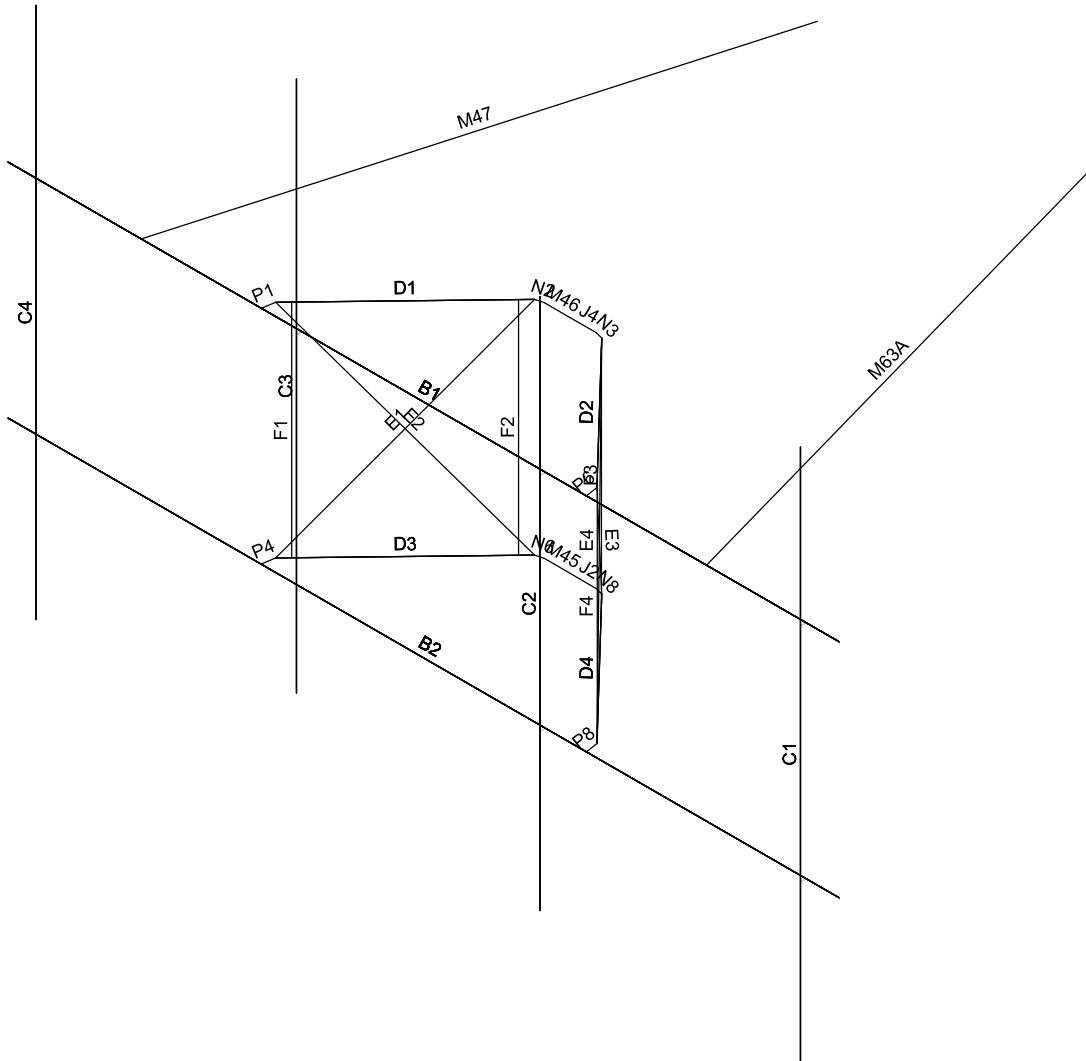
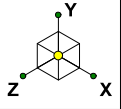
37519-1579.003.8190

876338 - Waterford

SK - 5

June 13, 2019 at 9:14 AM

37519-1579.003.8190\_Wind Load....



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AMS

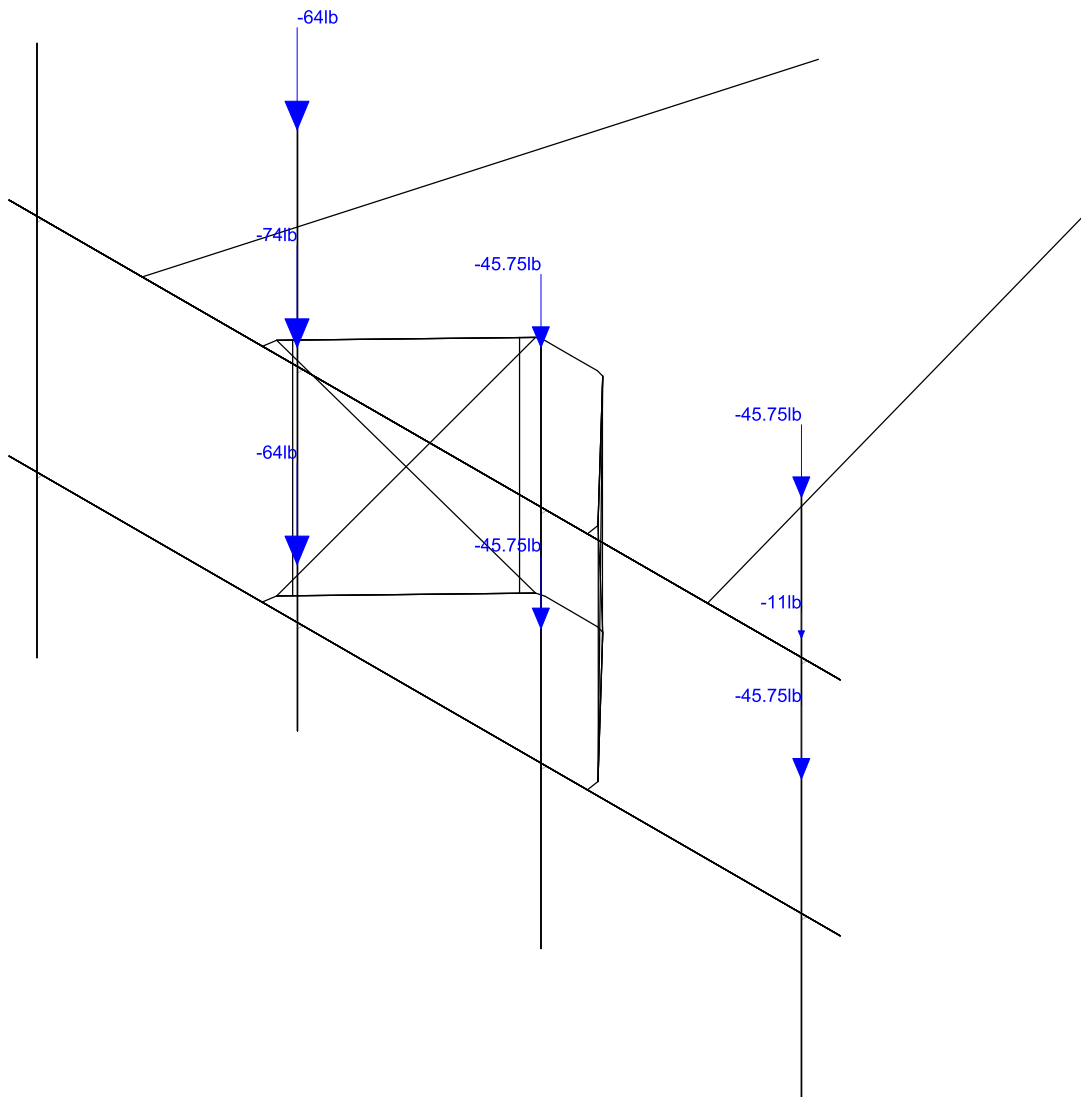
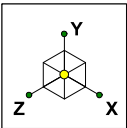
37519-1579.003.8190

876338 - Waterford

SK - 6

June 13, 2019 at 9:14 AM

37519-1579.003.8190\_Wind Load....



Loads: BLC 1, Dead  
Envelope Only Solution

Paul J. Ford and Company	876338 - Waterford	SK - 7
AMS		June 13, 2019 at 9:14 AM
37519-1579.003.8190		37519-1579.003.8190_Wind Load....



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 Designer : AMS  
 Job Number : 37519-1579.003.8190  
 Model Name : 876338 - Waterford

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**(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 (in/sec^2)	386.4
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 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISACONNECTION CODE	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parame Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR SET ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8



**(Global) Model Settings, Continued**

Seismic Code	ASCE 7-10
Seismic Base Elevation (in)	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 (11...Density[k/...	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 Gr. B	29000	11154	.3	.65 .49	35	1.5	60	1.2

**Member Primary Data**

	Label	I Joint	J Joint	K Joint	Rotate(de...	Section/Shape	Type	Design List	Material	Design Rules
1	D4	N53	N48			PIPE 2.0 HRA HRA	None	None	A53 Gr. B	Typical
2	D3	N52	N47			PIPE 2.0 HRA HRA	None	None	A53 Gr. B	Typical
3	D1	N51	N46			PIPE 2.0 HRA HRA	None	None	A53 Gr. B	Typical
4	D2	N50	N49			PIPE 2.0 HRA HRA	None	None	A53 Gr. B	Typical
5	F2	N69A	N68A			.625 Dia.	None	None	A36 Gr.36	Typical
6	F1	N65B	N64C			.625 Dia.	None	None	A36 Gr.36	Typical
7	F3	N70A	N67A			.625 Dia.	None	None	A36 Gr.36	Typical
8	F4	N66B	N63C			.625 Dia.	None	None	A36 Gr.36	Typical
9	J2	N13	N61A		90	.625 x 3.5"	None	None	A36 Gr.36	Typical
10	N6	N12	N52		90	.625 x 3.5"	None	None	A36 Gr.36	Typical
11	N8	N13	N53		90	.625 x 3.5"	None	None	A36 Gr.36	Typical
12	J4	N18	N62A		90	.625 x 3.5"	None	None	A36 Gr.36	Typical
13	N2	N17	N51		90	.625 x 3.5"	None	None	A36 Gr.36	Typical
14	N3	N18	N50		90	.625 x 3.5"	None	None	A36 Gr.36	Typical
15	E1	N51	N47			.75 Dia.	None	None	A36 Gr.36	Typical
16	E2	N52	N46			.75 Dia.	None	None	A36 Gr.36	Typical
17	E3	N53	N49			.75 Dia.	None	None	A36 Gr.36	Typical
18	E4	N48	N50			.75 Dia.	None	None	A36 Gr.36	Typical
19	P1	N23	N46		90	.625 x 3.5"	None	None	A36 Gr.36	Typical
20	P6	N25	N49		90	.625 x 3.5"	None	None	A36 Gr.36	Typical



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**Member Primary Data (Continued)**

	Label	I Joint	J Joint	K Joint	Rotate(de...	Section/Shape	Type	Design List	Material	Design Rules
21	P4	N27	N47		90	.625 x 3.5"	None	None	A36 Gr.36	Typical
22	P8	N29	N48		90	.625 x 3.5"	None	None	A36 Gr.36	Typical
23	B2	N31	N32			PIPE 2.5	None	None	A53 Gr. B	Typical
24	B1	N33	N34			PIPE 2.5	None	None	A53 Gr. B	Typical
25	C4	N59	N58			PIPE 2.0 HRA HRA	None	None	A53 Gr. B	Typical
26	M62	N55	N57			RIGID	None	None	RIGID	Typical
27	M63	N54	N56			RIGID	None	None	RIGID	Typical
28	C3	N65	N64			PIPE 2.0 HRA HRA	None	None	A53 Gr. B	Typical
29	M65	N61	N63			RIGID	None	None	RIGID	Typical
30	M66	N60	N62			RIGID	None	None	RIGID	Typical
31	C2	N71	N70			PIPE 2.0 HRA HRA	None	None	A53 Gr. B	Typical
32	M68	N67	N69			RIGID	None	None	RIGID	Typical
33	M69	N66	N68			RIGID	None	None	RIGID	Typical
34	C1	N77	N76			PIPE 2.0 HRA HRA	None	None	A53 Gr. B	Typical
35	M71	N73	N75			RIGID	None	None	RIGID	Typical
36	M72	N72	N74			RIGID	None	None	RIGID	Typical
37	M63A	N36	N59A			PIPE 2.0 HRA HRA	None	None	A53 Gr. B	Typical
38	M45	N61A	N12		90	.625 x 3.5"	None	None	A36 Gr.36	Typical
39	M46	N62A	N17		90	.625 x 3.5"	None	None	A36 Gr.36	Typical
40	M47	N63B	N59B			PIPE 2.0 HRA HRA	None	None	A53 Gr. B	Typical

**Member Advanced Data**

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	D4						Yes	** NA **			None
2	D3						Yes	** NA **			None
3	D1						Yes	** NA **			None
4	D2						Yes	** NA **			None
5	F2	BenPIN	BenPIN				Yes	** NA **			None
6	F1	BenPIN	BenPIN				Yes	** NA **			None
7	F3	BenPIN	BenPIN				Yes	** NA **			None
8	F4	BenPIN	BenPIN				Yes	** NA **			None
9	J2						Yes	** NA **			None
10	N6						Yes	** NA **			None
11	N8						Yes	** NA **			None
12	J4						Yes	** NA **			None
13	N2						Yes	** NA **			None
14	N3						Yes	** NA **			None
15	E1	BenPIN	BenPIN				Yes	** NA **			None
16	E2	BenPIN	BenPIN			Tension ...	Yes	** NA **			None
17	E3	BenPIN	BenPIN			Tension ...	Yes	** NA **			None
18	E4	BenPIN	BenPIN				Yes	** NA **			None
19	P1	BenPIN					Yes	** NA **			None
20	P6	BenPIN					Yes	** NA **			None
21	P4	BenPIN					Yes	** NA **			None
22	P8	BenPIN					Yes	** NA **			None
23	B2						Yes	** NA **			None
24	B1						Yes	** NA **			None
25	C4						Yes	** NA **			None
26	M62	OOOXOX					Yes	** NA **			None
27	M63	OOOXOX					Yes	** NA **			None
28	C3						Yes	** NA **			None
29	M65	OOOXOX					Yes	** NA **			None
30	M66	OOOXOX					Yes	** NA **			None
31	C2						Yes	** NA **			None
32	M68	OOOXOX					Yes	** NA **			None



### Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
33	M69	OOOXOX					Yes	** NA **			None
34	C1						Yes	** NA **			None
35	M71	OOOXOX					Yes	** NA **			None
36	M72	OOOXOX					Yes	** NA **			None
37	M63A	BenPIN					Yes	** NA **			None
38	M45						Yes	** NA **			None
39	M46						Yes	** NA **			None
40	M47	BenPIN					Yes	** NA **			None

### Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	D4	PIPE_2.0_...	33.054			Lbyy						Lateral
2	D3	PIPE_2.0_...	33.056			Lbyy						Lateral
3	D1	PIPE_2.0_...	33.056			Lbyy						Lateral
4	D2	PIPE_2.0_...	33.054			Lbyy						Lateral
5	F2	.625 Dia.	40			Lbyy						Lateral
6	F1	.625 Dia.	40			Lbyy						Lateral
7	F3	.625 Dia.	40			Lbyy						Lateral
8	F4	.625 Dia.	40			Lbyy						Lateral
9	J2	.625 x 3.5"	4.725			Lbyy						Lateral
10	N6	.625 x 3.5"	1.396			Lbyy						Lateral
11	N8	.625 x 3.5"	1.393			Lbyy						Lateral
12	J4	.625 x 3.5"	4.725			Lbyy						Lateral
13	N2	.625 x 3.5"	1.396			Lbyy						Lateral
14	N3	.625 x 3.5"	1.393			Lbyy						Lateral
15	E1	.75 Dia.	51.891			Lbyy						Lateral
16	E2	.75 Dia.	51.891			Lbyy						Lateral
17	E3	.75 Dia.	51.89			Lbyy						Lateral
18	E4	.75 Dia.	51.89			Lbyy						Lateral
19	P1	.625 x 3.5"	2.284			Lbyy						Lateral
20	P6	.625 x 3.5"	2.284			Lbyy						Lateral
21	P4	.625 x 3.5"	2.284			Lbyy						Lateral
22	P8	.625 x 3.5"	2.284			Lbyy						Lateral
23	B2	PIPE_2.5	150			Lbyy						Lateral
24	B1	PIPE_2.5	150			Lbyy						Lateral
25	C4	PIPE_2.0_...	96									Lateral
26	C3	PIPE_2.0_...	96									Lateral
27	C2	PIPE_2.0_...	96									Lateral
28	C1	PIPE_2.0_...	96									Lateral
29	M63A	PIPE_2.0_...	99.725									Lateral
30	M45	.625 x 3.5"	4.725			Lbyy						Lateral
31	M46	.625 x 3.5"	4.725			Lbyy						Lateral
32	M47	PIPE_2.0_...	98.819									Lateral

### Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Me...	Surface(P...
1	Dead	None		-1.1			10		
2	Live	None							
3	Wind 0	None					20	64	
4	Wind 30	None					20	64	
5	Wind 60	None					20	64	
6	Wind 90	None					20	64	
7	Wind 120	None					20	64	
8	Wind 150	None					20	64	





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 Designer : AMS  
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**Basic Load Cases (Continued)**

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Me...	Surface(P...
9	Ice Load	None					10	32	
10	Ice 0	None					20	64	
11	Ice 30	None					20	64	
12	Ice 60	None					20	64	
13	Ice 90	None					20	64	
14	Ice 120	None					20	64	
15	Ice 150	None					20	64	
16	Lm	None				1			
17	Lv	None				1			

**Load Combinations**

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	
1	1.4 D	Yes	Y		1	1.4																	
2	1.2 D + 1.6 L	Yes	Y		1	1.2	2	1.6															
3	1.2 D + 1.0 Wo @ 0	Yes	Y		1	1.2	3	1															
4	1.2 D + 1.0 Wo @ 30	Yes	Y		1	1.2	4	1															
5	1.2 D + 1.0 Wo @ 60	Yes	Y		1	1.2	5	1															
6	1.2 D + 1.0 Wo @ 90	Yes	Y		1	1.2	6	1															
7	1.2 D + 1.0 Wo @ 120	Yes	Y		1	1.2	7	1															
8	1.2 D + 1.0 Wo @ 150	Yes	Y		1	1.2	8	1															
9	1.2 D + 1.0 Wo @ 180	Yes	Y		1	1.2	3	-1															
10	1.2 D + 1.0 Wo @ 210	Yes	Y		1	1.2	4	-1															
11	1.2 D + 1.0 Wo @ 240	Yes	Y		1	1.2	5	-1															
12	1.2 D + 1.0 Wo @ 270	Yes	Y		1	1.2	6	-1															
13	1.2 D + 1.0 Wo @ 300	Yes	Y		1	1.2	7	-1															
14	1.2 D + 1.0 Wo @ 330	Yes	Y		1	1.2	8	-1															
15	1.2 D + 1.0 Di + 1.0 Wi @ 0	Yes	Y		1	1.2	9	1	10	1													
16	1.2 D + 1.0 Di + 1.0 Wi @ 30	Yes	Y		1	1.2	9	1	11	1													
17	1.2 D + 1.0 Di + 1.0 Wi @ 60	Yes	Y		1	1.2	9	1	12	1													
18	1.2 D + 1.0 Di + 1.0 Wi @ 90	Yes	Y		1	1.2	9	1	13	1													
19	1.2 D + 1.0 Di + 1.0 Wi @ 1...	Yes	Y		1	1.2	9	1	14	1													
20	1.2 D + 1.0 Di + 1.0 Wi @ 1...	Yes	Y		1	1.2	9	1	15	1													
21	1.2 D + 1.0 Di + 1.0 Wi @ 1...	Yes	Y		1	1.2	9	1	10	-1													
22	1.2 D + 1.0 Di + 1.0 Wi @ 2...	Yes	Y		1	1.2	9	1	11	-1													
23	1.2 D + 1.0 Di + 1.0 Wi @ 2...	Yes	Y		1	1.2	9	1	12	-1													
24	1.2 D + 1.0 Di + 1.0 Wi @ 2...	Yes	Y		1	1.2	9	1	13	-1													
25	1.2 D + 1.0 Di + 1.0 Wi @ 3...	Yes	Y		1	1.2	9	1	14	-1													
26	1.2 D + 1.0 Di + 1.0 Wi @ 3...	Yes	Y		1	1.2	9	1	15	-1													
27	1.2 D + 1.5 Lm + 1.0 Wm @...	Yes	Y		1	1.2	3	.049	16	1.5													
28	1.2 D + 1.5 Lm + 1.0 Wm @...	Yes	Y		1	1.2	4	.049	16	1.5													
29	1.2 D + 1.5 Lm + 1.0 Wm @...	Yes	Y		1	1.2	5	.049	16	1.5													
30	1.2 D + 1.5 Lm + 1.0 Wm @...	Yes	Y		1	1.2	6	.049	16	1.5													
31	1.2 D + 1.5 Lm + 1.0 Wm @...	Yes	Y		1	1.2	7	.049	16	1.5													
32	1.2 D + 1.5 Lm + 1.0 Wm @...	Yes	Y		1	1.2	8	.049	16	1.5													
33	1.2 D + 1.5 Lm + 1.0 Wm @...	Yes	Y		1	1.2	3	-.049	16	1.5													
34	1.2 D + 1.5 Lm + 1.0 Wm @...	Yes	Y		1	1.2	4	-.049	16	1.5													
35	1.2 D + 1.5 Lm + 1.0 Wm @...	Yes	Y		1	1.2	5	-.049	16	1.5													
36	1.2 D + 1.5 Lm + 1.0 Wm @...	Yes	Y		1	1.2	6	-.049	16	1.5													
37	1.2 D + 1.5 Lm + 1.0 Wm @...	Yes	Y		1	1.2	7	-.049	16	1.5													
38	1.2 D + 1.5 Lm + 1.0 Wm @...	Yes	Y		1	1.2	8	-.049	16	1.5													
39	1.2 D + 1.5 Lv	Yes	Y		1	1.2	17	1.5															



Company : Paul J. Ford and Company  
 Designer : AMS  
 Job Number : 37519-1579.003.8190  
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### Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-in]	LC	MY [k-in]	LC	MZ [k-in]	LC
1	N62A	max	1769.75	11	1542.755	15	837.263	3	0	39	0	39	0	39
2		min	-2050.087	5	463.041	9	-2038.196	9	0	1	0	1	0	1
3	N61A	max	1444.297	36	1144.905	21	1758.205	15	0	39	0	39	0	39
4		min	8.812	6	317.828	3	396.412	9	0	1	0	1	0	1
5	N59A	max	179.974	4	54.8	23	726.207	5	0	39	0	39	0	39
6		min	-181.105	10	18.011	5	-729.942	11	0	1	0	1	0	1
7	N59B	max	144.544	7	53.963	19	641.38	13	0	39	0	39	0	39
8		min	-145.287	13	18.576	13	-644.762	7	0	1	0	1	0	1
9	Totals:	max	1785.871	13	2758.758	17	2170.587	3						
10		min	-1785.86	7	1009.115	10	-2170.558	9						

### Envelope AISC 15th(360-16): LRFD Steel Code Checks

Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc	phi*Pnt	phi*Mn y	phi*Mn z	Cb	Eqn
1	F3	.625 Dia.	.901	34.583	.056	0	28	1057.552	9940.19	1.243	1.243	1.243	1.243	1...H1-1a
2	F4	.625 Dia.	.793	34.583	.026	0	13	1057.552	9940.19	1.243	1.243	1.243	1.243	1...H1-1a
3	C3	PIPE_2.0_...	.787	56	.143	56	32	14916.0...	32130	22.459	22.459	22.459	22.459	1...H1-1b
4	F1	.625 Dia.	.560	24.167	.025	0	37	1057.552	9940.19	1.243	1.243	1.243	1.243	1 H1-1a
5	F2	.625 Dia.	.505	24.167	.054	0	28	1057.552	9940.19	1.243	1.243	1.243	1.243	1 H1-1a
6	N3	.625 x 3.5"	.493	1.393	.195	0	y 31	70652.85	70875	11.074	62.016	62.016	62.016	1...H1-1b
7	B2	PIPE 2.5	.458	104....	.042	103....	28	14558.7...	50715	43.155	43.155	43.155	43.155	1...H1-1b
8	B1	PIPE 2.5	.425	103....	.065	46.875	10	14558.7...	50715	43.155	43.155	43.155	43.155	1...H1-1b
9	N8	.625 x 3.5"	.420	1.393	.127	1.393	y 35	70652.85	70875	11.074	62.016	62.016	62.016	1...H1-1b
10	J4	.625 x 3.5"	.403	4.725	.305	4.725	y 31	68362.0...	70875	11.074	62.016	62.016	62.016	1...H1-1b
11	M46	.625 x 3.5"	.401	0	.267	0	y 28	68362.0...	70875	11.074	62.016	62.016	62.016	1...H1-1b
12	N2	.625 x 3.5"	.334	1.396	.176	0	y 28	70651.9...	70875	11.074	62.016	62.016	62.016	1...H1-1b
13	D4	PIPE_2.0_...	.308	2.066	.176	33.054	33	29336.0...	32130	22.459	22.459	22.459	22.459	1...H1-1b
14	E1	.75 Dia.	.306	28.108	.038	0	29	1303.092	14313.8...	2.147	2.147	2.147	2.147	1...H1-1a
15	J2	.625 x 3.5"	.275	0	.226	0	y 34	68362.0...	70875	11.074	62.016	62.016	62.016	2...H1-1b
16	M45	.625 x 3.5"	.270	0	.187	0	y 34	68362.0...	70875	11.074	62.016	62.016	62.016	1...H1-1b
17	D2	PIPE_2.0_...	.267	0	.181	1.722	28	29336.0...	32130	22.459	22.459	22.459	22.459	2...H1-1b
18	D1	PIPE_2.0_...	.242	0	.082	31.335	15	29335.75	32130	22.459	22.459	22.459	22.459	1...H1-1b
19	P8	.625 x 3.5"	.235	2.284	.038	2.284	z 28	70279.4...	70875	11.074	62.016	62.016	62.016	1...H1-1b
20	N6	.625 x 3.5"	.234	1.396	.130	0	y 33	70651.9...	70875	11.074	62.016	62.016	62.016	1 H1-1b
21	C1	PIPE_2.0_...	.190	68	.096	68	7	14916.0...	32130	22.459	22.459	22.459	22.459	2...H1-1b
22	C2	PIPE_2.0_...	.186	68	.142	68	28	14916.0...	32130	22.459	22.459	22.459	22.459	2...H1-1b
23	D3	PIPE_2.0_...	.178	0	.101	33.056	15	29335.75	32130	22.459	22.459	22.459	22.459	1...H1-1b
24	E4	.75 Dia.	.146	25.945	.024	51.89	23	1303.155	14313.8...	2.147	2.147	2.147	2.147	1...H1-1b
25	P6	.625 x 3.5"	.140	2.284	.076	2.284	y 31	70279.4...	70875	11.074	62.016	62.016	62.016	1...H1-1b
26	P1	.625 x 3.5"	.123	2.284	.075	2.284	y 28	70279.4...	70875	11.074	62.016	62.016	62.016	1...H1-1b
27	P4	.625 x 3.5"	.121	2.284	.024	2.284	z 20	70279.4...	70875	11.074	62.016	62.016	62.016	1...H1-1b
28	M63A	PIPE_2.0_...	.070	49.862	.006	99.725	24	14037.6...	32130	22.459	22.459	22.459	22.459	1...H1-1b
29	M47	PIPE_2.0_...	.068	49.409	.006	98.819	24	14249.4...	32130	22.459	22.459	22.459	22.459	1...H1-1b
30	C4	PIPE_2.0_...	.015	28	.080	68	7	14916.0...	32130	22.459	22.459	22.459	22.459	1...H1-1b
31	E2	.75 Dia.	.006	51.891	.018	51.891	38	1303.092	14313.8...	2.147	2.147	2.147	2.147	1...H1-1b*
32	E3	.75 Dia.	.000	0	.000	0	39	1303.155	14313.8...	2.147	2.147	2.147	2.147	1 H1-1a

# **PF** PAUL J. FORD & COMPANY Y

250 E Broad St, Ste 600 • Columbus, OH 43215  
Phone 614.221.6679 www.pauljford.com

Project # 37519-2242.001.8190

By AMS

Date: 06/10/19

v0.1, Effective 07/10/18

## MOUNT TO TOWER CONNECTION CHECKS

### REACTIONS

Px=	1.811	Kip
Py=	2.049	Kip
(Axial)Pz=	1.54	Kip
Mx=	0	Kip-in
My=	0	Kip-in
(Torque)Mz=	0	Kip-in
Number of Bolts	=	1

### BOLT CHECKS

Tension Reaction	1.54	kip
Shear Reaction	2.73	kip
Bolt Type	A325N	
Bolt Diameter	0.625	in
Tensile Strength	20.7	kips
Shear Strength	12.4	kips
Reduced Tensile Strength	-	kips

Tensile Capacity Used	7.4%
Shear Capacity Used	22.0%

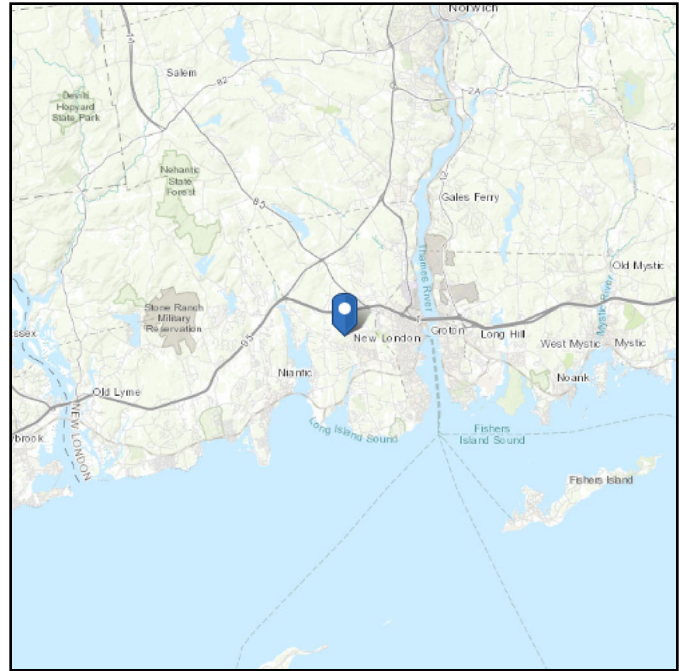
**Note: Tension reduction not required if tension or shear capacity < 30%**

# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

**Standard:** ASCE/SEI 7-10  
**Risk Category:** II  
**Soil Class:** D - Stiff Soil

**Elevation:** 242 ft (NAVD 88)  
**Latitude:** 41.354639  
**Longitude:** -72.150444



## Wind

### Results:

Wind Speed:	134 Vmph	←— Jurisdiction required 135 mph ultimate wind speed
10-year MRI	79 Vmph	
25-year MRI	89 Vmph	
50-year MRI	99 Vmph	
100-year MRI	109 Vmph	

**Data Source:** ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

**Date Accessed:** Mon Apr 29 2019

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

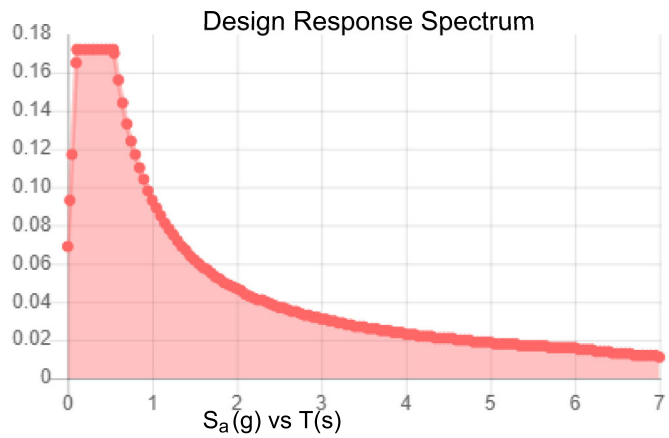
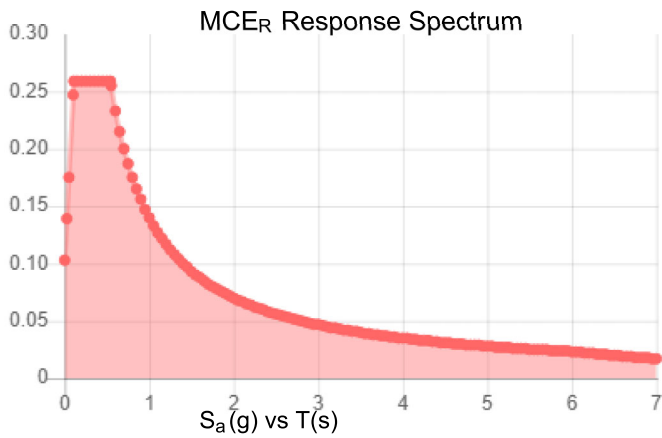
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

**Site Soil Class:** D - Stiff Soil

**Results:**

$S_s$ :	0.162	$S_{DS}$ :	0.172
$S_1$ :	0.058	$S_{D1}$ :	0.093
$F_a$ :	1.6	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.081
$S_{MS}$ :	0.259	PGA <sub>M</sub> :	0.129
$S_{M1}$ :	0.14	$F_{PGA}$ :	1.6
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:**

Mon Apr 29 2019

**Date Source:**

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

## Ice

---

**Results:**

Ice Thickness: 0.75 in.  
Concurrent Temperature: 15 F  
Gust Speed: 50 mph

**Data Source:** Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

**Date Accessed:** Mon Apr 29 2019

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

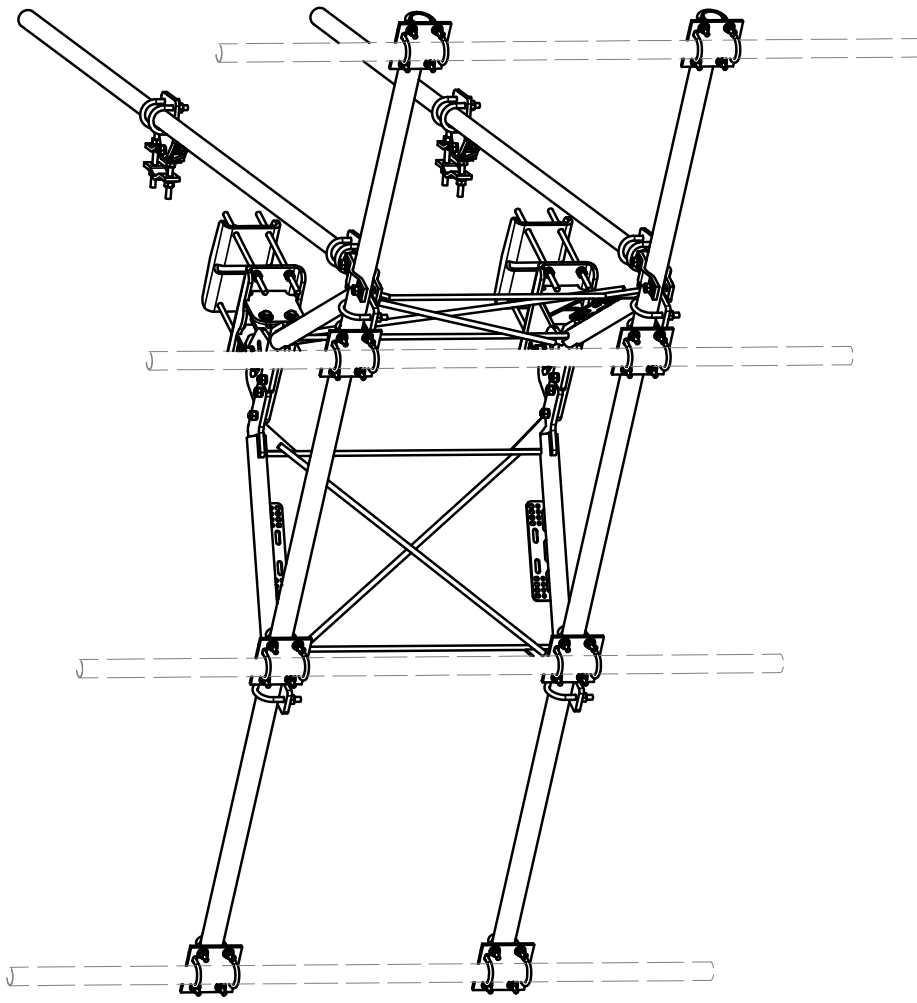
ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

## **APPENDIX D**

### **MANUFACTURER DRAWINGS (FOR REFERENCE ONLY)**





ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	2	X-VFAW	SUPPORT ARM		71.41	142.81
2	1	X-HDCAMTBW	CLAMP WELDMENT FOR BCAM-HD		33.86	33.86
3	1	X-MHTPHD	MULTI-HOLE TAPER PLATE WELDMENT		36.24	36.24
4	2	X-VFAPL4	VFA-HD PIVOT PLATE	12 in	15.88	31.77
5	2	X-LCBP4	BENT BACKING PLATE	13 in	19.00	38.01
6	1	X-HDCAMSS	ANGLE ADJUSTMENT WELDMENT FOR BCAM-HD		16.39	16.39
7	4	X-SPTB	SLIDING PIPE TIE BACK PLATE	5 1/2 in	5.87	23.49
8	1	X-HDCAMSP	POSITIONING PLATE WELDMENT FOR BCAM-HD		2.58	2.58
9	4	X-TBCA	TIE BACK CLIP ANGLE		2.01	8.02
10	8	SCX2	CROSSOVER PLATE	7 in	4.80	38.37
11	4	MCP	CLAMP HALF 1/2" THICK, 11'-5/8" LONG	12 1/16 in	14.37	57.48
12	8	DCP	1/2" THICK, 5-3/4" CENTER TO CENTER CLAMP HALF	8 1/8 in	2.36	18.90
13	2	P2126	2-3/8" X 126" (2" SCH. 40) GALVANIZED PIPE	126 in	40.75	81.50
14	2	P30150	2-7/8" X 150" (2-1/2" SCH. 40) GALVANIZED PIPE	150 in	76.94	153.87
15	4	A34212	3/4" x 2-1/2" UNC HEX BOLT (A325)	2 1/2 in	0.48	1.92
16	4	G34FW	3/4" HDG USS FLATWASHER		0.06	0.24
17	4	G34LW	3/4" HDG LOCKWASHER		0.04	0.17
18	4	G34NUT	3/4" HDG HEAVY 2H HEX NUT		0.21	0.85
19	8	G58R-18	5/8" x 18" THREADED ROD (HDG.)	18 in	0.40	3.19
20	4	G58R-12	5/8" x 12" THREADED ROD (HDG.)		1.05	4.18
21	4	G58R-8	5/8" x 8" THREADED ROD (HDG.)		0.70	2.79
22	4	X-UB5300	5/8" X 3" X 5-1/4" X 2-1/2" U-BOLT (HDG.)		1.15	4.60
23	8	X-UB5258	5/8" X 2-5/8" X 4-1/2" X 2" U-BOLT (HDG.)		1.00	8.00
24	2	G5807	5/8" x 7" HDG HEX BOLT GR5 FULL THREAD	7 in	0.70	1.41
25	1	G5806	5/8" x 6" HDG HEX BOLT GR5 FULL THREAD	6 in	0.62	0.62
26	8	G5804	5/8" x 4" HDG HEX BOLT GR5		0.44	3.55
27	4	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.08
28	8	A582114	5/8" x 2-1/4" HDG A325 HEX BOLT	2 1/4 in	0.31	2.50
29	25	G58FW	5/8" HDG USS FLATWASHER	1 1/8 in	0.07	1.76
30	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
31	71	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	9.22
32	32	X-UB1300	1/2" X 3" X 5" X 2" GALV U-BOLT		0.74	23.64
33	16	X-UB1212	1/2" X 2" X 3" X 1-1/4" U-BOLT (HDG.)		0.60	9.56
34	64	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	2.18
35	64	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	0.89
36	64	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	4.58
					TOTAL WT. #	738.06

PARTS LIST

Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Dallas, TX

Engineering  
 Support Team:  
 1-888-53-7446

**SITE PRO**  
 A Valmont COMPANY

Engineering Support Team:  
 1-888-53-7446

Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Dallas, TX

DESCRIPTION	12" 6" HEAVY DUTY V-FRAME ASSEMBLY WITH TWO STIFF ARMS
DRAWN BY	CEK
DATE	1/25/2017
ENG. APPROVAL	
CHECKED BY	BMC
DATE	12/13/2017
CLASS / SUB	81 / 02
CUSTOMER	CUSTOMER
PART NO.	VFA12-HD
DWG. NO.	VFA12-HD

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

PROPRIETARY NOTE: DIMENSIONS CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017
REVISION HISTORY				



# Transcom Engineering, Inc.

Wireless Network Design and Deployment

## Radio Frequency Emissions Analysis Report

**T-MOBILE** Existing Facility

**Site ID: CT11381C**

Waterford South/RT 1  
41 Rockridge Road  
Waterford, CT 06385

**May 17, 2019**

**Transcom Engineering Project Number: 737001-0019**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>4.13 %</b>

# Transcom Engineering, Inc.

Wireless Network Design and Deployment

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May 17, 2019

T-MOBILE

Attn: Jason Overbey, RF Manager  
35 Griffin Road South  
Bloomfield, CT 6009

## Emissions Analysis for Site: **CT11381C – Waterford South/RT 1**

Transcom Engineering, Inc (“Transcom”) was directed to analyze the proposed upgrades to the T-MOBILE facility located at **41 Rockridge Road, Waterford, CT**, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  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.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 600 & 700 MHz bands are approximately  $400 \mu\text{W}/\text{cm}^2$  and  $467 \mu\text{W}/\text{cm}^2$  respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is  $1000 \mu\text{W}/\text{cm}^2$ . 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.

# Transcom Engineering, Inc.

Wireless Network Design and Deployment

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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.

# Transcom Engineering, Inc.

Wireless Network Design and Deployment

## CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **41 Rockridge Road, Waterford, CT**, 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 manufactures supplied specifications, minus 10 dB for directional panel antennas, 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.

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. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	1900 MHz (PCS)	1	40
GSM	1900 MHz (PCS)	1	15
LTE	2100 MHz (AWS)	2	60
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20

*Table 1: Channel Data Table*

# Transcom Engineering, Inc.

Wireless Network Design and Deployment

The following antennas listed in *Table 2* were used in the modeling for transmission in the 600, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Ericsson AIR21 B2A/B4P	117
A	2	Ericsson AIR21 B4A/B2P	117
A	3	RFS APXVAARR24 43-U-NA20	117
B	1	Ericsson AIR21 B2A/B4P	117
B	2	Ericsson AIR21 B4A/B2P	117
B	3	RFS APXVAARR24 43-U-NA20	117
C	1	Ericsson AIR21 B2A/B4P	117
C	2	Ericsson AIR21 B4A/B2P	117
C	3	RFS APXVAARR24 43-U-NA20	117

*Table 2: Antenna Data*

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

# Transcom Engineering, Inc.

Wireless Network Design and Deployment

## RESULTS

Per the calculations completed for the proposed T-MOBILE configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBi)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Ericsson AIR21 B2A/B4P	1900 MHz (PCS)	15.9	2	70	2,723.32	0.79
Antenna A2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	1.36
Antenna A3	RFS APXVAARR24 43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.69
Sector A Composite MPE%							<b>3.85</b>
Antenna B1	Ericsson AIR21 B2A/B4P	1900 MHz (PCS)	15.9	2	70	2,723.32	0.79
Antenna B2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	1.36
Antenna B3	RFS APXVAARR24 43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.69
Sector B Composite MPE%							<b>3.85</b>
Antenna C1	Ericsson AIR21 B2A/B4P	1900 MHz (PCS)	15.9	2	70	2,723.32	0.79
Antenna C2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	1.36
Antenna C3	RFS APXVAARR24 43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.69
Sector C Composite MPE%							<b>3.85</b>

*Table 3: T-MOBILE Emissions Levels*

# Transcom Engineering, Inc.

Wireless Network Design and Deployment

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum T-MOBILE MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each T-MOBILE Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	MPE%
T-MOBILE – Max Per Sector Value	<b>3.85 %</b>
Sprint	0.28 %
<b>Site Total MPE %:</b>	<b>4.13 %</b>

*Table 4: All Carrier MPE Contributions*

T-MOBILE Sector A Total:	3.85 %
T-MOBILE Sector B Total:	3.85 %
T-MOBILE Sector C Total:	3.85 %
Site Total:	4.13 %

*Table 5: Site MPE Summary*

# Transcom Engineering, Inc.

Wireless Network Design and Deployment

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated T-MOBILE sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
T-Mobile 1900 MHz (PCS) UMTS	1	1,556.18	117	4.54	1900 MHz (PCS)	1000	0.45%
T-Mobile 1900 MHz (PCS) GSM	1	1,167.14	117	3.41	1900 MHz (PCS)	1000	0.34%
T-Mobile 2100 MHz (AWS) LTE	2	2,334.27	117	13.62	2100 MHz (AWS)	1000	1.36%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	117	4.60	600 MHz	400	1.15%
T-Mobile 700 MHz LTE	2	432.54	117	2.52	700 MHz	467	0.54%
						<b>Total:</b>	<b>3.85%</b>

*Table 6: T-MOBILE Maximum Sector MPE Power Values*



# Transcom Engineering, Inc.

Wireless Network Design and Deployment

## 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:	3.85 %
Sector B:	3.85 %
Sector C:	3.85 %
T-MOBILE Maximum Total (per sector):	3.85 %
Site Total:	4.13 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **4.13 %** 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.



Scott Heffernan  
RF Engineering Director  
**Transcom Engineering, Inc**  
PO Box 1048  
Sterling, MA 01564

# T-Mobile

T-MOBILE SITE NAME:  
**WATERFORD SOUTH/RT 1**  
 T-MOBILE SITE NUMBER:  
**CT11381C**

CROWN BU: 876338 / APP#: 479831  
**67D02C CONFIGURATION**

41 MANITOCK HILL RD  
 WATERFORD, CT 06385

EXISTING 136'-0" SELF SUPPORT TOWER



### PROJECT SUMMARY

SITE TYPE: EXISTING EQUIPMENT UPGRADE  
 SITE ADDRESS: 41 MANITOCK HILL RD  
 WATERFORD, CT 06385  
 JURISDICTION: NEW LONDON COUNTY

MAPS: 41.364709° N  
 72.150400° W  
 TOWER OWNER: CROWN CASTLE  
 200 LOCUSTON DRIVE, SUITE 150  
 KING OF PRUSSIA, PA 19406  
 JASON SMITH  
 (610) 638-3225

CUSTOMER/APPLICANT: T-MOBILE  
 4 SYLVAN WAY  
 WATERFORD, CT 06385  
 (973) 397-4800

OCCUPANCY TYPE: UNMANNED  
 A.D.A. COMPLIANCE: FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION

### CONTACT INFORMATION

A&E FIRM: B+T GROUP  
 500 MILLERS, STE. 300  
 TULSA, OK 74119  
 CONTACT: MIKE OAKES  
 PHONE: (918) 587-4630

ELECTRIC BOZRAH LIGHT AND POWER CO  
 PROVIDER: 860-889-7388

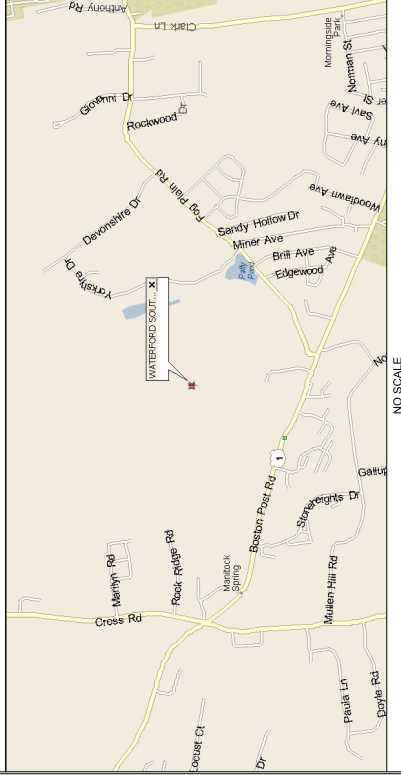
TELCO: AT&T  
 PROVIDER: 855-637-9527

### CODE COMPLIANCE

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

CODE	2018 CT SRC
BUILDING/DWELLING	2018 CT SRC
STRUCTURAL	2018 CT SRC
MECHANICAL	2018 CT SRC
ELECTRICAL	NEC 2017

### LOCATION MAP



### DRIVING DIRECTIONS

DEPART BRADLEY INTERNATIONAL AIRPORT ON TERMINAL RD. ROAD NAME CHANGES TO BRADLEY FIELD CONNECTOR. ROAD NAME CHANGES TO CT-20 [BRADLEY FIELD CONNECTOR]. TAKE RAMP (RIGHT) ONTO I-91 [RICHARD P HORAN MEMORIAL HWY]. AT EXIT 30, TAKE RAMP ONTO I-84 [US-44]. AT EXIT 85, TAKE RAMP (RIGHT) ONTO CT-2 [VETERANS OF FOREIGN WARS MEML HWY]. AT EXIT 13, KEEP RIGHT ONTO CT-85 [NEW LONDON RD]. TURN RIGHT ONTO CROSS RD. KEEP LEFT ONTO US-1 [ROBSON POST RD]. TURN LEFT ONTO MANITOCK HILL RD [MANITOCK HILL]. TURN RIGHT ONTO LOCAL ROAD(S). ARRIVE AT WATERFORD SOUTH/RT 1.

### PROJECT DESCRIPTION

- THE PROPOSED PROJECT INCLUDES:
- REMOVE (6) 1 5/8" COAX CABLES
  - REMOVE (1) DUS41
  - INSTALL (3) NEW ANTENNAS AT 117'-0"
  - INSTALL (3) NEW RRUS AT 117'-0"
  - INSTALL (2) NEW 6x12 HCS FIBER
  - REMOVE (2) EXISTING MOUNTS PER MOUNT REPLACEMENT REPORT BY PAUL J FORD & COMPANY DATED 6/13/19

### DO NOT SCALE DRAWINGS

ALL DRAWINGS CONTAINED HEREIN CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE, AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

### DRAWING INDEX

SHEET #	TITLE	REV. #
T-1	TITLE SHEET	1
A-1	OVERALL SITE PLAN	1
A-2	ANTENNA/CABLE SCHEDULE AND AZIMUTH PLANS	1
A-3	TOWER ELEVATION	1
A-4	ANTENNA AND RRU DETAILS	1
E-1	PANEL SCHEDULE AND ONE-LINE DIAGRAM	1

### A/E DOCUMENT REVIEW STATUS

TITLE	SIGNATURE	DATE
T-MOBILE PROP:		
T-MOBILE R.F. MGR:		
T-MOBILE MGRS:		
T-MOBILE CONST. MGR:		
INTERCONNECT:		
T-MOBILE SITE DEV. MGR:		
PROPERTY OWNER:		
PLANNING:		

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.



CALL CONNECTICUT ONE CALL  
 (800) 922-4455  
 CALL 3 WORKING DAYS  
 BEFORE YOU DIG!



PROJECT NO:	09972.003.01		
CHECKED BY:	RMC		
ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
0	1/4/20	JJD	CONSTRUCTION
1	3/4/21	JJD	CONSTRUCTION

CT11381C  
 BU #: 876338  
 WATERFORD SOUTH/RT 1  
 41 MANITOCK HILL RD  
 WATERFORD, CT 06385  
 EXISTING 136'-0"  
 SELF SUPPORT TOWER

B&T ENGINEERING, INC.  
 P.E.C. 00019564  
 Expires 2/10/22

IT IS A VIOLATION OF LAW FOR ANY PERSON, FIRM OR CORPORATION TO REPRODUCE OR TO ATTEMPT TO REPRODUCE THESE DOCUMENTS WITHOUT THE WRITTEN PERMISSION OF THE PROFESSIONAL ENGINEER.

SHEET NUMBER: T-1  
 REVISION: 1

GENERAL NOTES:  
 1. SUBJECT PROPERTY IS SITUATED AT  
 41 MANTOCK HILL RD, WATERFORD, CT 06385.  
 2. APPLICANT:  
 T--MOBILE  
 A DELAWARE LIMITED LIABILITY COMPANY  
 4 SYLVAN WAY  
 #400 SPINNEY, NEW JERSEY 07054  
 (973) 597-4800

TOWER OWNER:  
 CROWN CASTLE INTERNATIONAL

THE APPLICANT IS TO UPDATE THEIR NETWORK BY INSTALLING THREE (3) TOWERS AND THREE (3) ADDITIONAL CABLES MOUNTED ON AN EXISTING SELF SUPPORT TOWER. THIS FACILITY SHALL BE VISITED ON THE AVERAGE OF ONCE A MONTH FOR MAINTENANCE AND SHALL BE MONITORED FROM A REMOTE FACILITY.

THE EXISTING SITE IS LOCATED AT LATITUDE OF 41.354700° N± AND LONGITUDE OF 72.150400° W±. THE HORIZONTAL DATUM ARE IN TERMS OF NORTH AMERICAN DATUM OF 1983 (NAD 83).

THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSES OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND EACH OF THE DRAWINGS HAVE BEEN REVISED TO INDICATED "ISSUED FOR CONSTRUCTION"

6. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:

6.A. CURRENT PREVAILING MUNICIPAL AND/OR COUNTY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.  
 6.B. CURRENT PREVAILING STATE AND FEDERAL SPECIFICATIONS, STANDARDS AND REQUIREMENTS.

7. THE CONTRACTOR SHALL NOTIFY B+T GROUP, P.A. IMMEDIATELY IF ANY FIELD-CONDITIONS ENCOUNTERED DIFFER FROM THOSE REPRESENTED HEREON, AND/OR IF SUCH CONDITIONS WOULD OR COULD RENDER THE DESIGNS SHOWN HEREON INAPPROPRIATE AND/OR INEFFECTIVE.

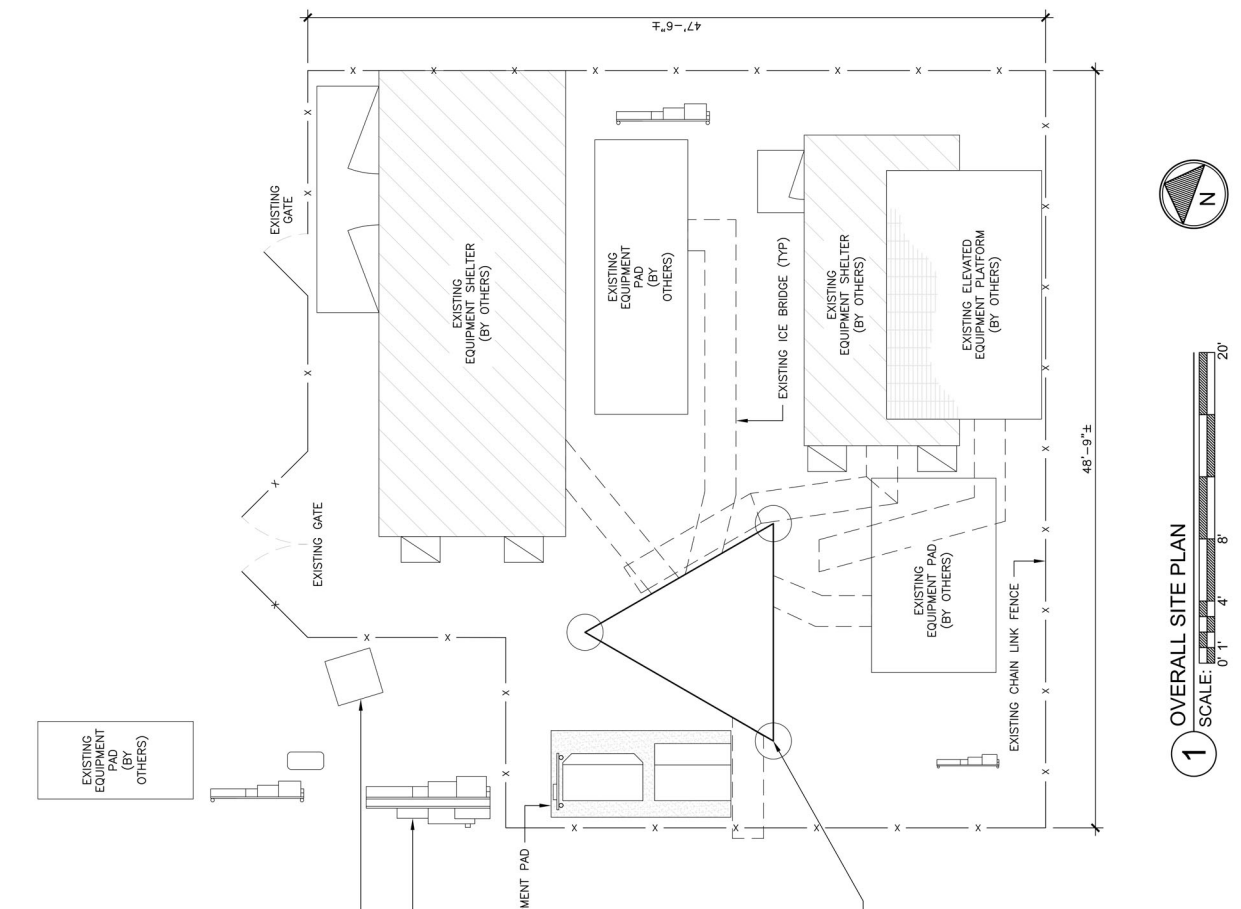
8. THE CONTRACTOR IS RESPONSIBLE TO PROTECT, REPAIR AND/OR REPLACE ANY DAMAGED STRUCTURES, UTILITIES OR LANDSCAPED AREA WHICH MAY BE DISTURBED DURING THE CONSTRUCTION OF THIS FACILITY.

9. THE CONSTRUCTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ALL CONSTRUCTION MEANS AND METHODS. THE CONSTRUCTION CONTRACTOR IS ALSO RESPONSIBLE FOR ALL JOB SITE SAFETY.

10. SITE INFORMATION SHOWN TAKEN FROM CROWN CASTLE SITE PLANS AND FROM CROWN CASTLE INSPECTION PHOTOS.

11. NO GUARANTEE IS MADE NOR SHOULD BE ASSUMED AS TO THE COMPLETENESS OR ACCURACY OF THE HORIZONTAL OR VERTICAL LOCATIONS. ALL PARTIES UTILIZING THIS INFORMATION SHALL FIELD VERIFY THE ACCURACY AND COMPLETENESS OF THE INFORMATION SHOWN PRIOR TO CONSTRUCTION ACTIVITIES.

12. ALL IMPROVEMENTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE TOWNSHIP ENGINEER WHO WILL BE GIVEN PROPER NOTIFICATION PRIOR TO THE START OF ANY CONSTRUCTION.



EXISTING TRANSFORMER

EXISTING H-FRAME (TYP)

EXISTING T-MOBILE EQUIPMENT PAD

EXISTING 136'-0" SELF SUPPORT TOWER

EXISTING EQUIPMENT PAD (BY OTHERS)

EXISTING EQUIPMENT SHELTER (BY OTHERS)

EXISTING ICE BRIDGE (TYP)

EXISTING ELEVATED EQUIPMENT PLATFORM (BY OTHERS)

EXISTING CHAIN LINK FENCE

EXISTING GATE

EXISTING GATE

47'-6"±

48'-9"±

1 OVERALL SITE PLAN

SCALE: 1" = 20'

0' 1' 4' 8' 20'

N

B+T GRP

CROWN CASTLE

T-Mobile

CT11381C  
 BU #: 876338  
 WATERFORD SOUTH/RT 1  
 41 MANTOCK HILL RD  
 WATERFORD, CT 06385  
 EXISTING 136'-0"  
 SELF SUPPORT TOWER

PROJECT NO: 09972.003.01  
 CHECKED BY: RMC

ISSUED FOR:  
 REV DATE DRAW DESCRIPTION  
 0 1/4/20 JUD CONSTRUCTION  
 1 3/4/21 JUD CONSTRUCTION

B&T ENGINEERING, INC.  
 PEC 0001964  
 Expires 2/10/22

STATE OF CONNECTICUT  
 PROFESSIONAL ENGINEER  
 No. 23924  
 EXPIRES 3/4/22

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SHEET NUMBER: A-1  
 REVISION: 1



CT1381C  
 BU #: 876338  
 WATERFORD SOUTH/RT 1  
 41 MANTOCK HILL RD  
 WATERFORD, CT 06385  
 EXISTING 136'-0"  
 SELF SUPPORT TOWER

PROJECT NO: 09972.003.01  
 CHECKED BY: RMC

REV	DATE	DRWN	DESCRIPTION
0	1/4/20	JJD	CONSTRUCTION
1	3/4/21	JJD	CONSTRUCTION

B&T ENGINEERING, INC.  
 PEC 0001964  
 Expires 2/10/22

STATE OF CONNECTICUT  
 PROFESSIONAL ENGINEER  
 No. 23924  
 3/4/22

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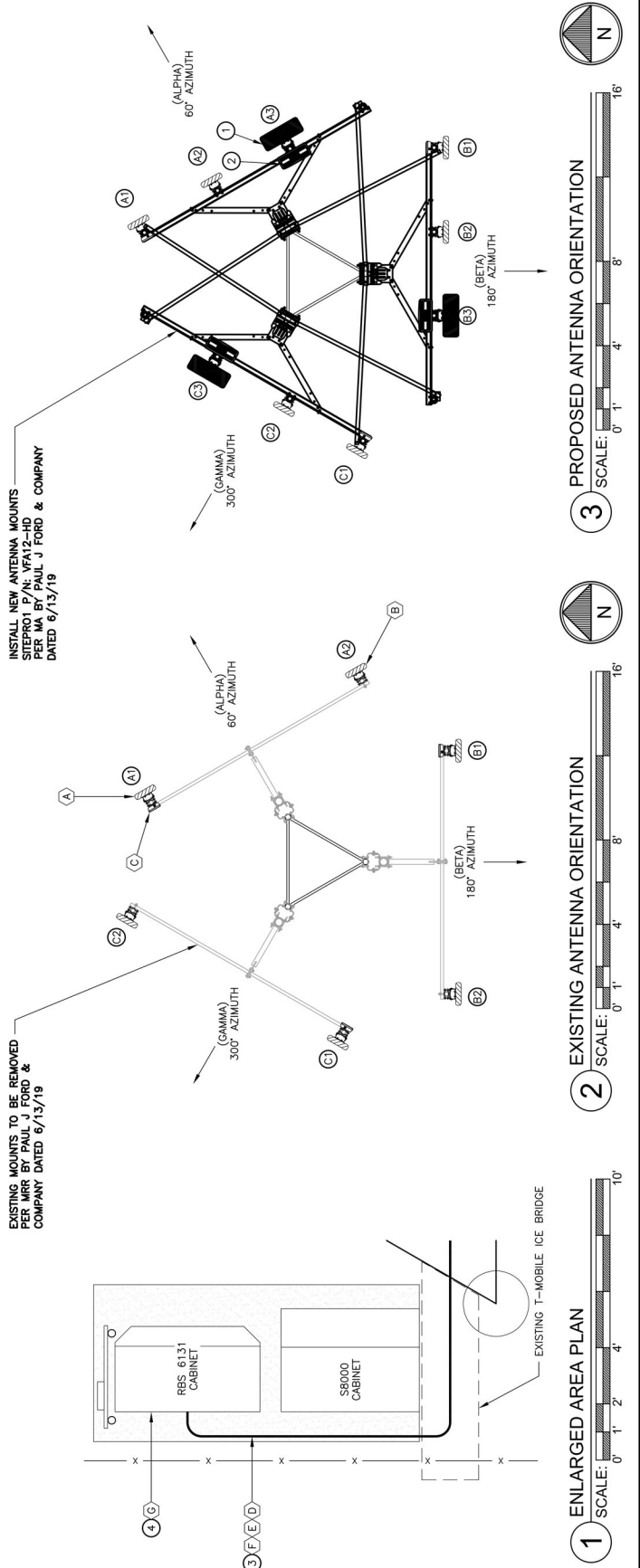
SHEET NUMBER: A-2  
 REVISION: 1

ANTENNA AND CABLE SCHEDULE

SECTOR	POSITION	EXISTING ANTENNAS	PROPOSED ANTENNA CONFIGURATION	E-TILT	M-TILT	ANTENNA CENTERLINE	TIMARRU	CABLES	JUMPER TYPE	CABLE LENGTH
60° - ALPHA	A1	ERICSSON AIR21 KRC118023-1_B2A_B4P	GSM UNITS	5°/5°/2'	2'	117'-0"	1/0	(2) 1 5/8" COAX (1) 9x18 HCS FIBER	(2) FIBER	169'-0"
	A2	ERICSSON AIR21 KRC118023-1_B2A_B4P	LTE	5°	2'		0/0	SHARED	(4) COAX (2) FIBER	(4) COAX (2) FIBER
	A3	RFS APXVARR24_43-U-NA20	LTE	5°/5°/5'	2'	0/1	(1) 6x12 HCS FIBER	(2) FIBER	(2) FIBER	169'-0"
180° - BETA	B1	ERICSSON AIR21 KRC118023-1_B2A_B4P	GSM UNITS	2°/2°/2'	2'	117'-0"	1/0	(2) 1 5/8" COAX	(2) FIBER	169'-0"
	B2	ERICSSON AIR21 KRC118023-1_B2A_B4P	LTE	5°	2'		0/0	SHARED	(4) COAX (2) FIBER	(4) COAX (2) FIBER
	B3	RFS APXVARR24_43-U-NA20	LTE	5°/5°/5'	2'	0/1	(1) 6x12 HCS FIBER	(2) FIBER	(2) FIBER	169'-0"
300° - GAMMA	C1	ERICSSON AIR21 KRC118023-1_B2A_B4P	GSM UNITS	5°/5°/2'	2'	117'-0"	1/0	(2) 1 5/8" COAX	(2) FIBER	169'-0"
	C2	ERICSSON AIR21 KRC118023-1_B2A_B4P	LTE	5°	2'		0/0	SHARED	(4) COAX (2) FIBER	(4) COAX (2) FIBER
	C3	RFS APXVARR24_43-U-NA20	LTE	5°/5°/5'	2'	0/1	(1) 6x12 HCS FIBER	(2) FIBER	(2) FIBER	169'-0"

LEGEND

EXISTING/DEMOLITION NOTES	INSTALLATION NOTES
(A) EXISTING ERICSSON AIR21 KRC118023-1_B2A_B4P ANTENNA TO REMAIN (TOTAL OF 3)	INSTALL RFS APXVARR24_43-U-NA20 ANTENNA ON NEW PIPE MOUNT (LENGTH TO BE V.I.F.) (TYP OF 1 PER SECTOR, TOTAL OF 3)
(B) EXISTING ERICSSON AIR21 KRC118023-1_B2P_B4A ANTENNA TO REMAIN (TOTAL OF 3)	INSTALL RADIO 4449 B12/B71 (TYP OF 1 PER SECTOR, TOTAL OF 3)
(C) EXISTING KRY 112 144/1 TMA TO REMAIN (TOTAL OF 3)	INSTALL (3) 6x12 HCS FIBER JUMPER FROM EXISTING ANTENNAS FOLLOWING EXISTING ROUTING
(D) EXISTING 1 5/8" COAX CABLES TO REMAIN (TOTAL OF 6)	INSTALL (2) BB 6630
(E) EXISTING 18 HCS FIBER TO REMAIN (TOTAL OF 1)	
(F) REMOVE (6) EXISTING 1 5/8" COAX CABLES	
(G) REMOVE (1) DUS41	





CT1381C  
 BU #: 876338  
 WATERFORD SOUTH/RT 1  
 41 MANTOCK HILL RD  
 WATERFORD, CT 06385  
 EXISTING 136'-0"  
 SELF SUPPORT TOWER

PROJECT NO: 09972.003.01  
 CHECKED BY: RMC

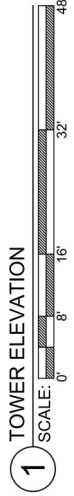
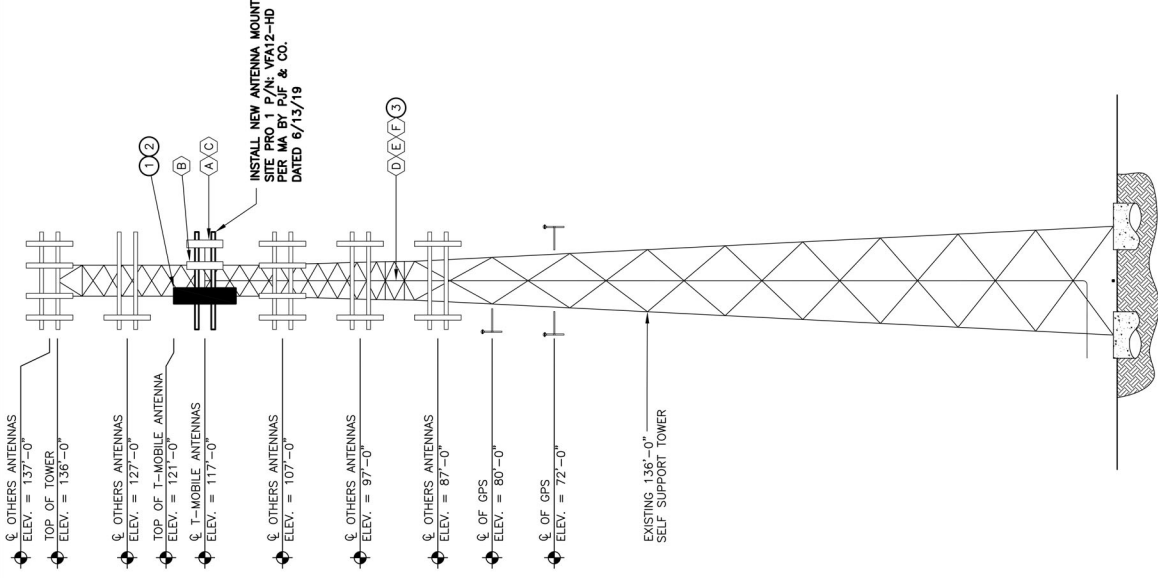
REV	DATE	DRWN	DESCRIPTION
0	1/4/20	JJD	CONSTRUCTION
1	3/4/21	JJD	CONSTRUCTION

B&T ENGINEERING, INC.  
 PEC 0001964  
 Expires 2/10/22



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SHEET NUMBER: A-3  
 REVISION: 1



EXISTING TOWER IS SUFFICIENT PER STRUCTURAL ANALYSIS BY CROWN CASTLE DATED 2/24/21

EXISTING MOUNT TO BE REMOVED AND REPLACED PER MOUNT REPLACEMENT REPORT BY PAUL J FORD & COMPANY DATED 6/13/19

LEGEND:

- NEW
- EXISTING

LEGEND	
EXISTING/DEMOLITION NOTES	INSTALLATION NOTES
(A) EXISTING ERICSSON AIR21 KRC118023-1_B2A_B4P ANTENNA TO REMAIN (TOTAL OF 3)	INSTALL RFS APXVARR24_43-U-NA20 ANTENNA ON NEW PIPE MOUNT PROVIDE NEW 2 7/8" OD SCH40 PIPE MAST (LENGTH TO BE V.I.P) (TYP OF 1 PER SECTOR, TOTAL OF 3)
(B) EXISTING ERICSSON AIR21 KRC118023-1_B2P_B4A ANTENNA TO REMAIN (TOTAL OF 3)	INSTALL RADIO 4449 B12/B71 (TYP OF 1 PER SECTOR, TOTAL OF 3)
(C) EXISTING KRY 112 144/1 TMA TO REMAIN (TOTAL OF 3)	INSTALL (3) 6x12 HCS FIBER JUNCTION BOXES AND ANTENNAS FOLLOWING EXISTING ROUTING
(D) EXISTING 1 5/8" COAX CABLES TO REMAIN (TOTAL OF 6)	
(E) EXISTING 9x18 HCS FIBER TO REMAIN (TOTAL OF 1)	
(F) REMOVE (6) EXISTING 1 5/8" COAX CABLES	





CT1381C  
 BU #: 876338  
 WATERFORD SOUTH/RT 1  
 41 MANTOCK HILL RD  
 WATERFORD, CT 06385  
 EXISTING 136'-0"  
 SELF SUPPORT TOWER

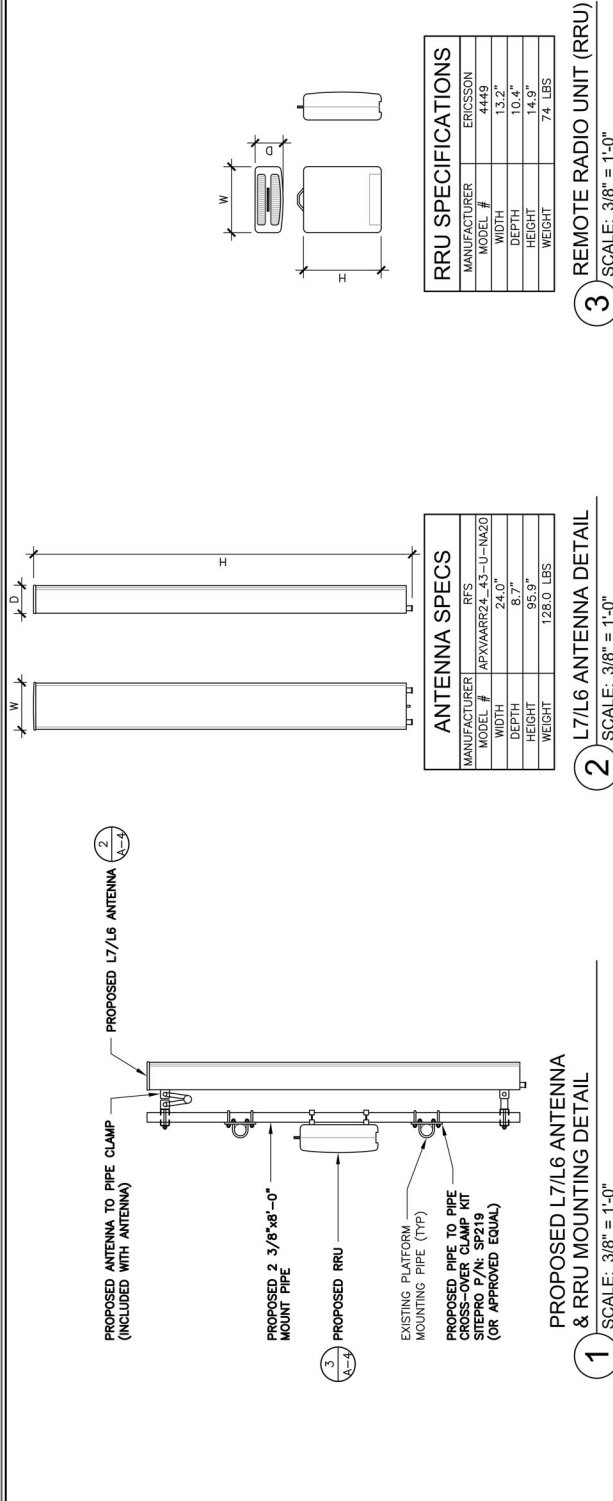
PROJECT NO: 099772.003.01  
 CHECKED BY: RMC

REV	DATE	DRWN	DESCRIPTION
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1	3/4/21	JJD	CONSTRUCTION

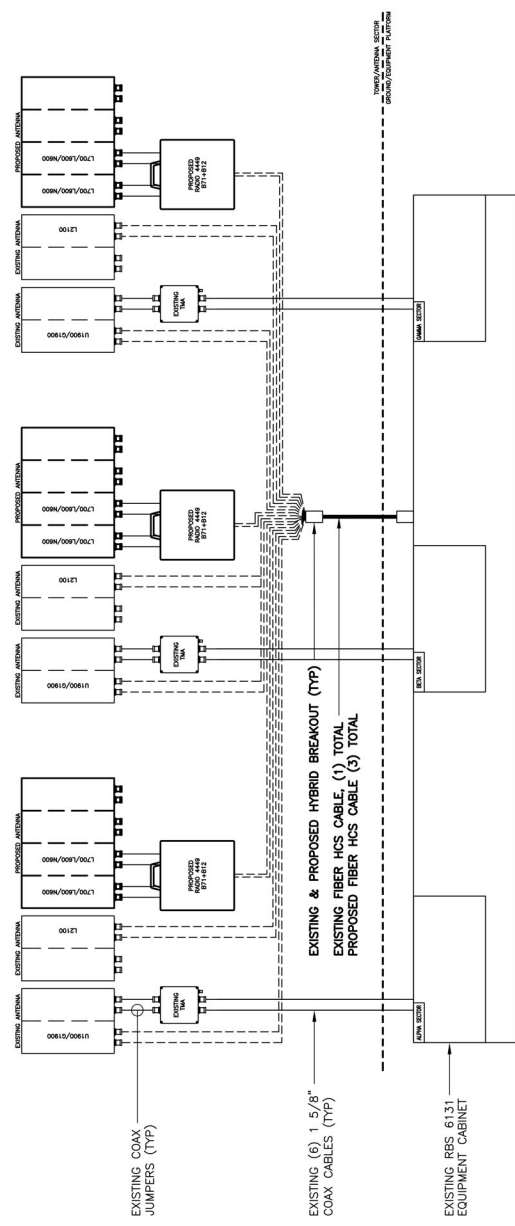
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 PEC 0001564  
 Expires 2/10/22

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SHEET NUMBER: **A-4**  
 REVISION: **1**



- NOTES:
- TAG ALL EXISTING AND PROPOSED CABLES/JUMPERS PER T-MOBILE SPECIFICATIONS.
  - SEE RF SCHEDULE FOR CABLE AND JUMPER LENGTHS.
  - REFER TO ANTENNA ORIENTATION ON SHEET A-2 FOR EXACT ANTENNA POSITIONING.





CT1381C  
 BU # 876338  
 WATERFORD SOUTH/RT 1  
 41 MANTOCK HILL RD  
 WATERFORD, CT 06385  
 EXISTING 136'-0"  
 SELF SUPPORT TOWER

PROJECT NO: 09972.003.01  
 CHECKED BY: RMC

REV	DATE	DRWN	DESCRIPTION
0	1/4/20	JJD	CONSTRUCTION
1	3/4/21	JJD	CONSTRUCTION

B&T ENGINEERING, INC.  
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SHEET NUMBER: E-1  
 REVISION: 1

FINAL PANEL SCHEDULE

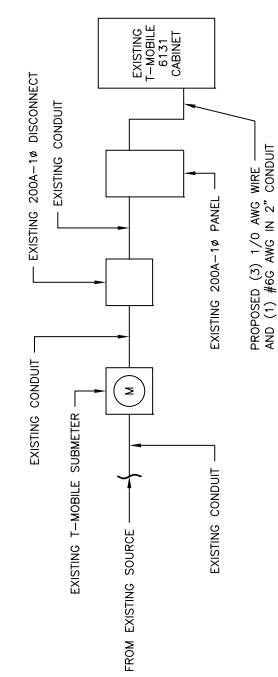
LOAD	POLES	AMPS	BUS						LOAD
			L1	L2	L3	L4	L5	L6	
LIGHT OUTLET	1	20A							MAN
RBS 6131	2	100A							

BRANCH POLES: □12 □24 □30 □42 APPROVED MFRS  
 RATED VOLTAGE: □100 □200 □400 □600  
 MAIN LUGS ONLY MAIN 200 AMPS BREAKER DEFUSED SWITCH  
 DEFUSED CIRCUIT BREAKER BRANCH DEVICES  
 CABINET: □ SURFACE □ FLUSH  
 □ HINGED DOOR  
 □ KEYPAD LOCK □ KEYPAD LATCH  
 □ FULL NEUTRAL BUS □ GROUND BAR

ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF 10,000 AMPS SYMMETRICAL TO BE GFCI BREAKERS

1. REPLACE EXISTING BREAKER IN POSITION 3 AND 5 WITH A NEW 2P 100A BREAKER  
 REPLACE EXISTING WIRES FOR EXISTING 6131 CABINET WITH (3) 1/0 AWG THHN (COPPER) AND (1) #6G AWG. MINIMUM CONDUIT SIZE TO BE 2".  
 IF 100A BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL 001204M200RB (OR APPROVED EQUAL).  
 GROUNDING FEEDER NEW PANELS REQUIRED. ALL NEW WIRING TO BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL APPLICABLE LOCAL CODES. WIRE SIZE WERE BASED OFF OF EXISTING PHOTOS.  
 FINAL T-MOBILE PANEL DETAIL

1 SCALE: N.T.S.



2 ONE-LINE DIAGRAM

SCALE: N.T.S.