

JULIE D. KOHLER

PLEASE REPLY TO: Bridgeport
WRITER'S DIRECT DIAL: (203) 337-4157
E-Mail Address: jkohler@cohenandwolf.com

April 1, 2015

Via First Class and Electronic Mail

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06501

**Re: Notice of Exempt Modification
New England Site Management, LLC/T-Mobile Equipment Upgrade
Site ID CT11144C
1050 Buckley Highway, Union, CT 06076
Revised Structural Analysis**

Dear Attorney Bachman:

Enclosed please find a revised structural analysis for the above referenced exempt modification filing. It has come to our attention that the structural analysis that was submitted on March 24, 2015 did not include the three (3) proposed smart-bias Ts that will be mounted behind the proposed antennas at a centerline of 140 feet.

Enclosed please find a Structural Analysis Report dated March 30, 2015 that reflects this correction.

Don't hesitate to let me know if you have any questions.

Sincerely,


Julie D. Kohler, Esq.

cc: Town of Union, First Selectman Albert L. Goodhall, Jr. (*via first class mail*)
New England Site Management, LLC (*via first class mail*)
Wayne and Kathy Kemp (*via first class mail*)
Jamie Ford, EBI Consulting (*via first class mail*)

STRUCTURAL ANALYSIS REPORT

March 30, 2015

T-Mobile, USA
35 Griffin Road South
Bloomfield, CT 06002

Subject: Site #: CT11144C
 EBI Reference #: 81150092
 Site Name: Union/I-84 X73-74/ Cemet1
 Address: 1050 Buckley Highway, Union, CT 06076

Dear Client:

In accordance with your request, EBI Consulting's structural engineers have reviewed the available documentation for the above site in order to determine its capability for supporting the structural loads from the proposed antennas, remote radio units, coaxial cables, and related equipment. This analysis is in accordance with the following design codes governing this project:

- State Building Code – 2005 CT Supplement (with 2009, 2011, and 2013 Amendments)
- International Building Code, 2003
- AISC Steel Construction Manual, 13th Edition
- ANSI/TIA-222-F

EBI Consulting has reviewed the following sources in preparing this analysis:

- Site visit photos by EBI Consulting, dated 02/18/2015
- Omnipoint Construction Drawings by Arcnet Architects, Inc., dated November 07, 1997
- "Mapping Report Self Supporting Tower Prepared for T-Mobile," by Atlantis Group
- AT&T Structural Analysis by URS Corporation, dated April 18, 2003
- "Structural Analysis Report: AT&T Union Central Site #5453," by Malouf Engineering Intl., Inc., dated August 21, 2007
- "Structural Analysis Report Self Supporting Tower Prepared for T-Mobile," by Atlantis Group, dated March 24, 2014
- Single page elevation output from TNX Tower, by Atlantis Group, dated February 17, 2014

At center line elevation 140'-0", it is proposed that three (one per sector) of six (two per sector) existing EMS RR90-17-02DP (56"H x 8"E x 2.8"D) antennas be replaced with a three (one per sector) proposed Commscope LNX-6515DS-VTM (96"H x 11.9"W x 7.1"D) antennas. The remaining three (one per sector) existing EMS RR90-19-02DP antennas and three (one per sector) existing TMAs will remain at this elevation. The proposed new equipment require (6) 1-5/8" coax cables, stacked onto the (6) existing 1-5/8" coax cables- two rows of six cables each. Additional proposed equipment includes three RRUS11 (19.7"H x 17"W x 7.2"D) at grade level and three Smart Bias-T's mounted behind the proposed antennas, with one per sector.

By engineering analysis, the existing tower is capable of supporting the existing and proposed equipment listed herein, with a maximum usage of approximately 97.1%. This analysis did not provide for any future equipment or tower extensions.

The analysis provided herein by EBI Consulting includes the following existing and proposed equipment:

Proposed equipment configuration:

Carrier	EL	Manufacturer	Model	Qty.	Mount type	Coax
	173	Commscope	DB224	1	-	(1) 1-1/4"
	172	-	2" OD x 6' Omni	1	-	(1) 1/2"
	170	-	2 Bay Dipole	1	-	(1) 1/2"
	168	-	6' Yagi w. mtg. pipe	1		(1) 1/2"
	164					(1) 1-5/8"
Nextel	153				(4) 3 ft. standoff	
Verizon	150	Amphenol	LPA-185080-8CF w. mtg. pipe	6	(3) Rohn 6'x15' Boom Gate	(12)1-5/8" 2 rows of 6
		Amphenol	BXA-185063/12CF w. mtg. pipe	3		
		Powerwave	P65-16-XL-2 w. mtg. pipe	3		
T-Mobile	140	Commscope	LNX-6515DS-VTM antennas	3	3 ft. side arm mount	(6) 1-5/8" (6) 1-5/8" (2 rows of 6)
		-	Smart Bias-T	3		
		EMS	RR90-19-02DP	3		
		AWS	PCS TMA	3		
Sprint	131	-	DB98H90A-M w. mtg. pipe	6	(3)-10 ft. frame	(6) 1-5/8"
ATT	120	-	96"x11"x7" w. mtg. pipe	3	(3)-12 ft. frame	(6) 1-1/4"
		Powerwave	7770.00 w. mtg. pipe	3		
		Ericsson	RRUS-11	3		
	120					(1) 1-1/4"
	91	-	Small Single dipole	1		(1) 1/2"
	87				(1) standoff	(3) 1/2"
	87		GPS			(1) 1/2"
	70	-	Single Pole Dipole	1		(1) 1/2"

Note: Proposed equipment is shown in bold.

Summary of Results: (Refer to attached TNX Tower Analysis for detailed analysis results)

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P _{allow} lb	% Capacity	Pass Fail
T1	168 - 160	Leg	ROHN 2.5 STD 2.875ODx0.203wall	1	-1520.22	55076.63	2.8	Pass
T2	160 - 140	Leg	ROHN 2.5 STD 2.875ODx0.203wall	21	-15201.90	55076.63	27.6	Pass
T3	140 - 128	Leg	ROHN 2.5 EH 2.875ODx0.276wall	53	-34915.00	72229.27	48.3	Pass
T4	128 - 120	Leg	2.5" sch 80+3" sch 40 split	74	-52380.00	96431.88	54.3	Pass
T5	120 - 105	Leg	3" Sch. 40 + 3.5" Sch. 40 split	89	-80613.50	100730.41	80.0	Pass
T6	105 - 100	Leg	3" Sch. 40 + 3.5" Sch. 40 split	110	-89525.20	120113.82	74.5	Pass
T7	100 - 93.33	Leg	ROHN 3.5 EH 4ODx0.318wall	122	-99293.90	110245.23	90.1	Pass
T8	93.33 - 86.66	Leg	ROHN 3.5 EH 4ODx0.318wall	131	-110279.00	132067.77	83.5	Pass
T9	86.66 - 79.99	Leg	ROHN 3.5 EH 4ODx0.318wall	143	-120814.00	132110.82	91.4	Pass
T10	79.99 - 73.32	Leg	ROHN 4 EH 4.5ODx0.337wall	155	-131580.00	139047.89	94.6	Pass
T11	73.32 - 66.65	Leg	ROHN 4 EH 4.5ODx0.337wall	164	-141531.00	161009.06	87.9	Pass
T12	66.65 - 59.98	Leg	ROHN 4 EH 4.5ODx0.337wall	176	-151297.00	161038.39	94.0	Pass
T13	59.98 - 39.98	Leg	ROHN 5 EH 5.563ODx0.375wall	188	-180846.00	206291.07	87.7	Pass
T14	39.98 - 19.98	Leg	ROHN 6 EHS 6.625ODx0.34wall	209	-205972.00	212197.60	97.1	Pass
T15	19.98 - 0	Leg	ROHN 6 EH 6.625ODx0.432wall	224	-232038.00	264405.87	87.8	Pass
T1	168 - 160	Diagonal	L1 3/4x1 3/4x3/16	11	-585.66	7172.11	8.2	Pass
T2	160 - 140	Diagonal	L1 3/4x1 3/4x3/16	26	-2766.50	7172.11	38.6	Pass
T3	140 - 128	Diagonal	L2x2x3/16	59	-4515.19	10545.42	42.8	Pass
T4	128 - 120	Diagonal	L2x2x3/16	79	-5163.82	10588.49	48.8	Pass
T5	120 - 105	Diagonal	L2x2x3/16	94	-5045.71	7048.98	71.6	Pass
T6	105 - 100	Diagonal	L2x2x3/16	115	-5080.16	6436.64	78.9	Pass
T7	100 - 93.33	Diagonal	L2 1/2x2 1/2x3/16	127	-5693.93	9650.27	59.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P _{allow} lb	% Capacity	Pass Fail	
T8	93.33 - 86.66	Diagonal	L2 1/2x2 1/2x3/16	136	-5806.07	8771.07	66.2	Pass	
T9	86.66 - 79.99	Diagonal	L2 1/2x2 1/2x3/16	148	-5948.76	7990.83	74.4	Pass	
T10	79.99 - 73.32	Diagonal	L2 1/2x2 1/2x1/4	160	-6152.36	9544.72	64.5	Pass	
T11	73.32 - 66.65	Diagonal	L2 1/2x2 1/2x1/4	169	-6190.81	8735.63	70.9	Pass	
T12	66.65 - 59.98	Diagonal	L2 1/2x2 1/2x1/4	181	-6505.72	8015.80	81.2	Pass	
T13	59.98 - 39.98	Diagonal	L3x3x1/4	199	-7005.05	12114.77	57.8	Pass	
T14	39.98 - 19.98	Diagonal	L3 1/2x3 1/2x1/4	220	-8377.42	13526.48	61.9	Pass	
T15	19.98 - 0	Diagonal	L3 1/2x3 1/2x1/4	235	-9091.26	11295.19	80.5	Pass	
T6	105 - 100	Secondary Horizontal	L3x3x3/16	118	1552.61	21068.06	7.4	Pass	
T8	93.33 - 86.66	Secondary Horizontal	L2x2x3/16	139	-1912.53	6968.10	27.4	Pass	
T9	86.66 - 79.99	Secondary Horizontal	L2x2x3/16	152	-2095.24	6062.80	34.6	Pass	
T11	73.32 - 66.65	Secondary Horizontal	L3x3x3/16	172	-2454.52	15903.09	15.4	Pass	
T12	66.65 - 59.98	Secondary Horizontal	L2x2x3/16	184	-2623.90	4228.10	62.1	Pass	
T1	168 - 160	Top Girt	L1 3/4x1 3/4x3/16	5	-126.79	2434.02	5.2	Pass	
							Summary		
							Leg (T14)	97.1	Pass
							Diagonal (T12)	81.2	Pass
							Secondary Horizontal (T12)	62.1	Pass
							Top Girt (T1)	5.2	Pass
							RATING =	97.1	Pass

The maximum stress under the proposed conditions and configurations is **97.1%** of the tower capacity, governed by stresses in the tower diagonals. Therefore **the tower has adequate structural capacity** for the proposed equipment configurations.

Foundation:

The foundation reactions are summarized below:

	EBI Consulting	Malouf Engineering	URS Corporation
Reactions	Current (TIA-222-F)	09-21-2007 (TIA-222-F)	04-18-2003 (TIA-222-F)
Moment (k-ft)	3639	3689	3556
Shear (k)	38.3	39	37
Axial (k)	42.6	54	46

All reactions are within the allowable capacity of the pad & pier foundation, with dimensions as reported in the existing structural analysis by others, as calculated within this analysis. Therefore, the existing foundation is structurally adequate for supporting the tower under the proposed loading configuration.

Limitations and Assumptions:

This report is based on the following assumptions:

1. Tower is properly installed and maintained.
2. All members are as specified in the original design documents and are in good condition.
3. All required members are in place.
4. All bolts are in place and are tightly fastened.
5. Tower is in plumb condition.
6. All member protective coatings are in good condition.
7. All tower members were properly designed, detailed, fabricated, and installed, and have been properly maintained since erection.
8. Foundations were properly designed, constructed, and analyzed to support original and previous analysis design loads.

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

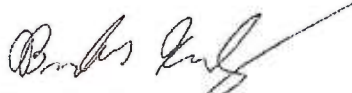
1. Adding antennas
2. Removing/replacing antennas
3. Adding coaxial cables
4. Extending the height of the tower

EBI hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If any information conflicts with that which is contained herein, please disregard this report and contact EBI. EBI disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

This analysis relies upon the condition that the structure is: properly designed, analyzed, and constructed to building code requirements, not been adversely modified, and remains in sound structural condition. Please notify EBI Consulting immediately should any of these conditions be found not to exist. All proposed equipment shall be installed in accordance with the manufacturer's requirements. No structural qualification is made or implied by this report for existing structural members not supporting the proposed installation.

Please feel free to contact our office should you have any questions.

Sincerely yours,
EBI Consulting
March 30, 2015



Brandon Kelsey, E.I.T.



Richard L. Peterman, P.E.
Professional Engineer



Attachments: Photograph log, analysis calculations

PHOTOGRAPH LOG

Photo 1:

168 ft tall self support tower



Photo 2:

EL=140 ft, existing T-Mobile mounted on existing 3 ft. standoff mount.



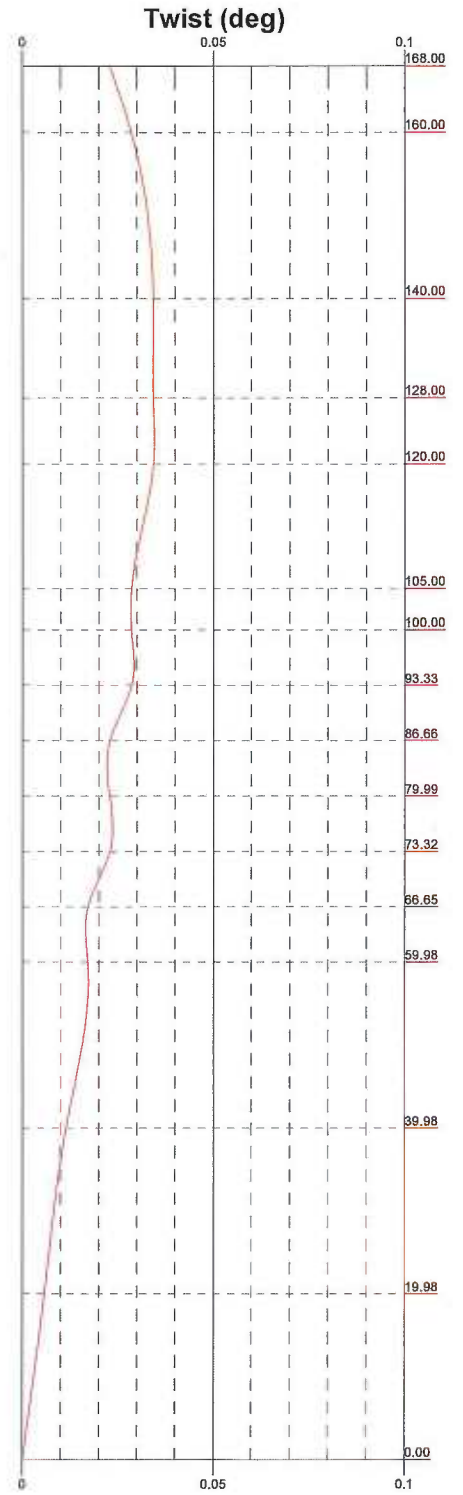
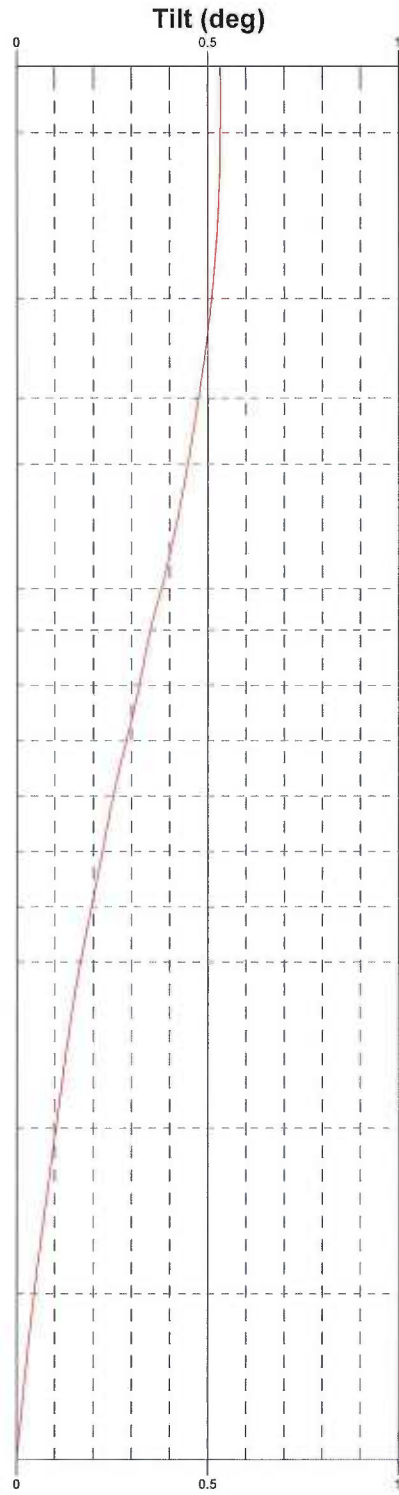
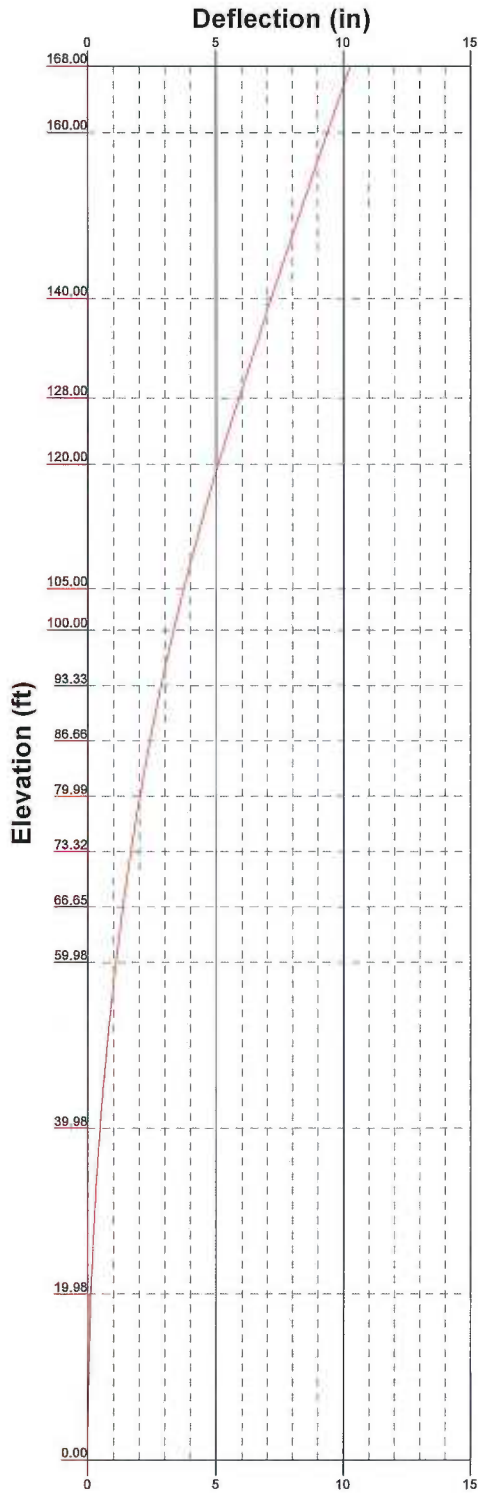
Photo 3:

Feedlines



STRUCTURAL DESIGN PARAMETERS

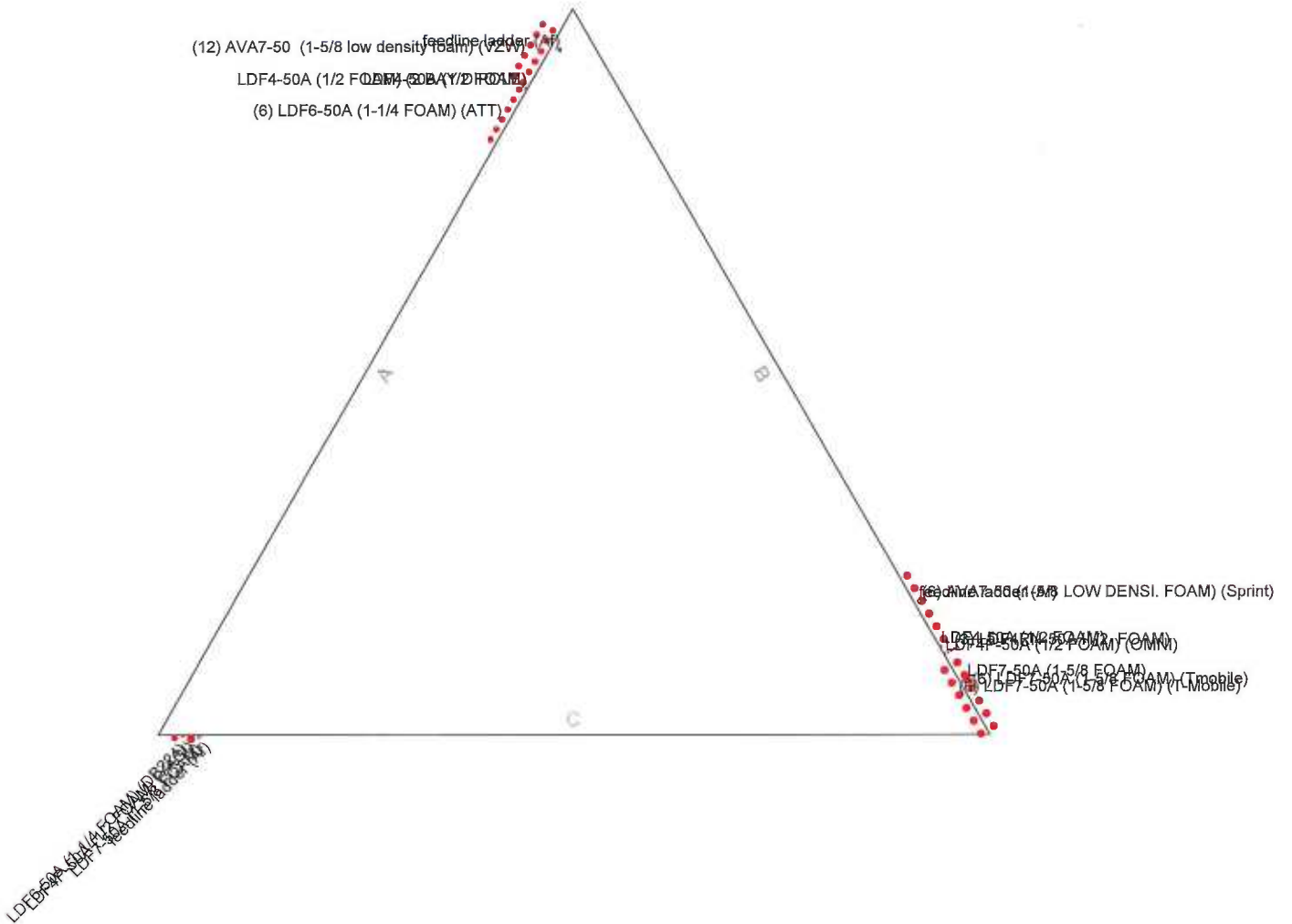
BUILDING CODE/S:	see letter
OCCUPANCY CATEGORY:	II
WIND LOADS:	
Basic Wind Speed (3-Sec Gust), V (per state code):	100 MPH, equivalent to 80 MPH fastest mile
Basic Wind Speed (fastest mile), V (per TIA-F):	85 MPH
ICE LOADS:	
Ice thickness:	0.5 INCH
Basic Wind Speed with Ice, Vi:	73.6 MPH



EBI Consulting 21 B Street Burlington, MA Phone: 781.273.2500 FAX: 781.273.3311	Job: Union/ I-84		
	Project: CT11144C		
	Client: T-Mobile	Drawn by: RA	App'd:
	Code: TIA/EIA-222-F	Date: 02/27/15	Scale: NTS
	Path:	Dwg No. E-5	

Feed Line Plan

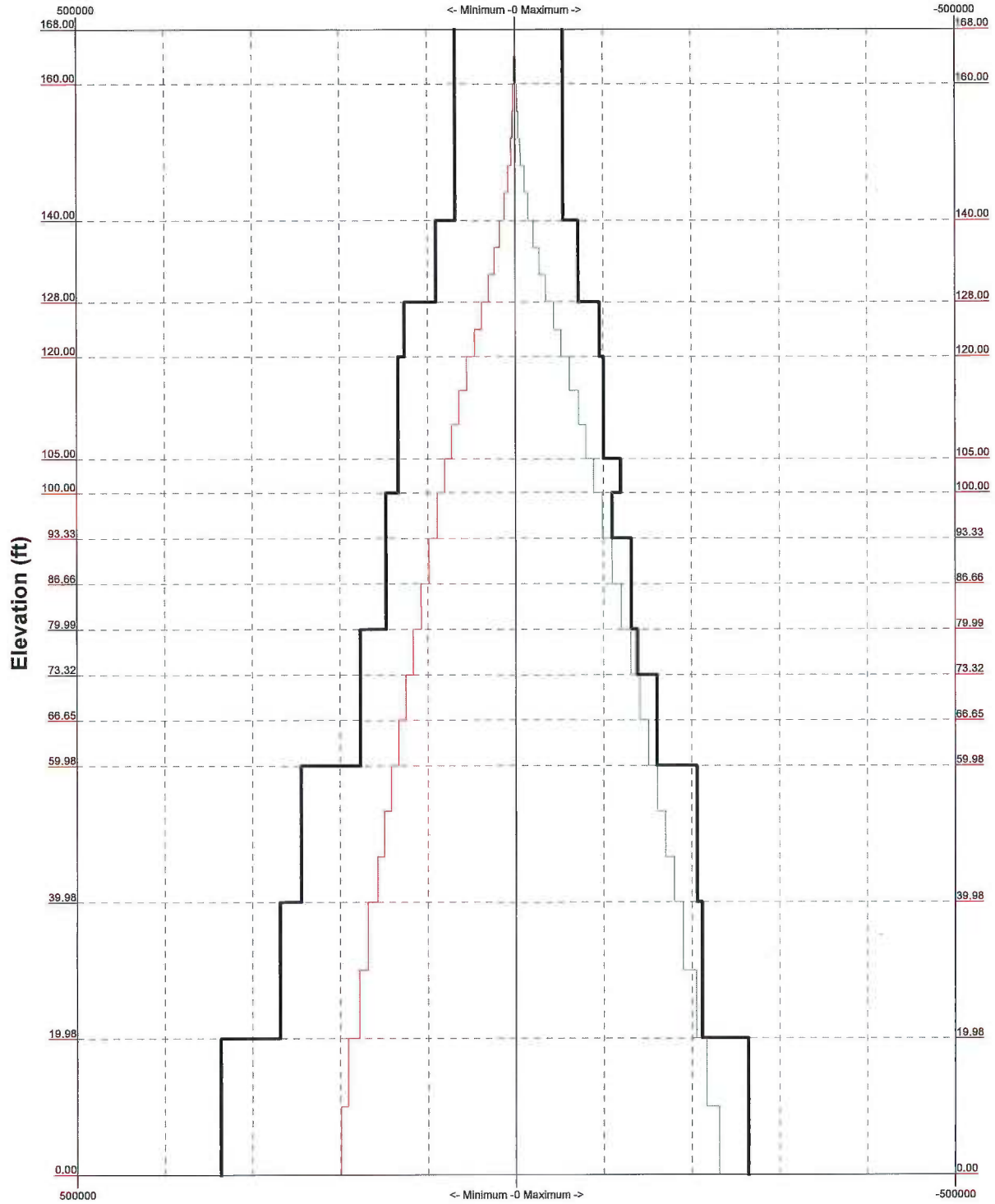
_____ Round _____ Flat _____ App In Face _____ App Out Face



EBI Consulting 21 B Street Burlington, MA Phone: 781.273.2500 FAX: 781.273.3311	Job: Union/ I-84		
	Project: CT11144C		
	Client: T-Mobile	Drawn by: RA	App'd:
	Code: TIA/EIA-222-F	Date: 02/27/15	Scale: NTS
	Path:		Dwg No. E-7

TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Leg Capacity ——— Leg Compression (lb)



EBI Consulting		Job: Union/I-84	
21 B Street		Project: CT11144C	
Burlington, MA		Client: T-Mobile	Drawn by: RA
Phone: 781.273.2500		Date: 02/27/15	App'd:
FAX: 781.273.3311		Code: TIA/EIA-222-F	Scale: NTS
		Path:	Dwg No. E-3

tnxTower EBI Consulting 21 B Street Burlington, MA Phone: 781.273.2500 FAX: 781.273.3311	Job Union/ I-84	Page 1 of 36
	Project CT11144C	Date 13:09:26 02/27/15
	Client T-Mobile	Designed by RA

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 168.00 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 6.69 ft at the top and 18.85 ft at the base.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in Tolland County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 74 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

Weld together tower sections have flange connections..

Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..

Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..

Welds are fabricated with ER-70S-6 electrodes..

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in tower member design is 1.333.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section √ Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned Assume Rigid Index Plate Use Clear Spans For Wind Area √ Use Clear Spans For KL/r √ Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. √ Autocalc Torque Arm Areas SR Members Have Cut Ends √ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Use TIA-222-G Tension Splice Capacity Exemption | <ul style="list-style-type: none"> √ Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules √ Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression √ All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feedline Torque √ Include Angle Block Shear Check Poles Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|---|---|

tnxTower EBI Consulting 21 B Street Burlington, MA Phone: 781.273.2500 FAX: 781.273.3311	Job	Union/ I-84	Page	3 of 36
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	Client	T-Mobile	Designed by	RA

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	168.00-160.00	4.00	X Brace	No	No	0.0000	0.0000
T2	160.00-140.00	4.00	X Brace	No	No	0.0000	0.0000
T3	140.00-128.00	4.00	X Brace	No	No	0.0000	0.0000
T4	128.00-120.00	4.00	X Brace	No	No	0.0000	0.0000
T5	120.00-105.00	5.00	X Brace	No	No	0.0000	0.0000
T6	105.00-100.00	5.00	X Brace	No	Yes	0.0000	0.0000
T7	100.00-93.33	6.67	X Brace	No	No	0.0000	0.0000
T8	93.33-86.66	6.67	X Brace	No	Yes	0.0000	0.0000
T9	86.66-79.99	6.67	X Brace	No	Yes	0.0000	0.0000
T10	79.99-73.32	6.67	X Brace	No	No	0.0000	0.0000
T11	73.32-66.65	6.67	X Brace	No	Yes	0.0000	0.0000
T12	66.65-59.98	6.67	X Brace	No	Yes	0.0000	0.0000
T13	59.98-39.98	6.67	X Brace	No	No	0.0000	0.0000
T14	39.98-19.98	10.00	X Brace	No	No	0.0000	0.0000
T15	19.98-0.00	9.99	X Brace	No	No	0.0000	0.0000

Tower Section Geometry (cont'd)

Tower Elevation	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
ft						
T1 168.00-160.00	Pipe	ROHN 2.5 STD 2.875ODx0.203wall	A500-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 160.00-140.00	Pipe	ROHN 2.5 STD 2.875ODx0.203wall	A500-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T3 140.00-128.00	Pipe	ROHN 2.5 EH 2.875ODx0.276wall	A500-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T4 128.00-120.00	Arbitrary Shape	2.5" sch 80+3" sch 40 split	A500-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T5 120.00-105.00	Arbitrary Shape	3" Sch. 40 + 3.5" Sch. 40 split	A500-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T6 105.00-100.00	Arbitrary Shape	3" Sch. 40 + 3.5" Sch. 40 split	A500-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T7 100.00-93.33	Pipe	ROHN 3.5 EH 4ODx0.318wall	A500-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T8 93.33-86.66	Pipe	ROHN 3.5 EH 4ODx0.318wall	A500-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T9 86.66-79.99	Pipe	ROHN 3.5 EH 4ODx0.318wall	A500-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T10 79.99-73.32	Pipe	ROHN 4 EH 4.5ODx0.337wall	A500-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T11 73.32-66.65	Pipe	ROHN 4 EH 4.5ODx0.337wall	A500-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T12 66.65-59.98	Pipe	ROHN 4 EH 4.5ODx0.337wall	A500-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T13 59.98-39.98	Pipe	ROHN 5 EH 5.563ODx0.375wall	A500-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T14 39.98-19.98	Pipe	ROHN 6 EHS 6.625ODx0.34wall	A500-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T15 19.98-0.00	Pipe	ROHN 6 EH 6.625ODx0.432wall	A500-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)

tnxTower EBI Consulting 21 B Street Burlington, MA Phone: 781.273.2500 FAX: 781.273.3311	Job Union/ I-84	Page 4 of 36
	Project CT11144C	Date 13:09:26 02/27/15
	Client T-Mobile	Designed by RA

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 168.00-160.00	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T6 105.00-100.00	Single Angle	L3x3x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T8 93.33-86.66	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T9 86.66-79.99	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T11 73.32-66.65	Single Angle	L3x3x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T12 66.65-59.98	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 168.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt
T3 140.00-128.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt
T4 128.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt
T5 120.00-105.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt
T6 105.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt
T7 100.00-93.33	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt
T8 93.33-86.66	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt
T9 86.66-79.99	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt
T10 79.99-73.32	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt
T11 73.32-66.65	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt

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Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
T12 66.65-59.98	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt
T13 59.98-39.98	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt
T14 39.98-19.98	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt
T15 19.98-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt

Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors ¹							
				X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace	
											X Y
T1 168.00-160.00	No	No	1	1	1	1	1	1	1	1	1
T2 160.00-140.00	No	No	1	1	1	1	1	1	1	1	1
T3 140.00-128.00	No	No	1	1	1	1	1	1	1	1	1
T4 128.00-120.00	No	No	1	1	1	1	1	1	1	1	1
T5 120.00-105.00	No	No	1	1	1	1	1	1	1	1	1
T6 105.00-100.00	No	No	1	1	1	1	1	1	0.5	1	1
T7 100.00-93.33	No	No	1	1	1	1	1	1	1	1	1
T8 93.33-86.66	No	No	1	1	1	1	1	1	0.5	1	1
T9 86.66-79.99	No	No	1	1	1	1	1	1	0.5	1	1
T10 79.99-73.32	No	No	1	1	1	1	1	1	1	1	1
T11 73.32-66.65	No	No	1	1	1	1	1	1	0.5	1	1
T12 66.65-59.98	No	No	1	1	1	1	1	1	0.5	1	1
T13 59.98-39.98	No	No	1	1	1	1	1	1	1	1	1
T14 39.98-19.98	No	No	1	1	1	1	1	1	1	1	1
T15 19.98-0.00	No	No	1	1	1	1	1	1	1	1	1

¹Note: 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)

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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 168.00-160.00	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T2 160.00-140.00	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T3 140.00-128.00	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T4 128.00-120.00	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T5 120.00-105.00	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T6 105.00-100.00	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T7 100.00-93.33	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T8 93.33-86.66	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T9 86.66-79.99	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T10 79.99-73.32	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T11 73.32-66.65	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T12 66.65-59.98	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T13 59.98-39.98	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T14 39.98-19.98	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5
T15 19.98-0.00	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.5	0.0000	0.75	0.0000	0.5	0.0000	0.5

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Shield Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
AVA7-50 (1-5/8 low density foam) (VZW)	A	Yes	Ar (CfAe)	150.00 - 0.00	1.0000	0.43	12	6	1.6250	1.6250		0.21
LDF6-50A (1-1/4 FOAM) (ATT)	A	Yes	Ar (CfAe)	120.00 - 0.00	1.0000	0.35	6	6	1.5500	1.5500		0.66
LDF4RN-50A II/2 FOAM)	B	Yes	Ar (CfAe)	87.00 - 0.00	1.0000	0.39	3	1	0.5000	0.5000		0.33
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	164.00 - 0.00	1.0000	0.43	1	1	1.9800	1.9800		0.82
AVA7-50 (1-5/8 LOW DENSI. FOAM) (Sprint)	B	Yes	Ar (CfAe)	131.00 - 0.00	1.0000	0.33	6	6	1.9800	1.9800		0.72
feedline ladder (Af)	B	Yes	Af (CfAe)	120.00 - 0.00	1.0000	0.32	1	1	0.7500	0.7500	3.0000	0.00
LDF7-50A	B	Yes	Ar (CfAe)	140.00 - 0.00	1.0000	0.45	6	6	1.9800	1.9800		0.82

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(1-5/8 FOAM) (T-Mobile)												
feedline ladder (Af)	A	Yes	Af (CfAe)	120.00 - 0.00	-2.0000	0.45	1	1	0.7500	0.7500	3.0000	0.00
feedline ladder (Af)	C	Yes	Af (CfAe)	120.00 - 0.00	0.0000	0.45	1	1	0.7500	0.7500	3.0000	0.00
LDF7-50A (1-5/8 FOAM) (T-Mobile)	B	Yes	Ar (CfAe)	140.00 - 0.00	-1.0000	0.45	6	6	1.9800	1.9800		0.82
LDF6-50A (1-1/4 FOAM) (DB224)	C	Yes	Ar (CfAe)	168.00 - 0.00	0.0000	0.48	1	1	1.5500	1.5500		0.66
LDF4P-50A (1/2 FOAM) (OMNI)	B	Yes	Ar (CfAe)	168.00 - 0.00	0.0000	0.39	1	1	0.6300	0.6300		0.15
LDF4-50A (1/2 FOAM) (2 BAY DIPOLE)	A	Yes	Ar (CfAe)	168.00 - 0.00	0.0000	0.39	1	1	0.6300	0.6300		0.15
LDF4P-50A (1/2 FOAM) (YAGI)	C	Yes	Ar (CfAe)	168.00 - 0.00	0.0000	0.47	1	1	0.6300	0.6300		0.15
LDF4-50A (1/2 FOAM)	A	Yes	Ar (CfAe)	91.00 - 0.00	0.0000	0.39	1	1	0.6300	0.6300		0.15
LDF4-50A (1/2 FOAM)	B	Yes	Ar (CfAe)	70.00 - 0.00	0.0000	0.38	1	1	0.6300	0.6300		0.15
LDF7-50A (1-5/8 FOAM)	C	No	Ar (CfAe)	164.00 - 0.00	0.0000	0.46	1	1	1.9800	1.9800		0.82

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
T1	168.00-160.00	A	0.420	0.000	0.000	0.000	1.20
		B	1.080	0.000	0.000	0.000	4.48
		C	2.113	0.000	0.000	0.000	9.76
T2	160.00-140.00	A	16.214	0.000	0.000	0.000	28.20
		B	4.350	0.000	0.000	0.000	19.40
		C	6.933	0.000	0.000	0.000	32.60
T3	140.00-128.00	A	18.827	0.000	0.000	0.000	32.04
		B	29.340	0.000	0.000	0.000	142.68
		C	4.160	0.000	0.000	0.000	19.56
T4	128.00-120.00	A	12.551	0.000	0.000	0.000	21.36
		B	25.500	0.000	0.000	0.000	121.04
		C	2.773	0.000	0.000	0.000	13.04
T5	120.00-105.00	A	35.159	0.938	0.000	0.000	99.45
		B	47.813	0.938	0.000	0.000	226.95
		C	5.200	0.938	0.000	0.000	24.45
T6	105.00-100.00	A	11.720	0.313	0.000	0.000	33.15
		B	15.938	0.313	0.000	0.000	75.65
		C	1.733	0.313	0.000	0.000	8.15
T7	100.00-93.33	A	15.634	0.417	0.000	0.000	44.22
		B	21.261	0.417	0.000	0.000	100.92
		C	2.312	0.417	0.000	0.000	10.87
T8	93.33-86.66	A	15.862	0.417	0.000	0.000	44.87
		B	21.303	0.417	0.000	0.000	101.25

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Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight lb
T9	86.66-79.99	C	2.312	0.417	0.000	0.000	10.87
		A	15.984	0.417	0.000	0.000	45.22
		B	22.094	0.417	0.000	0.000	107.52
T10	79.99-73.32	C	2.312	0.417	0.000	0.000	10.87
		A	15.984	0.417	0.000	0.000	45.22
		B	22.094	0.417	0.000	0.000	107.52
T11	73.32-66.65	C	2.312	0.417	0.000	0.000	10.87
		A	15.984	0.417	0.000	0.000	45.22
		B	22.270	0.417	0.000	0.000	108.02
T12	66.65-59.98	C	2.312	0.417	0.000	0.000	10.87
		A	15.984	0.417	0.000	0.000	45.22
		B	22.445	0.417	0.000	0.000	108.52
T13	59.98-39.98	C	2.312	0.417	0.000	0.000	10.87
		A	47.928	1.250	0.000	0.000	135.60
		B	67.300	1.250	0.000	0.000	325.40
T14	39.98-19.98	C	6.933	1.250	0.000	0.000	32.60
		A	47.928	1.250	0.000	0.000	135.60
		B	67.300	1.250	0.000	0.000	325.40
T15	19.98-0.00	C	6.933	1.250	0.000	0.000	32.60
		A	47.880	1.249	0.000	0.000	135.46
		B	67.233	1.249	0.000	0.000	325.07
		C	6.926	1.249	0.000	0.000	32.57

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight lb
T1	168.00-160.00	A	0.500	1.087	0.000	0.000	0.000	6.72
		B		2.080	0.000	0.000	0.000	16.06
		C		3.780	0.000	0.000	0.000	31.36
T2	160.00-140.00	A	0.500	18.714	0.000	0.000	0.000	197.78
		B		7.683	0.000	0.000	0.000	63.50
		C		11.933	0.000	0.000	0.000	101.75
T3	140.00-128.00	A	0.500	20.827	0.000	0.000	0.000	227.25
		B		44.840	0.000	0.000	0.000	414.56
		C		7.160	0.000	0.000	0.000	61.05
T4	128.00-120.00	A	0.500	13.885	0.000	0.000	0.000	151.50
		B		38.833	0.000	0.000	0.000	356.83
		C		4.773	0.000	0.000	0.000	40.70
T5	120.00-105.00	A	0.500	45.159	1.771	0.000	0.000	470.44
		B		72.813	1.771	0.000	0.000	683.33
		C		8.950	1.771	0.000	0.000	90.58
T6	105.00-100.00	A	0.500	15.053	0.590	0.000	0.000	156.81
		B		24.271	0.590	0.000	0.000	227.78
		C		2.983	0.590	0.000	0.000	30.19
T7	100.00-93.33	A	0.500	20.080	0.787	0.000	0.000	209.19
		B		32.377	0.787	0.000	0.000	303.86
		C		3.980	0.787	0.000	0.000	40.28
T8	93.33-86.66	A	0.500	20.670	0.787	0.000	0.000	212.83
		B		32.476	0.787	0.000	0.000	304.82
		C		3.980	0.787	0.000	0.000	40.28
T9	86.66-79.99	A	0.500	20.986	0.787	0.000	0.000	214.79
		B		34.323	0.787	0.000	0.000	322.68
		C		3.980	0.787	0.000	0.000	40.28
T10	79.99-73.32	A	0.500	20.986	0.787	0.000	0.000	214.79
		B		34.323	0.787	0.000	0.000	322.68
		C		3.980	0.787	0.000	0.000	40.28

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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight lb
T11	73.32-66.65	A	0.500	20.986	0.787	0.000	0.000	214.79
		B		34.778	0.787	0.000	0.000	325.50
		C		3.980	0.787	0.000	0.000	40.28
T12	66.65-59.98	A	0.500	20.986	0.787	0.000	0.000	214.79
		B		35.229	0.787	0.000	0.000	328.29
		C		3.980	0.787	0.000	0.000	40.28
T13	59.98-39.98	A	0.500	62.928	2.361	0.000	0.000	644.05
		B		105.633	2.361	0.000	0.000	984.37
		C		11.933	2.361	0.000	0.000	120.78
T14	39.98-19.98	A	0.500	62.928	2.361	0.000	0.000	644.05
		B		105.633	2.361	0.000	0.000	984.37
		C		11.933	2.361	0.000	0.000	120.78
T15	19.98-0.00	A	0.500	62.865	2.359	0.000	0.000	643.41
		B		105.528	2.359	0.000	0.000	983.39
		C		11.921	2.359	0.000	0.000	120.66

Feed Line Shielding

Section	Elevation ft	Face	A_R ft ²	A_R Ice ft ²	A_F ft ²	A_F Ice ft ²
T1	168.00-160.00	A	0.000	0.064	0.043	0.112
		B	0.000	0.123	0.111	0.215
		C	0.000	0.164	0.150	0.288
T2	160.00-140.00	A	0.000	0.769	0.779	1.346
		B	0.000	0.373	0.370	0.653
		C	0.000	0.338	0.309	0.592
T3	140.00-128.00	A	0.000	0.844	1.008	1.687
		B	0.000	2.177	2.849	4.354
		C	0.000	0.203	0.212	0.406
T4	128.00-120.00	A	0.000	0.562	0.672	1.125
		B	0.000	1.885	2.476	3.770
		C	0.000	0.135	0.141	0.271
T5	120.00-105.00	A	0.000	1.730	2.053	3.460
		B	0.000	3.015	3.919	6.029
		C	0.000	0.298	0.294	0.596
T6	105.00-100.00	A	0.000	0.794	1.085	1.828
		B	0.000	1.385	2.071	3.186
		C	0.000	0.137	0.156	0.315
T7	100.00-93.33	A	0.000	0.594	0.881	1.485
		B	0.000	1.035	1.682	2.587
		C	0.000	0.102	0.126	0.256
T8	93.33-86.66	A	0.000	0.844	1.167	1.987
		B	0.000	1.429	2.185	3.363
		C	0.000	0.141	0.164	0.332
T9	86.66-79.99	A	0.000	0.845	1.161	1.988
		B	0.000	1.442	2.178	3.391
		C	0.000	0.139	0.162	0.327
T10	79.99-73.32	A	0.000	0.585	0.853	1.461
		B	0.000	0.997	1.601	2.492
		C	0.000	0.096	0.119	0.240
T11	73.32-66.65	A	0.000	0.826	1.279	2.191
		B	0.000	1.428	2.419	3.786
		C	0.000	0.136	0.178	0.360
T12	66.65-59.98	A	0.000	0.819	1.122	1.922
		B	0.000	1.433	2.139	3.364
		C	0.000	0.135	0.156	0.316

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Section	Elevation	Face	A_R	$A_{R, Ice}$	A_F	$A_{F, Ice}$
	ft		ft ²	ft ²	ft ²	ft ²
T13	59.98-39.98	A	0.000	1.670	2.925	5.009
		B	0.000	2.923	5.574	8.769
		C	0.000	0.275	0.407	0.824
T14	39.98-19.98	A	0.000	1.186	2.424	4.150
		B	0.000	2.076	4.618	7.265
		C	0.000	0.195	0.337	0.682
T15	19.98-0.00	A	0.000	1.148	2.347	4.019
		B	0.000	2.010	4.473	7.036
		C	0.000	0.189	0.327	0.661

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	$CP_{X, Ice}$	$CP_{Z, Ice}$
	ft	in	in	in	in
T1	168.00-160.00	-1.2553	1.5423	-1.3661	1.5263
T2	160.00-140.00	-2.0807	-4.9122	-2.0127	-2.6279
T3	140.00-128.00	8.4521	-2.0535	9.0345	0.6538
T4	128.00-120.00	10.5148	-1.0094	11.1643	1.4757
T5	120.00-105.00	9.8963	-4.0955	10.4319	-2.1159
T6	105.00-100.00	9.4357	-4.0262	9.8735	-2.0091
T7	100.00-93.33	11.5702	-4.6587	12.4390	-2.4278
T8	93.33-86.66	11.2628	-4.7510	11.9126	-2.6068
T9	86.66-79.99	12.3578	-4.7660	13.3046	-2.4319
T10	79.99-73.32	13.9555	-5.2246	15.2886	-2.7474
T11	73.32-66.65	12.8098	-4.8284	14.0732	-2.3994
T12	66.65-59.98	14.1303	-5.1306	15.4060	-2.4613
T13	59.98-39.98	15.3088	-5.4483	17.3474	-2.7201
T14	39.98-19.98	17.2661	-6.0050	20.0149	-3.0753
T15	19.98-0.00	19.0734	-6.5694	22.1125	-3.3548

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	$C_A A_A$ Front	$C_A A_A$ Side	Weight	
			ft	°	ft	ft ²	ft ²	lb	
Andrew_DB224-Omni	C	From Leg	0.50	0.0000	173.00	No Ice	7.44	7.44	38.00
			0:00			1/2" Ice	9.60	9.60	90.44
			0.00						
7' Whip	B	From Leg	0.50	0.0000	172.00	No Ice	1.74	1.74	37.30
			0:00			1/2" Ice	2.60	2.60	53.68
			0.00						
20' 4-Bay Dipole	A	From Leg	0.50	0.0000	170.00	No Ice	4.00	4.00	55.00
			0:00			1/2" Ice	6.00	6.00	100.00
			0.00						
6' Yagi	C	From Leg	0.25	0.0000	168.00	No Ice	0.00	0.00	0.00
			0:00			1/2" Ice	0.00	0.00	0.00
			0.00						

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Lateral					
2.5 PIPE X 96" LONG	C	From Leg	0.25	0.0000	168.00 - 160.00	No Ice	3.84	6.14	92.64
			0.00			1/2" Ice	4.76	7.89	139.03
			0.00						
Pirod 4' Side Mount Standoff (1) (Nextel)	A	From Leg	3.00	0.0000	153.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
			0.00						
Pirod 4' Side Mount Standoff (1) (Nextel)	B	From Leg	3.00	0.0000	153.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
			0.00						
Pirod 4' Side Mount Standoff (1) (Nextel)	C	From Leg	3.00	0.0000	153.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
			0.00						
Rohn 6'x15' Boom Gate (3) (Verizon)	C	None		0.0000	150.00	No Ice	53.20	53.20	1790.00
						1/2" Ice	63.30	63.30	2230.00
(2) Amphenol	A	From Leg	4.00	0.0000	150.00	No Ice	2.11	3.65	21.60
LPA-185080-8CF w Mtg Pipe (Verizon)			0.00			1/2" Ice	2.40	4.20	50.31
			0.00						
(2) Amphenol	B	From Leg	4.00	0.0000	150.00	No Ice	2.11	3.65	21.60
LPA-185080-8CF w Mtg Pipe (Verizon)			0.00			1/2" Ice	2.40	4.20	50.31
			0.00						
(2) Amphenol	C	From Leg	4.00	0.0000	150.00	No Ice	2.11	3.65	21.60
LPA-185080-8CF w Mtg Pipe (Verizon)			0.00			1/2" Ice	2.40	4.20	50.31
			0.00						
Amphenol	A	From Leg	4.00	0.0000	150.00	No Ice	4.79	5.04	36.90
BXA-185063/12CF w pipe (Verizon)			0.00			1/2" Ice	5.24	5.98	80.24
			0.00						
Amphenol	B	From Leg	4.00	0.0000	150.00	No Ice	4.79	5.04	36.90
BXA-185063/12CF w pipe (Verizon)			0.00			1/2" Ice	5.24	5.98	80.24
			0.00						
Amphenol	C	From Leg	4.00	0.0000	150.00	No Ice	4.79	5.04	36.90
BXA-185063/12CF w pipe (Verizon)			0.00			1/2" Ice	5.24	5.98	80.24
			0.00						
Powerwave P65-16-XL-2 w mtg pipe (Verizon)	A	From Leg	4.00	0.0000	150.00	No Ice	8.40	5.84	78.74
			0.00			1/2" Ice	8.95	6.65	142.00
			0.00						
Powerwave P65-16-XL-2 w mtg pipe (Verizon)	B	From Leg	4.00	0.0000	150.00	No Ice	8.40	5.84	78.74
			0.00			1/2" Ice	8.95	6.65	142.00
			0.00						
Powerwave P65-16-XL-2 w mtg pipe (Verizon)	C	From Leg	4.00	0.0000	150.00	No Ice	8.40	5.84	78.74
			0.00			1/2" Ice	8.95	6.65	142.00
			0.00						
TMA (T-Mobile)	A	From Leg	4.00	0.0000	140.00	No Ice	0.47	0.17	11.00
			0.00			1/2" Ice	0.56	0.24	14.50
			0.00						
TMA (T-Mobile)	B	From Leg	4.00	0.0000	140.00	No Ice	0.47	0.17	11.00
			0.00			1/2" Ice	0.56	0.24	14.50
			0.00						
TMA (T-Mobile)	C	From Leg	4.00	0.0000	140.00	No Ice	0.47	0.17	11.00
			0.00			1/2" Ice	0.56	0.24	14.50
			0.00						
Valmont 10' Wireless Frame (3) (Sprint)	A	None		0.0000	131.00	No Ice	30.70	30.70	714.00
						1/2" Ice	42.00	42.00	858.00
(2) DB980H90A-M w/Mount	A	From Leg	4.00	0.0000	131.00	No Ice	4.27	3.86	34.05

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			ft ft ft	°	ft	ft ²	ft ²	lb
(ATT)			0.00		1/2" Ice	3.50	1.56	71.57
RRUS-11 (ATT)	B	From Leg	0.00	0.0000	120.00	No Ice	3.26	50.70
			4.00		1/2" Ice	3.50	1.56	71.57
RRUS-11 (ATT)	C	From Leg	0.00	0.0000	120.00	No Ice	3.26	50.70
			4.00		1/2" Ice	3.50	1.56	71.57
Pirod 4' Side Mount Standoff (1) (T-Mobile)	A	From Leg	0.00	0.0000	140.00	No Ice	2.72	50.00
			3.00		1/2" Ice	4.91	4.91	89.00
Pirod 4' Side Mount Standoff (1) (T-Mobile)	B	From Leg	0.00	0.0000	140.00	No Ice	2.72	50.00
			3.00		1/2" Ice	4.91	4.91	89.00
Pirod 4' Side Mount Standoff (1) (T-Mobile)	C	From Leg	0.00	0.0000	140.00	No Ice	2.72	50.00
			3.00		1/2" Ice	4.91	4.91	89.00
GPS-QBW-26N	A	From Leg	0.00	0.0000	87.00	No Ice	0.10	0.60
			0.25		1/2" Ice	0.18	0.18	0.78
Pirod 4' Side Mount Standoff (1)	A	From Leg	0.00	0.0000	87.00	No Ice	2.72	50.00
			3.00		1/2" Ice	4.91	4.91	89.00

Tower Pressures - No Ice

$$G_H = 1.126$$

Section Elevation	z	K _Z	q _z	A _G	F _a	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²	c	ft ²	ft ²	ft ²		ft ²	ft ²
T1 168.00-160.00	164.00	1.581	29	55.437	A	5.479	4.253	3.833	39.39	0.000	0.000
					B	5.411	4.913				
					C	5.373	5.947				
T2 160.00-140.00	150.00	1.541	29	138.592	A	10.588	25.797	9.583	26.34	0.000	0.000
					B	10.998	13.933				
					C	11.058	16.517				
T3 140.00-128.00	134.00	1.492	28	83.155	A	6.787	24.577	5.750	18.33	0.000	0.000
					B	4.946	35.090				
					C	7.583	9.910				
T4 128.00-120.00	124.00	1.46	27	55.310	A	4.525	16.679	4.128	19.47	0.000	0.000
					B	2.721	29.628				
					C	5.055	6.901				
T5 120.00-105.00	112.50	1.42	26	115.534	A	7.861	44.489	9.331	17.82	0.000	0.000
					B	5.995	57.143				
					C	9.620	14.531				
T6 105.00-100.00	102.50	1.382	26	43.578	A	4.619	14.830	3.110	15.99	0.000	0.000
					B	3.633	19.048				
					C	5.548	4.844				

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Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
T7 100.00-93.33	96.67	1.359	25	62.619	A	4.222	20.088	4.454	18.32	0.000	0.000
					B	3.422	25.715		15.29	0.000	0.000
					C	4.977	6.767		37.93	0.000	0.000
T8 93.33-86.66	90.00	1.332	25	67.125	A	5.786	20.316	4.454	17.06	0.000	0.000
					B	4.768	25.757		14.59	0.000	0.000
					C	6.789	6.767		32.86	0.000	0.000
T9 86.66-79.99	83.33	1.303	24	71.631	A	6.139	20.438	4.454	16.76	0.000	0.000
					B	5.122	26.549		14.06	0.000	0.000
					C	7.138	6.767		32.03	0.000	0.000
T10 79.99-73.32	76.66	1.272	24	76.415	A	4.953	20.995	5.011	19.31	0.000	0.000
					B	4.206	27.105		16.00	0.000	0.000
					C	5.688	7.323		38.51	0.000	0.000
T11 73.32-66.65	69.99	1.24	23	80.921	A	7.707	20.995	5.011	17.46	0.000	0.000
					B	6.567	27.281		14.80	0.000	0.000
					C	8.808	7.323		31.06	0.000	0.000
T12 66.65-59.98	63.32	1.205	22	85.427	A	7.244	20.995	5.011	17.75	0.000	0.000
					B	6.228	27.456		14.88	0.000	0.000
					C	8.210	7.323		32.26	0.000	0.000
T13 59.98-39.98	49.98	1.126	21	284.951	A	21.296	66.503	18.575	21.16	0.000	0.000
					B	18.647	85.875		17.77	0.000	0.000
					C	23.814	25.508		37.66	0.000	0.000
T14 39.98-19.98	29.98	1	18	327.256	A	20.656	70.049	22.121	24.39	0.000	0.000
					B	18.462	89.421		20.50	0.000	0.000
					C	22.743	29.054		42.71	0.000	0.000
T15 19.98-0.00	9.99	1	18	367.421	A	22.757	69.979	22.099	23.83	0.000	0.000
					B	20.631	89.332		20.10	0.000	0.000
					C	24.777	29.025		41.07	0.000	0.000

Tower Pressure - With Ice

$$G_H = 1.126$$

Section Elevation	z	K _Z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
T1 168.00-160.00	164.00	1.581	22	0.5000	56.103	A	5.410	9.345	5.167	35.02	0.000	0.000
						B	5.308	10.280		33.15	0.000	0.000
						C	5.235	11.938		30.09	0.000	0.000
T2 160.00-140.00	150.00	1.541	21	0.5000	140.258	A	10.021	37.357	12.917	27.26	0.000	0.000
						B	10.714	26.723		34.50	0.000	0.000
						C	10.775	31.007		30.91	0.000	0.000
T3 140.00-128.00	134.00	1.492	21	0.5000	84.155	A	6.107	31.630	7.750	20.54	0.000	0.000
						B	3.441	54.310		13.42	0.000	0.000
						C	7.389	18.604		29.82	0.000	0.000
T4 128.00-120.00	124.00	1.46	20	0.5000	55.976	A	4.071	21.382	5.461	21.46	0.000	0.000
						B	1.426	45.008		11.76	0.000	0.000
						C	4.926	12.698		30.99	0.000	0.000
T5 120.00-105.00	112.50	1.42	20	0.5000	116.785	A	7.288	59.752	11.835	17.65	0.000	0.000
						B	4.718	86.121		13.03	0.000	0.000
						C	10.151	24.976		33.69	0.000	0.000
T6 105.00-100.00	102.50	1.382	19	0.5000	43.995	A	4.153	20.547	3.945	15.97	0.000	0.000
						B	2.796	29.175		12.34	0.000	0.000
						C	5.666	9.135		26.65	0.000	0.000
T7 100.00-93.33	96.67	1.359	19	0.5000	63.176	A	3.989	26.929	5.568	18.01	0.000	0.000
						B	2.887	38.785		13.36	0.000	0.000

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Section Elevation	z	K _Z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²			
T8 93.33-86.66	90.00	1.332	18	0.5000	67.682	A	5.218	11.320	5.568	33.67	0.000	0.000
						B	5.336	28.170		16.62	0.000	0.000
						C	3.960	39.392		12.84	0.000	0.000
T9 86.66-79.99	83.33	1.303	18	0.5000	72.188	A	6.991	12.183	5.568	29.04	0.000	0.000
						B	5.682	28.635		16.22	0.000	0.000
						C	4.280	41.375		12.20	0.000	0.000
T10 79.99-73.32	76.66	1.272	18	0.5000	76.972	A	7.343	12.335	6.125	28.29	0.000	0.000
						B	4.716	28.682		18.34	0.000	0.000
						C	3.685	41.606		13.52	0.000	0.000
T11 73.32-66.65	69.99	1.24	17	0.5000	81.478	A	5.937	12.164	6.125	33.84	0.000	0.000
						B	7.166	29.517		16.70	0.000	0.000
						C	5.571	42.706		12.69	0.000	0.000
T12 66.65-59.98	63.32	1.205	17	0.5000	85.984	A	8.997	13.200	6.125	27.59	0.000	0.000
						B	6.815	29.679		16.78	0.000	0.000
						C	5.373	43.307		12.58	0.000	0.000
T13 59.98-39.98	49.98	1.126	16	0.5000	286.619	A	8.421	13.357	21.914	28.12	0.000	0.000
						B	20.323	90.829		19.72	0.000	0.000
						C	16.563	132.281		14.72	0.000	0.000
T14 39.98-19.98	29.98	1	14	0.5000	328.925	A	24.508	41.230	25.460	33.34	0.000	0.000
						B	20.041	93.440		22.44	0.000	0.000
						C	16.926	135.255		16.73	0.000	0.000
T15 19.98-0.00	9.99	1	14	0.5000	369.088	A	23.509	43.436	25.435	38.03	0.000	0.000
						B	22.195	93.967		21.90	0.000	0.000
						C	19.178	135.768		16.42	0.000	0.000

Tower Pressure - Service

$$G_H = 1.126$$

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
T1 168.00-160.00	164.00	1.581	15	55.437	A	5.479	4.253	3.833	39.39	0.000	0.000
					B	5.411	4.913		37.13	0.000	0.000
					C	5.373	5.947		33.87	0.000	0.000
T2 160.00-140.00	150.00	1.541	14	138.592	A	10.588	25.797	9.583	26.34	0.000	0.000
					B	10.998	13.933		38.44	0.000	0.000
					C	11.058	16.517		34.75	0.000	0.000
T3 140.00-128.00	134.00	1.492	14	83.155	A	6.787	24.577	5.750	18.33	0.000	0.000
					B	4.946	35.090		14.36	0.000	0.000
					C	7.583	9.910		32.87	0.000	0.000
T4 128.00-120.00	124.00	1.46	13	55.310	A	4.525	16.679	4.128	19.47	0.000	0.000
					B	2.721	29.628		12.76	0.000	0.000
					C	5.055	6.901		34.52	0.000	0.000
T5 120.00-105.00	112.50	1.42	13	115.534	A	7.861	44.489	9.331	17.82	0.000	0.000
					B	5.995	57.143		14.78	0.000	0.000
					C	9.620	14.531		38.64	0.000	0.000
T6 105.00-100.00	102.50	1.382	13	43.578	A	4.619	14.830	3.110	15.99	0.000	0.000
					B	3.633	19.048		13.71	0.000	0.000
					C	5.548	4.844		29.93	0.000	0.000
T7 100.00-93.33	96.67	1.359	13	62.619	A	4.222	20.088	4.454	18.32	0.000	0.000
					B	3.422	25.715		15.29	0.000	0.000
					C	4.977	6.767		37.93	0.000	0.000

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Section Elevation	z	K _z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
T8 93.33-86.66	90.00	1.332	12	67.125	A	5.786	20.316	4.454	17.06	0.000	0.000
					B	4.768	25.757		14.59	0.000	0.000
					C	6.789	6.767		32.86	0.000	0.000
T9 86.66-79.99	83.33	1.303	12	71.631	A	6.139	20.438	4.454	16.76	0.000	0.000
					B	5.122	26.549		14.06	0.000	0.000
					C	7.138	6.767		32.03	0.000	0.000
T10 79.99-73.32	76.66	1.272	12	76.415	A	4.953	20.995	5.011	19.31	0.000	0.000
					B	4.206	27.105		16.00	0.000	0.000
					C	5.688	7.323		38.51	0.000	0.000
T11 73.32-66.65	69.99	1.24	11	80.921	A	7.707	20.995	5.011	17.46	0.000	0.000
					B	6.567	27.281		14.80	0.000	0.000
					C	8.808	7.323		31.06	0.000	0.000
T12 66.65-59.98	63.32	1.205	11	85.427	A	7.244	20.995	5.011	17.75	0.000	0.000
					B	6.228	27.456		14.88	0.000	0.000
					C	8.210	7.323		32.26	0.000	0.000
T13 59.98-39.98	49.98	1.126	10	284.951	A	21.296	66.503	18.575	21.16	0.000	0.000
					B	18.647	85.875		17.77	0.000	0.000
					C	23.814	25.508		37.66	0.000	0.000
T14 39.98-19.98	29.98	1	9	327.256	A	20.656	70.049	22.121	24.39	0.000	0.000
					B	18.462	89.421		20.50	0.000	0.000
					C	22.743	29.054		42.71	0.000	0.000
T15 19.98-0.00	9.99	1	9	367.421	A	22.757	69.979	22.099	23.83	0.000	0.000
					B	20.631	89.332		20.10	0.000	0.000
					C	24.777	29.025		41.07	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T1 168.00-160.00	15.44	379.26	A	0.176	2.68	0.586	1	1	7.970	755.42	94.43	C
			B	0.186	2.643	0.588	1	1	8.299			
			C	0.204	2.582	0.591	1	1	8.889			
T2 160.00-140.00	80.20	842.12	A	0.263	2.4	0.605	1	1	26.199	2017.85	100.89	A
			B	0.18	2.665	0.587	1	1	19.170			
			C	0.199	2.599	0.59	1	1	20.806			
T3 140.00-128.00	194.28	617.42	A	0.377	2.111	0.643	1	1	22.579	1740.35	145.03	B
			B	0.481	1.925	0.688	1	1	29.096			
			C	0.21	2.562	0.593	1	1	13.455			
T4 128.00-120.00	155.44	484.82	A	0.383	2.098	0.645	1	1	15.282	1365.92	170.74	B
			B	0.585	1.814	0.744	1	1	24.777			
			C	0.216	2.543	0.594	1	1	9.154			
T5 120.00-105.00	350.85	904.66	A	0.453	1.968	0.675	1	1	37.879	2580.21	172.01	B
			B	0.546	1.847	0.722	1	1	47.271			
			C	0.209	2.566	0.592	1	1	18.226			
T6 105.00-100.00	116.95	408.12	A	0.446	1.98	0.672	1	1	14.578	923.78	184.76	B
			B	0.52	1.875	0.708	1	1	17.121			
			C	0.238	2.473	0.599	1	1	8.449			
T7 100.00-93.33	156.01	458.03	A	0.388	2.088	0.647	1	1	17.217	1153.94	173.00	B
			B	0.465	1.949	0.68	1	1	20.918			
			C	0.188	2.638	0.588	1	1	8.955			
T8 93.33-86.66	157.00	539.10	A	0.389	2.086	0.647	1	1	18.933	1208.22	181.14	B
			B	0.455	1.966	0.675	1	1	22.166			
			C	0.202	2.59	0.591	1	1	10.786			
T9 86.66-79.99	163.62	554.40	A	0.371	2.124	0.64	1	1	19.224	1234.09	185.02	B
			B	0.442	1.987	0.67	1	1	22.902			

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	Project CT11144C	Date 13:09:26 02/27/15
	Client T-Mobile	Designed by RA

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T10 79.99-73.32	163.62	614.88	C	0.194	2.616	0.589	1	1	11.125	1190.35	178.46	B
			A	0.34	2.196	0.629	1	1	18.155			
			B	0.41	2.045	0.656	1	1	21.977			
T11 73.32-66.65	164.12	759.76	C	0.17	2.698	0.585	1	1	9.970	1285.50	192.73	B
			A	0.355	2.161	0.634	1	1	21.021			
			B	0.418	2.029	0.659	1	1	24.552			
T12 66.65-59.98	164.62	734.10	C	0.199	2.598	0.59	1	1	13.131	1251.96	187.70	B
			A	0.331	2.218	0.626	1	1	20.381			
			B	0.394	2.075	0.649	1	1	24.054			
T13 59.98-39.98	493.60	2600.71	C	0.182	2.658	0.587	1	1	12.508	3674.93	183.75	B
			A	0.308	2.275	0.618	1	1	62.422			
			B	0.367	2.133	0.639	1	1	73.488			
T14 39.98-19.98	493.60	2664.22	C	0.173	2.688	0.585	1	1	38.744	3438.04	171.90	B
			A	0.277	2.358	0.609	1	1	63.329			
			B	0.33	2.22	0.625	1	1	74.388			
T15 19.98-0.00	493.11	3128.28	C	0.158	2.741	0.583	1	1	39.675	3618.00	181.08	B
			A	0.252	2.43	0.602	1	1	64.918			
			B	0.299	2.298	0.616	1	1	75.631			
Sum Weight:	3362.44	15689.88						OTM	2121 kip-ft	27438.56		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T1 168.00-160.00	15.44	379.26	A	0.176	2.68	0.586	0.8	1	6.875	664.10	83.01	C
			B	0.186	2.643	0.588	0.8	1	7.216			
			C	0.204	2.582	0.591	0.8	1	7.814			
T2 160.00-140.00	80.20	842.12	A	0.263	2.4	0.605	0.8	1	24.081	1854.76	92.74	A
			B	0.18	2.665	0.587	0.8	1	16.970			
			C	0.199	2.599	0.59	0.8	1	18.595			
T3 140.00-128.00	194.28	617.42	A	0.377	2.111	0.643	0.8	1	21.221	1681.19	140.10	B
			B	0.481	1.925	0.688	0.8	1	28.106			
			C	0.21	2.562	0.593	0.8	1	11.939			
T4 128.00-120.00	155.44	484.82	A	0.383	2.098	0.645	0.8	1	14.377	1335.92	166.99	B
			B	0.585	1.814	0.744	0.8	1	24.233			
			C	0.216	2.543	0.594	0.8	1	8.142			
T5 120.00-105.00	350.85	904.66	A	0.453	1.968	0.675	0.8	1	36.306	2514.76	167.65	B
			B	0.546	1.847	0.722	0.8	1	46.072			
			C	0.209	2.566	0.592	0.8	1	16.302			
T6 105.00-100.00	116.95	408.12	A	0.446	1.98	0.672	0.8	1	13.654	884.58	176.92	B
			B	0.52	1.875	0.708	0.8	1	16.395			
			C	0.238	2.473	0.599	0.8	1	7.340			
T7 100.00-93.33	156.01	458.03	A	0.388	2.088	0.647	0.8	1	16.372	1116.19	167.34	B
			B	0.465	1.949	0.68	0.8	1	20.234			
			C	0.188	2.638	0.588	0.8	1	7.960			
T8 93.33-86.66	157.00	539.10	A	0.389	2.086	0.647	0.8	1	17.775	1156.25	173.35	B
			B	0.455	1.966	0.675	0.8	1	21.212			
			C	0.202	2.59	0.591	0.8	1	9.428			
T9 86.66-79.99	163.62	554.40	A	0.371	2.124	0.64	0.8	1	17.996	1178.89	176.75	B
			B	0.442	1.987	0.67	0.8	1	21.877			
			C	0.194	2.616	0.589	0.8	1	9.698			
T10 79.99-73.32	163.62	614.88	A	0.34	2.196	0.629	0.8	1	17.164	1144.79	171.63	B
			B	0.41	2.045	0.656	0.8	1	21.136			

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T11 73.32-66.65	164.12	759.76	C	0.17	2.698	0.585	0.8	1	8.833	1216.73	182.42	B
			A	0.355	2.161	0.634	0.8	1	19.480			
			B	0.418	2.029	0.659	0.8	1	23.239			
T12 66.65-59.98	164.62	734.10	C	0.199	2.598	0.59	0.8	1	11.369	1187.13	177.98	B
			A	0.331	2.218	0.626	0.8	1	18.933			
			B	0.394	2.075	0.649	0.8	1	22.809			
T13 59.98-39.98	493.60	2600.71	C	0.182	2.658	0.587	0.8	1	10.866	3488.43	174.42	B
			A	0.308	2.275	0.618	0.8	1	58.163			
			B	0.367	2.133	0.639	0.8	1	69.759			
T14 39.98-19.98	493.60	2664.22	C	0.173	2.688	0.585	0.8	1	33.981	3267.39	163.37	B
			A	0.277	2.358	0.609	0.8	1	59.198			
			B	0.33	2.22	0.625	0.8	1	70.696			
T15 19.98-0.00	493.11	3128.28	C	0.158	2.741	0.583	0.8	1	35.126	3420.61	171.20	B
			A	0.252	2.43	0.602	0.8	1	60.367			
			B	0.299	2.298	0.616	0.8	1	71.505			
Sum Weight:	3362.44	15689.88	C	0.146	2.785	0.581	0.8	1	36.684	26111.71		
							OTM	2016 kip-ft				

Tower Forces - No Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T1 168.00-160.00	15.44	379.26	A	0.176	2.68	0.586	0.85	1	7.149	686.93	85.87	C
			B	0.186	2.643	0.588	0.85	1	7.487			
			C	0.204	2.582	0.591	0.85	1	8.083			
T2 160.00-140.00	80.20	842.12	A	0.263	2.4	0.605	0.85	1	24.611	1895.53	94.78	A
			B	0.18	2.665	0.587	0.85	1	17.520			
			C	0.199	2.599	0.59	0.85	1	19.148			
T3 140.00-128.00	194.28	617.42	A	0.377	2.111	0.643	0.85	1	21.561	1695.98	141.33	B
			B	0.481	1.925	0.688	0.85	1	28.354			
			C	0.21	2.562	0.593	0.85	1	12.318			
T4 128.00-120.00	155.44	484.82	A	0.383	2.098	0.645	0.85	1	14.603	1343.42	167.93	B
			B	0.585	1.814	0.744	0.85	1	24.369			
			C	0.216	2.543	0.594	0.85	1	8.395			
T5 120.00-105.00	350.85	904.66	A	0.453	1.968	0.675	0.85	1	36.699	2531.12	168.74	B
			B	0.546	1.847	0.722	0.85	1	46.371			
			C	0.209	2.566	0.592	0.85	1	16.783			
T6 105.00-100.00	116.95	408.12	A	0.446	1.98	0.672	0.85	1	13.885	894.38	178.88	B
			B	0.52	1.875	0.708	0.85	1	16.576			
			C	0.238	2.473	0.599	0.85	1	7.617			
T7 100.00-93.33	156.01	458.03	A	0.388	2.088	0.647	0.85	1	16.583	1125.62	168.76	B
			B	0.465	1.949	0.68	0.85	1	20.405			
			C	0.188	2.638	0.588	0.85	1	8.209			
T8 93.33-86.66	157.00	539.10	A	0.389	2.086	0.647	0.85	1	18.065	1169.24	175.30	B
			B	0.455	1.966	0.675	0.85	1	21.451			
			C	0.202	2.59	0.591	0.85	1	9.768			
T9 86.66-79.99	163.62	554.40	A	0.371	2.124	0.64	0.85	1	18.303	1192.69	178.81	B
			B	0.442	1.987	0.67	0.85	1	22.133			
			C	0.194	2.616	0.589	0.85	1	10.055			
T10 79.99-73.32	163.62	614.88	A	0.34	2.196	0.629	0.85	1	17.412	1156.18	173.34	B
			B	0.41	2.045	0.656	0.85	1	21.346			
			C	0.17	2.698	0.585	0.85	1	9.117			
T11 73.32-66.65	164.12	759.76	A	0.355	2.161	0.634	0.85	1	19.865	1233.92	185.00	B
			B	0.418	2.029	0.659	0.85	1	23.567			

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T12 66.65-59.98	164.62	734.10	C	0.199	2.598	0.59	0.85	1	11.810	1203.34	180.41	B
			A	0.331	2.218	0.626	0.85	1	19.295			
			B	0.394	2.075	0.649	0.85	1	23.120			
T13 59.98-39.98	493.60	2600.71	C	0.182	2.658	0.587	0.85	1	11.277	3535.06	176.75	B
			A	0.308	2.275	0.618	0.85	1	59.228			
			B	0.367	2.133	0.639	0.85	1	70.691			
T14 39.98-19.98	493.60	2664.22	C	0.173	2.688	0.585	0.85	1	35.172	3310.05	165.50	B
			A	0.277	2.358	0.609	0.85	1	60.230			
			B	0.33	2.22	0.625	0.85	1	71.619			
T15 19.98-0.00	493.11	3128.28	C	0.158	2.741	0.583	0.85	1	36.264	3469.96	173.67	B
			A	0.252	2.43	0.602	0.85	1	61.505			
			B	0.299	2.298	0.616	0.85	1	72.536			
Sum Weight:	3362.44	15689.88		0.146	2.785	0.581	0.85	1	37.923	26443.42		
									OTM	2042 kip-ft		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T1 168.00-160.00	54.14	626.75	A	0.263	2.399	0.605	1	1	11.067	709.72	88.71	C
			B	0.278	2.357	0.609	1	1	11.572			
			C	0.306	2.28	0.618	1	1	12.610			
T2 160.00-140.00	363.03	1373.37	A	0.338	2.2	0.628	1	1	33.489	1773.22	88.66	A
			B	0.267	2.388	0.606	1	1	26.917			
			C	0.298	2.302	0.615	1	1	29.853			
T3 140.00-128.00	702.86	963.45	A	0.448	1.976	0.673	1	1	27.380	1963.11	163.59	B
			B	0.686	1.776	0.81	1	1	47.442			
			C	0.309	2.273	0.619	1	1	18.898			
T4 128.00-120.00	549.03	709.13	A	0.455	1.966	0.675	1	1	18.514	1798.75	224.84	B
			B	0.83	1.841	0.921	1	1	42.875			
			C	0.315	2.257	0.621	1	1	12.805			
T5 120.00-105.00	1244.35	1324.91	A	0.574	1.822	0.738	1	1	51.388	3209.32	213.95	B
			B	0.778	1.801	0.879	1	1	80.381			
			C	0.301	2.294	0.616	1	1	25.540			
T6 105.00-100.00	414.78	627.01	A	0.561	1.833	0.731	1	1	19.168	1048.16	209.63	B
			B	0.727	1.78	0.839	1	1	27.282			
			C	0.336	2.204	0.628	1	1	11.400			
T7 100.00-93.33	553.32	670.11	A	0.489	1.914	0.692	1	1	22.628	1268.82	190.23	B
			B	0.66	1.779	0.792	1	1	33.600			
			C	0.262	2.403	0.605	1	1	12.066			
T8 93.33-86.66	557.93	815.36	A	0.495	1.907	0.695	1	1	24.914	1286.06	192.81	B
			B	0.641	1.784	0.779	1	1	34.655			
			C	0.283	2.341	0.611	1	1	14.434			
T9 86.66-79.99	577.75	842.45	A	0.475	1.934	0.685	1	1	25.305	1320.15	197.92	B
			B	0.632	1.787	0.774	1	1	36.304			
			C	0.273	2.371	0.608	1	1	14.842			
T10 79.99-73.32	577.75	856.65	A	0.434	2.001	0.666	1	1	23.819	1250.45	187.47	B
			B	0.588	1.812	0.747	1	1	34.747			
			C	0.235	2.483	0.598	1	1	13.213			
T11 73.32-66.65	580.57	1105.35	A	0.45	1.973	0.673	1	1	27.042	1314.94	197.14	B
			B	0.593	1.809	0.749	1	1	37.560			
			C	0.272	2.372	0.608	1	1	17.020			
T12 66.65-59.98	583.36	1064.46	A	0.424	2.018	0.662	1	1	26.459	1277.45	191.52	B
			B	0.566	1.829	0.733	1	1	37.137			

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	Client	T-Mobile	Designed by	RA

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T13 59.98-39.98	1749.20	3571.74	C	0.253	2.428	0.603	1	1	16.471	3633.20	181.66	B
			A	0.388	2.089	0.647	1	1	79.063			
			B	0.519	1.876	0.708	1	1	110.157			
T14 39.98-19.98	1749.20	3622.78	C	0.229	2.501	0.597	1	1	49.116	3317.72	165.89	B
			A	0.345	2.183	0.631	1	1	78.974			
			B	0.463	1.953	0.679	1	1	108.787			
T15 19.98-0.00	1747.45	4151.23	C	0.204	2.584	0.591	1	1	49.185	3440.84	172.21	B
			A	0.315	2.258	0.621	1	1	80.503			
			B	0.42	2.026	0.66	1	1	108.768			
Sum Weight:	12004.74	22324.76		0.188	2.635	0.588	1	1	51.420			
									OTM	2270 kip-ft	28611.90	

Tower Forces - With Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T1 168.00-160.00	54.14	626.75	A	0.263	2.399	0.605	0.8	1	9.985	650.79	81.35	C
			B	0.278	2.357	0.609	0.8	1	10.510			
			C	0.306	2.28	0.618	0.8	1	11.563			
T2 160.00-140.00	363.03	1373.37	A	0.338	2.2	0.628	0.8	1	31.485	1667.10	83.35	A
			B	0.267	2.388	0.606	0.8	1	24.774			
			C	0.298	2.302	0.615	0.8	1	27.698			
T3 140.00-128.00	702.86	963.45	A	0.448	1.976	0.673	0.8	1	26.159	1934.63	161.22	B
			B	0.686	1.776	0.81	0.8	1	46.754			
			C	0.309	2.273	0.619	0.8	1	17.421			
T4 128.00-120.00	549.03	709.13	A	0.455	1.966	0.675	0.8	1	17.699	1786.78	223.35	B
			B	0.83	1.841	0.921	0.8	1	42.590			
			C	0.315	2.257	0.621	0.8	1	11.820			
T5 120.00-105.00	1244.35	1324.91	A	0.574	1.822	0.738	0.8	1	49.931	3171.64	211.44	B
			B	0.778	1.801	0.879	0.8	1	79.438			
			C	0.301	2.294	0.616	0.8	1	23.510			
T6 105.00-100.00	414.78	627.01	A	0.561	1.833	0.731	0.8	1	18.337	1026.68	205.34	B
			B	0.727	1.78	0.839	0.8	1	26.723			
			C	0.336	2.204	0.628	0.8	1	10.267			
T7 100.00-93.33	553.32	670.11	A	0.489	1.914	0.692	0.8	1	21.830	1247.02	186.96	B
			B	0.66	1.779	0.792	0.8	1	33.023			
			C	0.262	2.403	0.605	0.8	1	11.023			
T8 93.33-86.66	557.93	815.36	A	0.495	1.907	0.695	0.8	1	23.847	1256.67	188.41	B
			B	0.641	1.784	0.779	0.8	1	33.863			
			C	0.283	2.341	0.611	0.8	1	13.036			
T9 86.66-79.99	577.75	842.45	A	0.475	1.934	0.685	0.8	1	24.169	1289.03	193.26	B
			B	0.632	1.787	0.774	0.8	1	35.448			
			C	0.273	2.371	0.608	0.8	1	13.373			
T10 79.99-73.32	577.75	856.65	A	0.434	2.001	0.666	0.8	1	22.876	1223.93	183.50	B
			B	0.588	1.812	0.747	0.8	1	34.010			
			C	0.235	2.483	0.598	0.8	1	12.026			
T11 73.32-66.65	580.57	1105.35	A	0.45	1.973	0.673	0.8	1	25.609	1275.93	191.29	B
			B	0.593	1.809	0.749	0.8	1	36.446			
			C	0.272	2.372	0.608	0.8	1	15.221			
T12 66.65-59.98	583.36	1064.46	A	0.424	2.018	0.662	0.8	1	25.096	1240.49	185.98	B
			B	0.566	1.829	0.733	0.8	1	36.062			
			C	0.253	2.428	0.603	0.8	1	14.787			
T13 59.98-39.98	1749.20	3571.74	A	0.388	2.089	0.647	0.8	1	74.998	3523.95	176.20	B
			B	0.519	1.876	0.708	0.8	1	106.844			

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	Project CT11144C	Date 13:09:26 02/27/15
	Client T-Mobile	Designed by RA

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T14 39.98-19.98	1749.20	3622.78	C	0.229	2.501	0.597	0.8	1	44.214	3214.48	160.72	B
			A	0.345	2.183	0.631	0.8	1	74.966			
			B	0.463	1.953	0.679	0.8	1	105.402			
			C	0.204	2.584	0.591	0.8	1	44.483			
T15 19.98-0.00	1747.45	4151.23	A	0.315	2.258	0.621	0.8	1	76.064	3319.50	166.14	B
			B	0.42	2.026	0.66	0.8	1	104.933			
			C	0.188	2.635	0.588	0.8	1	46.309			
Sum Weight:	12004.74	22324.76						OTM	2208 kip-ft	27828.62		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T1 168.00-160.00	54.14	626.75	A	0.263	2.399	0.605	0.85	1	10.255	665.52	83.19	C
			B	0.278	2.357	0.609	0.85	1	10.776			
			C	0.306	2.28	0.618	0.85	1	11.825			
T2 160.00-140.00	363.03	1373.37	A	0.338	2.2	0.628	0.85	1	31.986	1693.63	84.68	A
			B	0.267	2.388	0.606	0.85	1	25.310			
			C	0.298	2.302	0.615	0.85	1	28.237			
T3 140.00-128.00	702.86	963.45	A	0.448	1.976	0.673	0.85	1	26.464	1941.75	161.81	B
			B	0.686	1.776	0.81	0.85	1	46.926			
			C	0.309	2.273	0.619	0.85	1	17.790			
T4 128.00-120.00	549.03	709.13	A	0.455	1.966	0.675	0.85	1	17.903	1789.77	223.72	B
			B	0.83	1.841	0.921	0.85	1	42.661			
			C	0.315	2.257	0.621	0.85	1	12.066			
T5 120.00-105.00	1244.35	1324.91	A	0.574	1.822	0.738	0.85	1	50.295	3181.06	212.07	B
			B	0.778	1.801	0.879	0.85	1	79.673			
			C	0.301	2.294	0.616	0.85	1	24.017			
T6 105.00-100.00	414.78	627.01	A	0.561	1.833	0.731	0.85	1	18.545	1032.05	206.41	B
			B	0.727	1.78	0.839	0.85	1	26.863			
			C	0.336	2.204	0.628	0.85	1	10.550			
T7 100.00-93.33	553.32	670.11	A	0.489	1.914	0.692	0.85	1	22.030	1252.47	187.78	B
			B	0.66	1.779	0.792	0.85	1	33.167			
			C	0.262	2.403	0.605	0.85	1	11.283			
T8 93.33-86.66	557.93	815.36	A	0.495	1.907	0.695	0.85	1	24.114	1264.02	189.51	B
			B	0.641	1.784	0.779	0.85	1	34.061			
			C	0.283	2.341	0.611	0.85	1	13.385			
T9 86.66-79.99	577.75	842.45	A	0.475	1.934	0.685	0.85	1	24.453	1296.81	194.42	B
			B	0.632	1.787	0.774	0.85	1	35.662			
			C	0.273	2.371	0.608	0.85	1	13.740			
T10 79.99-73.32	577.75	856.65	A	0.434	2.001	0.666	0.85	1	23.111	1230.56	184.49	B
			B	0.588	1.812	0.747	0.85	1	34.194			
			C	0.235	2.483	0.598	0.85	1	12.323			
T11 73.32-66.65	580.57	1105.35	A	0.45	1.973	0.673	0.85	1	25.967	1285.68	192.76	B
			B	0.593	1.809	0.749	0.85	1	36.724			
			C	0.272	2.372	0.608	0.85	1	15.671			
T12 66.65-59.98	583.36	1064.46	A	0.424	2.018	0.662	0.85	1	25.437	1249.73	187.37	B
			B	0.566	1.829	0.733	0.85	1	36.331			
			C	0.253	2.428	0.603	0.85	1	15.208			
T13 59.98-39.98	1749.20	3571.74	A	0.388	2.089	0.647	0.85	1	76.014	3551.26	177.56	B
			B	0.519	1.876	0.708	0.85	1	107.672			
			C	0.229	2.501	0.597	0.85	1	45.439			
T14 39.98-19.98	1749.20	3622.78	A	0.345	2.183	0.631	0.85	1	75.968	3240.29	162.01	B
			B	0.463	1.953	0.679	0.85	1	106.248			

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	Project	CT11144C	Date	13:09:26 02/27/15
	Client	T-Mobile	Designed by	RA

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T15 19.98-0.00	1747.45	4151.23	C	0.204	2.584	0.591	0.85	1	45.658	3349.84	167.66	B
			A	0.315	2.258	0.621	0.85	1	77.174			
			B	0.42	2.026	0.66	0.85	1	105.892			
			C	0.188	2.635	0.588	0.85	1	47.587			
Sum Weight:	12004.74	22324.76					OTM	2223 kip-ft		28024.44		

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T1 168.00-160.00	15.44	379.26	A	0.176	2.68	0.586	1	1	7.970	376.40	47.05	C
			B	0.186	2.643	0.588	1	1	8.299			
			C	0.204	2.582	0.591	1	1	8.889			
T2 160.00-140.00	80.20	842.12	A	0.263	2.4	0.605	1	1	26.199	1005.43	50.27	A
			B	0.18	2.665	0.587	1	1	19.170			
			C	0.199	2.599	0.59	1	1	20.806			
T3 140.00-128.00	194.28	617.42	A	0.377	2.111	0.643	1	1	22.579	867.17	72.26	B
			B	0.481	1.925	0.688	1	1	29.096			
			C	0.21	2.562	0.593	1	1	13.455			
T4 128.00-120.00	155.44	484.82	A	0.383	2.098	0.645	1	1	15.282	680.59	85.07	B
			B	0.585	1.814	0.744	1	1	24.777			
			C	0.216	2.543	0.594	1	1	9.154			
T5 120.00-105.00	350.85	904.66	A	0.453	1.968	0.675	1	1	37.879	1285.64	85.71	B
			B	0.546	1.847	0.722	1	1	47.271			
			C	0.209	2.566	0.592	1	1	18.226			
T6 105.00-100.00	116.95	408.12	A	0.446	1.98	0.672	1	1	14.578	460.29	92.06	B
			B	0.52	1.875	0.708	1	1	17.121			
			C	0.238	2.473	0.599	1	1	8.449			
T7 100.00-93.33	156.01	458.03	A	0.388	2.088	0.647	1	1	17.217	574.97	86.20	B
			B	0.465	1.949	0.68	1	1	20.918			
			C	0.188	2.638	0.588	1	1	8.955			
T8 93.33-86.66	157.00	539.10	A	0.389	2.086	0.647	1	1	18.933	602.02	90.26	B
			B	0.455	1.966	0.675	1	1	22.166			
			C	0.202	2.59	0.591	1	1	10.786			
T9 86.66-79.99	163.62	554.40	A	0.371	2.124	0.64	1	1	19.224	614.91	92.19	B
			B	0.442	1.987	0.67	1	1	22.902			
			C	0.194	2.616	0.589	1	1	11.125			
T10 79.99-73.32	163.62	614.88	A	0.34	2.196	0.629	1	1	18.155	593.12	88.92	B
			B	0.41	2.045	0.656	1	1	21.977			
			C	0.17	2.698	0.585	1	1	9.970			
T11 73.32-66.65	164.12	759.76	A	0.355	2.161	0.634	1	1	21.021	640.53	96.03	B
			B	0.418	2.029	0.659	1	1	24.552			
			C	0.199	2.598	0.59	1	1	13.131			
T12 66.65-59.98	164.62	734.10	A	0.331	2.218	0.626	1	1	20.381	623.81	93.53	B
			B	0.394	2.075	0.649	1	1	24.054			
			C	0.182	2.658	0.587	1	1	12.508			
T13 59.98-39.98	493.60	2600.71	A	0.308	2.275	0.618	1	1	62.422	1831.10	91.56	B
			B	0.367	2.133	0.639	1	1	73.488			
			C	0.173	2.688	0.585	1	1	38.744			
T14 39.98-19.98	493.60	2664.22	A	0.277	2.358	0.609	1	1	63.329	1713.07	85.65	B
			B	0.33	2.22	0.625	1	1	74.388			
			C	0.158	2.741	0.583	1	1	39.675			
T15 19.98-0.00	493.11	3128.28	A	0.252	2.43	0.602	1	1	64.918	1802.74	90.23	B
			B	0.299	2.298	0.616	1	1	75.631			

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	Project	CT11144C	Date	13:09:26 02/27/15
	Client	T-Mobile	Designed by	RA

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
Sum Weight:	3362.44	15689.88	C	0.146	2.785	0.581	1	1	41.639	13671.81		

Tower Forces - Service - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
T1 168.00-160.00	15.44	379.26	A	0.176	2.68	0.586	0.8	1	6.875	330.90	41.36	C
			B	0.186	2.643	0.588	0.8	1	7.216			
			C	0.204	2.582	0.591	0.8	1	7.814			
T2 160.00-140.00	80.20	842.12	A	0.263	2.4	0.605	0.8	1	24.081	924.17	46.21	A
			B	0.18	2.665	0.587	0.8	1	16.970			
			C	0.199	2.599	0.59	0.8	1	18.595			
T3 140.00-128.00	194.28	617.42	A	0.377	2.111	0.643	0.8	1	21.221	837.68	69.81	B
			B	0.481	1.925	0.688	0.8	1	28.106			
			C	0.21	2.562	0.593	0.8	1	11.939			
T4 128.00-120.00	155.44	484.82	A	0.383	2.098	0.645	0.8	1	14.377	665.65	83.21	B
			B	0.585	1.814	0.744	0.8	1	24.233			
			C	0.216	2.543	0.594	0.8	1	8.142			
T5 120.00-105.00	350.85	904.66	A	0.453	1.968	0.675	0.8	1	36.306	1253.03	83.54	B
			B	0.546	1.847	0.722	0.8	1	46.072			
			C	0.209	2.566	0.592	0.8	1	16.302			
T6 105.00-100.00	116.95	408.12	A	0.446	1.98	0.672	0.8	1	13.654	440.76	88.15	B
			B	0.52	1.875	0.708	0.8	1	16.395			
			C	0.238	2.473	0.599	0.8	1	7.340			
T7 100.00-93.33	156.01	458.03	A	0.388	2.088	0.647	0.8	1	16.372	556.16	83.38	B
			B	0.465	1.949	0.68	0.8	1	20.234			
			C	0.188	2.638	0.588	0.8	1	7.960			
T8 93.33-86.66	157.00	539.10	A	0.389	2.086	0.647	0.8	1	17.775	576.12	86.38	B
			B	0.455	1.966	0.675	0.8	1	21.212			
			C	0.202	2.59	0.591	0.8	1	9.428			
T9 86.66-79.99	163.62	554.40	A	0.371	2.124	0.64	0.8	1	17.996	587.41	88.07	B
			B	0.442	1.987	0.67	0.8	1	21.877			
			C	0.194	2.616	0.589	0.8	1	9.698			
T10 79.99-73.32	163.62	614.88	A	0.34	2.196	0.629	0.8	1	17.164	570.42	85.52	B
			B	0.41	2.045	0.656	0.8	1	21.136			
			C	0.17	2.698	0.585	0.8	1	8.833			
T11 73.32-66.65	164.12	759.76	A	0.355	2.161	0.634	0.8	1	19.480	606.26	90.89	B
			B	0.418	2.029	0.659	0.8	1	23.239			
			C	0.199	2.598	0.59	0.8	1	11.369			
T12 66.65-59.98	164.62	734.10	A	0.331	2.218	0.626	0.8	1	18.933	591.51	88.68	B
			B	0.394	2.075	0.649	0.8	1	22.809			
			C	0.182	2.658	0.587	0.8	1	10.866			
T13 59.98-39.98	493.60	2600.71	A	0.308	2.275	0.618	0.8	1	58.163	1738.18	86.91	B
			B	0.367	2.133	0.639	0.8	1	69.759			
			C	0.173	2.688	0.585	0.8	1	33.981			
T14 39.98-19.98	493.60	2664.22	A	0.277	2.358	0.609	0.8	1	59.198	1628.04	81.40	B
			B	0.33	2.22	0.625	0.8	1	70.696			
			C	0.158	2.741	0.583	0.8	1	35.126			
T15 19.98-0.00	493.11	3128.28	A	0.252	2.43	0.602	0.8	1	60.367	1704.39	85.30	B
			B	0.299	2.298	0.616	0.8	1	71.505			
			C	0.146	2.785	0.581	0.8	1	36.684			
Sum Weight:	3362.44	15689.88						OTM	1005 kip-ft	13010.68		

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	Client T-Mobile	Designed by RA

Tower Forces - Service - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
168.00-160.00	15.44	379.26	A	0.176	2.68	0.586	0.85	1	7.149	342.28	42.78	C
			B	0.186	2.643	0.588	0.85	1	7.487			
			C	0.204	2.582	0.591	0.85	1	8.083			
160.00-140.00	80.20	842.12	A	0.263	2.4	0.605	0.85	1	24.611	944.49	47.22	A
			B	0.18	2.665	0.587	0.85	1	17.520			
			C	0.199	2.599	0.59	0.85	1	19.148			
140.00-128.00	194.28	617.42	A	0.377	2.111	0.643	0.85	1	21.561	845.05	70.42	B
			B	0.481	1.925	0.688	0.85	1	28.354			
			C	0.21	2.562	0.593	0.85	1	12.318			
128.00-120.00	155.44	484.82	A	0.383	2.098	0.645	0.85	1	14.603	669.39	83.67	B
			B	0.585	1.814	0.744	0.85	1	24.369			
			C	0.216	2.543	0.594	0.85	1	8.395			
120.00-105.00	350.85	904.66	A	0.453	1.968	0.675	0.85	1	36.699	1261.18	84.08	B
			B	0.546	1.847	0.722	0.85	1	46.371			
			C	0.209	2.566	0.592	0.85	1	16.783			
105.00-100.00	116.95	408.12	A	0.446	1.98	0.672	0.85	1	13.885	445.64	89.13	B
			B	0.52	1.875	0.708	0.85	1	16.576			
			C	0.238	2.473	0.599	0.85	1	7.617			
100.00-93.33	156.01	458.03	A	0.388	2.088	0.647	0.85	1	16.583	560.86	84.09	B
			B	0.465	1.949	0.68	0.85	1	20.405			
			C	0.188	2.638	0.588	0.85	1	8.209			
93.33-86.66	157.00	539.10	A	0.389	2.086	0.647	0.85	1	18.065	582.60	87.35	B
			B	0.455	1.966	0.675	0.85	1	21.451			
			C	0.202	2.59	0.591	0.85	1	9.768			
86.66-79.99	163.62	554.40	A	0.371	2.124	0.64	0.85	1	18.303	594.28	89.10	B
			B	0.442	1.987	0.67	0.85	1	22.133			
			C	0.194	2.616	0.589	0.85	1	10.055			
79.99-73.32	163.62	614.88	A	0.34	2.196	0.629	0.85	1	17.412	576.09	86.37	B
			B	0.41	2.045	0.656	0.85	1	21.346			
			C	0.17	2.698	0.585	0.85	1	9.117			
73.32-66.65	164.12	759.76	A	0.355	2.161	0.634	0.85	1	19.865	614.83	92.18	B
			B	0.418	2.029	0.659	0.85	1	23.567			
			C	0.199	2.598	0.59	0.85	1	11.810			
66.65-59.98	164.62	734.10	A	0.331	2.218	0.626	0.85	1	19.295	599.59	89.89	B
			B	0.394	2.075	0.649	0.85	1	23.120			
			C	0.182	2.658	0.587	0.85	1	11.277			
59.98-39.98	493.60	2600.71	A	0.308	2.275	0.618	0.85	1	59.228	1761.41	88.07	B
			B	0.367	2.133	0.639	0.85	1	70.691			
			C	0.173	2.688	0.585	0.85	1	35.172			
39.98-19.98	493.60	2664.22	A	0.277	2.358	0.609	0.85	1	60.230	1649.30	82.46	B
			B	0.33	2.22	0.625	0.85	1	71.619			
			C	0.158	2.741	0.583	0.85	1	36.264			
19.98-0.00	493.11	3128.28	A	0.252	2.43	0.602	0.85	1	61.505	1728.98	86.54	B
			B	0.299	2.298	0.616	0.85	1	72.536			
			C	0.146	2.785	0.581	0.85	1	37.923			
Sum Weight:	3362.44	15689.88						OTM	1018 kip-ft	13175.96		

Force Totals

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Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M _x kip-ft	Sum of Overturning Moments, M _z kip-ft	Sum of Torques kip-ft
Leg Weight	7697.18					
Bracing Weight	7992.70					
Total Member Self-Weight	15689.88			0	-10	
Total Weight	24592.18			0	-10	
Wind 0 deg - No Ice		-32.78	-37819.12	-3552	-4	27
Wind 30 deg - No Ice		18364.68	-31874.12	-3006	-1739	17
Wind 60 deg - No Ice		31554.07	-18217.75	-1719	-2988	3
Wind 90 deg - No Ice		36786.14	32.78	6	-3478	-11
Wind 120 deg - No Ice		32735.93	18937.95	1781	-3084	-23
Wind 150 deg - No Ice		18421.46	31906.90	3012	-1749	-28
Wind 180 deg - No Ice		32.78	36492.28	3449	-15	-25
Wind 210 deg - No Ice		-18364.68	31874.12	3007	1720	-17
Wind 240 deg - No Ice		-32703.15	18881.17	1772	3059	-3
Wind 270 deg - No Ice		-36786.14	-32.78	-5	3459	11
Wind 300 deg - No Ice		-31586.85	-18274.53	-1728	2974	22
Wind 330 deg - No Ice		-18421.46	-31906.90	-3011	1729	28
Member Ice	6634.88					
Total Weight Ice	42640.28			-8	-28	
Wind 0 deg - Ice		-33.48	-38262.11	-3606	-22	31
Wind 30 deg - Ice		18788.99	-32610.46	-3082	-1796	23
Wind 60 deg - Ice		32407.39	-18710.41	-1772	-3082	10
Wind 90 deg - Ice		37635.98	33.48	-3	-3573	-6
Wind 120 deg - Ice		33119.21	19160.05	1796	-3141	-21
Wind 150 deg - Ice		18846.99	32643.94	3071	-1805	-30
Wind 180 deg - Ice		33.48	37478.82	3529	-33	-30
Wind 210 deg - Ice		-18788.99	32610.46	3065	1741	-23
Wind 240 deg - Ice		-33085.73	19102.06	1786	3080	-10
Wind 270 deg - Ice		-37635.98	-33.48	-14	3518	6
Wind 300 deg - Ice		-32440.87	-18768.41	-1781	3033	21
Wind 330 deg - Ice		-18846.99	-32643.94	-3087	1750	30
Total Weight	24592.18			0	-10	
Wind 0 deg - Service		-16.33	-18844.13	-1771	3	13
Wind 30 deg - Service		9150.57	-15881.91	-1499	-861	8
Wind 60 deg - Service		15722.44	-9077.36	-858	-1484	2
Wind 90 deg - Service		18329.42	16.33	2	-1728	-6
Wind 120 deg - Service		16311.33	9436.21	887	-1531	-12
Wind 150 deg - Service		9178.86	15898.25	1500	-866	-14
Wind 180 deg - Service		16.33	18183.00	1718	-2	-13
Wind 210 deg - Service		-9150.57	15881.91	1497	862	-8
Wind 240 deg - Service		-16295.00	9407.92	882	1529	-2
Wind 270 deg - Service		-18329.42	-16.33	-3	1729	6
Wind 300 deg - Service		-15738.78	-9105.65	-862	1487	11
Wind 330 deg - Service		-9178.86	-15898.25	-1501	867	14

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice

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Comb. No.	Description
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	23	233608.53	19124.46	-10687.63
	Max. H _x	10	225537.79	20325.98	-11615.50
	Max. H _z	17	-204845.47	-20901.42	11729.47
	Min. Vert	17	-204845.47	-20901.42	11729.47
	Min. H _x	17	-204845.47	-20901.42	11729.47
	Min. H _z	10	225537.79	20325.98	-11615.50
Leg B	Max. Vert	19	237139.25	-18722.92	-11573.46
	Max. H _x	25	-202491.50	20433.13	12512.13
	Max. H _z	25	-202491.50	20433.13	12512.13
	Min. Vert	12	-203283.46	18221.06	11314.00
	Min. H _x	6	227143.06	-19970.68	-12346.19
	Min. H _z	6	227143.06	-19970.68	-12346.19
Leg A	Max. Vert	15	236420.64	967.89	21987.74
	Max. H _x	12	114465.07	2657.26	11641.80
	Max. H _z	2	226585.10	810.52	23457.93
	Min. Vert	8	-203841.56	-777.28	-21447.14
	Min. H _x	6	-101321.60	-2752.05	-10854.23
	Min. H _z	21	-203210.43	-912.06	-23964.74

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Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear _x lb	Shear _y lb	Overturning Moment, M _x kip-ft	Overturning Moment, M _y kip-ft	Torque kip-ft
Dead Only	24592.18	0.00	0.00	0	-10	0
Dead+Wind 0 deg - No Ice	24592.17	-32.78	-37818.14	-3565	-4	27
Dead+Wind 30 deg - No Ice	24592.17	18364.10	-31873.26	-3017	-1746	17
Dead+Wind 60 deg - No Ice	24592.17	31553.11	-18217.20	-1725	-2999	3
Dead+Wind 90 deg - No Ice	24592.17	36785.10	32.85	6	-3491	-11
Dead+Wind 120 deg - No Ice	24592.17	32735.08	18937.46	1788	-3095	-23
Dead+Wind 150 deg - No Ice	24592.17	18421.00	31905.96	3023	-1755	-28
Dead+Wind 180 deg - No Ice	24592.17	32.78	36491.17	3461	-15	-25
Dead+Wind 210 deg - No Ice	24592.17	-18364.23	31873.18	3018	1726	-17
Dead+Wind 240 deg - No Ice	24592.17	-32702.30	18880.68	1779	3070	-3
Dead+Wind 270 deg - No Ice	24592.17	-36785.10	-32.70	-5	3471	11
Dead+Wind 300 deg - No Ice	24592.17	-31585.89	-18273.97	-1735	2985	22
Dead+Wind 330 deg - No Ice	24592.17	-18420.88	-31906.03	-3022	1735	28
Dead+Ice+Temp	42640.28	-0.34	0.13	-8	-28	0
Dead+Wind 0 deg+Ice+Temp	42640.26	-33.49	-38260.36	-3627	-22	31
Dead+Wind 30 deg+Ice+Temp	42640.26	18788.02	-32608.93	-3100	-1806	23
Dead+Wind 60 deg+Ice+Temp	42640.27	32406.82	-18710.09	-1782	-3100	10
Dead+Wind 90 deg+Ice+Temp	42640.26	37634.17	33.56	-3	-3594	-6
Dead+Wind 120 deg+Ice+Temp	42640.26	33117.69	19159.18	1806	-3159	-21
Dead+Wind 150 deg+Ice+Temp	42640.26	18846.14	32642.34	3089	-1816	-30
Dead+Wind 180 deg+Ice+Temp	42640.27	33.48	37478.17	3549	-33	-30
Dead+Wind 210 deg+Ice+Temp	42640.26	-18788.18	32608.86	3083	1751	-23
Dead+Wind 240 deg+Ice+Temp	42640.26	-33084.24	19101.19	1797	3098	-10
Dead+Wind 270 deg+Ice+Temp	42640.26	-37634.20	-33.40	-14	3539	6
Dead+Wind 300 deg+Ice+Temp	42640.27	-32440.31	-18768.08	-1792	3050	21
Dead+Wind 330 deg+Ice+Temp	42640.26	-18846.03	-32642.41	-3105	1760	30
Dead+Wind 0 deg - Service	24592.18	-16.33	-18843.62	-1776	-7	13
Dead+Wind 30 deg - Service	24592.18	9150.29	-15881.47	-1503	-875	8
Dead+Wind 60 deg - Service	24592.18	15721.98	-9077.09	-859	-1499	2
Dead+Wind 90 deg - Service	24592.18	18328.90	16.35	3	-1744	-6
Dead+Wind 120 deg - Service	24592.18	16310.88	9435.95	891	-1547	-12
Dead+Wind 150 deg - Service	24592.18	9178.61	15897.79	1507	-879	-14
Dead+Wind 180 deg - Service	24592.18	16.33	18182.47	1725	-12	-13
Dead+Wind 210 deg - Service	24592.18	-9150.33	15881.45	1504	855	-8
Dead+Wind 240 deg - Service	24592.18	-16294.56	9407.66	886	1525	-2
Dead+Wind 270 deg - Service	24592.18	-18328.91	-16.31	-2	1725	6
Dead+Wind 300 deg - Service	24592.18	-15738.32	-9105.38	-864	1482	11
Dead+Wind 330 deg - Service	24592.18	-9178.58	-15897.81	-1506	860	14

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	-0.00	-24592.18	0.00	-0.00	24592.18	-0.00	0.000%
2	-32.78	-24592.18	-37819.12	32.78	24592.17	37818.14	0.002%
3	18364.68	-24592.18	-31874.12	-18364.10	24592.17	31873.26	0.002%
4	31554.07	-24592.18	-18217.75	-31553.11	24592.17	18217.20	0.003%
5	36786.14	-24592.18	32.78	-36785.10	24592.17	-32.85	0.002%
6	32735.93	-24592.18	18937.95	-32735.08	24592.17	-18937.46	0.002%
7	18421.46	-24592.18	31906.90	-18421.00	24592.17	-31905.96	0.002%
8	32.78	-24592.18	36492.28	-32.78	24592.17	-36491.17	0.003%
9	-18364.68	-24592.18	31874.12	18364.23	24592.17	-31873.18	0.002%
10	-32703.15	-24592.18	18881.17	32702.30	24592.17	-18880.68	0.002%
11	-36786.14	-24592.18	-32.78	36785.10	24592.17	32.70	0.002%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
12	-31586.85	-24592.18	-18274.53	31585.89	24592.17	18273.97	0.003%
13	-18421.46	-24592.18	-31906.90	18420.88	24592.17	31906.03	0.002%
14	-0.00	-42640.28	0.00	0.34	42640.28	-0.13	0.001%
15	-33.48	-42640.28	-38262.11	33.49	42640.26	38260.36	0.003%
16	18788.99	-42640.28	-32610.45	-18788.02	42640.26	32608.93	0.003%
17	32407.39	-42640.28	-18710.41	-32406.82	42640.27	18710.09	0.001%
18	37635.98	-42640.28	33.48	-37634.17	42640.26	-33.56	0.003%
19	33119.21	-42640.28	19160.05	-33117.69	42640.26	-19159.18	0.003%
20	18846.99	-42640.28	32643.94	-18846.14	42640.26	-32642.34	0.003%
21	33.48	-42640.28	37478.82	-33.48	42640.27	-37478.17	0.001%
22	-18788.99	-42640.28	32610.45	18788.18	42640.26	-32608.86	0.003%
23	-33085.73	-42640.28	19102.06	33084.24	42640.26	-19101.19	0.003%
24	-37635.98	-42640.28	-33.48	37634.20	42640.26	33.40	0.003%
25	-32440.87	-42640.28	-18768.41	32440.31	42640.27	18768.08	0.001%
26	-18846.99	-42640.28	-32643.94	18846.03	42640.26	32642.41	0.003%
27	-16.33	-24592.18	-18844.13	16.33	24592.18	18843.62	0.002%
28	9150.57	-24592.18	-15881.91	-9150.29	24592.18	15881.47	0.002%
29	15722.44	-24592.18	-9077.36	-15721.98	24592.18	9077.09	0.002%
30	18329.42	-24592.18	16.33	-18328.90	24592.18	-16.35	0.002%
31	16311.33	-24592.18	9436.21	-16310.88	24592.18	-9435.95	0.002%
32	9178.86	-24592.18	15898.25	-9178.61	24592.18	-15897.79	0.002%
33	16.33	-24592.18	18183.00	-16.33	24592.18	-18182.47	0.002%
34	-9150.57	-24592.18	15881.91	9150.33	24592.18	-15881.45	0.002%
35	-16295.00	-24592.18	9407.92	16294.56	24592.18	-9407.66	0.002%
36	-18329.42	-24592.18	-16.33	18328.91	24592.18	16.31	0.002%
37	-15738.78	-24592.18	-9105.65	15738.32	24592.18	9105.38	0.002%
38	-9178.86	-24592.18	-15898.25	9178.58	24592.18	15897.81	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	11	0.00000001	0.00007853
3	Yes	11	0.00000001	0.00008518
4	Yes	11	0.00000001	0.00009118
5	Yes	11	0.00000001	0.00008513
6	Yes	11	0.00000001	0.00007851
7	Yes	11	0.00000001	0.00008519
8	Yes	11	0.00000001	0.00009127
9	Yes	11	0.00000001	0.00008529
10	Yes	11	0.00000001	0.00007853
11	Yes	11	0.00000001	0.00008524
12	Yes	11	0.00000001	0.00009125
13	Yes	11	0.00000001	0.00008519
14	Yes	6	0.00000001	0.00008936
15	Yes	11	0.00000001	0.00013814
16	Yes	11	0.00000001	0.00014491
17	Yes	12	0.00000001	0.00005799
18	Yes	11	0.00000001	0.00014483
19	Yes	11	0.00000001	0.00013809
20	Yes	11	0.00000001	0.00014489
21	Yes	12	0.00000001	0.00005807
22	Yes	11	0.00000001	0.00014507
23	Yes	11	0.00000001	0.00013810
24	Yes	11	0.00000001	0.00014500

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25	Yes	12	0.0000001	0.00005807
26	Yes	11	0.0000001	0.00014491
27	Yes	11	0.0000001	0.00008172
28	Yes	11	0.0000001	0.00008493
29	Yes	11	0.0000001	0.00008793
30	Yes	11	0.0000001	0.00008489
31	Yes	11	0.0000001	0.00008171
32	Yes	11	0.0000001	0.00008496
33	Yes	11	0.0000001	0.00008804
34	Yes	11	0.0000001	0.00008502
35	Yes	11	0.0000001	0.00008172
36	Yes	11	0.0000001	0.00008497
37	Yes	11	0.0000001	0.00008802
38	Yes	11	0.0000001	0.00008495

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	168 - 160	10.270	31	0.5322	0.0251
T2	160 - 140	9.377	31	0.5313	0.0268
T3	140 - 128	7.154	31	0.5113	0.0326
T4	128 - 120	5.877	31	0.4759	0.0344
T5	120 - 105	5.078	31	0.4460	0.0342
T6	105 - 100	3.737	31	0.3776	0.0307
T7	100 - 93.33	3.339	31	0.3522	0.0290
T8	93.33 - 86.66	2.853	31	0.3203	0.0270
T9	86.66 - 79.99	2.414	31	0.2877	0.0247
T10	79.99 - 73.32	2.018	31	0.2542	0.0222
T11	73.32 - 66.65	1.671	31	0.2258	0.0201
T12	66.65 - 59.98	1.362	31	0.1970	0.0180
T13	59.98 - 39.98	1.093	31	0.1680	0.0157
T14	39.98 - 19.98	0.481	31	0.1046	0.0097
T15	19.98 - 0	0.132	31	0.0463	0.0049

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
173.00	Andrew_DB224-Omni	31	10.270	0.5322	0.0251	286884
172.00	7' Whip	31	10.270	0.5322	0.0251	286884
170.00	20' 4-Bay Dipole	31	10.270	0.5322	0.0251	286884
168.00	6' Yagi	31	10.270	0.5322	0.0251	286884
164.00	2.5 PIPE X 96" LONG	31	9.824	0.5319	0.0259	286884
160.00	2.5 PIPE X 96" LONG	31	9.377	0.5313	0.0268	263889
153.00	Pirod 4' Side Mount Standoff (1)	31	8.594	0.5285	0.0288	159985
150.00	Rohn 6'x15' Boom Gate (3)	31	8.259	0.5263	0.0297	89549
140.00	TMA	31	7.154	0.5113	0.0326	35038
131.00	Valmont 10' Wireless Frame (3)	31	6.188	0.4861	0.0342	19378
120.00	Powerwave 7770.00 w. mtg pipe	31	5.078	0.4460	0.0342	13522
91.00	3' Yagi	31	2.694	0.3092	0.0263	11772
87.00	GPS-QBW-26N	31	2.435	0.2894	0.0249	13013
70.00	3' Yagi	31	1.512	0.2117	0.0191	13982

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Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	168 - 160	20.568	6	1.0663	0.0651
T2	160 - 140	18.794	19	1.0644	0.0683
T3	140 - 128	14.396	19	1.0240	0.0803
T4	128 - 120	11.864	19	0.9529	0.0843
T5	120 - 105	10.273	19	0.8931	0.0828
T6	105 - 100	7.585	19	0.7590	0.0721
T7	100 - 93.33	6.785	19	0.7095	0.0674
T8	93.33 - 86.66	5.802	19	0.6468	0.0621
T9	86.66 - 79.99	4.914	19	0.5820	0.0563
T10	79.99 - 73.32	4.111	19	0.5153	0.0504
T11	73.32 - 66.65	3.406	19	0.4583	0.0456
T12	66.65 - 59.98	2.776	19	0.4004	0.0406
T13	59.98 - 39.98	2.229	19	0.3419	0.0355
T14	39.98 - 19.98	0.981	19	0.2132	0.0219
T15	19.98 - 0	0.268	19	0.0944	0.0111

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
173.00	Andrew_DB224-Omni	6	20.568	1.0663	0.0651	145871
172.00	7' Whip	6	20.568	1.0663	0.0651	145871
170.00	20' 4-Bay Dipole	6	20.568	1.0663	0.0651	145871
168.00	6' Yagi	6	20.568	1.0663	0.0651	145871
164.00	2.5 PIPE X 96" LONG	19	19.678	1.0656	0.0666	145871
160.00	2.5 PIPE X 96" LONG	19	18.794	1.0644	0.0683	135161
153.00	Pirod 4' Side Mount Standoff (1)	19	17.245	1.0588	0.0722	78979
150.00	Rohn 6'x15' Boom Gate (3)	19	16.582	1.0542	0.0741	44958
140.00	TMA	19	14.396	1.0240	0.0803	17432
131.00	Valmont 10' Wireless Frame (3)	19	12.483	0.9733	0.0839	9666
120.00	Powerwave 7770.00 w. mtg pipe	19	10.273	0.8931	0.0828	6748
91.00	3' Yagi	19	5.482	0.6247	0.0602	5888
87.00	GPS-QBW-26N	19	4.957	0.5855	0.0567	6463
70.00	3' Yagi	19	3.083	0.4300	0.0432	6946

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio $\frac{P}{P_a}$
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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P/P _a
T1	168 - 160	ROHN 2.5 STD 2.875ODx0.203wall	8.00	4.00	50.7 K=1.00	24.2	1.7040	-1520.22	41317.80	0.037 ✓
T2	160 - 140	ROHN 2.5 STD 2.875ODx0.203wall	20.00	4.00	50.7 K=1.00	24.2	1.7040	-15201.90	41317.80	0.368 ✓
T3	140 - 128	ROHN 2.5 EH 2.875ODx0.276wall	12.00	4.00	51.9 K=1.00	24.0	2.2535	-34915.00	54185.50	0.644 ✓
T4	128 - 120	2.5" sch 80+3" sch 40 split	8.00	4.00	58.5 K=1.00	23.0	3.1500	-52380.00	72342.00	0.724 ✓
T5	120 - 105	3" Sch. 40 + 3.5" Sch. 40 split	15.03	5.01	60.3 K=1.00	22.7	3.3350	-80613.50	75566.70	1.067 ✓
T6	105 - 100	3" Sch. 40 + 3.5" Sch. 40 split	5.01	2.58	31.1 K=1.00	27.0	3.3350	-89525.20	90107.90	0.994 ✓
T7	100 - 93.33	ROHN 3.5 EH 4ODx0.318wall	6.68	6.68	61.4 K=1.00	22.5	3.6784	-99293.90	82704.60	1.201 ✓
T8	93.33 - 86.66	ROHN 3.5 EH 4ODx0.318wall	6.68	3.46	31.7 K=1.00	26.9	3.6784	-110279.00	99075.60	1.113 ✓
T9	86.66 - 79.99	ROHN 3.5 EH 4ODx0.318wall	6.68	3.45	31.7 K=1.00	26.9	3.6784	-120814.00	99107.90	1.219 ✓
T10	79.99 - 73.32	ROHN 4 EH 4.5ODx0.337wall	6.68	6.68	54.3 K=1.00	23.7	4.4074	-131580.00	104312.00	1.261 ✓
T11	73.32 - 66.65	ROHN 4 EH 4.5ODx0.337wall	6.68	3.44	27.9 K=1.00	27.4	4.4074	-141531.00	120787.00	1.172 ✓
T12	66.65 - 59.98	ROHN 4 EH 4.5ODx0.337wall	6.68	3.43	27.9 K=1.00	27.4	4.4074	-151297.00	120809.00	1.252 ✓
T13	59.98 - 39.98	ROHN 5 EH 5.563ODx0.375wall	20.03	6.68	43.6 K=1.00	25.3	6.1120	-180846.00	154757.00	1.169 ✓
T14	39.98 - 19.98	ROHN 6 EHS 6.625ODx0.34wall	20.03	10.02	54.0 K=1.00	23.7	6.7133	-205972.00	159188.00	1.294 ✓
T15	19.98 - 0	ROHN 6 EH 6.625ODx0.432wall	20.01	10.01	54.7 K=1.00	23.6	8.4049	-232038.00	198354.00	1.170 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P/P _a
T1	168 - 160	L1 3/4x1 3/4x3/16	7.79	3.76	131.3 K=1.00	8.7	0.6211	-585.66	5380.43	0.109 ✓
T2	160 - 140	L1 3/4x1 3/4x3/16	7.79	3.76	131.3 K=1.00	8.7	0.6211	-2766.50	5380.43	0.514 ✓
T3	140 - 128	L2x2x3/16	7.79	3.76	114.4 K=1.00	11.1	0.7150	-4515.19	7911.04	0.571 ✓
T4	128 - 120	L2x2x3/16	7.79	3.75	114.1 K=1.00	11.1	0.7150	-5163.82	7943.35	0.650 ✓
T5	120 - 105	L2x2x3/16	9.40	4.67	142.1 K=1.00	7.4	0.7150	-5045.71	5288.06	0.954 ✓
T6	105 - 100	L2x2x3/16	9.83	4.88	148.7 K=1.00	6.8	0.7150	-5080.16	4828.69	1.052 ✓
T7	100 - 93.33	L2 1/2x2 1/2x3/16	11.25	5.63	136.4 K=1.00	8.0	0.9020	-5693.93	7239.51	0.787 ✓

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Section No.	Elevation ft	Size	L ft	L _u ft	KL/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P/P _a
T8	93.33 - 86.66	L2 1/2x2 1/2x3/16	11.80	5.90	143.1 K=1.00	7.3	0.9020	-5806.07	6579.95	0.882 ✓
T9	86.66 - 79.99	L2 1/2x2 1/2x3/16	12.36	6.18	149.9 K=1.00	6.6	0.9020	-5948.76	5994.62	0.992 ✓
T10	79.99 - 73.32	L2 1/2x2 1/2x1/4	12.94	6.45	157.5 K=1.00	6.0	1.1900	-6152.36	7160.33	0.859 ✓
T11	73.32 - 66.65	L2 1/2x2 1/2x1/4	13.52	6.74	164.7 K=1.00	5.5	1.1900	-6190.81	6553.36	0.945 ✓
T12	66.65 - 59.98	L2 1/2x2 1/2x1/4	14.11	7.03	171.9 K=1.00	5.1	1.1900	-6505.72	6013.35	1.082 ✓
T13	59.98 - 39.98	L3x3x1/4	15.31	7.59	153.8 K=1.00	6.3	1.4400	-7005.05	9088.35	0.771 ✓
T14	39.98 - 19.98	L3 1/2x3 1/2x1/4	18.28	9.12	157.7 K=1.00	6.0	1.6900	-8377.42	10147.40	0.826 ✓
T15	19.98 - 0	L3 1/2x3 1/2x1/4	20.01	9.98	172.6 K=1.00	5.0	1.6900	-9091.26	8473.51	1.073 ✓

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	KL/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P/P _a
T6	105 - 100	L3x3x3/16	8.46	8.15	82.0 K=0.50	14.8	1.0900	-1552.61	16100.30	0.096 ✓
T8	93.33 - 86.66	L2x2x3/16	9.72	9.38	142.9 K=0.50	7.3	0.7150	-1912.53	5227.38	0.366 ✓
T9	86.66 - 79.99	L2x2x3/16	10.39	10.06	153.2 K=0.50	6.4	0.7150	-2095.24	4548.24	0.461 ✓
T11	73.32 - 66.65	L3x3x3/16	11.75	11.37	114.5 K=0.50	10.9	1.0900	-2454.52	11930.30	0.206 ✓
T12	66.65 - 59.98	L2x2x3/16	12.42	12.05	183.5 K=0.50	4.4	0.7150	-2623.90	3171.87	0.827 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	KL/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P/P _a
T1	168 - 160	L1 3/4x1 3/4x3/16	6.69	6.45	225.4 K=1.00	2.9	0.6211	-126.79	1825.97	0.069 ✓
KL/R > 200 (C) - 5										

Tension Checks

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Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _a ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P/P _a
T1	168 - 160	ROHN 2.5 STD 2.875ODx0.203wall	8.00	4.00	50.7	30.0	1.7040	939.49	51121.50	0.018
T2	160 - 140	ROHN 2.5 STD 2.875ODx0.203wall	20.00	4.00	50.7	30.0	1.7040	12192.10	51121.50	0.238
T3	140 - 128	ROHN 2.5 EH 2.875ODx0.276wall	12.00	4.00	51.9	30.0	2.2535	30224.10	67606.20	0.447
T4	128 - 120	2.5" sch 80+3" sch 40 split	8.00	4.00	58.5	30.0	3.1500	46559.50	94500.00	0.493
T5	120 - 105	3" Sch. 40 + 3.5" Sch. 40 split	15.03	5.01	60.3	30.0	3.3350	72520.30	100050.00	0.725
T6	105 - 100	3" Sch. 40 + 3.5" Sch. 40 split	5.01	2.58	31.1	30.0	3.3350	80566.20	100050.00	0.805
T7	100 - 93.33	ROHN 3.5 EH 4ODx0.318wall	6.68	6.68	61.4	30.0	3.6784	89152.00	110352.00	0.808
T8	93.33 - 86.66	ROHN 3.5 EH 4ODx0.318wall	6.68	3.46	31.7	30.0	3.6784	98654.40	110352.00	0.894
T9	86.66 - 79.99	ROHN 3.5 EH 4ODx0.318wall	6.68	3.45	31.7	30.0	3.6784	107555.00	110352.00	0.975
T10	79.99 - 73.32	ROHN 4 EH 4.5ODx0.337wall	6.68	6.68	54.3	30.0	4.4074	116749.00	132223.00	0.883
T11	73.32 - 66.65	ROHN 4 EH 4.5ODx0.337wall	6.68	3.44	27.9	30.0	4.4074	124989.00	132223.00	0.945
T12	66.65 - 59.98	ROHN 4 EH 4.5ODx0.337wall	6.68	3.43	27.9	30.0	4.4074	133190.00	132223.00	1.007
T13	59.98 - 39.98	ROHN 5 EH 5.563ODx0.375wall	20.03	6.68	43.6	30.0	6.1120	157226.00	183359.00	0.857
T14	39.98 - 19.98	ROHN 6 EHS 6.625ODx0.34wall	20.03	10.02	54.0	30.0	6.7133	177585.00	201398.00	0.882
T15	19.98 - 0	ROHN 6 EH 6.625ODx0.432wall	20.01	10.01	54.7	30.0	8.4049	198636.00	252148.00	0.788

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _a ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P/P _a
T1	168 - 160	L1 3/4x1 3/4x3/16	7.79	3.76	84.0	29.0	0.3105	561.47	9005.86	0.062
T2	160 - 140	L1 3/4x1 3/4x3/16	7.79	3.76	84.0	29.0	0.3105	2770.07	9005.86	0.308
T3	140 - 128	L2x2x3/16	7.79	3.76	73.1	29.0	0.3575	4481.72	10367.50	0.432
T4	128 - 120	L2x2x3/16	7.79	3.75	72.9	29.0	0.3575	5056.89	10367.50	0.488
T5	120 - 105	L2x2x3/16	9.40	4.67	90.7	29.0	0.3575	4910.05	10367.50	0.474

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P/P _a
T6	105 - 100	L2x2x3/16	9.83	4.88	95.0	29.0	0.3575	5007.13	10367.50	0.483
T7	100 - 93.33	L2 1/2x2 1/2x3/16	11.25	5.63	86.8	29.0	0.4510	5526.12	13079.00	0.423
T8	93.33 - 86.66	L2 1/2x2 1/2x3/16	11.80	5.90	91.0	29.0	0.4510	5678.26	13079.00	0.434
T9	86.66 - 79.99	L2 1/2x2 1/2x3/16	12.36	6.18	95.4	29.0	0.4510	5816.56	13079.00	0.445
T10	79.99 - 73.32	L2 1/2x2 1/2x1/4	12.94	6.45	100.6	29.0	0.5950	5928.75	17255.00	0.344
T11	73.32 - 66.65	L2 1/2x2 1/2x1/4	13.52	6.74	105.1	29.0	0.5950	6152.85	17255.00	0.357
T12	66.65 - 59.98	L2 1/2x2 1/2x1/4	14.11	7.03	109.8	29.0	0.5950	6167.47	17255.00	0.357
T13	59.98 - 39.98	L3x3x1/4	15.92	7.89	101.8	32.5	0.7200	7073.80	23400.00	0.302
T14	39.98 - 19.98	L3 1/2x3 1/2x1/4	19.14	9.54	105.1	32.5	0.8450	8495.99	27462.50	0.309
T15	19.98 - 0	L3 1/2x3 1/2x1/4	20.89	10.42	114.7	32.5	0.8450	9351.86	27462.50	0.341

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P/P _a
T6	105 - 100	L3x3x3/16	8.46	8.15	104.1	29.0	0.5450	1552.61	15805.00	0.098
T8	93.33 - 86.66	L2x2x3/16	9.72	9.38	182.5	29.0	0.3575	1912.53	10367.50	0.184
T9	86.66 - 79.99	L2x2x3/16	10.39	10.06	195.7	29.0	0.3575	2095.24	10367.50	0.202
T11	73.32 - 66.65	L3x3x3/16	11.75	11.37	145.3	29.0	0.5450	2454.52	15805.00	0.155
T12	66.65 - 59.98	L2x2x3/16	12.42	12.05	234.3	29.0	0.3575	2623.90	10367.50	0.253

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P/P _a
T1	168 - 160	L1 3/4x1 3/4x3/16	6.69	6.45	144.2	29.0	0.3105	104.46	9005.86	0.012

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Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P _{allow} lb	% Capacity	Pass Fail	
T1	168 - 160	Leg	ROHN 2.5 STD 2.875ODx0.203wall	1	-1520.22	55076.63	2.8	Pass	
T2	160 - 140	Leg	ROHN 2.5 STD 2.875ODx0.203wall	21	-15201.90	55076.63	27.6	Pass	
T3	140 - 128	Leg	ROHN 2.5 EH 2.875ODx0.276wall	53	-34915.00	72229.27	48.3	Pass	
T4	128 - 120	Leg	2.5" sch 80+3" sch 40 split	74	-52380.00	96431.88	54.3	Pass	
T5	120 - 105	Leg	3" Sch. 40 + 3.5" Sch. 40 split	89	-80613.50	100730.41	80.0	Pass	
T6	105 - 100	Leg	3" Sch. 40 + 3.5" Sch. 40 split	110	-89525.20	120113.82	74.5	Pass	
T7	100 - 93.33	Leg	ROHN 3.5 EH 4ODx0.318wall	122	-99293.90	110245.23	90.1	Pass	
T8	93.33 - 86.66	Leg	ROHN 3.5 EH 4ODx0.318wall	131	-110279.00	132067.77	83.5	Pass	
T9	86.66 - 79.99	Leg	ROHN 3.5 EH 4ODx0.318wall	143	-120814.00	132110.82	91.4	Pass	
T10	79.99 - 73.32	Leg	ROHN 4 EH 4.5ODx0.337wall	155	-131580.00	139047.89	94.6	Pass	
T11	73.32 - 66.65	Leg	ROHN 4 EH 4.5ODx0.337wall	164	-141531.00	161009.06	87.9	Pass	
T12	66.65 - 59.98	Leg	ROHN 4 EH 4.5ODx0.337wall	176	-151297.00	161038.39	94.0	Pass	
T13	59.98 - 39.98	Leg	ROHN 5 EH 5.563ODx0.375wall	188	-180846.00	206291.07	87.7	Pass	
T14	39.98 - 19.98	Leg	ROHN 6 EHS 6.625ODx0.34wall	209	-205972.00	212197.60	97.1	Pass	
T15	19.98 - 0	Leg	ROHN 6 EH 6.625ODx0.432wall	224	-232038.00	264405.87	87.8	Pass	
T1	168 - 160	Diagonal	L1 3/4x1 3/4x3/16	11	-585.66	7172.11	8.2	Pass	
T2	160 - 140	Diagonal	L1 3/4x1 3/4x3/16	26	-2766.50	7172.11	38.6	Pass	
T3	140 - 128	Diagonal	L2x2x3/16	59	-4515.19	10545.42	42.8	Pass	
T4	128 - 120	Diagonal	L2x2x3/16	79	-5163.82	10588.49	48.8	Pass	
T5	120 - 105	Diagonal	L2x2x3/16	94	-5045.71	7048.98	71.6	Pass	
T6	105 - 100	Diagonal	L2x2x3/16	115	-5080.16	6436.64	78.9	Pass	
T7	100 - 93.33	Diagonal	L2 1/2x2 1/2x3/16	127	-5693.93	9650.27	59.0	Pass	
T8	93.33 - 86.66	Diagonal	L2 1/2x2 1/2x3/16	136	-5806.07	8771.07	66.2	Pass	
T9	86.66 - 79.99	Diagonal	L2 1/2x2 1/2x3/16	148	-5948.76	7990.83	74.4	Pass	
T10	79.99 - 73.32	Diagonal	L2 1/2x2 1/2x1/4	160	-6152.36	9544.72	64.5	Pass	
T11	73.32 - 66.65	Diagonal	L2 1/2x2 1/2x1/4	169	-6190.81	8735.63	70.9	Pass	
T12	66.65 - 59.98	Diagonal	L2 1/2x2 1/2x1/4	181	-6505.72	8015.80	81.2	Pass	
T13	59.98 - 39.98	Diagonal	L3x3x1/4	199	-7005.05	12114.77	57.8	Pass	
T14	39.98 - 19.98	Diagonal	L3 1/2x3 1/2x1/4	220	-8377.42	13526.48	61.9	Pass	
T15	19.98 - 0	Diagonal	L3 1/2x3 1/2x1/4	235	-9091.26	11295.19	80.5	Pass	
T6	105 - 100	Secondary Horizontal	L3x3x3/16	118	1552.61	21068.06	7.4	Pass	
T8	93.33 - 86.66	Secondary Horizontal	L2x2x3/16	139	-1912.53	6968.10	27.4	Pass	
T9	86.66 - 79.99	Secondary Horizontal	L2x2x3/16	152	-2095.24	6062.80	34.6	Pass	
T11	73.32 - 66.65	Secondary Horizontal	L3x3x3/16	172	-2454.52	15903.09	15.4	Pass	
T12	66.65 - 59.98	Secondary Horizontal	L2x2x3/16	184	-2623.90	4228.10	62.1	Pass	
T1	168 - 160	Top Girt	L1 3/4x1 3/4x3/16	5	-126.79	2434.02	5.2	Pass	
							Summary		
							Leg (T14)	97.1	Pass
							Diagonal (T12)	81.2	Pass
							Secondary Horizontal (T12)	62.1	Pass
							Top Girt (T1)	5.2	Pass
							RATING =	97.1	Pass

tnxTower EBI Consulting <i>21 B Street</i> Program Version: 02/17/2013 FOR REVIEW: 781.273.2500 FAX: 781.273.3311	Job Union/ I-84	Page 36 of 36
	Project CT11144C	Date 13:09:26 02/27/15
Program Version: 02/17/2013 FOR REVIEW: 781.273.2500 FAX: 781.273.3311	Client T-Mobile	Designed By SS FOR RA

3 sch. 40+ 3.5 sch 40 split

Calculate section properties of cross-section manually:

Description	Area, A (in ²)	Outer diameter (in)	Centroid, y (see note) (in)	Ay (in ³)	Moment of inertia, Ixx (in ⁴)	Moment of inertia, Iyy (in ⁴)	Ixx about group centroid (in ⁴)	Iyy about group centroid (in ⁴)
3 sch. 40	2.080	3.50	1.750	3.640	2.8500	2.8500	3.2794	2.8500
3.5 sch. 40 split	1.255	4.00	2.957	3.711	2.3939	0.4558	3.1055	0.455778
TOTAL:	3.335			7.351			6.3849	3.305778

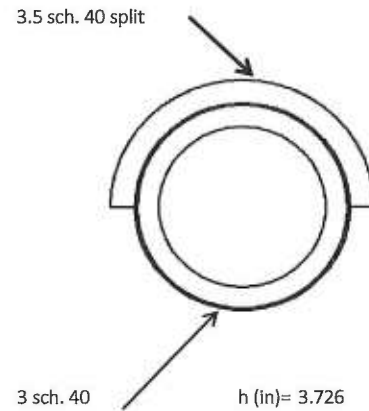
Note: Centroid measurement taken w/r/t bottom outside edge as oriented in graphic below.

Centroid location = 2.204 in
 Moment of inertia of section about X axis = 6.3849 in⁴
 Moment of inertia of section about Y axis = 3.305778 in⁴

$y = (\text{total } Ay) / (\text{total } A)$
 $\text{Transformed } I = I + A x (\text{centroid} - y)^2$

Section properties calculated manually

A = 3.335 in², both sections (weld allows for composite action)
 Ix = 6.385 in⁴, calculated above
 Iy = 3.306 in⁴, calculated above
 J = 9.691 in⁴, J = Ixx + Iyy
 y (left & right) = 4.000 in, o. dia of 3.5 sch. 40 split
 y (top) = 1.512 in, y (top) = (overall depth) - y (bottom)
 y (bottom) = 2.204 in, centroid
 Sx (top) = 4.224 in³, S = Ix/y
 Sx (bottom) = 2.896 in³, S = Ix/y
 Sy (top) = 2.187 in³, S = Iy/y
 Sy (bottom) = 1.500 in³, S = Iy/y
 rx = 1.384 in, rx = $\sqrt{Ix/A}$
 ry = 0.996 in, ry = $\sqrt{Iy/A}$



(note: schematic diagram, not to scale)

3 sch. 40+ 3.5 sch 40 split

Calculate section properties of cross-section manually:

Description	Area, A (in ²)	Outer diameter (in)	Centroid, y (see note) (in)	Ay (in ³)	Moment of inertia, Ixx (in ⁴)	Moment of inertia, Iyy (in ⁴)	Ixx about group centroid (in ⁴)	Iyy about group centroid (in ⁴)
3 sch. 40	2.080	3.50	1.750	3.640	2.8500	2.8500	3.2794	2.8500
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Note: Centroid measurement taken w/r/t bottom outside edge as oriented in graphic below.

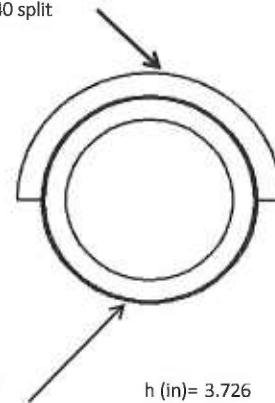
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 rx = 1.384 in, rx = $\sqrt{Ix/A}$
 ry = 0.996 in, ry = $\sqrt{Iy/A}$

3.5 sch. 40 split



(note: schematic diagram, not to scale)