STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

VIA ELECTRONIC MAIL

February 10, 2020

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103

RE: **EM-VER-036-200116** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 220 Winthrop Road, Deep River, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) is in receipt of your correspondence of January 22, 2020 and February 5, 2020 submitted in response to the Council's January 21, 2020 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/IN/emr

Robidoux, Evan

From: Dandeneau, Kathleen <KDANDENEAU@RC.com>
Sent: Wednesday, February 5, 2020 4:11 PM
To: Bachman, Melanie; CSC-DL Siting Council
Cc: Baldwin, Kenneth; Mayo, Rachel
Subject: EM-VER-036-200116 - 220 Winthrop Road, Deep River, CT - Additional Information
Attachments: Deep River_001.pdf

The original has been mailed to the Siting Council.

Kathleen M. Dandeneau
Legal Administrative Assistant

Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103
Direct 860.541.2689 | Fax 860.275.8299
kdandeneau@rc.com | www.rc.com

Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

February 5, 2020

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

Re: **EM-VER-036-200116 – Cellco Partnership d/b/a Verizon Wireless Notice of Intent to Modify an Existing Telecommunications Facility Located at 220 Winthrop Road, Deep River, Connecticut**

Dear Ms. Bachman:

In response to your January 21, 2020 letter regarding the above-referenced filing, attached is a full and complete copy of the Mounts Structural Replacement Report dated January 27, 2020, prepared by Paul J. Ford and Company.

If you have any questions or need any additional information, please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Enclosures

PAUL J. FORD & COMPANY

Report Date:	January 27, 2020
Client:	On Air Engineering, LLC 88 Foundry Pond Road Cold Spring, NY 10516 Attn: David Weinpahl, P.E. (201) 456-4624
Utility Name:	
Structure:	Existing 180-ft Monopole
Carrier:	Verizon Wireless
Carrier Site Name:	Deep River West CT
Mount Type:	(1) 12 ft Platform
Site Address:	220 Winthrop Rd
City, County, State:	Deep River, Middlesex County, CT
Latitude, Longitude:	41.365772, -72.475314
PJF Project:	A42919-0016.003.7190

Paul J. Ford and Company is pleased to submit this "**Mount Structural Replacement Report**". The purpose of this analysis is to determine if the mount has sufficient capacity to support the equipment described herein. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point is not part of this document.

Analysis Criteria:

Reference Standard:	2018 Connecticut State Building Code with the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1.
Ultimate Wind Speed:	130 mph 3-second gust wind speed without ice
Nominal Wind Speed:	101 mph 3-second gust wind speed without ice
Ice Wind Speed:	50 mph 3-second gust wind speed with 0.75" ice
IBC Site Criteria:	Risk Category II, Topographic Category 1, Exposure Category C

Summary of Analysis Results:

Antenna Mount:	**81.7%**	**SUFFICIENT***

***Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.**

We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and On Air Engineering, LLC. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully Submitted by:
Paul J. Ford and Company

Angela Sage, E.I.
Structural Designer
asage@pauljford.com

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30901
LICENSED PROFESSIONAL ENGINEER

2020.01.31
15:22:48-05'00'

TABLE OF CONTENTS

1) INTRODUCTION

The proposed mount under consideration is (1) 12 Platform installed at the 176' elevation on a 180' Monopole tower. The proposed mount considered in this analysis is a SitePro1 RMQP-496-HK.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 130 mph converted to a nominal 3-second gust wind speed of 101 mph per section 1609.3.1 as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. and 50 mph with 0.75 inch ice thickness. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1 were used in this analysis.

In addition, the mount has been analyzed for various live loading conditions consisting of a 250-pound maintenance load applied individually at the midpoint and cantilevered ends of horizontal members as well as a 250-pound maintenance load applied individually at mount pipe locations using a 3-second wind speed of 30 mph.

Table 1 – Equipment Configuration

Mounting Level (feet)	Center Line Elevation (feet)	Quantity	Manufacturer	Model	Status	Mount Type
176	178	6	JMA WIRELESS	MX06FRO660-03	Proposed	(1) SitePro1 RMQP-496-HK
		3	SAMSUNG	B2/B66A RRH-BR049		
		3	SAMSUNG	B5/B13 RRH-BR04C		
		3	JMA WIRELESS	91900314 Dual Bracket		
		1	RFS	RRFDC-6627-PF-48		Tower Mounted
		6	ANTEL	BXA-70063-6CF-2	To Be Removed	(1) 13.5' Platform
		6	ANTEL	BXA-171063-12CF-EDIN-2		
		3	NOKIA	UHBB B13 RRH 2X40		
		2	RFS	DB-B1-6C-8AB-0Z		

3) ANALYSIS PROCEDURE

Table 2 – Documents Provided

Document	Remarks	Reference	Source
Mount Manufacturer Drawings	SitePro1, 9/20/2018	RMQP-496-HK Rev. A	SitePro1
Equipment Layout Drawing	OnAir, 12/04/2019	CT46130 Rev 1	OnAir
Radio Frequency Data Sheet	Verizon, 10/15/2019	1368979	OnAir

3.1) Analysis Method

RISA-3D (version 17.0.3), a commercially available analysis software package, was used to create a three-dimensional model of the mount and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix C. In addition, this analysis is in accordance with Verizon's NSTD-446 *Antenna Mount Analysis and Modification Process (dated 03/29/19).*

3.2) Assumptions

1) *The analysis of the existing monopole tower or the effect of the mount attachment to the tower is not within the current scope of work.*
2) *The antenna mounting system was properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications and all bolts are tightened as specified by the manufacturer and AISC requirements.*
3) *The configuration of antennas, mounts, and other appurtenances are as specified in Table 1.*
4) *All member connections have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report. All U-Bolt connections have been properly tightened. This analysis will be required to be revised if the existing conditions in the field differ from those shown in the above referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.*
5) *Steel grades have been assumed as follows:*
   - *a) Channel, Solid Round, Angle, Plate, Unistrut* — *ASTM A36 (GR 36)*
   - *b) Pipe* — *ASTM A53 (GR 35)*
   - *c) HSS (Rectangular)* — *ASTM 500 (GR B-46)*
   - *d) HSS (Round)* — *ASTM 500 (GR B-42)*
   - *e) Connection Bolts* — *ASTM A325*
   - *f) Threaded Rods* — *ASTM F1554 (GR 36)*
   - *g) U-Bolts* — *SAE J429 (GR2)*
6) *Proposed equipment is to be installed in the locations specified in Appendix A. Any changes to the proposed equipment locations will render this report invalid.*

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

4) ANALYSIS RESULTS

Table 3 – Mount Component Capacity

Notes	Component	% Capacity	Pass / Fail
1	Mount Pipes	81.7	Pass
1	Face Horizontal	28.1	Pass
1	Standoff Members	17.9	Pass
1	Bracing Members	15.6	Pass
1	Support Rail	77.2	Pass
1	Corner Plates	21.7	Pass
1	Kick-Brace	9.9	Pass
1	Grating Support Members	23.9	Pass
1	Mount to Tower Connection (bolts/welds)	28.0	Pass

Mount Rating (max from all components) =	81.7%

Notes:
1. See additional documentation in "Appendix C – Software analysis Output" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

- SitePro1 RMQP-496-HK with (12) 8-ft long, P2.0 X-STR (2.38" O.D. x 0.204") mount pipes

Verizon Mount Rating: M2050R(2500)-4[6]

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

1) It is the responsibility of the client to ensure that the information provided to Paul J. Ford and Company is accurate and complete. Paul J. Ford and Company will rely on the accuracy and completeness of such information in performing or furnishing services under this project.

2) If the existing conditions are not as represented on the referenced drawings and/or documents, Paul J. Ford and Company should be contacted immediately to evaluate the significance of the deviation.

3) The mount has been analyzed according to the minimum design loads recommended by the Reference Standard. If additional design loads are required, Paul J. Ford and Company should be made aware of this prior to the start of the project.

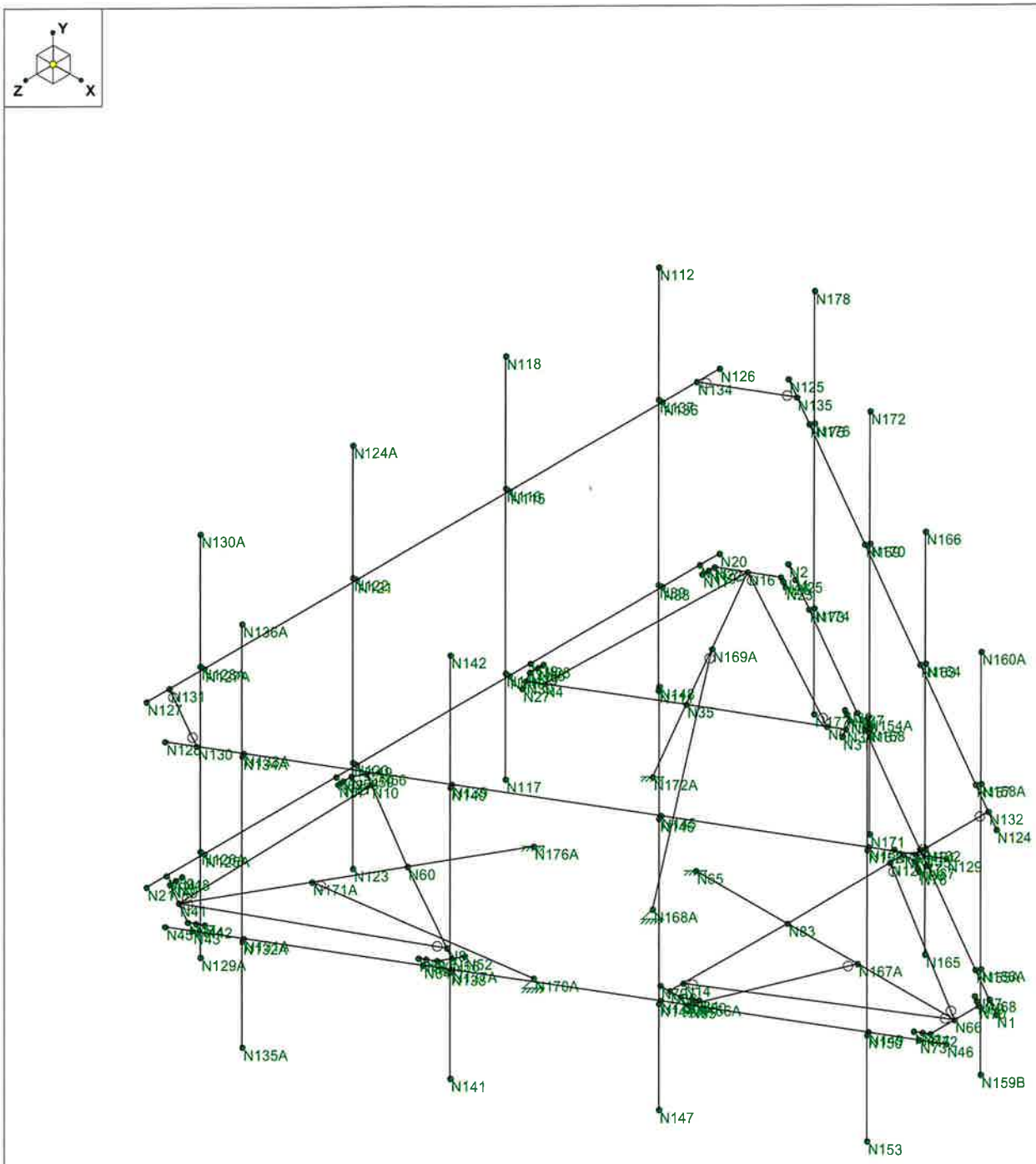
4) The standard of care for all Professional Engineering Services performed or furnished by Paul J. Ford and Company under this project will be the skill and care used by members of the Consultant's profession practicing under similar circumstances at the same time and in the same locality.

5) All Services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Paul J. Ford and Company is not responsible for the conclusions, opinions and/or recommendations made by others based on the information supplied herein.

****

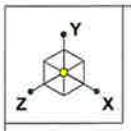
APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

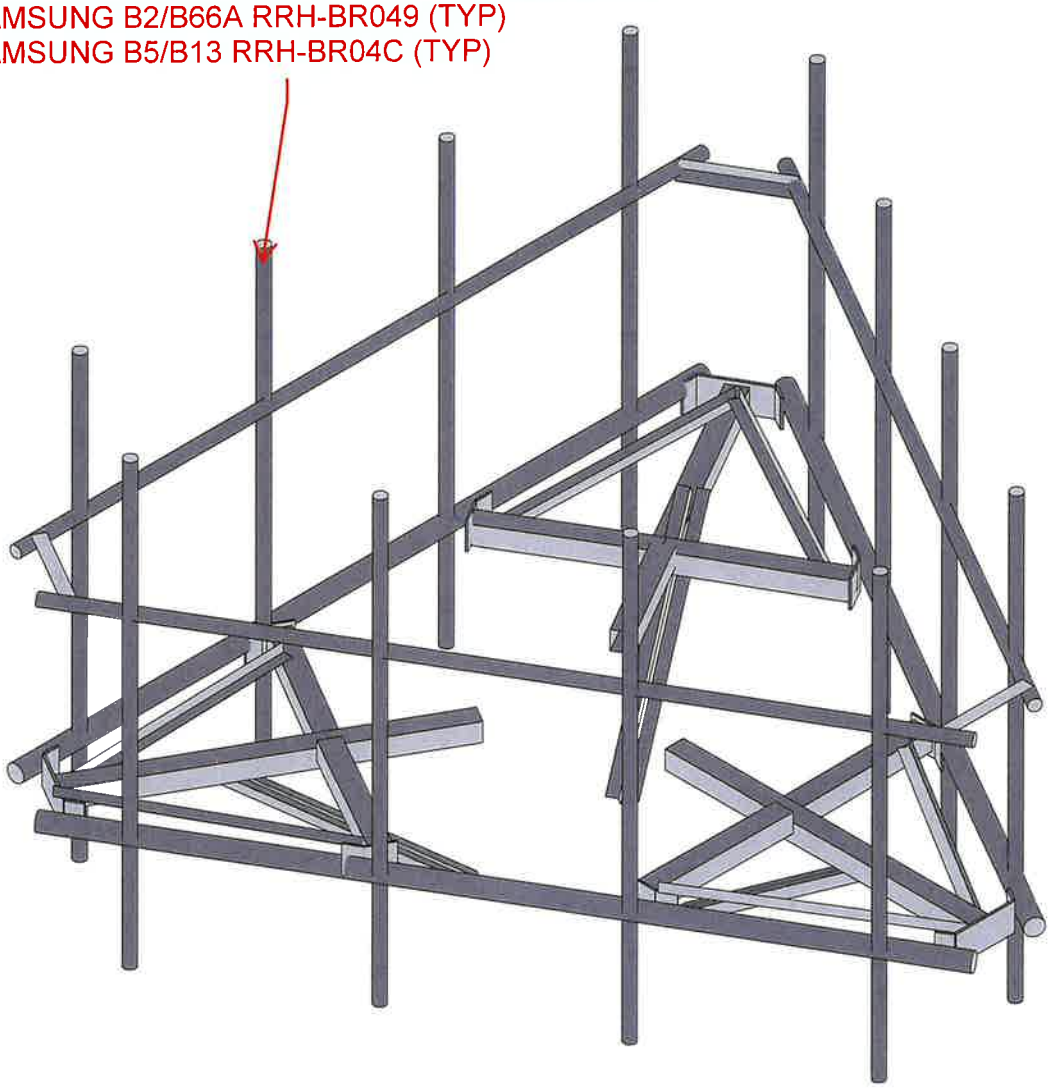
Paul J. Ford and Company	Deep River West CT	SK - 1
AMS		Jan 27, 2020 at 9:20 AM
42919-0016.003.7190		42919-0016.003.7190_Wind.r3d



ANTENNA AZIMUTHS
ALPHA - 80°
BETA - 220°
GAMMA - 330°

LEGEND
EXISTING: BLUE
PROPOSED: RED

(2) JMA WIRELESS MX06FRO660-03 (TYP)
(1) JMA WIRELESS 91900314 DUAL BRACKET (TYP)
(1) SAMSUNG B2/B66A RRH-BR049 (TYP)
(1) SAMSUNG B5/B13 RRH-BR04C (TYP)



NOTES:
1) A 6" VERTICAL TOLERANCE FOR PROPOSED EQUIPMENT IS ACCEPTABLE.
2) CONTRACTOR TO VERIFY LOCATION OF EXISTING EQUIPMENT PRIOR TO INSTALLATION OF PROPOSED EQUIPMENT. NOTIFY EOR FOR ANY DEVIATIONS.
3) INSTALL SHALL NOT CAUSE HARM TO THE STRUCTURE, CLIMBING FACILITY, SAFETY CLIMB OR ANY SYSTEM INSTALLED ON THE STRUCTURE.

Envelope Only Solution

Paul J. Ford and Company	Deep River West CT	SK - 2
AMS		Jan 27, 2020 at 9:20 AM
42919-0016.003.7190		42919-0016.003.7190_Wind.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Project # A42919-0016.003.7190
By AMS

Analysis 30 degrees

Mount Loading per TIA-222-G-2

Structure & Wind Speed

Structure Type =	Mount	
Mount Type =	3 Sectors	
Mount Centerline, z =	176	ft
Centerline Y Coordinate =	0	in
Wind Speed =	101	mph
Service Wind Speed =	30	mph
Const. Duration =		
Non-Op Wind Speed =	#N/A	mph
Op Wind Speed =	30	mph
Ice Wind Speed =	50	mph
Ice Thickness =	0.75	in

Topo

Exposure Cat =	C	
Structure Class =	II	
Topographic Cat =	1	
Crest Height =	0	ft

Velocity Pressure Coefficients

z_g =	900	ft	
a =	9.50		
K_{zmin} =	0.85		
K_z =	1.43		Calculated Value
K_z =	1.43		Section 2.6.5.2
K_{zt} =	1.00		Section 2.6.6.4
Gh =	1.00		Section 2.6.7
K_d =	0.95		Table 2-2
I =	1.00		Table 2-3
q_z=	35.37	psf	Section 2.6.9.6

Ice Loading

Ii =	1.00	
Iwi =	1.00	
q_z=	8.67	psf
K_{iz} =	1.18	
T_{iz} =	1.77	in
h =	1.00	in
W_i =	12.94	psf

Wind Pressures

Pressure =	35.367
Ice Pressure =	8.667

Antennas

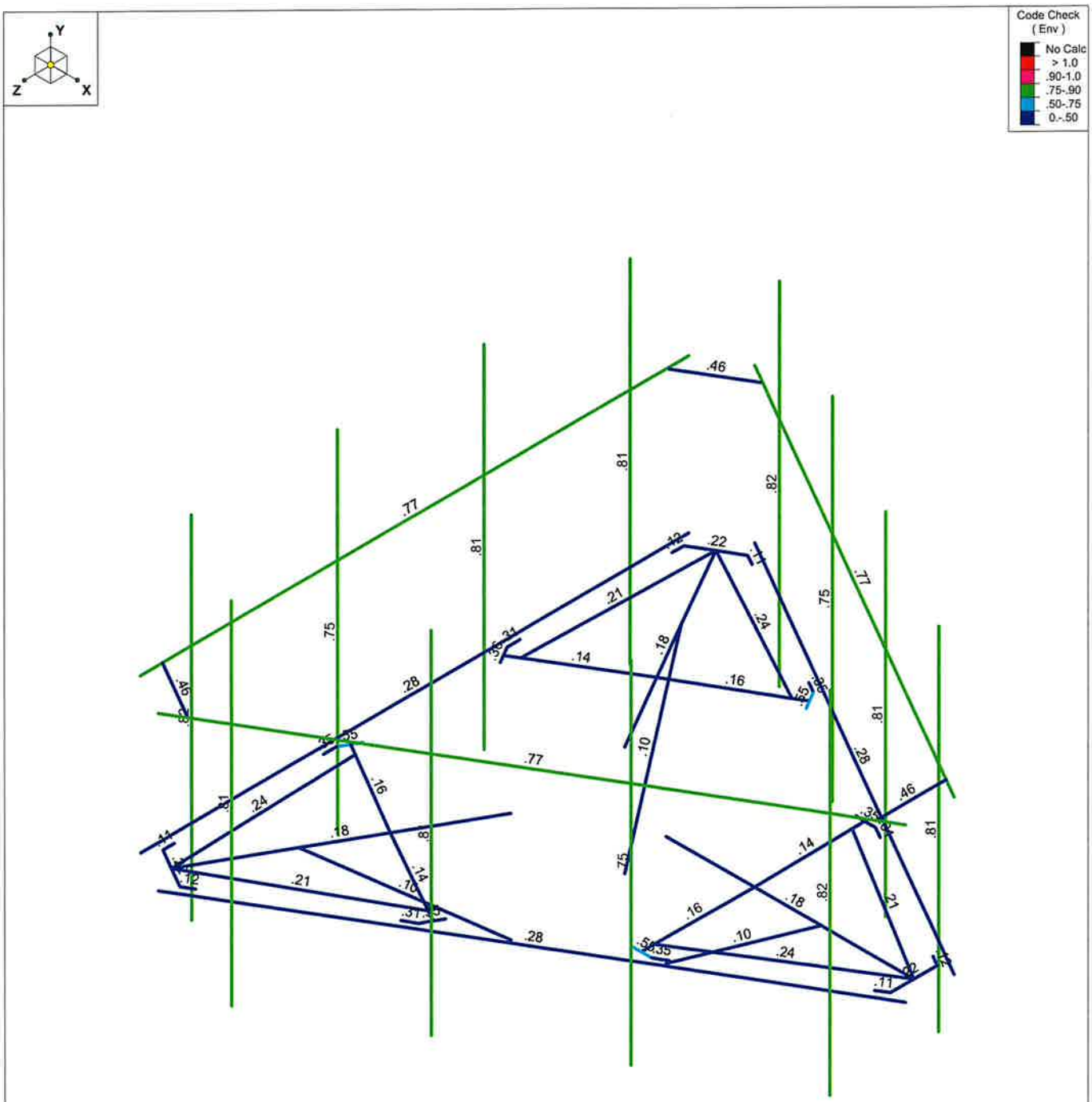
Item	Status	Manufacturer	Antenna	Height (in)	Width (in)	Depth (in)	Flat or Round	Weight (lbs)	Sector / Face	Position	Top/Bottom Mounting Point Spacing	Override Spacing (in)	Max Antenna C/L (ft)	Min Antenna C/L (ft)	Antenna C/L (ft)	Antenna Top Mount Location from Mount Pipe Bottom (in)	Antenna Bottom Mount Location from Mount Pipe Bottom (in)
1	P	JMA WIRELESS	(2) MX06FRO660-03 w/ dual bracket	71.3	30.8	10.7	Flat	176	A	2	65.30		179.28	176.72	178	80.65	15.35
2	P	JMA WIRELESS	(2) MX06FRO660-03 w/ dual bracket	71.3	30.8	10.7	Flat	176	B	2	65.30		179.28	176.72	178	80.65	15.35
3	P	JMA WIRELESS	(2) MX06FRO660-03 w/ dual bracket	71.3	30.8	10.7	Flat	176	C	2	65.30		179.28	176.72	178	80.65	15.35
14	P	SAMSUNG TELECOMMUNICATIONS	B2/B66A RRH-BR049	15	15	8.1	Flat	70.3	A	2	9.00		181.63	174.38	178	52.50	43.50
15	P	SAMSUNG TELECOMMUNICATIONS	B2/B66A RRH-BR049	15	15	8.1	Flat	70.3	B	2	9.00		181.63	174.38	178	52.50	43.50
16	P	SAMSUNG TELECOMMUNICATIONS	B2/B66A RRH-BR049	15	15	8.1	Flat	70.3	C	2	9.00		181.63	174.38	178	52.50	43.50
17	P	SAMSUNG TELECOMMUNICATIONS	B5/B13 RRH-BR04C	15	15	8.1	Flat	70.3	A	2	9.00		181.63	174.38	178	52.50	43.50
18	P	SAMSUNG TELECOMMUNICATIONS	B5/B13 RRH-BR04C	15	15	8.1	Flat	70.3	B	2	9.00		181.63	174.38	178	52.50	43.50
19	P	SAMSUNG TELECOMMUNICATIONS	B5/B13 RRH-BR04C	15	15	8.1	Flat	70.3	C	2	9.00		181.63	174.38	178	52.50	43.50

Dishes

Item	Status	Manufacturer	Microwave Dish	Dia (in)	Dish Type	Weight (lbs)	Sector / Face	Position	Top/Bottom Mounting Point Spacing	Override Spacing (in)	Max Antenna C/L (ft)	Min Antenna C/L (ft)	Antenna C/L (ft)	Antenna Top Mount Location from Mount Pipe Bottom (in)	Antenna Bottom Mount Location from Mount Pipe Bottom (in)

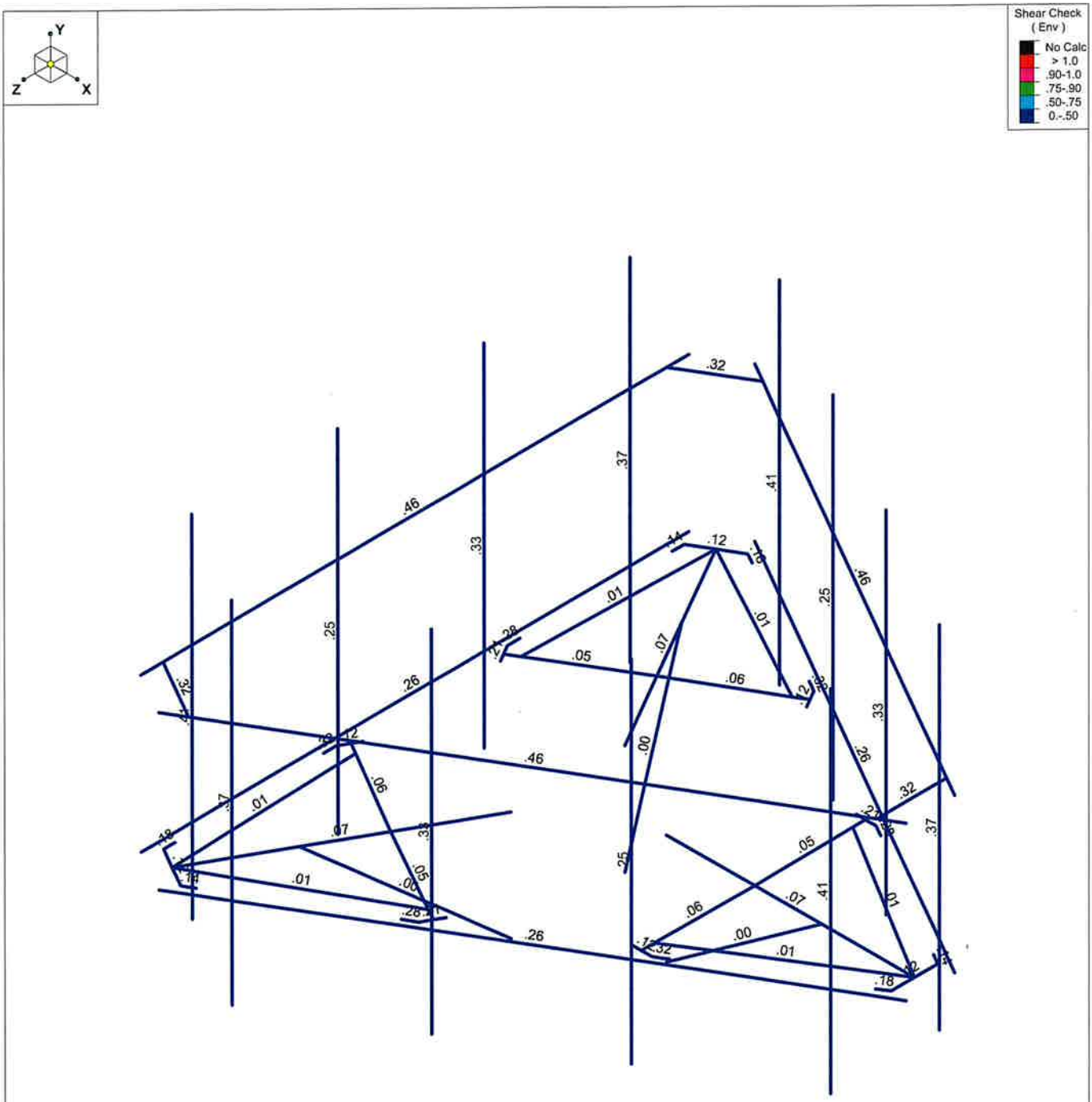
APPENDIX C

SOFTWARE ANALYSIS OUTPUT



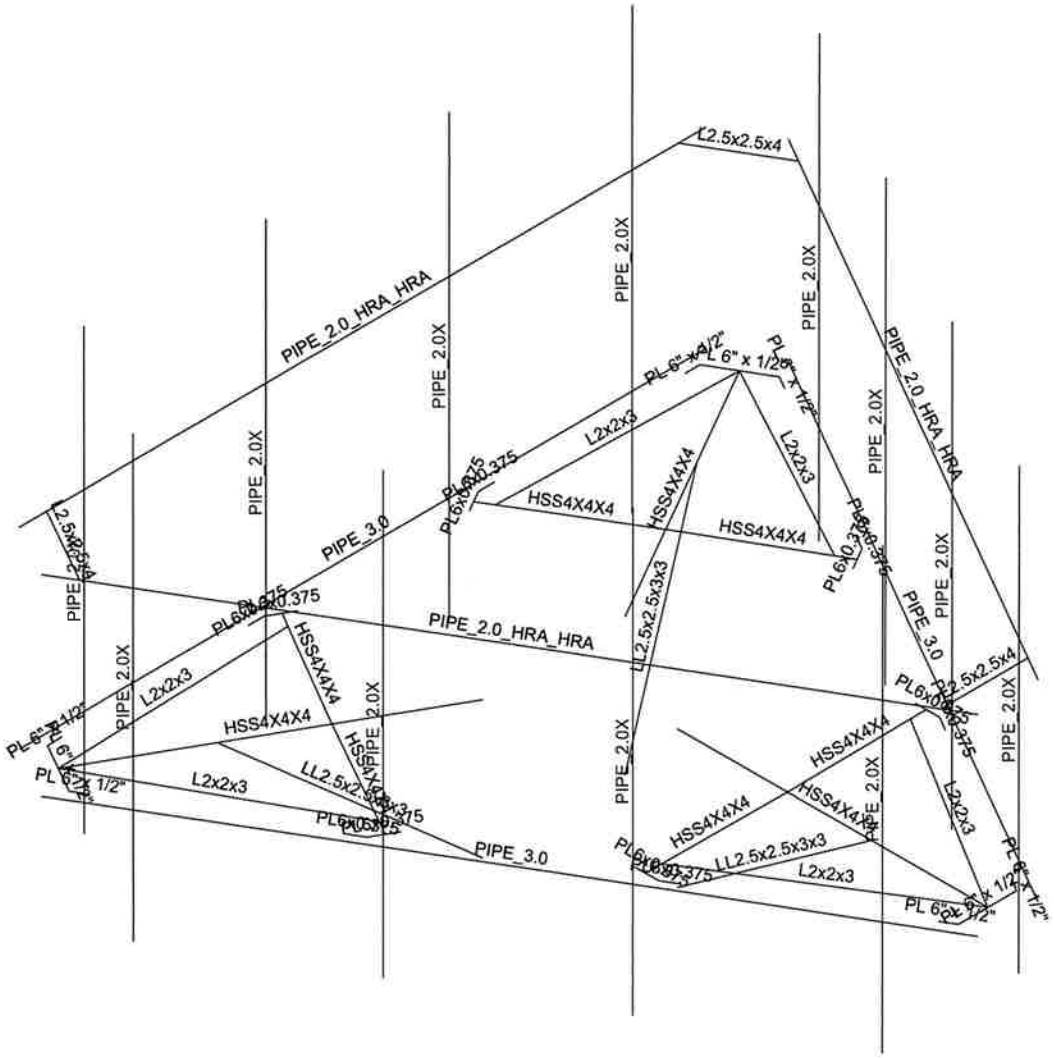
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford and Company	Deep River West CT	SK - 3
AMS		Jan 27, 2020 at 9:20 AM
42919-0016.003.7190		42919-0016.003.7190_Wind.r3d



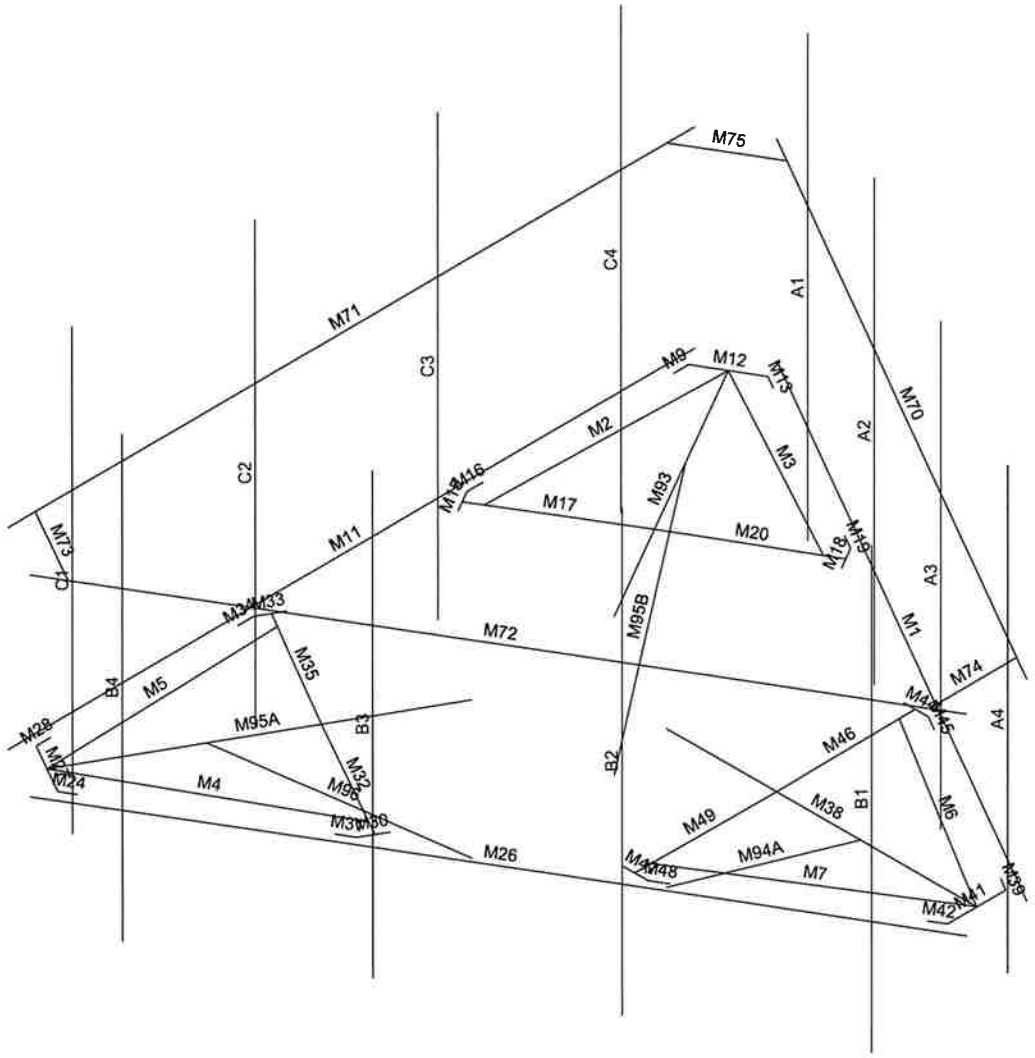
Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford and Company	Deep River West CT	SK - 4
AMS		Jan 27, 2020 at 9:20 AM
42919-0016.003.7190		42919-0016.003.7190_Wind.r3d



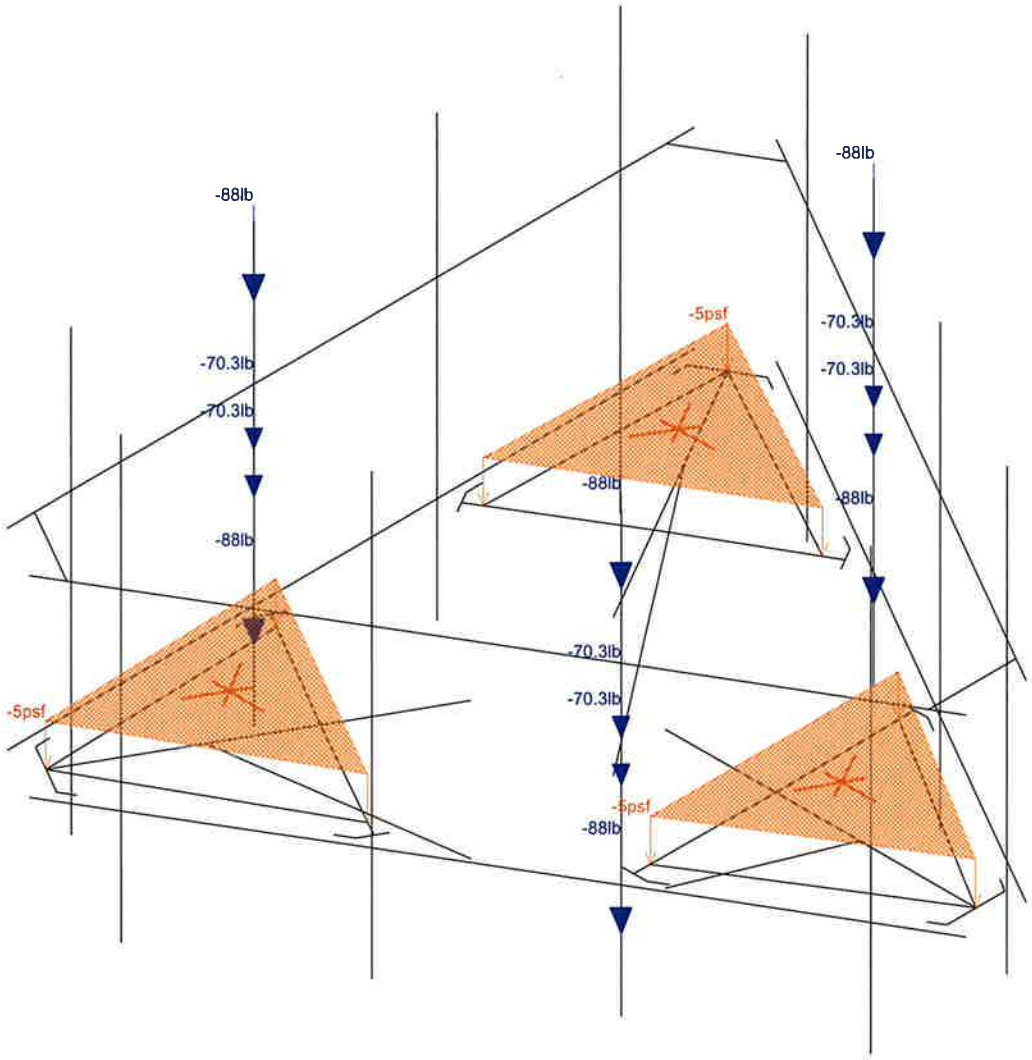
Envelope Only Solution

Paul J. Ford and Company	Deep River West CT	SK - 5
AMS		Jan 27, 2020 at 9:21 AM
42919-0016.003.7190		42919-0016.003.7190_Wind.r3d



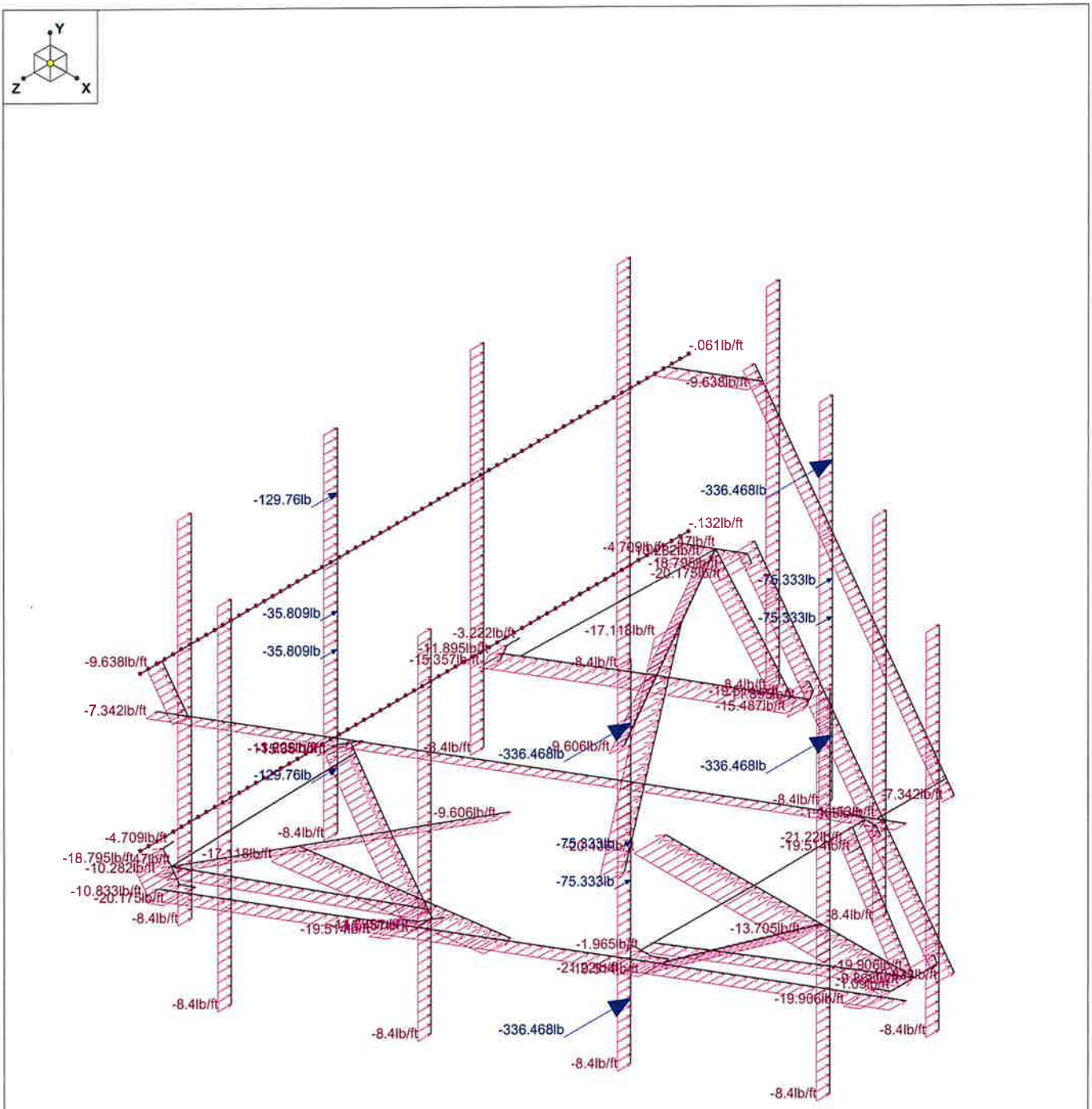
Envelope Only Solution

Paul J. Ford and Company	Deep River West CT	SK - 6
AMS		Jan 27, 2020 at 9:21 AM
42919-0016.003.7190		42919-0016.003.7190_Wind.r3d



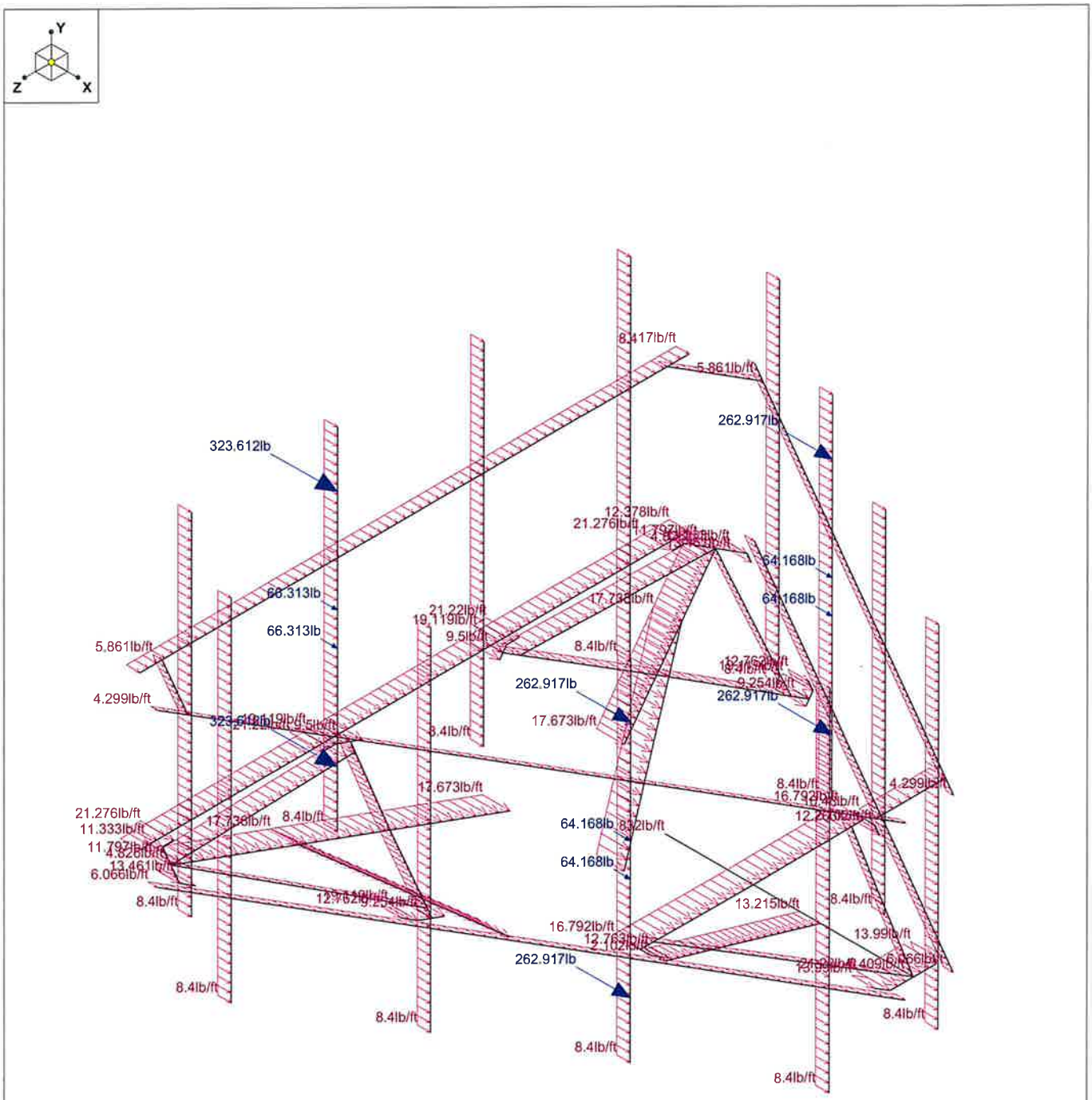
Loads: BLC 1, Dead
Envelope Only Solution

Paul J. Ford and Company	Deep River West CT	SK - 7
AMS		Jan 27, 2020 at 12:36 PM
42919-0016.003.7190		42919-0016.003.7190_Wind.r3d



Loads: BLC 3, Wind 0
Envelope Only Solution

Paul J. Ford and Company	Deep River West CT	SK - 8
AMS		Jan 27, 2020 at 9:21 AM
42919-0016.003.7190		42919-0016.003.7190_Wind.r3d



Loads: BLC 6, Wind 90
Envelope Only Solution

Paul J. Ford and Company	Deep River West CT	SK - 9
AMS		Jan 27, 2020 at 9:21 AM
42919-0016.003.7190		42919-0016.003.7190_Wind.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

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

(Global) Model Settings, Continued

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

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E..	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2			PIPE_3.0	None	None	A53 Gr.B	Typical
2	M2	N16	N4		270	L2x2x3	None	None	A36 Gr.36	Typical
3	M3	N16	N6			L2x2x3	None	None	A36 Gr.36	Typical
4	M4	N41	N8		270	L2x2x3	None	None	A36 Gr.36	Typical
5	M5	N41	N10			L2x2x3	None	None	A36 Gr.36	Typical
6	M6	N66	N12		270	L2x2x3	None	None	A36 Gr.36	Typical
7	M7	N66	N14			L2x2x3	None	None	A36 Gr.36	Typical
8	M9	N17	N22			PL 6" x 1/2"	None	None	A36 Gr.36	Typical
9	M10	N18	N19			RIGID	None	None	RIGID	Typical
10	M11	N20	N21			PIPE_3.0	None	None	A53 Gr.B	Typical
11	M12	N24	N22			PL 6" x 1/2"	None	None	A36 Gr.36	Typical
12	M13	N23	N24			PL 6" x 1/2"	None	None	A36 Gr.36	Typical
13	M14	N25	N26			RIGID	None	None	RIGID	Typical
14	M15	N29	N27			PL6x0.375	None	None	A36 Gr.36	Typical
15	M16	N28	N29			PL6x0.375	None	None	A36 Gr.36	Typical
16	M17	N30	N35			HSS4X4X4	None	None	A500 Gr.B Rect	Typical
17	M18	N33	N31			PL6x0.375	None	None	A36 Gr.36	Typical
18	M19	N32	N33			PL6x0.375	None	None	A36 Gr.36	Typical
19	M20	N34	N35			HSS4X4X4	None	None	A500 Gr.B Rect	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
20	M21	N36	N37			RIGID	None	None	RIGID	Typical
21	M22	N39	N38			RIGID	None	None	RIGID	Typical
22	M24	N42	N47			PL 6" x 1/2"	None	None	A36 Gr.36	Typical
23	M25	N43	N44			RIGID	None	None	RIGID	Typical
24	M26	N45	N46			PIPE_3.0	None	None	A53 Gr.B	Typical
25	M27	N49	N47			PL 6" x 1/2"	None	None	A36 Gr.36	Typical
26	M28	N48	N49			PL 6" x 1/2"	None	None	A36 Gr.36	Typical
27	M29	N50	N51			RIGID	None	None	RIGID	Typical
28	M30	N54	N52			PL6x0.375	None	None	A36 Gr.36	Typical
29	M31	N53	N54			PL6x0.375	None	None	A36 Gr.36	Typical
30	M32	N55	N60			HSS4X4X4	None	None	A500 Gr.B Rect	Typical
31	M33	N58	N56			PL6x0.375	None	None	A36 Gr.36	Typical
32	M34	N57	N58			PL6x0.375	None	None	A36 Gr.36	Typical
33	M35	N59	N60			HSS4X4X4	None	None	A500 Gr.B Rect	Typical
34	M36	N62	N61			RIGID	None	None	RIGID	Typical
35	M37	N64	N63			RIGID	None	None	RIGID	Typical
36	M38	N65	N66			HSS4X4X4	None	None	A500 Gr.B Rect	Typical
37	M39	N67	N70			PL 6" x 1/2"	None	None	A36 Gr.36	Typical
38	M40	N68	N69			RIGID	None	None	RIGID	Typical
39	M41	N72	N70			PL 6" x 1/2"	None	None	A36 Gr.36	Typical
40	M42	N71	N72			PL 6" x 1/2"	None	None	A36 Gr.36	Typical
41	M43	N73	N74			RIGID	None	None	RIGID	Typical
42	M44	N77	N75			PL6x0.375	None	None	A36 Gr.36	Typical
43	M45	N76	N77			PL6x0.375	None	None	A36 Gr.36	Typical
44	M46	N78	N83			HSS4X4X4	None	None	A500 Gr.B Rect	Typical
45	M47	N81	N79			PL6x0.375	None	None	A36 Gr.36	Typical
46	M48	N80	N81			PL6x0.375	None	None	A36 Gr.36	Typical
47	M49	N82	N83			HSS4X4X4	None	None	A500 Gr.B Rect	Typical
48	M50	N85	N84			RIGID	None	None	RIGID	Typical
49	M51	N86	N87			RIGID	None	None	RIGID	Typical
50	M52	N89	N88			RIGID	None	None	RIGID	Typical
51	M70	N124	N125			PIPE_2.0_HR...	None	None	A53 Gr.B	Typical
52	M71	N126	N127			PIPE_2.0_HR...	None	None	A53 Gr.B	Typical
53	M72	N128	N129			PIPE_2.0_HR...	None	None	A53 Gr.B	Typical
54	M73	N131	N130		90	L2.5x2.5x4	None	None	A36 Gr.36	Typical
55	M74	N133	N132		90	L2.5x2.5x4	None	None	A36 Gr.36	Typical
56	M75	N135	N134		90	L2.5x2.5x4	None	None	A36 Gr.36	Typical
57	M76	N137	N136			RIGID	None	None	RIGID	Typical
58	C4	N111	N112			PIPE_2.0X	None	None	A53 Gr.B	Typical
59	M64	N114	N113			RIGID	None	None	RIGID	Typical
60	M65	N116	N115			RIGID	None	None	RIGID	Typical
61	C3	N117	N118			PIPE_2.0X	None	None	A53 Gr.B	Typical
62	M67	N120	N119			RIGID	None	None	RIGID	Typical
63	M68	N122	N121			RIGID	None	None	RIGID	Typical
64	C2	N123	N124A			PIPE_2.0X	None	None	A53 Gr.B	Typical
65	M70A	N126A	N125A			RIGID	None	None	RIGID	Typical
66	M71A	N128A	N127A			RIGID	None	None	RIGID	Typical
67	C1	N129A	N130A			PIPE_2.0X	None	None	A53 Gr.B	Typical
68	M73A	N132A	N131A			RIGID	None	None	RIGID	Typical
69	M74A	N134A	N133A			RIGID	None	None	RIGID	Typical
70	B4	N135A	N136A			PIPE_2.0X	None	None	A53 Gr.B	Typical
71	M76A	N138	N137A			RIGID	None	None	RIGID	Typical
72	M77	N140	N139			RIGID	None	None	RIGID	Typical
73	B3	N141	N142			PIPE_2.0X	None	None	A53 Gr.B	Typical
74	M79	N144	N143			RIGID	None	None	RIGID	Typical
75	M80	N146	N145			RIGID	None	None	RIGID	Typical
76	B2	N147	N148			PIPE_2.0X	None	None	A53 Gr.B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
77	M82	N150	N149			RIGID	None	None	RIGID	Typical
78	M83	N152	N151			RIGID	None	None	RIGID	Typical
79	B1	N153	N154A			PIPE 2.0X	None	None	A53 Gr.B	Typical
80	M85A	N156A	N155A			RIGID	None	None	RIGID	Typical
81	M86A	N158A	N157			RIGID	None	None	RIGID	Typical
82	A4	N159B	N160A			PIPE 2.0X	None	None	A53 Gr.B	Typical
83	M88	N162	N161			RIGID	None	None	RIGID	Typical
84	M89	N164	N163			RIGID	None	None	RIGID	Typical
85	A3	N165	N166			PIPE 2.0X	None	None	A53 Gr.B	Typical
86	M91	N168	N167			RIGID	None	None	RIGID	Typical
87	M92	N170	N169			RIGID	None	None	RIGID	Typical
88	A2	N171	N172			PIPE 2.0X	None	None	A53 Gr.B	Typical
89	M94	N174	N173			RIGID	None	None	RIGID	Typical
90	M95	N176	N175			RIGID	None	None	RIGID	Typical
91	A1	N177	N178			PIPE 2.0X	None	None	A53 Gr.B	Typical
92	M93	N172A	N16			HSS4X4X4	None	None	A500 Gr.B Rect	Typical
93	M95A	N176A	N41			HSS4X4X4	None	None	A500 Gr.B Rect	Typical
94	M94A	N167A	N166A			LL2.5x2.5x3x3	None	None	A36 Gr.36	Typical
95	M95B	N169A	N168A			LL2.5x2.5x3x3	None	None	A36 Gr.36	Typical
96	M96	N171A	N170A			LL2.5x2.5x3x3	None	None	A36 Gr.36	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes	** NA **			None
2	M2	BenPIN	BenPIN				Yes	** NA **			None
3	M3	BenPIN	BenPIN				Yes	** NA **			None
4	M4	BenPIN	BenPIN				Yes	** NA **			None
5	M5	BenPIN	BenPIN				Yes	** NA **			None
6	M6	BenPIN	BenPIN				Yes	** NA **			None
7	M7	BenPIN	BenPIN				Yes	** NA **			None
8	M9						Yes	** NA **			None
9	M10	BenPIN					Yes	** NA **			None
10	M11						Yes	** NA **			None
11	M12						Yes	** NA **			None
12	M13						Yes	** NA **			None
13	M14	BenPIN					Yes	** NA **			None
14	M15						Yes	** NA **			None
15	M16						Yes	** NA **			None
16	M17						Yes	** NA **			None
17	M18						Yes	** NA **			None
18	M19						Yes	** NA **			None
19	M20						Yes	** NA **			None
20	M21		BenPIN				Yes	** NA **			None
21	M22	BenPIN					Yes	** NA **			None
22	M24						Yes	** NA **			None
23	M25	BenPIN					Yes	** NA **			None
24	M26						Yes	** NA **			None
25	M27						Yes	** NA **			None
26	M28						Yes	** NA **			None
27	M29	BenPIN					Yes	** NA **			None
28	M30						Yes	** NA **			None
29	M31						Yes	** NA **			None
30	M32						Yes	** NA **			None
31	M33						Yes	** NA **			None
32	M34						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
33	M35						Yes	** NA **			None
34	M36	BenPIN					Yes	** NA **			None
35	M37	BenPIN					Yes	** NA **			None
36	M38						Yes	** NA **			None
37	M39						Yes	** NA **			None
38	M40	BenPIN					Yes	** NA **			None
39	M41						Yes	** NA **			None
40	M42						Yes	** NA **			None
41	M43	BenPIN					Yes	** NA **			None
42	M44						Yes	** NA **			None
43	M45						Yes	** NA **			None
44	M46						Yes	** NA **			None
45	M47						Yes	** NA **			None
46	M48						Yes	** NA **			None
47	M49						Yes	** NA **			None
48	M50	BenPIN					Yes	** NA **			None
49	M51		BenPIN				Yes	** NA **			None
50	M52						Yes	** NA **			None
51	M70						Yes	** NA **			None
52	M71						Yes	** NA **			None
53	M72						Yes	** NA **			None
54	M73	OOOOXO	OOOOXO				Yes	** NA **			None
55	M74	OOOOXO	OOOOXO				Yes	** NA **			None
56	M75	OOOOXO	OOOOXO				Yes	** NA **			None
57	M76		OOOXOO				Yes	** NA **			None
58	C4						Yes	** NA **			None
59	M64						Yes	** NA **			None
60	M65		OOOXOO				Yes	** NA **			None
61	C3						Yes	** NA **			None
62	M67						Yes	** NA **			None
63	M68		OOOXOO				Yes	** NA **			None
64	C2						Yes	** NA **			None
65	M70A						Yes	** NA **			None
66	M71A		OOOXOO				Yes	** NA **			None
67	C1						Yes	** NA **			None
68	M73A						Yes	** NA **			None
69	M74A		OOOXOO				Yes	** NA **			None
70	B4						Yes	** NA **			None
71	M76A						Yes	** NA **			None
72	M77		OOOXOO				Yes	** NA **			None
73	B3						Yes	** NA **			None
74	M79						Yes	** NA **			None
75	M80		OOOXOO				Yes	** NA **			None
76	B2						Yes	** NA **			None
77	M82						Yes	** NA **			None
78	M83		OOOXOO				Yes	** NA **			None
79	B1						Yes	** NA **			None
80	M85A						Yes	** NA **			None
81	M86A		OOOXOO				Yes	** NA **			None
82	A4						Yes	** NA **			None
83	M88						Yes	** NA **			None
84	M89		OOOXOO				Yes	** NA **			None
85	A3						Yes	** NA **			None
86	M91						Yes	** NA **			None
87	M92		OOOXOO				Yes	** NA **			None
88	A2						Yes	** NA **			None
89	M94						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
90	M95		OOOXOO				Yes	** NA **			None
91	A1						Yes	** NA **			None
92	M93						Yes	** NA **			None
93	M95A						Yes	** NA **			None
94	M94A	BenPIN					Yes	** NA **			None
95	M95B	BenPIN					Yes	** NA **			None
96	M96	BenPIN					Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	PIPE_3.0	150			Lbyy						Lateral
2	M2	L2x2x3	51.837			Lbyy						Lateral
3	M3	L2x2x3	51.837			Lbyy						Lateral
4	M4	L2x2x3	51.837			Lbyy						Lateral
5	M5	L2x2x3	51.837			Lbyy						Lateral
6	M6	L2x2x3	51.837			Lbyy						Lateral
7	M7	L2x2x3	51.837			Lbyy						Lateral
8	M9	PL 6" x 1/2"	3.184			Lbyy						Lateral
9	M11	PIPE_3.0	150			Lbyy						Lateral
10	M12	PL 6" x 1/2"	12.707			Lbyy						Lateral
11	M13	PL 6" x 1/2"	3.184			Lbyy						Lateral
12	M15	PL6x0.375	5.363			Lbyy						Lateral
13	M16	PL6x0.375	3.499			Lbyy						Lateral
14	M17	HSS4X4X4	30.71			Lbyy						Lateral
15	M18	PL6x0.375	5.363			Lbyy						Lateral
16	M19	PL6x0.375	3.499			Lbyy						Lateral
17	M20	HSS4X4X4	30.71			Lbyy						Lateral
18	M24	PL 6" x 1/2"	3.184			Lbyy						Lateral
19	M26	PIPE_3.0	150			Lbyy						Lateral
20	M27	PL 6" x 1/2"	12.707			Lbyy						Lateral
21	M28	PL 6" x 1/2"	3.184			Lbyy						Lateral
22	M30	PL6x0.375	5.363			Lbyy						Lateral
23	M31	PL6x0.375	3.499			Lbyy						Lateral
24	M32	HSS4X4X4	30.71			Lbyy						Lateral
25	M33	PL6x0.375	5.363			Lbyy						Lateral
26	M34	PL6x0.375	3.499			Lbyy						Lateral
27	M35	HSS4X4X4	30.71			Lbyy						Lateral
28	M38	HSS4X4X4	68.014			Lbyy						Lateral
29	M39	PL 6" x 1/2"	3.184			Lbyy						Lateral
30	M41	PL 6" x 1/2"	12.707			Lbyy						Lateral
31	M42	PL 6" x 1/2"	3.184			Lbyy						Lateral
32	M44	PL6x0.375	5.363			Lbyy						Lateral
33	M45	PL6x0.375	3.499			Lbyy						Lateral
34	M46	HSS4X4X4	30.71			Lbyy						Lateral
35	M47	PL6x0.375	5.363			Lbyy						Lateral
36	M48	PL6x0.375	3.499			Lbyy						Lateral
37	M49	HSS4X4X4	30.71			Lbyy						Lateral
38	M70	PIPE_2.0_...	150			Lbyy						Lateral
39	M71	PIPE_2.0_...	150			Lbyy						Lateral
40	M72	PIPE_2.0_...	150			Lbyy						Lateral
41	M73	L2.5x2.5x4	19.173									Lateral
42	M74	L2.5x2.5x4	19.173									Lateral
43	M75	L2.5x2.5x4	19.173									Lateral
44	C4	PIPE_2.0X	96									Lateral
45	C3	PIPE_2.0X	96									Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
46	C2	PIPE_2.0X	96									Lateral
47	C1	PIPE_2.0X	96									Lateral
48	B4	PIPE_2.0X	96									Lateral
49	B3	PIPE_2.0X	96									Lateral
50	B2	PIPE_2.0X	96									Lateral
51	B1	PIPE_2.0X	96									Lateral
52	A4	PIPE_2.0X	96									Lateral
53	A3	PIPE_2.0X	96									Lateral
54	A2	PIPE_2.0X	96									Lateral
55	A1	PIPE_2.0X	96									Lateral
56	M93	HSS4X4X4	68.014			Lbyy						Lateral
57	M95A	HSS4X4X4	68.014			Lbyy						Lateral
58	M94A	LL2.5x2.5x3...	52									Lateral
59	M95B	LL2.5x2.5x3...	52									Lateral
60	M96	LL2.5x2.5x3...	52									Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Dead	None		-1.1			12		3	
2	Live	None								
3	Wind 0	None					24	120		
4	Wind 30	None					24	120		
5	Wind 60	None					24	120		
6	Wind 90	None					24	120		
7	Wind 120	None					24	120		
8	Wind 150	None					24	120		
9	Ice Load	None					12	60	3	
10	Ice 0	None					24	120		
11	Ice 30	None					24	120		
12	Ice 60	None					24	120		
13	Ice 90	None					24	120		
14	Ice 120	None					24	120		
15	Ice 150	None					24	120		
16	Lm	None				1				
17	Lv	None				1				
18	BLC 1 Transient Area Loads	None						75		
19	BLC 9 Transient Area Loads	None						75		

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4 D	Yes	Y		1	1.4																		
2	1.2 D + 1.6 L	Yes	Y		1	1.2	2	1.6																
3	1.2 D + 1.6 Wo @ 0	Yes	Y		1	1.2	3	1.6																
4	1.2 D + 1.6 Wo @ 30	Yes	Y		1	1.2	4	1.6																
5	1.2 D + 1.6 Wo @ 60	Yes	Y		1	1.2	5	1.6																
6	1.2 D + 1.6 Wo @ 90	Yes	Y		1	1.2	6	1.6																
7	1.2 D + 1.6 Wo @ 120	Yes	Y		1	1.2	7	1.6																
8	1.2 D + 1.6 Wo @ 150	Yes	Y		1	1.2	8	1.6																
9	1.2 D + 1.6 Wo @ 180	Yes	Y		1	1.2	3	-1.6																
10	1.2 D + 1.6 Wo @ 210	Yes	Y		1	1.2	4	-1.6																
11	1.2 D + 1.6 Wo @ 240	Yes	Y		1	1.2	5	-1.6																
12	1.2 D + 1.6 Wo @ 270	Yes	Y		1	1.2	6	-1.6																
13	1.2 D + 1.6 Wo @ 300	Yes	Y		1	1.2	7	-1.6																
14	1.2 D + 1.6 Wo @ 330	Yes	Y		1	1.2	8	-1.6																

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
15	1.2 D + 1.0 Di + 1.0 Wi @ 0	Yes	Y		1	1.2	9	1	10	1																
16	1.2 D + 1.0 Di + 1.0 Wi @ 30	Yes	Y		1	1.2	9	1	11	1																
17	1.2 D + 1.0 Di + 1.0 Wi @ 60	Yes	Y		1	1.2	9	1	12	1																
18	1.2 D + 1.0 Di + 1.0 Wi @ 90	Yes	Y		1	1.2	9	1	13	1																
19	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	14	1																
20	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	15	1																
21	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	10	-1																
22	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	11	-1																
23	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	12	-1																
24	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	13	-1																
25	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	14	-1																
26	1.2 D + 1.0 Di + 1.0 Wi @ ...	Yes	Y		1	1.2	9	1	15	-1																
27	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	3	.088	16	1.5																
28	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	4	.088	16	1.5																
29	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	5	.088	16	1.5																
30	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	6	.088	16	1.5																
31	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	7	.088	16	1.5																
32	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	8	.088	16	1.5																
33	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	3	-.088	16	1.5																
34	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	4	-.088	16	1.5																
35	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	5	-.088	16	1.5																
36	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	6	-.088	16	1.5																
37	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	7	-.088	16	1.5																
38	1.2 D + 1.5 Lm + 1.0 Wm ...	Yes	Y		1	1.2	8	-.088	16	1.5																
39	1.2 D + 1.5 Lv	Yes	Y		1	1.2	17	1.5																		

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-in]	LC	MY [k-in]	LC	MZ [k-in]	LC
1	N65	max	4351.028	12	768.023	12	1637.864	3	1.105	13	30.777	9	9.657	24
2		min	-6569.516	6	-317.691	6	-1650.753	9	-4.671	19	-30.364	3	-1.53	6
3	N172A	max	3147.09	14	767.983	8	5768.323	14	10.341	20	30.806	5	3.376	3
4		min	-2041.851	8	-317.66	14	-3844.726	8	-.018	14	-30.393	11	-4.66	9
5	N176A	max	3421.906	10	768.083	4	3691.512	4	2.633	10	30.787	13	-.842	9
6		min	-2308.686	4	-317.742	10	-5610.508	10	-7.237	4	-30.373	7	-8.485	15
7	N166A	max	3540.79	18	2562.336	18	53.264	14	0	39	0	39	0	39
8		min	-1137.133	12	-818.252	12	-53.24	10	0	1	0	1	0	1
9	N168A	max	568.372	8	2562.247	26	984.477	8	0	39	0	39	0	39
10		min	-1770.323	26	-817.994	8	-3066.31	26	0	1	0	1	0	1
11	N170A	max	568.623	4	2562.353	22	3066.43	22	0	39	0	39	0	39
12		min	-1770.415	22	-818.314	4	-984.855	4	0	1	0	1	0	1
13	Totals:	max	6997.848	12	7955.754	23	6692.22	3						
14		min	-6997.889	6	3163.608	5	-6692.211	9						

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

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-...	phi*Mn z-...	Cb	Eqn
1	C1	PIPE_2.0X	.817	24	10	.415	66		11	19844.858	44100	30.366	30.366	1....	H3-6
2	B1	PIPE_2.0X	.817	24	6	.414	66		7	19844.858	44100	30.366	30.366	1....	H3-6
3	A1	PIPE_2.0X	.817	24	14	.414	66		3	19844.858	44100	30.366	30.366	1....	H3-6
4	A4	PIPE_2.0X	.808	24	6	.372	66		5	19844.858	44100	30.366	30.366	1....	H3-6
5	B4	PIPE_2.0X	.808	24	10	.372	66		9	19844.858	44100	30.366	30.366	1....	H3-6
6	C4	PIPE_2.0X	.808	24	14	.372	66		13	19844.858	44100	30.366	30.366	1....	H3-6
7	A3	PIPE_2.0X	.806	24	6	.335	24		5	19844.858	44100	30.366	30.366	1....	H3-6
8	B3	PIPE_2.0X	.806	24	10	.335	24		9	19844.858	44100	30.366	30.366	1....	H3-6
9	C3	PIPE_2.0X	.806	24	14	.334	24		13	19844.858	44100	30.366	30.366	1....	H3-6

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

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-...	phi*Mn z-...	Cb	Eqn
10	M72	PIPE_2.0_H...	.772	6.25	5	.460	14.062		5	6295.422	32130	22.459	22.459	3....	H3-6
11	M70	PIPE_2.0_H...	.772	6.25	13	.460	14.063		13	6295.422	32130	22.459	22.459	3....	H3-6
12	M71	PIPE_2.0_H...	.772	6.25	9	.460	14.063		9	6295.422	32130	22.459	22.459	3....	H3-6
13	C2	PIPE_2.0X	.752	24	10	.254	66		10	19844.858	44100	30.366	30.366	1....	H3-6
14	B2	PIPE_2.0X	.751	24	6	.254	66		6	19844.858	44100	30.366	30.366	1....	H3-6
15	A2	PIPE_2.0X	.751	24	14	.254	66		14	19844.858	44100	30.366	30.366	1....	H3-6
16	M18	PL6x0.375	.550	2.849	5	.124	2.849	y	10	63826.168	72900	6.836	109.35	1....	H1-1b
17	M47	PL6x0.375	.550	2.849	9	.124	2.849	y	14	63826.168	72900	6.836	109.35	1....	H1-1b
18	M33	PL6x0.375	.550	2.849	13	.124	2.849	y	6	63826.168	72900	6.836	109.35	1....	H1-1b
19	M73	L2.5x2.5x4	.461	19.173	5	.323	0	z	13	35474.554	38556	13.363	30.449	1.4	H2-1
20	M74	L2.5x2.5x4	.461	19.173	13	.323	0	z	9	35474.554	38556	13.363	30.449	1.4	H2-1
21	M75	L2.5x2.5x4	.461	19.173	9	.323	0	z	5	35474.554	38556	13.363	30.449	1....	H2-1
22	M15	PL6x0.375	.355	2.849	11	.213	2.849	y	19	63826.168	72900	6.836	109.35	1....	H1-1b
23	M30	PL6x0.375	.355	2.849	7	.213	2.849	y	15	63826.168	72900	6.836	109.35	1....	H1-1b
24	M44	PL6x0.375	.355	2.849	3	.213	2.849	y	23	63826.168	72900	6.836	109.35	1....	H1-1b
25	M34	PL6x0.375	.346	1.422	5	.323	3.499	y	21	68804.199	72900	6.836	109.35	1....	H1-1b
26	M19	PL6x0.375	.346	1.422	9	.323	3.499	y	25	68804.199	72900	6.836	109.35	1....	H1-1b
27	M48	PL6x0.375	.346	1.422	13	.323	3.499	y	17	68804.199	72900	6.836	109.35	1....	H1-1b
28	M45	PL6x0.375	.311	1.422	12	.281	3.499	y	19	68804.199	72900	6.836	109.35	1....	H1-1b
29	M31	PL6x0.375	.311	1.422	4	.281	3.499	y	23	68804.199	72900	6.836	109.35	1....	H1-1b
30	M16	PL6x0.375	.311	1.422	8	.281	3.499	y	15	68804.199	72900	6.836	109.35	1....	H1-1b
31	M1	PIPE_3.0	.281	54.688	6	.261	50		5	28250.554	65205	68.985	68.985	3....	H3-6
32	M26	PIPE_3.0	.281	54.687	10	.261	50		9	28250.554	65205	68.985	68.985	3....	H3-6
33	M11	PIPE_3.0	.281	54.688	14	.261	50		13	28250.554	65205	68.985	68.985	3....	H3-6
34	M5	L2x2x3	.239	25.918	11	.010	51.837	y	17	9185.35	23392.8	6.693	13.031	1....	H2-1
35	M3	L2x2x3	.239	25.918	3	.010	51.837	y	21	9185.35	23392.8	6.693	13.031	1....	H2-1
36	M7	L2x2x3	.239	25.918	7	.010	51.837	y	25	9185.35	23392.8	6.693	13.031	1....	H2-1
37	M41	PL 6" x 1/2"	.217	6.354	6	.124	6.354	y	9	64843.035	97200	12.15	145.8	1....	H1-1b
38	M12	PL 6" x 1/2"	.217	6.354	14	.124	6.354	y	5	64843.035	97200	12.15	145.8	1....	H1-1b
39	M27	PL 6" x 1/2"	.217	6.354	10	.124	6.354	y	13	64843.035	97200	12.15	145.8	1....	H1-1b
40	M4	L2x2x3	.207	25.918	9	.010	51.837	z	15	9185.35	23392.8	6.693	13.03	1....	H2-1
41	M2	L2x2x3	.207	25.918	13	.010	51.837	z	19	9185.35	23392.8	6.693	13.03	1....	H2-1
42	M6	L2x2x3	.207	25.918	5	.010	51.837	z	23	9185.35	23392.8	6.693	13.03	1....	H2-1
43	M93	HSS4X4X4	.179	0	11	.065	0	z	5	121966.8...	139518	194.166	194.166	2....	H1-1b
44	M95A	HSS4X4X4	.179	0	7	.065	0	z	13	121966.8...	139518	194.166	194.166	2....	H1-1b
45	M38	HSS4X4X4	.179	0	3	.065	0	z	9	121966.8...	139518	194.166	194.166	2....	H1-1b
46	M35	HSS4X4X4	.156	30.71	23	.057	3.519	z	11	135745.8...	139518	194.166	194.166	1....	H1-1b
47	M49	HSS4X4X4	.156	30.71	19	.057	3.519	z	7	135745.8...	139518	194.166	194.166	1....	H1-1b
48	M20	HSS4X4X4	.156	30.71	15	.057	3.519	z	3	135745.8...	139518	194.166	194.166	1....	H1-1b
49	M46	HSS4X4X4	.141	30.71	17	.045	3.519	z	6	135745.8...	139518	194.166	194.166	1....	H1-1b
50	M17	HSS4X4X4	.141	30.71	25	.045	3.519	z	14	135745.8...	139518	194.166	194.166	1....	H1-1b
51	M32	HSS4X4X4	.141	30.71	21	.045	3.519	z	10	135745.8...	139518	194.166	194.166	1....	H1-1b
52	M39	PL 6" x 1/2"	.123	1.659	6	.144	3.184	y	5	94760.158	97200	12.15	145.8	2....	H1-1b
53	M24	PL 6" x 1/2"	.123	1.659	10	.144	3.184	y	9	94760.158	97200	12.15	145.8	2....	H1-1b
54	M9	PL 6" x 1/2"	.123	1.659	14	.144	3.184	y	13	94760.158	97200	12.15	145.8	2....	H1-1b
55	M28	PL 6" x 1/2"	.113	1.659	10	.181	3.184	y	11	94760.158	97200	12.15	145.8	2....	H1-1b
56	M42	PL 6" x 1/2"	.113	1.659	6	.181	3.184	y	7	94760.158	97200	12.15	145.8	2....	H1-1b
57	M13	PL 6" x 1/2"	.113	1.659	14	.181	3.184	y	3	94760.158	97200	12.15	145.8	2....	H1-1b
58	M96	LL2.5x2.5x3x3	.099	52	22	.003	52	z	12	43964.697	58320	47.452	30.595	1	H1-1b*
59	M94A	LL2.5x2.5x3x3	.099	52	18	.003	0	z	14	43964.697	58320	47.452	30.595	1	H1-1b*
60	M95B	LL2.5x2.5x3x3	.099	52	26	.003	52	z	12	43964.697	58320	47.452	30.595	1	H1-1b*

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Project # A42919-0016.003.7190
By AMS
Date: 01/27/20
v0.1, Effective 07/10/18

MOUNT TO TOWER CONNECTION CHECKS

REACTIONS

Px=	1.651	Kip
Py=	0.768	Kip
(Axial)Pz=	6.57	Kip
Mx=	9.657	Kip-in
My=	30.777	Kip-in
(Torque)Mz=	4.671	Kip-in

Number of Bolts	=	4	
Plate Size	b=	9	in
	d=	9	in
Edge distance for Bolts	=	1.5	in
Bolt group centroid y-coordinate, Yc		4.5	in
Bolt group centroid x-coordinate, Xc		4.5	in
Load eccentricity in x-direction, ex		0	in
Load eccentricity in y-direction, ey		0	in
Total Moment including load eccentricity ΣMx=		9.657	Kips-in
Total Moment including load eccentricity ΣMy=		30.777	Kips-in
Total Moment including load eccentricity ΣMz=		4.671	Kips-in

WELD CHECKS

Standoff Member Type		Square	
Width	=	4	in
Depth (only for square members)	=	4	in
Weld Size	=	0.3750	
Total Forces in X direction =		0.316	kips
Total Forces in Y direction =		0.205	kips
Total Forces in Z direction =		2.31	kips
Resultant	=	2.34	kips
Φ*Fw (Kip/in)/16" weld =		1.392	
Capacity used		27.98%	

BOLT CHECKS

Tension Reaction	5.01	kip
Shear Reaction	0.72	kip
Bolt Type	A325N	
Bolt Diameter	0.625	in
Tensile Strength	20.7	kips
Shear Strength	12.4	kips
Reduced Tensile Strength	-	kips
Tensile Capacity Used	24.2%	
Shear Capacity Used	5.8%	

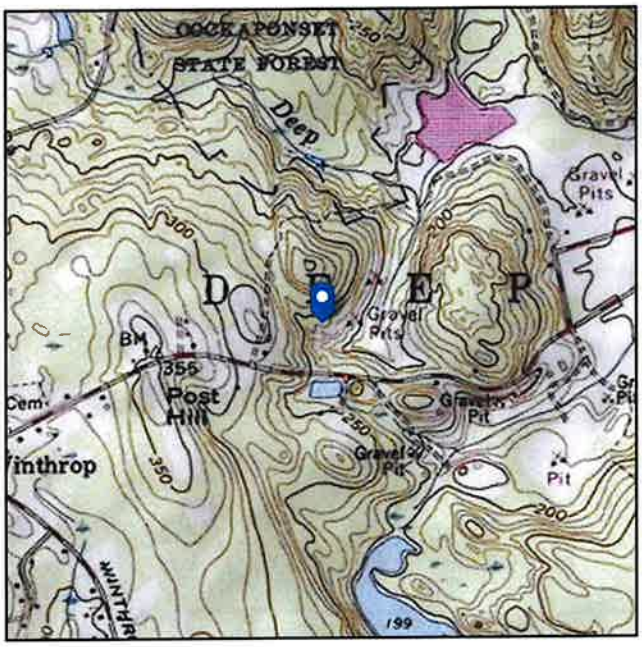
Note: Tension reduction not required if tension or shear capacity < 30%

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 241.52 ft (NAVD 88)
Latitude: 41.365772
Longitude: -72.475314



Wind

Results:

Wind Speed:	130 Vmph
10-year MRI	78 Vmph
25-year MRI	88 Vmph
50-year MRI	96 Vmph
100-year MRI	106 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Thu Dec 12 2019

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

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

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

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	0.17	S_{DS} :	0.182
S_1 :	0.06	S_{D1} :	0.096
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.086
S_{MS} :	0.272	PGA_M :	0.137
S_{M1} :	0.144	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B

Data Accessed: Thu Dec 12 2019

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

Ice

Results:

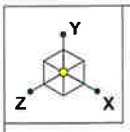
Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Thu Dec 12 2019

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

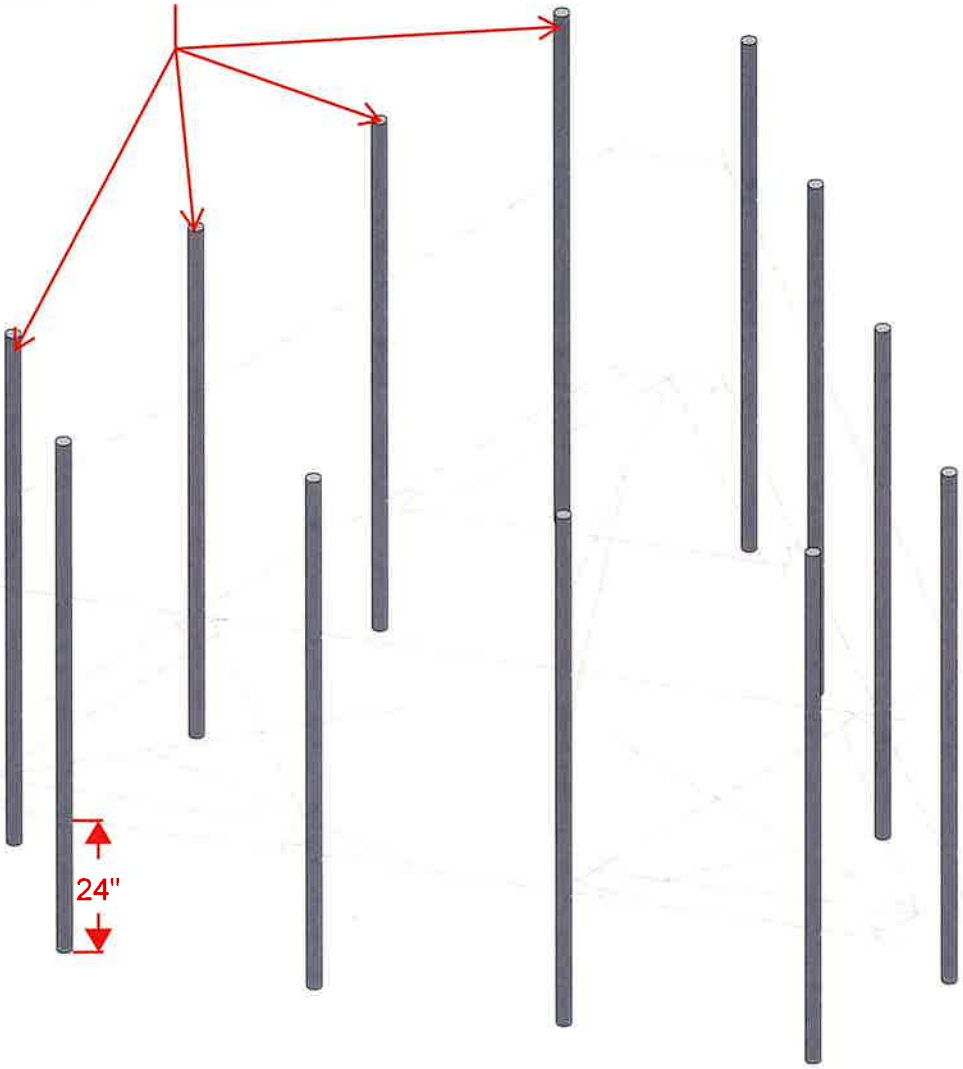
Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from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

APPENDIX D

SUPPLEMENTAL MODIFICATION INFORMATION



INSTALL (12) 8-FT LONG
P2X-STRONG MOUNT PIPES EVENLY
SPACED (TYP 4 PER SECTOR)



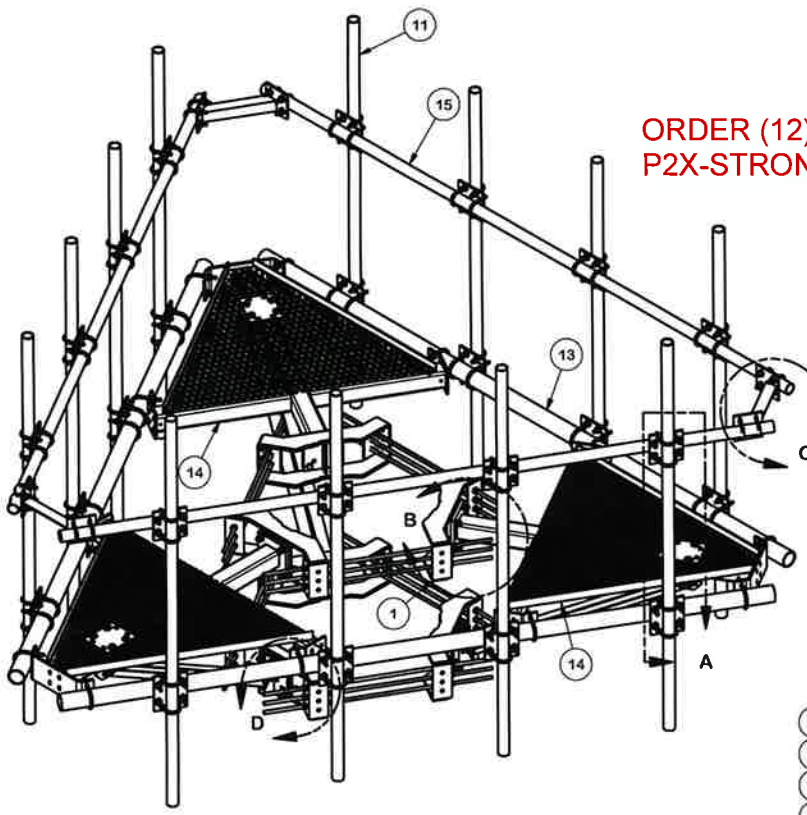
NOTES:
1) A 6" VERTICAL TOLERANCE FOR PROPOSED EQUIPMENT IS ACCEPTABLE.
2) CONTRACTOR TO VERIFY LOCATION OF EXISTING EQUIPMENT PRIOR TO INSTALLATION OF PROPOSED EQUIPMENT. NOTIFY EOR FOR ANY DEVIATIONS.
3) INSTALL SHALL NOT CAUSE HARM TO THE STRUCTURE, CLIMBING FACILITY, SAFETY CLIMB OR ANY SYSTEM INSTALLED ON THE STRUCTURE.

Envelope Only Solution

Paul J. Ford and Company	Deep River West CT	SK - 10
AMS		Jan 27, 2020 at 9:22 AM
42919-0016.003.7190		42919-0016.003.7190_Wind.r3d

APPENDIX E

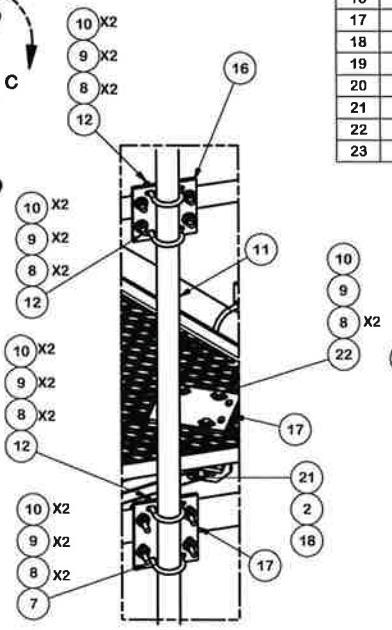
MANUFACTURER DRAWINGS (FOR REFERENCE ONLY)



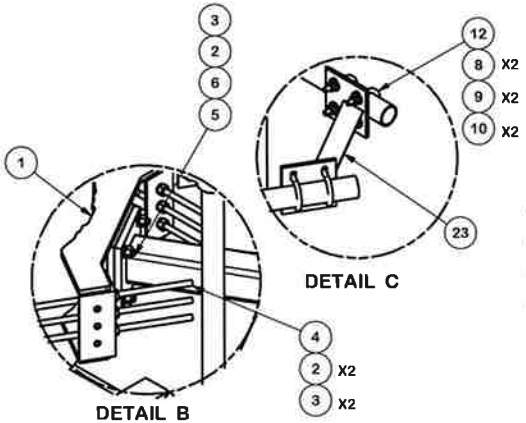
ORDER (12) 8-FT LONG
P2X-STRONG MOUNT PIPES

PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.81	412.85
2	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
3	60	A58NUT	5/8" HDG A325 HEX NUT		0.13	7.79
4	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)		2.09	37.63
4	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)		4.18	75.27
5	24	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	8.54
6	24	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.82
7	36	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.83	29.82
8	264	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	9.00
9	252	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.50
10	252	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	18.05
11	12	P296	2-3/8" X 96" SCH. 40 GALVANIZED PIPE	96 in	30.76	369.08
12	84	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.60	50.17
13	3	P3150	3-1/2" X 150" (3" SCH 40) GALVANIZED PIPE	150 in	94.80	284.40
14	3	X-SV196	LOW PROFILE PLATFORM CORNER		212.10	636.31
15	3	P2150	2-3/8" O.D. X 150" SCH 40 GALVANIZED PIPE	150 in	45.77	137.31
16	12	SCX2	CROSSOVER PLATE	7 in	4.80	57.56
17	15	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	90.32
18	6	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.78
19	6	X-253993	PLATFORM REINFORCEMENT KIT ANGLE	52 25/32 in	14.33	85.99
20	6	X-TBW	T-BRACKET WELDMENT		13.60	81.60
21	6	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.62
22	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	5 1/2 in	0.41	4.91
23	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
					TOTAL WT. #	2445.81

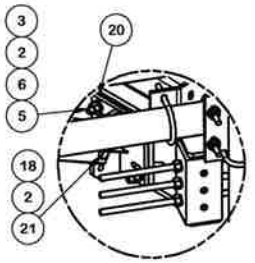


DETAIL A



DETAIL B

DETAIL C



DETAIL D

TOLERANCE NOTES

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

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED X-253992 TO X-TBW	4488	CEK	9/20/2018

REVISION HISTORY

DESCRIPTION
12' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-3/8" ANTENNA MOUTING
PIPES, AND HANDRAIL

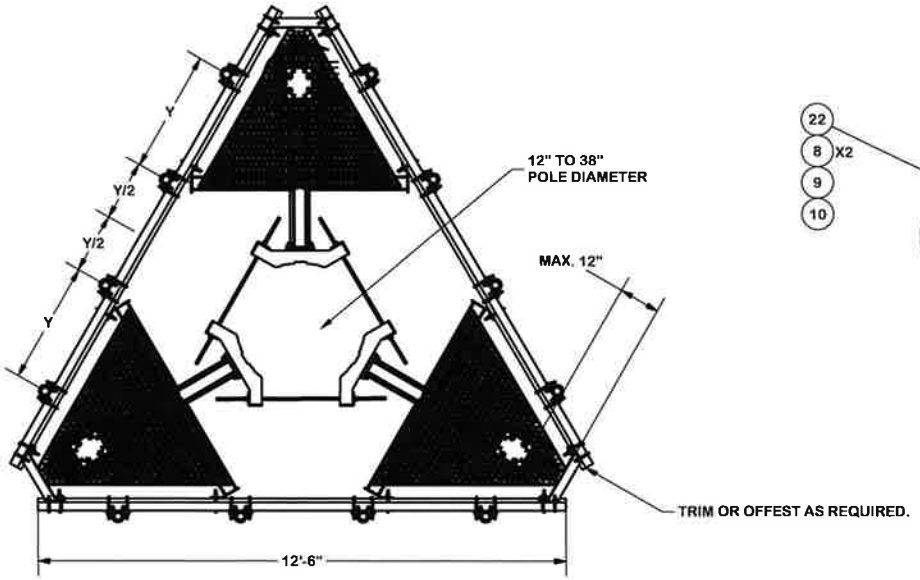
SITE PRO 1
A valmont COMPANY

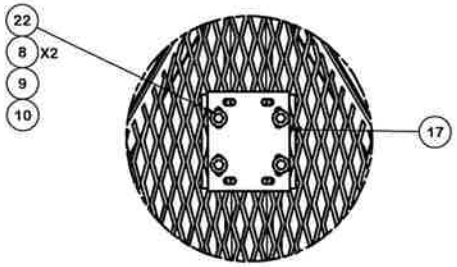
Engineering Support Team: 1-888-753-7446

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

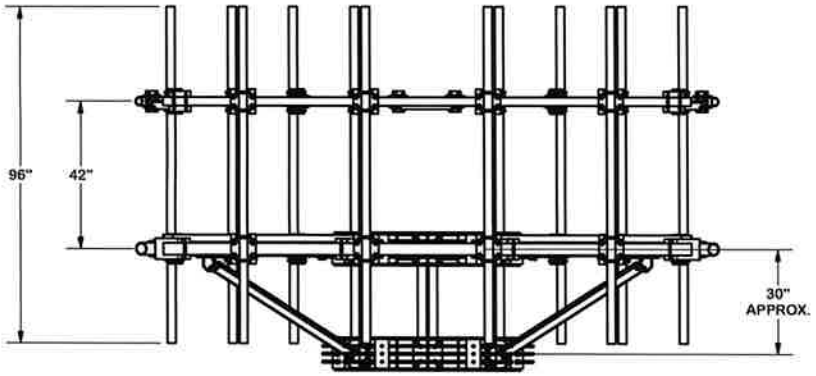
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 7/14/2014		RMQP-496-HK

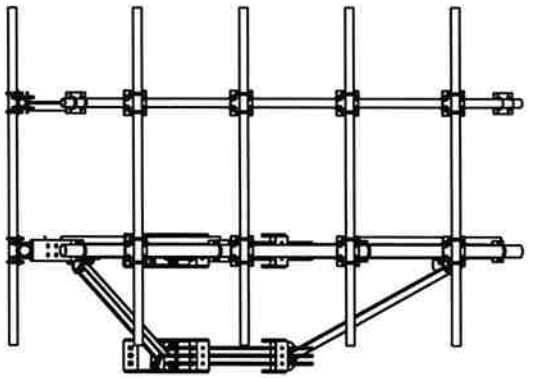
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/14/2014	RMQP-496-HK





DETAIL E





TOLERANCE NOTES

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

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED X-253992 TO X-TBW	4488	CEK	9/20/2018

REVISION HISTORY

DESCRIPTION
12' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-3/8" ANTENNA MOUTING
PIPES, AND HANDRAIL

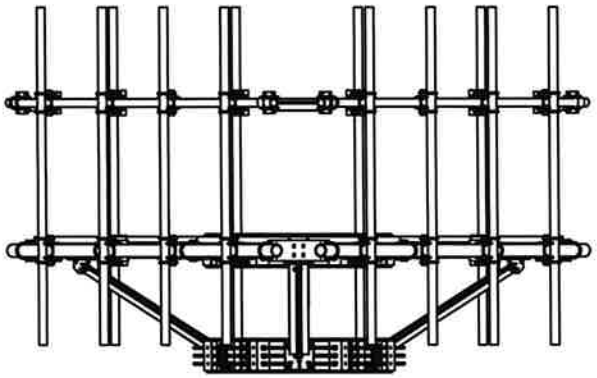
SITE PRO 1
A valmont COMPANY

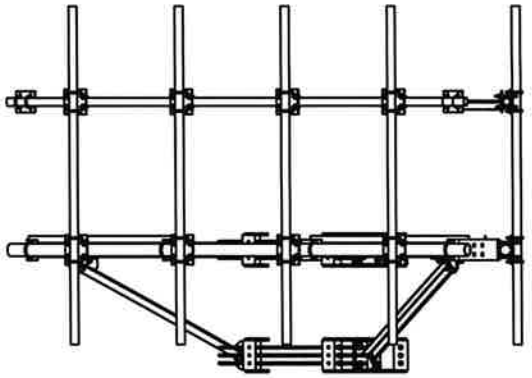
Engineering Support Team: 1-888-753-7446

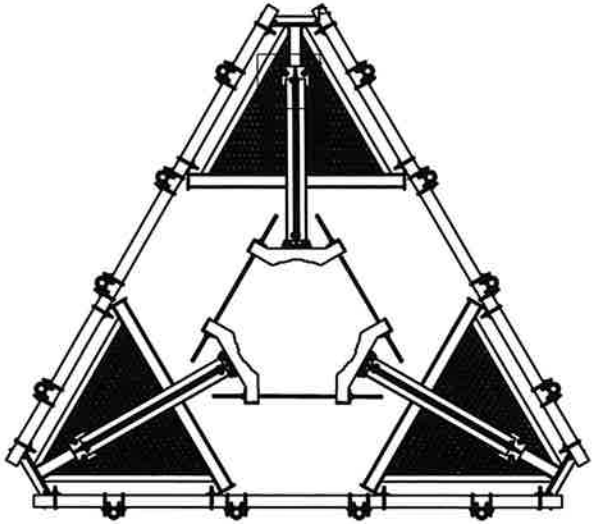
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

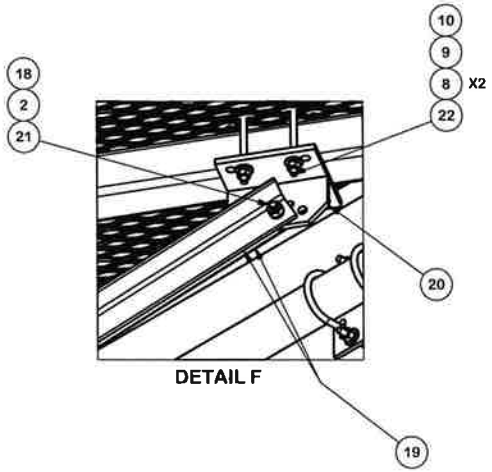
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 7/14/2014		RMQP-496-HK

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/14/2014	RMQP-496-HK









DETAIL F

TOLERANCE NOTES

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

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED X-253992 TO X-TBW	4488	CEK	9/20/2018

REVISION HISTORY

DESCRIPTION
12' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-3/8" ANTENNA MOUTING
PIPES, AND HANDRAIL

SITE PRO 1
A valmont COMPANY

Engineering Support Team:
1-888-753-7446

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

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 7/14/2014		RMQP-496-HK

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/14/2014	RMQP-496-HK

APPENDIX F

POST MODIFICATION INSPECTION (PMI) REQUIREMENTS FOR DESKTOP REVIEW

Post Modification Inspection (PMI) Report Requirements

Documents & Photos Required from Contractor

Purpose – to provide PJF the proper documentation in order to complete the required Mount Desktop review of the Post Modification Inspection Report.

- Contractor is responsible for making certain the photos provided as noted below provide confirmation that the modification was completed in accordance with the modification drawings.
- Contractor shall relay any data that can impact the performance of the mount or the mount modification, this includes safety issues.

Base Requirements:

- Provide "as built drawings" showing contractor's name, preparer's signature, and date. Any deviations from the drawing (proposed modification) must be shown.
- Notation that all hardware was properly installed, and the existing hardware was inspected for any issues.
- Verification that loading is as communicated in the modification drawings. NOTE if loading is different than what is conveyed in the modification drawing contact PJF immediately.
- Each photo should be time and date stamped.
- Photos should be high resolution and submitted in a Zip File and should be organized in the file structure as depicted in Schedule A attached.
- Any special photos outside of the standard requirements will be indicated on the drawings.
- Contractor shall ensure that the safety climb wire rope is supported and not adversely impacted by the install of the modification components. This may involve the install of wire rope guides, or other items to protect the wire rope.
- The photos in the file structure should be uploaded to **pjfmount@pauljford.com** as depicted on the drawings.

Photo Requirements:

- *Base and "During Installation Photos"*
  - Base pictures include
    - Photo of Gate Signs showing the tower owner, site name, and number.
    - Photo of carrier shelter showing the carrier site name and number if available.
    - Photos of the galvanizing compound and/or paint used (if applicable), clearly showing the label and name.
  - "During Installation" Photos if provided – must be placed only in this folder
- *Photos taken at ground level*
  - Overall tower structure before and after installation of the modifications
  - Photos of the appropriate mount before and after installation of the modifications; if the mounts are at different rad elevations, pictures must be provided for all elevations that the modifications were installed.
- *Photos taken at Mount Elevation*
  - Photos showing each individual sector before and after installation of modifications. Each entire sector must be in one photo to show in the inter-connection of members.
  - Close-up photos of each installed modification per the modification drawings; pictures should also include connection hardware (U-bolts, bolts, nuts, all-threaded rods, etc.)

- Photos showing the measurements of the installed modification member sizes (i.e. lengths, widths, depths, diameters, thicknesses).
- Photos showing the elevation or distances of the installed modifications from the appropriate reference locations shown in the modification drawings.
- Photos showing the installed modifications onto the tower with tape drop measurements (if applicable) (i.e. ring/collar mounts, tie-backs, V-bracing kits, etc.); if the existing mount elevations needs to be changed according to the modification drawings, a tape drop measurement shall be provided before the elevation change.
- Photos showing the safety climb wire rope above and below the mount prior to modification.
- Photos showing the safety climb wire rope above and below the mount post modification.

Antenna and equipment placement and Geometry Certification:

- The contractor must certify that the antenna and equipment placement and geometry is in accordance with the antenna placement diagrams as included in this mount analysis.

☐ The contractor certifies per photos that the equipment on the mount is as depicted on the antenna placement diagrams as included in this mount analysis.

☐ The contractor notes that the equipment on the mount is not in accordance with the antenna placement diagrams and has accordingly marked up the diagrams or provided a diagram outlining the differences.

Certifying Individual: Company _____

Name _____

Signature _____

Schedule A – Photo & Document File Structure

- VzW Site Number / Name
  - Base & "During Installation" Photos
  - Pre-Installation Photos
    - Alpha
    - Beta
    - Gamma
    - Ground Level
    - Tape Drop
  - Post-Installation Photos
    - Alpha
    - Beta
    - Gamma
    - Ground Level
    - Tape Drop
  - Material Certification – Submission of this document including executed certification on Page 2
  - Specific Required Additional Photos
  - Required Additional Photos

Special Instructions / Validation as required from the MA or any other information the contractor deems necessary to share that was identified:

Issue: _____

_____

_____

Response: _____

_____

_____

From:	Dandeneau, Kathleen
To:	Bachman, Melanie; CSC-DL Siting Council
Cc:	Baldwin, Kenneth; Mayo, Rachel
Subject:	EM-VER-036-200116 - 220 Winthrop Road, Deep River, CT - Additional Information
Date:	Wednesday, January 22, 2020 3:20:11 PM
Attachments:	Deep River_001.pdf

The original has been mailed to the Siting Council.

Kathleen M. Dandeneau
Legal Administrative Assistant

Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103
Direct 860.541.2689 | Fax 860.275.8299
kdandeneau@rc.com | www.rc.com

Robinson+Cole
Boston | Hartford | New York | Providence | Miami | Stamford
Los Angeles | Wilmington | Philadelphia | Albany | New London

Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

January 22, 2020

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

Re: **EM-VER-036-200116 – Cellco Partnership d/b/a Verizon Wireless Notice of Intent to Modify an Existing Telecommunications Facility Located at 220 Winthrop Road, Deep River, Connecticut**

Dear Ms. Bachman:

In response to your January 21, 2020 letter regarding the above-referenced filing, attached is the following additional information.

1. A stamped and signed copy of the Structural Analysis Report prepared by Tower Engineering Solutions and dated December 5, 2019.

2. A stamped and signed full and complete copy of the Mounts Analysis dated December 13, 2019, prepared by Paul J. Ford and Company.

If you have any questions or need any additional information, please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Enclosures

TES
Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

Structural Analysis Report

Existing 180 ft. Valmont Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT46130-A

Customer Site Name: Deep River-winthrop Rd

Carrier Name: Verizon (App#: 100842, V4)

Carrier Site ID / Name: 262760 / Deep River West CT

Site Location: 220 Winthrop Rd

Deep River, Connecticut

Middlesex County

Latitude: 41.365872

Longitude: -72.474849

Analysis Result:

Max Structural Usage: 86.5% [Pass]

Max Foundation Usage: 77.0% [Pass]

Additional Usage Caused by New Mount/Mount Modification: +0.3%

Report Prepared By : Delu Zhou

TES
Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

Structural Analysis Report

Existing 180 ft. Valmont Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT46130-A

Customer Site Name: Deep River-winthrop Rd

Carrier Name: Verizon (App#: 100842, V4)

Carrier Site ID / Name: 262760 / Deep River West CT

Site Location: 220 Winthrop Rd

Deep River, Connecticut

Middlesex County

Latitude: 41.365872

Longitude: -72.474849

Analysis Result:

Max Structural Usage: 86.5% [Pass]

Max Foundation Usage: 77.0% [Pass]

Additional Usage Caused by New Mount/Mount Modification: +0.3%

Report Prepared By : Delu Zhou

Introduction

The purpose of this report is to summarize the analysis results on the 180 ft Valmont Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Original structural design report & permit drawings prepared by Valmont. Dated 10-27-2000. Order No 17593-98. CT750 Deep River Site. Project No F082. Previous structural report prepared by FDH Engineering, Inc. Dated 11-04-2013. Project No 13SFRX1400.
Foundation Drawing	Original foundation drawings prepared by Valmont Industries, Inc. Dated 08-11-1998. Project No 2633. Order No 17593-98. Drawing No 2633-F.
Geotechnical Report	Geotechnical report prepared by TECTONIC Engineering Consultants, P.C. Dated 07-13-1998. Work Order No 1170.C750.
Modification Drawings	N/A

Analysis Criteria

The comprehensive analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-H. In accordance with this standard, the structure was analyzed using **TESPoles,** a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Wind Speed Used in the Analysis:	123.0 mph (3-Sec. Gust) (Ultimate wind speed)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 3/4" radial ice concurrent
Service Load Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-H / 2018 IBC / 2018 Connecticut State Building Code
Exposure Category:	C
Risk Category:	II
Topographic Category:	1
Crest Height:	0 ft.
Seismic Parameters:	S_S = 0.21, S_1 = 0.054

This structural analysis is based upon the tower being classified as a Risk Category II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft.)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
-	178.0	3	JMA Wireless MX06FRO660-03- Panel	Platform w/ Handrails	(2) 1 5/8" Hybrid	Verizon
-		3	Amphenol BXA-70063-6CF-2- Panel			
-		6	Amphenol BXA-171063-12CF-EDIN-2 Panel			
-		3	Commscope CBC1923Q-43 Diplexer			
-		3	Alcatel Lucent RRH2X40-07-U			
-		3	Samsung B2/B66A RRH BR049			
-		1	Rfs Celwave DB-B1-6C-8AB-0Z COVP			
5	166.0	3	RFS APXVTM14-C-I20 - Panel	Platform w/Handrails + Sitepro PRK-1245L + handrail kit + Sitepro PRK-SFS-H-L]	(4) 1-1/4" Hybrid	Sprint Nextel
6		3	Commscope NNVV-65B-R4 - Panel			
7		3	ALU 1900 Mhz			
8		6	ALU 800 Mhz			
9		3	ALU TD-RRH8x20-25			
10	158.0	6	EMS RR90-17-02DP - Panel	(3) T-Arms	(6) 1 5/8"	T-Mobile
11		6	Airtech PCS 1900 G3 TMAs			
12	150.0	2	Cci HPA-65R-BUU-H6- Panel	Low Profile Platform w/ Handrail kit HRK-12	(12) 1 1/4"; [(1) 10 mm & (2) 19.7 mm inside (1) 3" Innerduct]	AT&T
13		1	Commscope SBNHH-1D65A- Panel			
14		3	Ericsson RRUS-32- RRU			
15		2	KMW AM-X-CD-16-65-00T-RET Panel			
16		3	Powerwave 7770 - Panel			
17		1	KMW AM-X-CD-14-65-00T- Panel			
18		6	Powerwave LGP21401 TMA			
19		3	Ericsson RRUS-11- RRU			
20		1	Raycap DC6-48-60-18-8F Surge			

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	178.0	6	JMA MX06FRO660-03 - Panel	Platform w/ Handrails (3) 91900314	(2) 1 5/8" Hybrid	Verizon
2		3	Samsung B5/B13 RRH BR04C			
3		3	Samsung B2/B66A RRH BR049			
4		1	Raycap RRFDS-6627-PF48			

See the attached coax layout for the line placement considered in the analysis.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	**86.5%**	**78.0%**	**57.2%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	5490.3	45.8	69.8

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Service Load Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-H for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 1.8668 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-H Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.

3. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the ANSI/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

4. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

5. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

6. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

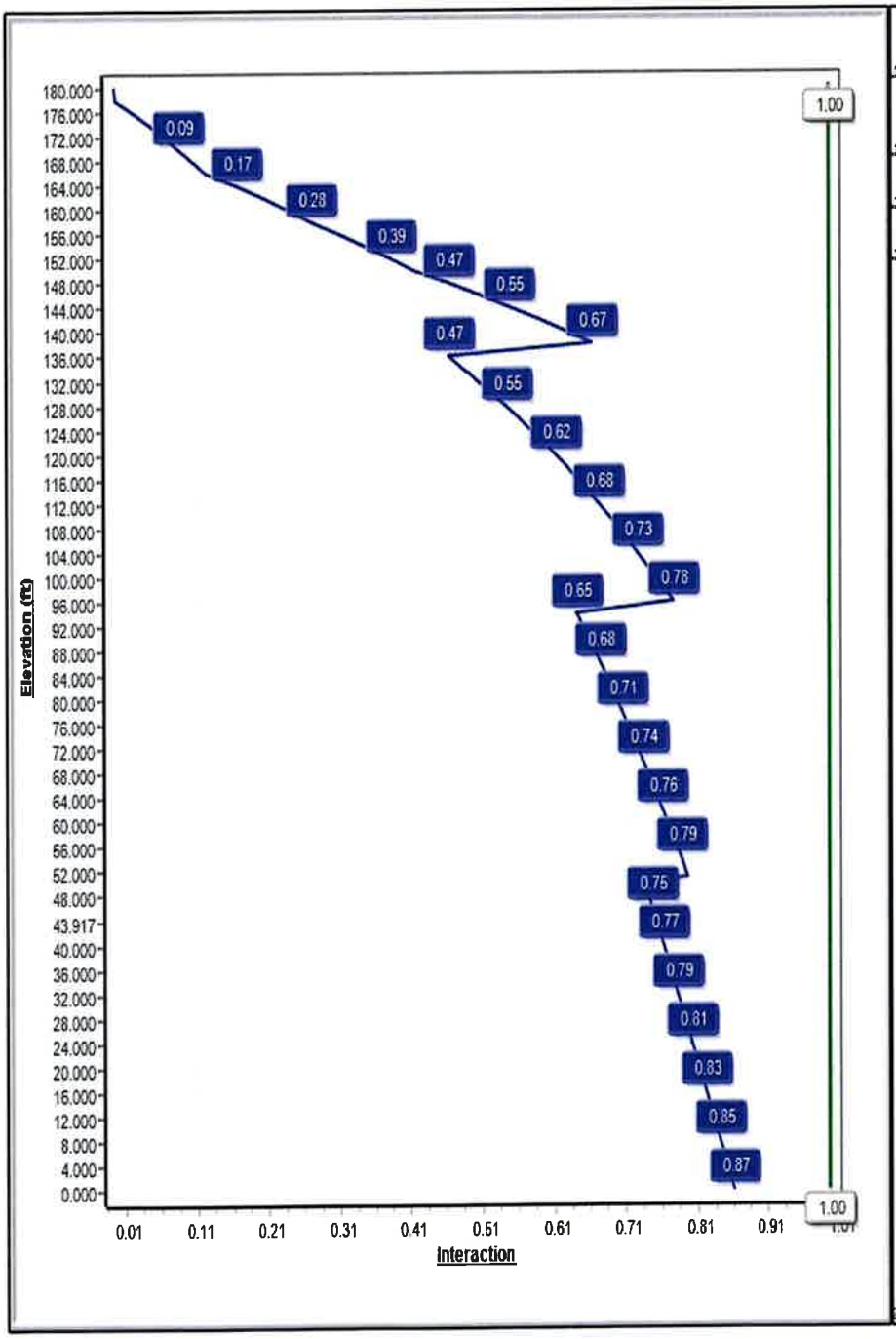
Usage Diagram - Max Ratio 86.51% at 0.0ft

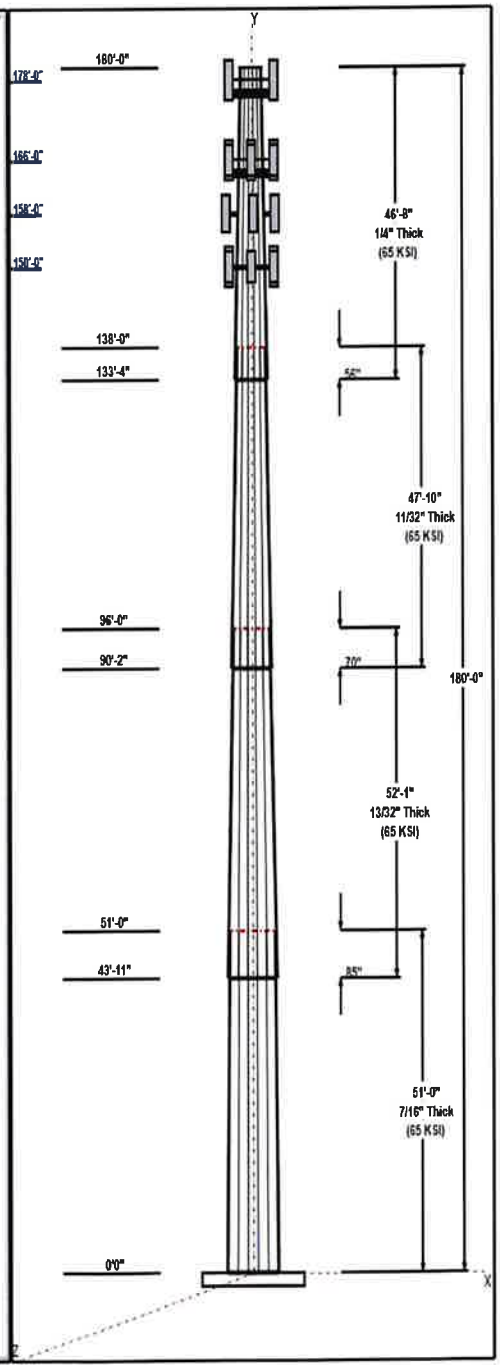
Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Gh:**	1.1	Page: 1	
Base Elev:	0.000 (ft)				

Tower Engineering Solutions

Dead Load Factor:	1.20	**Iterations:**	29
Wind Load Factor:	1.00		

Load Case : 1.2D + 1.0W 123 mph Wind





Structure: CT46130-A-SBA

Type: Tapered
Site Name: Deep River-winthrop Rd
Height: 180.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 12 Sided
Taper: 0.24800

12/5/2019

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	51.00	49.35	62.00	0.438		0.24800	65
2	52.08	39.00	51.92	0.406	Slip	0.24800	65
3	47.83	29.28	41.14	0.344	Slip	0.24800	65
4	46.67	19.36	30.93	0.250	Slip	0.24800	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
178.00	178.00	6	JMA MX06FRO660-03	Verizon
178.00	178.00	3	Samsung B2/B66A RRH	Verizon
178.00	178.00	1	Platform w/ Handrails w/	Verizon
178.00	178.00	3	Samsung B5/B13 RRH	Verizon
178.00	178.00	1	Raycap	Verizon
166.00	166.00	3	RFS APXVTM14-C-I20	Sprint Nextel
166.00	166.00	3	Commscope	Sprint Nextel
166.00	166.00	3	ALU 1900 Mhz	Sprint Nextel
166.00	166.00	6	ALU 800 Mhz	Sprint Nextel
166.00	166.00	3	ALU TD-RRH8x20-25	Sprint Nextel
166.00	166.00	1	Sitepro	Sprint Nextel
166.00	166.00	1	Sitepro	Sprint Nextel
166.00	166.00	1	Platform w/ Hand Rails	Sprint Nextel
158.00	158.00	3	T-Arms	T-Mobile
158.00	158.00	6	EMS RR90-17-02DP	T-Mobile
158.00	158.00	6	PCS1900 G3 TMA	T-Mobile
150.00	150.00	2	Cci HPA-65R-BUU-H6	AT&T
150.00	150.00	1	SBNHH-1D65A	AT&T
150.00	150.00	3	RRUS-32	AT&T
150.00	150.00	2	KMW AM-X-CD-16-65-00T	AT&T
150.00	150.00	3	Powerwave 7770	AT&T
150.00	150.00	1	KMW AM-X-CD-14-65-00T	AT&T
150.00	150.00	6	Powerwave LGP21401	AT&T
150.00	150.00	3	Ericsson RRUS-11	AT&T
150.00	150.00	1	Raycap DC6-48-60-18-8F	AT&T
150.00	150.00	1	Platform w/ Hand Rail	AT&T

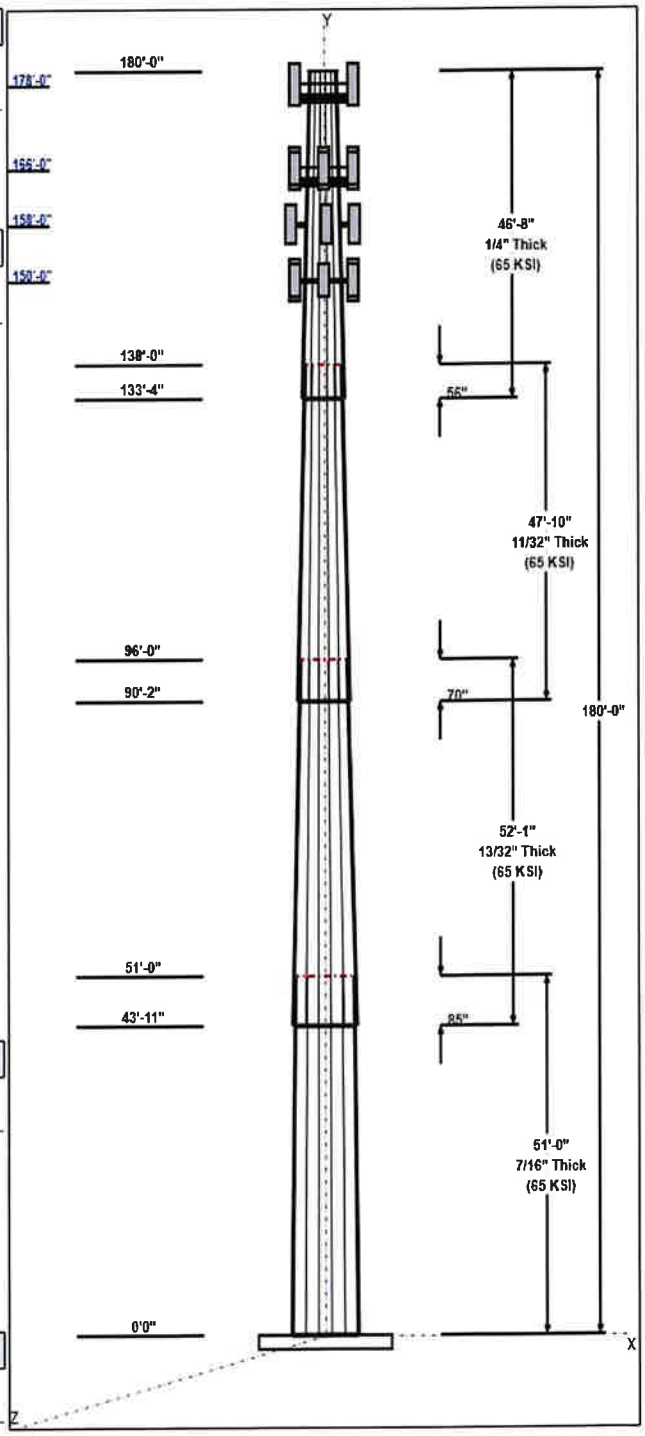
Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
3.00	178.00	Inside	1 5/8" Hybrid	Verizon
3.00	166.00	Inside	1-1/4" Fiber	Sprint Nextel
3.00	158.00	Inside	1 5/8" Coax	T-Mobile
3.00	150.00	Inside	1 1/4" Coax	AT&T
3.00	150.00	Inside	10 mm Fiber	AT&T
3.00	150.00	Inside	19.7 mm DC	AT&T
3.00	150.00	Inside	3" Innerduct	AT&T

Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
20	2.25" 18J	75.0	Radial

Base Plate



Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
2.7500	76.7	60.0	Polygon

Reactions

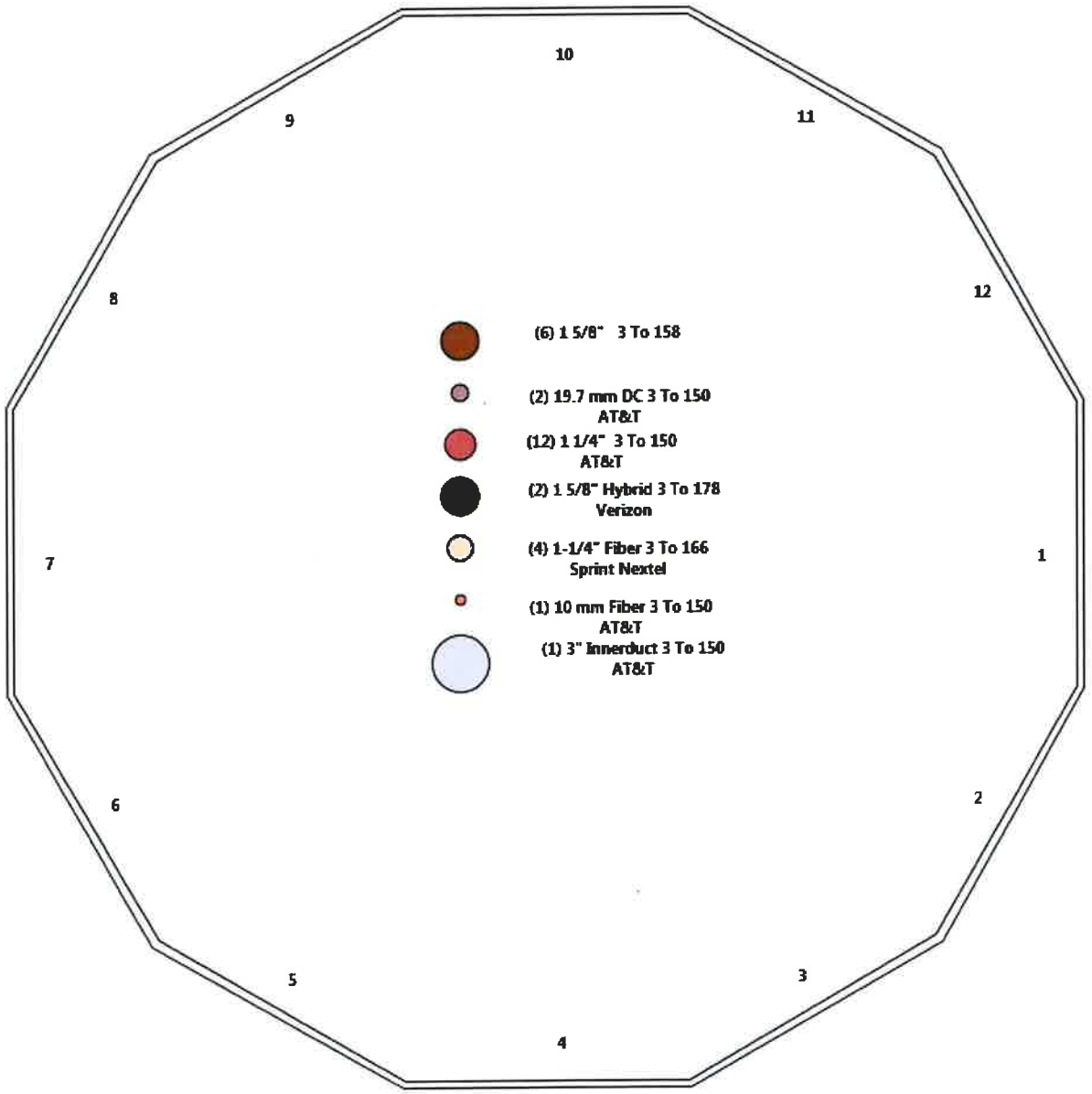
Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.0W 123 mph Wind	5490.3	45.8	56.5
0.9D + 1.0W 123 mph Wind	5425.5	45.8	42.3
1.2D + 1.0Di + 1.0Wi 50 mph Wind	1165.4	9.6	69.8
1.2D + 1.0Ev + 1.0Eh	527.4	4.5	56.5
0.9D + 1.0Ev + 1.0Eh	520.8	4.5	42.4
1.0D + 1.0W 60 mph Wind	1298.7	10.9	47.1

Structure: CT46130-A-SBA - Coax Line Placement

Type: Monopole
Site Name: Deep River-winthrop Rd
Height: 180.00 (ft)

12/5/2019

Tower Engineering Solutions



Shaft Properties

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 5	

Tower Engineering Solutions

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	12	51.000	0.4375	65		0.00	13,505
2	12	52.083	0.4063	65	Slip	85.00	10,446
3	12	47.833	0.3438	65	Slip	70.00	6,281
4	12	46.667	0.2500	65	Slip	56.00	3,183
					Total Shaft Weight:		**33,414**

	Bottom						Top						
Sec. No.	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Taper**
1	62.00	0.00	86.73	41953.54	35.83	141.71	49.35	51.00	68.91	21044.2	28.08	112.8	0.248000
2	51.92	43.92	67.39	22826.23	32.10	127.81	39.00	96.00	50.49	9601.48	23.58	96.01	0.248000
3	41.14	90.17	45.15	9591.86	29.92	119.68	29.28	138.00	32.02	3421.62	20.68	85.17	0.248000
4	30.93	133.3	24.70	2968.17	31.01	123.73	19.36	180.00	15.38	717.07	18.61	77.44	0.248000

Load Summary

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 6	

Tower Engineering Solutions

Discrete Appurtenances

				No Ice			Ice				
No.	Elev (ft)	Description	Qty	Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
1	178.00	JMA MX06FRO660-03	6	60.00	9.87	0.82	186.20	10.501	0.82	0.00	0.00
2	178.00	Samsung B2/B66A RRH BR049	3	84.40	1.88	0.67	147.57	2.327	0.67	0.00	0.00
3	178.00	Platform w/ Handrails w/ 91900314	1	2202.20	40.00	1.00	3375.10	50.652	1.00	0.00	0.00
4	178.00	Samsung B5/B13 RRH BR04C	3	70.30	2.22	0.67	99.75	2.535	0.67	0.00	0.00
5	178.00	Raycap RRFDS-6627-PF48	1	32.00	2.61	1.00	69.76	2.937	1.00	0.00	0.00
6	166.00	RFS APXVTM14-C-I20	3	56.20	6.34	0.77	129.28	6.885	0.77	0.00	0.00
7	166.00	Commscope NNVV-65B-R4	3	77.40	12.27	0.74	221.63	13.005	0.74	0.00	0.00
8	166.00	ALU 1900 Mhz	3	44.00	3.80	0.67	99.14	4.502	0.67	0.00	0.00
9	166.00	ALU 800 Mhz	6	53.00	2.49	0.50	90.36	3.068	0.50	0.00	0.00
10	166.00	ALU TD-RRH8x20-25	3	70.00	4.05	0.67	120.20	4.444	0.67	0.00	0.00
11	166.00	Sitepro	1	230.00	6.70	1.00	392.20	10.244	1.00	0.00	0.00
12	166.00	Sitepro	1	406.61	7.00	1.00	650.34	10.456	1.00	0.00	0.00
13	166.00	Platform w/ Hand Rails	1	2000.00	40.00	1.00	3057.80	50.578	1.00	0.00	0.00
14	158.00	T-Arms	3	350.00	8.00	0.75	472.80	11.509	0.75	0.00	0.00
15	158.00	EMS RR90-17-02DP	6	13.50	7.34	0.68	84.72	7.931	0.68	0.00	0.00
16	158.00	PCS1900 G3 TMA	6	20.00	1.04	0.50	31.34	1.441	0.50	0.00	0.00
17	150.00	Cci HPA-65R-BUU-H6	2	51.00	9.66	0.85	165.08	10.322	0.85	0.00	0.00
18	150.00	SBNHH-1D65A	1	33.50	5.88	1.00	104.86	6.402	1.00	0.00	0.00
19	150.00	RRUS-32	3	77.00	3.87	0.67	128.08	3.695	0.67	0.00	0.00
20	150.00	KMW AM-X-CD-16-65-00T	2	48.50	8.02	0.75	129.64	9.417	0.75	0.00	0.00
21	150.00	Powerwave 7770	3	35.00	5.51	0.73	95.06	6.017	0.73	0.00	0.00
22	150.00	KMW AM-X-CD-14-65-00T	1	36.40	7.05	1.00	92.16	8.371	1.00	0.00	0.00
23	150.00	Powerwave LGP21401 TMA's	6	14.10	1.22	0.50	26.60	1.615	0.50	0.00	0.00
24	150.00	Ericsson RRUS-11	3	50.70	2.52	0.67	86.30	2.832	0.67	0.00	0.00
25	150.00	Raycap DC6-48-60-18-8F	1	31.80	1.81	0.67	62.71	2.241	0.67	0.00	0.00
26	150.00	Platform w/ Hand Rail	1	1600.00	35.00	1.00	2649.92	50.271	1.00	0.00	0.00
		Totals:	**73**	**10,480.11**			**18,359.04**				

Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	Exposed Width	Exposed
3.00	178.00	(2) 1 5/8" Hybrid	0.00	Inside
3.00	166.00	(4) 1-1/4" Fiber	0.00	Inside
3.00	158.00	(6) 1 5/8" Coax	0.00	Inside
3.00	150.00	(12) 1 1/4" Coax	0.00	Inside
3.00	150.00	(1) 10 mm Fiber	0.00	Inside
3.00	150.00	(2) 19.7 mm DC	0.00	Inside
3.00	150.00	(1) 3" Innerduct	0.00	Inside

Shaft Section Properties

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 7	

Tower Engineering Solutions

Increment Length: 2 (ft)

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
0.00		0.4375	62.000	86.726	41953.5	35.83	141.71	65.6	1307.	0.0
2.00		0.4375	61.504	86.027	40947.6	35.52	140.58	66.0	1286.	587.8
4.00		0.4375	61.008	85.329	39958.0	35.22	139.45	66.3	1265.	583.1
6.00		0.4375	60.512	84.630	38984.4	34.92	138.31	66.6	1244.	578.3
8.00		0.4375	60.016	83.931	38026.7	34.61	137.18	67.0	1224.	573.6
10.00		0.4375	59.520	83.232	37084.8	34.31	136.05	67.3	1203.	568.8
12.00		0.4375	59.024	82.534	36158.7	34.01	134.91	67.6	1183.	564.1
14.00		0.4375	58.528	81.835	35248.1	33.70	133.78	68.0	1163.	559.3
16.00		0.4375	58.032	81.136	34352.9	33.40	132.64	68.3	1143.	554.6
18.00		0.4375	57.536	80.438	33472.9	33.09	131.51	68.6	1123.	549.8
20.00		0.4375	57.040	79.739	32608.2	32.79	130.38	69.0	1104.	545.0
22.00		0.4375	56.544	79.040	31758.5	32.49	129.24	69.3	1085.	540.3
24.00		0.4375	56.048	78.341	30923.6	32.18	128.11	69.6	1065.	535.5
26.00		0.4375	55.552	77.643	30103.5	31.88	126.98	69.9	1046.	530.8
28.00		0.4375	55.056	76.944	29298.1	31.58	125.84	70.3	1028.	526.0
30.00		0.4375	54.560	76.245	28507.1	31.27	124.71	70.6	1009.	521.3
32.00		0.4375	54.064	75.546	27730.5	30.97	123.57	70.9	990.9	516.5
34.00		0.4375	53.568	74.848	26968.2	30.66	122.44	71.3	972.6	511.8
36.00		0.4375	53.072	74.149	26219.9	30.36	121.31	71.6	954.4	507.0
38.00		0.4375	52.576	73.450	25485.6	30.06	120.17	71.9	936.4	502.2
40.00		0.4375	52.080	72.751	24765.2	29.75	119.04	72.3	918.6	497.5
42.00		0.4375	51.584	72.053	24058.4	29.45	117.91	72.6	901.0	492.7
43.92	Bot - Section 2	0.4375	51.109	71.383	23393.9	29.16	116.82	72.9	884.3	467.7
44.00		0.4375	51.088	71.354	23365.3	29.15	116.77	72.9	883.5	39.3
46.00		0.4375	50.592	70.655	22685.6	28.84	115.64	73.3	866.2	939.4
48.00		0.4375	50.096	69.956	22019.2	28.54	114.51	73.6	849.1	930.3
50.00		0.4375	49.600	69.258	21365.9	28.23	113.37	73.9	832.2	921.1
51.00	Top - Section 1	0.4063	50.165	65.090	20569.8	30.94	123.48	0.0	0.0	457.1
52.00		0.4063	49.917	64.766	20263.8	30.78	122.87	71.1	784.2	220.9
54.00		0.4063	49.421	64.117	19660.8	30.45	121.65	71.5	768.5	438.6
56.00		0.4063	48.925	63.468	19070.0	30.13	120.43	71.9	753.0	434.1
58.00		0.4063	48.429	62.819	18491.1	29.80	119.21	72.2	737.6	429.7
60.00		0.4063	47.933	62.170	17924.0	29.47	117.99	72.6	722.4	425.3
62.00		0.4063	47.437	61.521	17368.7	29.14	116.77	72.9	707.3	420.9
64.00		0.4063	46.941	60.873	16824.9	28.82	115.55	73.3	692.4	416.5
66.00		0.4063	46.445	60.224	16292.6	28.49	114.32	73.6	677.7	412.1
68.00		0.4063	45.949	59.575	15771.7	28.16	113.10	74.0	663.1	407.6
70.00		0.4063	45.453	58.926	15262.0	27.84	111.88	74.4	648.7	403.2
72.00		0.4063	44.957	58.277	14763.4	27.51	110.66	74.7	634.4	398.8
74.00		0.4063	44.461	57.628	14275.7	27.18	109.44	75.1	620.3	394.4
76.00		0.4063	43.965	56.980	13799.0	26.85	108.22	75.4	606.3	390.0
78.00		0.4063	43.469	56.331	13332.9	26.53	107.00	75.8	592.5	385.6
80.00		0.4063	42.973	55.682	12877.5	26.20	105.78	76.1	578.9	381.2
82.00		0.4063	42.477	55.033	12432.6	25.87	104.56	76.5	565.4	376.7
84.00		0.4063	41.981	54.384	11998.0	25.55	103.34	76.9	552.1	372.3
86.00		0.4063	41.485	53.735	11573.7	25.22	102.12	77.2	539.0	367.9
88.00		0.4063	40.989	53.087	11159.5	24.89	100.89	77.6	526.0	363.5
90.00		0.4063	40.493	52.438	10755.3	24.56	99.67	77.9	513.1	359.1
90.17	Bot - Section 3	0.4063	40.451	52.384	10722.0	24.54	99.57	78.0	512.1	29.7
92.00		0.4063	39.997	51.789	10361.0	24.24	98.45	78.3	500.4	605.1

Increment Length: 2 (ft)

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
94.00		0.4063	39.501	51.140	9976.4	23.91	97.23	78.6	487.9	652.3
96.00	Top - Section 2	0.3438	39.692	43.554	8607.2	28.80	115.47	0.0	0.0	644.1
98.00		0.3438	39.196	43.005	8285.8	28.41	114.02	73.7	408.4	294.5
100.00		0.3438	38.700	42.456	7972.5	28.02	112.58	74.2	398.0	290.8
102.00		0.3438	38.204	41.907	7667.2	27.64	111.14	74.6	387.7	287.1
104.00		0.3438	37.708	41.358	7369.8	27.25	109.70	75.0	377.6	283.3
106.00		0.3438	37.212	40.809	7080.1	26.86	108.25	75.4	367.6	279.6
108.00		0.3438	36.716	40.260	6798.2	26.48	106.81	75.8	357.7	275.9
110.00		0.3438	36.220	39.711	6523.9	26.09	105.37	76.3	348.0	272.1
112.00		0.3438	35.724	39.162	6257.0	25.70	103.92	76.7	338.4	268.4
114.00		0.3438	35.228	38.613	5997.5	25.32	102.48	77.1	328.9	264.6
116.00		0.3438	34.732	38.063	5745.3	24.93	101.04	77.5	319.6	260.9
118.00		0.3438	34.236	37.514	5500.3	24.54	99.60	77.9	310.4	257.2
120.00		0.3438	33.740	36.965	5262.3	24.16	98.15	78.4	301.3	253.4
122.00		0.3438	33.244	36.416	5031.3	23.77	96.71	78.8	292.4	249.7
124.00		0.3438	32.748	35.867	4807.2	23.38	95.27	79.2	283.6	246.0
126.00		0.3438	32.252	35.318	4589.8	23.00	93.82	79.6	274.9	242.2
128.00		0.3438	31.756	34.769	4379.1	22.61	92.38	80.1	266.4	238.5
130.00		0.3438	31.260	34.220	4174.9	22.22	90.94	80.5	258.0	234.8
132.00		0.3438	30.764	33.671	3977.2	21.84	89.50	80.9	249.7	231.0
133.33	Bot - Section 4	0.3438	30.433	33.305	3848.9	21.58	88.53	81.2	244.3	151.9
134.00		0.3438	30.268	33.122	3785.8	21.45	88.05	81.3	241.6	131.2
136.00		0.3438	29.772	32.573	3600.6	21.06	86.61	81.7	233.6	389.4
138.00	Top - Section 3	0.2500	29.776	23.768	2644.8	29.77	119.10	0.0	0.0	382.9
140.00		0.2500	29.280	23.369	2513.8	29.24	117.12	72.8	165.9	160.4
142.00		0.2500	28.784	22.970	2387.1	28.71	115.14	73.4	160.2	157.7
144.00		0.2500	28.288	22.571	2264.8	28.18	113.15	74.0	154.7	155.0
146.00		0.2500	27.792	22.171	2146.7	27.64	111.17	74.6	149.2	152.2
148.00		0.2500	27.296	21.772	2032.8	27.11	109.18	75.1	143.9	149.5
150.00		0.2500	26.800	21.373	1923.0	26.58	107.20	75.7	138.6	146.8
152.00		0.2500	26.304	20.973	1817.2	26.05	105.22	76.3	133.5	144.1
154.00		0.2500	25.808	20.574	1715.4	25.52	103.23	76.9	128.4	141.4
156.00		0.2500	25.312	20.175	1617.4	24.99	101.25	77.5	123.4	138.7
158.00		0.2500	24.816	19.776	1523.3	24.45	99.26	78.0	118.6	135.9
160.00		0.2500	24.320	19.376	1432.9	23.92	97.28	78.6	113.8	133.2
162.00		0.2500	23.824	18.977	1346.1	23.39	95.30	79.2	109.2	130.5
164.00		0.2500	23.328	18.578	1262.9	22.86	93.31	79.8	104.6	127.8
166.00		0.2500	22.832	18.179	1183.2	22.33	91.33	80.4	100.1	125.1
168.00		0.2500	22.336	17.779	1107.0	21.80	89.34	80.9	95.7	122.4
170.00		0.2500	21.840	17.380	1034.0	21.26	87.36	81.5	91.5	119.6
172.00		0.2500	21.344	16.981	964.4	20.73	85.38	81.9	87.3	116.9
174.00		0.2500	20.848	16.581	898.0	20.20	83.39	81.9	83.2	114.2
176.00		0.2500	20.352	16.182	834.6	19.67	81.41	81.9	79.2	111.5
178.00		0.2500	19.856	15.783	774.4	19.14	79.42	81.9	75.3	108.8
180.00		0.2500	19.360	15.384	717.1	18.61	77.44	81.9	71.6	106.1
										33413.9

Wind Loading - Shaft

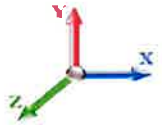
Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 1.2D + 1.0W 123 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 29

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	31.009	34.11	603.99	0.950	0.000	0.00	0.000	0.00	0.0	0.0	0.0
2.00		1.00	0.85	31.009	34.11	599.16	0.950	0.000	2.00	10.655	10.12	345.3	0.0	705.4
4.00		1.00	0.85	31.009	34.11	594.33	0.950	0.000	2.00	10.569	10.04	342.5	0.0	699.7
6.00		1.00	0.85	31.009	34.11	589.49	0.950	0.000	2.00	10.484	9.96	339.7	0.0	694.0
8.00		1.00	0.85	31.009	34.11	584.66	0.950	0.000	2.00	10.398	9.88	337.0	0.0	688.3
10.00		1.00	0.85	31.009	34.11	579.83	0.950	0.000	2.00	10.313	9.80	334.2	0.0	682.6
12.00		1.00	0.85	31.009	34.11	575.00	0.950	0.000	2.00	10.227	9.72	331.4	0.0	676.9
14.00		1.00	0.85	31.009	34.11	570.17	0.950	0.000	2.00	10.142	9.63	328.6	0.0	671.2
16.00		1.00	0.86	31.392	34.53	568.81	0.950	0.000	2.00	10.056	9.55	329.9	0.0	665.5
18.00		1.00	0.88	32.180	35.40	570.99	0.950	0.000	2.00	9.970	9.47	335.3	0.0	659.8
20.00		1.00	0.90	32.902	36.19	572.38	0.950	0.000	2.00	9.885	9.39	339.9	0.0	654.1
22.00		1.00	0.92	33.569	36.93	573.12	0.950	0.000	2.00	9.799	9.31	343.8	0.0	648.3
24.00		1.00	0.94	34.189	37.61	573.32	0.950	0.000	2.00	9.714	9.23	347.0	0.0	642.6
26.00		1.00	0.95	34.770	38.25	573.06	0.950	0.000	2.00	9.628	9.15	349.8	0.0	636.9
28.00		1.00	0.97	35.317	38.85	572.39	0.950	0.000	2.00	9.542	9.07	352.2	0.0	631.2
30.00		1.00	0.98	35.834	39.42	571.37	0.950	0.000	2.00	9.457	8.98	354.1	0.0	625.5
32.00		1.00	1.00	36.324	39.96	570.03	0.950	0.000	2.00	9.371	8.90	355.7	0.0	619.8
34.00		1.00	1.01	36.791	40.47	568.42	0.950	0.000	2.00	9.286	8.82	357.0	0.0	614.1
36.00		1.00	1.02	37.236	40.96	566.55	0.950	0.000	2.00	9.200	8.74	358.0	0.0	608.4
38.00		1.00	1.03	37.662	41.43	564.46	0.950	0.000	2.00	9.115	8.66	358.7	0.0	602.7
40.00		1.00	1.04	38.071	41.88	562.16	0.950	0.000	2.00	9.029	8.58	359.2	0.0	597.0
42.00		1.00	1.05	38.464	42.31	559.68	0.950	0.000	2.00	8.943	8.50	359.5	0.0	591.3
43.92	Bot - Section 2	1.00	1.06	38.827	42.71	557.13	0.950	0.000	1.92	8.490	8.07	344.5	0.0	561.3
44.00		1.00	1.06	38.843	42.73	557.02	0.950	0.000	0.08	0.373	0.35	15.1	0.0	47.2
46.00		1.00	1.07	39.208	43.13	554.19	0.950	0.000	2.00	8.912	8.47	365.2	0.0	1127.3
48.00		1.00	1.08	39.561	43.52	551.23	0.950	0.000	2.00	8.827	8.39	364.9	0.0	1116.3
50.00		1.00	1.09	39.902	43.89	548.12	0.950	0.000	2.00	8.741	8.30	364.5	0.0	1105.3
51.00	Top - Section 1	1.00	1.10	40.069	44.08	546.52	0.950	0.000	1.00	4.339	4.12	181.7	0.0	548.5
52.00		1.00	1.10	40.233	44.26	553.90	0.950	0.000	1.00	4.317	4.10	181.5	0.0	265.1
54.00		1.00	1.11	40.554	44.61	550.58	0.950	0.000	2.00	8.570	8.14	363.2	0.0	526.3
56.00		1.00	1.12	40.866	44.95	547.14	0.950	0.000	2.00	8.485	8.06	362.3	0.0	521.0
58.00		1.00	1.13	41.169	45.29	543.60	0.950	0.000	2.00	8.399	7.98	361.3	0.0	515.7
60.00		1.00	1.14	41.464	45.61	539.95	0.950	0.000	2.00	8.313	7.90	360.2	0.0	510.4
62.00		1.00	1.14	41.751	45.93	536.21	0.950	0.000	2.00	8.228	7.82	359.0	0.0	505.1
64.00		1.00	1.15	42.031	46.23	532.38	0.950	0.000	2.00	8.142	7.74	357.6	0.0	499.8
66.00		1.00	1.16	42.304	46.53	528.47	0.950	0.000	2.00	8.057	7.65	356.2	0.0	494.5
68.00		1.00	1.17	42.571	46.83	524.47	0.950	0.000	2.00	7.971	7.57	354.6	0.0	489.2
70.00		1.00	1.17	42.831	47.11	520.39	0.950	0.000	2.00	7.885	7.49	352.9	0.0	483.9
72.00		1.00	1.18	43.086	47.39	516.24	0.950	0.000	2.00	7.800	7.41	351.2	0.0	478.6
74.00		1.00	1.19	43.335	47.67	512.02	0.950	0.000	2.00	7.714	7.33	349.3	0.0	473.3
76.00		1.00	1.19	43.579	47.94	507.73	0.950	0.000	2.00	7.629	7.25	347.4	0.0	468.0
78.00		1.00	1.20	43.818	48.20	503.38	0.950	0.000	2.00	7.543	7.17	345.4	0.0	462.7
80.00		1.00	1.21	44.053	48.46	498.96	0.950	0.000	2.00	7.458	7.08	343.3	0.0	457.4
82.00		1.00	1.21	44.282	48.71	494.49	0.950	0.000	2.00	7.372	7.00	341.1	0.0	452.1
84.00		1.00	1.22	44.507	48.96	489.96	0.950	0.000	2.00	7.286	6.92	338.9	0.0	446.8
86.00		1.00	1.23	44.728	49.20	485.37	0.950	0.000	2.00	7.201	6.84	336.6	0.0	441.5
88.00		1.00	1.23	44.945	49.44	480.73	0.950	0.000	2.00	7.115	6.76	334.2	0.0	436.2

Wind Loading - Shaft

Structure: CT46130-A-SBA | **Code:** EIA/TIA-222-H | 12/5/2019

Site Name: Deep River-winthrop Rd | **Exposure:** C

Height: 180.00 (ft) | **Crest Height:** 0.00

Base Elev: 0.000 (ft) | **Site Class:** D - Stiff Soil

Gh: 1.1 | **Topography:** 1 | **Struct Class:** II | Page: 10

Tower Engineering Solutions

90.00	1.00	1.24	45.159	49.67	476.03	0.950	0.000	2.00	7.030	6.68	331.7	0.0	430.9
90.17 Bot - Section 3	1.00	1.24	45.176	49.69	475.64	0.950	0.000	0.17	0.582	0.55	27.5	0.0	35.7
92.00	1.00	1.24	45.368	49.90	471.29	0.950	0.000	1.83	6.471	6.15	306.8	0.0	726.1
94.00	1.00	1.25	45.574	50.13	466.50	0.950	0.000	2.00	6.977	6.63	332.3	0.0	782.7
96.00 Top - Section 2	1.00	1.25	45.776	50.35	461.67	0.950	0.000	2.00	6.891	6.55	329.7	0.0	772.9
98.00	1.00	1.26	45.975	50.57	464.94	0.950	0.000	2.00	6.806	6.47	327.0	0.0	353.4
100.00	1.00	1.27	46.171	50.79	460.03	0.950	0.000	2.00	6.720	6.38	324.2	0.0	349.0
102.00	1.00	1.27	46.364	51.00	455.09	0.950	0.000	2.00	6.635	6.30	321.5	0.0	344.5
104.00	1.00	1.28	46.554	51.21	450.10	0.950	0.000	2.00	6.549	6.22	318.6	0.0	340.0
106.00	1.00	1.28	46.741	51.42	445.07	0.950	0.000	2.00	6.464	6.14	315.7	0.0	335.5
108.00	1.00	1.29	46.926	51.62	440.00	0.950	0.000	2.00	6.378	6.06	312.8	0.0	331.0
110.00	1.00	1.29	47.107	51.82	434.90	0.950	0.000	2.00	6.292	5.98	309.8	0.0	326.5
112.00	1.00	1.30	47.286	52.01	429.75	0.950	0.000	2.00	6.207	5.90	306.7	0.0	322.1
114.00	1.00	1.30	47.463	52.21	424.58	0.950	0.000	2.00	6.121	5.82	303.6	0.0	317.6
116.00	1.00	1.31	47.637	52.40	419.37	0.950	0.000	2.00	6.036	5.73	300.5	0.0	313.1
118.00	1.00	1.31	47.809	52.59	414.12	0.950	0.000	2.00	5.950	5.65	297.3	0.0	308.6
120.00	1.00	1.32	47.978	52.78	408.85	0.950	0.000	2.00	5.864	5.57	294.0	0.0	304.1
122.00	1.00	1.32	48.145	52.96	403.54	0.950	0.000	2.00	5.779	5.49	290.7	0.0	299.6
124.00	1.00	1.32	48.310	53.14	398.20	0.950	0.000	2.00	5.693	5.41	287.4	0.0	295.2
126.00	1.00	1.33	48.473	53.32	392.83	0.950	0.000	2.00	5.608	5.33	284.1	0.0	290.7
128.00	1.00	1.33	48.634	53.50	387.43	0.950	0.000	2.00	5.522	5.25	280.7	0.0	286.2
130.00	1.00	1.34	48.793	53.67	382.00	0.950	0.000	2.00	5.437	5.16	277.2	0.0	281.7
132.00	1.00	1.34	48.950	53.85	376.54	0.950	0.000	2.00	5.351	5.08	273.7	0.0	277.2
133.33 Bot - Section 4	1.00	1.34	49.054	53.96	372.89	0.950	0.000	1.33	3.520	3.34	180.4	0.0	182.3
134.00	1.00	1.35	49.106	54.02	371.06	0.950	0.000	0.67	1.774	1.69	91.1	0.0	157.5
136.00	1.00	1.35	49.259	54.19	365.55	0.950	0.000	2.00	5.266	5.00	271.1	0.0	467.3
138.00 Top - Section 3	1.00	1.35	49.411	54.35	360.01	0.950	0.000	2.00	5.181	4.92	267.5	0.0	459.5
140.00	1.00	1.36	49.561	54.52	360.61	0.950	0.000	2.00	5.095	4.84	263.9	0.0	192.5
142.00	1.00	1.36	49.709	54.68	355.03	0.950	0.000	2.00	5.009	4.76	260.2	0.0	189.2
144.00	1.00	1.37	49.855	54.84	349.42	0.950	0.000	2.00	4.924	4.68	256.5	0.0	186.0
146.00	1.00	1.37	50.000	55.00	343.80	0.950	0.000	2.00	4.838	4.60	252.8	0.0	182.7
148.00	1.00	1.37	50.144	55.16	338.14	0.950	0.000	2.00	4.753	4.51	249.0	0.0	179.4
150.00 Appurtenance(s)	1.00	1.38	50.286	55.31	332.47	0.950	0.000	2.00	4.667	4.43	245.2	0.0	176.2
152.00	1.00	1.38	50.426	55.47	326.77	0.950	0.000	2.00	4.581	4.35	241.4	0.0	172.9
154.00	1.00	1.39	50.565	55.62	321.05	0.950	0.000	2.00	4.496	4.27	237.6	0.0	169.7
156.00	1.00	1.39	50.703	55.77	315.31	0.950	0.000	2.00	4.410	4.19	233.7	0.0	166.4
158.00 Appurtenance(s)	1.00	1.39	50.839	55.92	309.54	0.950	0.000	2.00	4.325	4.11	229.8	0.0	163.1
160.00	1.00	1.40	50.974	56.07	303.76	0.950	0.000	2.00	4.239	4.03	225.8	0.0	159.9
162.00	1.00	1.40	51.107	56.22	297.95	0.950	0.000	2.00	4.154	3.95	221.8	0.0	156.6
164.00	1.00	1.40	51.239	56.36	292.13	0.950	0.000	2.00	4.068	3.86	217.8	0.0	153.3
166.00 Appurtenance(s)	1.00	1.41	51.370	56.51	286.28	0.950	0.000	2.00	3.982	3.78	213.8	0.0	150.1
168.00	1.00	1.41	51.500	56.65	280.42	0.950	0.000	2.00	3.897	3.70	209.7	0.0	146.8
170.00	1.00	1.42	51.628	56.79	274.53	0.950	0.000	2.00	3.811	3.62	205.6	0.0	143.6
172.00	1.00	1.42	51.756	56.93	268.63	0.950	0.000	2.00	3.726	3.54	201.5	0.0	140.3
174.00	1.00	1.42	51.882	57.07	262.70	0.950	0.000	2.00	3.640	3.46	197.3	0.0	137.0
176.00	1.00	1.43	52.007	57.21	256.76	0.950	0.000	2.00	3.554	3.38	193.2	0.0	133.8
178.00 Appurtenance(s)	1.00	1.43	52.131	57.34	250.80	0.950	0.000	2.00	3.469	3.30	189.0	0.0	130.5
180.00	1.00	1.43	52.253	57.48	244.83	0.950	0.000	2.00	3.383	3.21	184.7	0.0	127.3
							Totals:	**180.00**			**27,684.8**		**40,096.7**

Discrete Appurtenance Forces

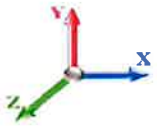
Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 1.2D + 1.0W 123 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 29

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	178.00	Samsung B5/B13 RRH	3	52.131	57.344	0.50	0.75	3.35	253.08	0.000	0.000	191.91	0.00	0.00
2	178.00	Samsung B2/B66A RRH	3	52.131	57.344	0.50	0.75	2.83	303.84	0.000	0.000	162.52	0.00	0.00
3	178.00	JMA MX06FRO660-03	6	52.131	57.344	0.61	0.75	36.42	432.00	0.000	0.000	2088.48	0.00	0.00
4	178.00	Platform w/ Handrails w/	1	52.131	57.344	1.00	1.00	40.00	2642.64	0.000	0.000	2293.75	0.00	0.00
5	178.00	Raycap	1	52.131	57.344	1.00	1.00	2.61	38.40	0.000	0.000	149.67	0.00	0.00
6	166.00	ALU 800 Mhz	6	51.370	56.507	0.38	0.75	5.60	381.60	0.000	0.000	316.58	0.00	0.00
7	166.00	RFS APXVTM14-C-I20	3	51.370	56.507	0.58	0.75	10.98	202.32	0.000	0.000	620.68	0.00	0.00
8	166.00	Commscope	3	51.370	56.507	0.55	0.75	20.43	278.64	0.000	0.000	1154.42	0.00	0.00
9	166.00	ALU 1900 Mhz	3	51.370	56.507	0.50	0.75	5.73	158.40	0.000	0.000	323.70	0.00	0.00
10	166.00	Sitepro	1	51.370	56.507	1.00	1.00	7.00	487.93	0.000	0.000	395.55	0.00	0.00
11	166.00	ALU TD-RRH8x20-25	3	51.370	56.507	0.50	0.75	6.11	252.00	0.000	0.000	345.00	0.00	0.00
12	166.00	Sitepro	1	51.370	56.507	1.00	1.00	6.70	276.00	0.000	0.000	378.60	0.00	0.00
13	166.00	Platform w/ Hand Rails	1	51.370	56.507	1.00	1.00	40.00	2400.00	0.000	0.000	2260.29	0.00	0.00
14	158.00	PCS1900 G3 TMA	6	50.839	55.923	0.40	0.80	2.50	144.00	0.000	0.000	139.58	0.00	0.00
15	158.00	T-Arms	3	50.839	55.923	0.56	0.75	13.50	1260.00	0.000	0.000	754.96	0.00	0.00
16	158.00	EMS RR90-17-02DP	6	50.839	55.923	0.54	0.80	23.96	97.20	0.000	0.000	1339.78	0.00	0.00
17	150.00	Powerwave 7770	3	50.286	55.314	0.55	0.75	9.05	126.00	0.000	0.000	500.60	0.00	0.00
18	150.00	Cci HPA-65R-BUU-H6	2	50.286	55.314	0.77	0.90	14.78	122.40	0.000	0.000	817.53	0.00	0.00
19	150.00	SBNHH-1D65A	1	50.286	55.314	1.00	1.00	5.88	40.20	0.000	0.000	325.25	0.00	0.00
20	150.00	RRUS-32	3	50.286	55.314	0.50	0.75	5.83	277.20	0.000	0.000	322.71	0.00	0.00
21	150.00	KMW AM-X-CD-16-65-00T	2	50.286	55.314	0.56	0.75	9.02	116.40	0.000	0.000	499.07	0.00	0.00
22	150.00	Powerwave LGP21401	6	50.286	55.314	0.38	0.75	2.75	101.52	0.000	0.000	151.84	0.00	0.00
23	150.00	KMW AM-X-CD-14-65-00T	1	50.286	55.314	0.75	0.75	5.29	43.68	0.000	0.000	292.47	0.00	0.00
24	150.00	Ericsson RRUS-11	3	50.286	55.314	0.50	0.75	3.80	182.52	0.000	0.000	210.13	0.00	0.00
25	150.00	Raycap DC6-48-60-18-8F	1	50.286	55.314	0.67	1.00	1.21	38.16	0.000	0.000	67.08	0.00	0.00
26	150.00	Platform w/ Hand Rail	1	50.286	55.314	1.00	1.00	35.00	1920.00	0.000	0.000	1936.00	0.00	0.00
							Totals:		**12,576.13**			**18,038.15**		

Total Applied Force Summary

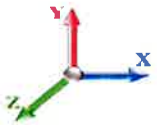
Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 1.2D + 1.0W 123 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 29

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
2.00		345.27	705.41	0.00	0.00
4.00		342.50	724.29	0.00	0.00
6.00		339.73	743.16	0.00	0.00
8.00		336.95	737.46	0.00	0.00
10.00		334.18	731.75	0.00	0.00
12.00		331.41	726.05	0.00	0.00
14.00		328.63	720.34	0.00	0.00
16.00		329.88	714.63	0.00	0.00
18.00		335.29	708.93	0.00	0.00
20.00		339.86	703.22	0.00	0.00
22.00		343.75	697.51	0.00	0.00
24.00		347.05	691.81	0.00	0.00
26.00		349.84	686.10	0.00	0.00
28.00		352.18	680.39	0.00	0.00
30.00		354.13	674.69	0.00	0.00
32.00		355.72	668.98	0.00	0.00
34.00		357.00	663.27	0.00	0.00
36.00		357.99	657.57	0.00	0.00
38.00		358.72	651.86	0.00	0.00
40.00		359.21	646.16	0.00	0.00
42.00		359.48	640.45	0.00	0.00
43.92		344.50	608.41	0.00	0.00
44.00		15.15	49.26	0.00	0.00
46.00		365.16	1176.50	0.00	0.00
48.00		364.91	1165.50	0.00	0.00
50.00		364.49	1154.49	0.00	0.00
51.00		181.66	573.12	0.00	0.00
52.00		181.51	289.71	0.00	0.00
54.00		363.19	575.44	0.00	0.00
56.00		362.33	570.14	0.00	0.00
58.00		361.33	564.84	0.00	0.00
60.00		360.21	559.54	0.00	0.00
62.00		358.98	554.24	0.00	0.00
64.00		357.62	548.94	0.00	0.00
66.00		356.16	543.64	0.00	0.00
68.00		354.60	538.34	0.00	0.00
70.00		352.94	533.05	0.00	0.00
72.00		351.19	527.75	0.00	0.00
74.00		349.34	522.45	0.00	0.00
76.00		347.41	517.15	0.00	0.00
78.00		345.40	511.85	0.00	0.00
80.00		343.31	506.55	0.00	0.00
82.00		341.14	501.25	0.00	0.00
84.00		338.89	495.95	0.00	0.00
86.00		336.57	490.66	0.00	0.00
88.00		334.19	485.36	0.00	0.00

Total Applied Force Summary

Structure:	CT46130-A-SBA		**Code:**	EIA/TIA-222-H	12/5/2019
Site Name:	Deep River-winthrop Rd		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 13

Tower Engineering Solutions

90.00		331.73	480.06	0.00	0.00
90.17		27.47	39.77	0.00	0.00
92.00		306.78	771.14	0.00	0.00
94.00		332.28	831.87	0.00	0.00
96.00		329.66	822.09	0.00	0.00
98.00		326.99	402.61	0.00	0.00
100.00		324.25	398.13	0.00	0.00
102.00		321.46	393.65	0.00	0.00
104.00		318.61	389.16	0.00	0.00
106.00		315.71	384.68	0.00	0.00
108.00		312.76	380.19	0.00	0.00
110.00		309.76	375.71	0.00	0.00
112.00		306.70	371.23	0.00	0.00
114.00		303.61	366.74	0.00	0.00
116.00		300.46	362.26	0.00	0.00
118.00		297.27	357.78	0.00	0.00
120.00		294.03	353.29	0.00	0.00
122.00		290.75	348.81	0.00	0.00
124.00		287.42	344.33	0.00	0.00
126.00		284.06	339.84	0.00	0.00
128.00		280.65	335.36	0.00	0.00
130.00		277.21	330.87	0.00	0.00
132.00		273.72	326.39	0.00	0.00
133.33		180.43	215.10	0.00	0.00
134.00		91.05	173.86	0.00	0.00
136.00		271.08	516.42	0.00	0.00
138.00		267.49	508.68	0.00	0.00
140.00		263.87	241.64	0.00	0.00
142.00		260.21	238.38	0.00	0.00
144.00		256.52	235.12	0.00	0.00
146.00		252.80	231.86	0.00	0.00
148.00		249.04	228.60	0.00	0.00
150.00	(23) attachments	5367.94	3193.42	0.00	0.00
152.00		241.42	202.04	0.00	0.00
154.00		237.56	198.78	0.00	0.00
156.00		233.68	195.52	0.00	0.00
158.00	(15) attachments	2464.08	1693.46	0.00	0.00
160.00		225.81	174.02	0.00	0.00
162.00		221.83	170.76	0.00	0.00
164.00		217.82	167.50	0.00	0.00
166.00	(21) attachments	6008.60	4601.13	0.00	0.00
168.00		209.71	151.82	0.00	0.00
170.00		205.62	148.56	0.00	0.00
172.00		201.50	145.30	0.00	0.00
174.00		197.35	142.04	0.00	0.00
176.00		193.17	138.78	0.00	0.00
178.00	(14) attachments	5075.29	3805.48	0.00	0.00
180.00		184.74	127.26	0.00	0.00
	Totals:	**45,722.93**	**56,489.65**	**0.00**	**0.00**

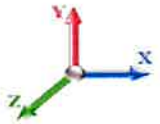
Calculated Forces

Structure: CT46130-A-SBA
Site Name: Deep River-winthrop Rd
Height: 180.00 (ft)
Base Elev: 0.000 (ft)
Gh: 1.1 **Topography:** 1

Code: EIA/TIA-222-H 12/5/2019
Exposure: C
Crest Height: 0.00
Site Class: D - Stiff Soil
Struct Class: II Page: 14

Tower Engineering Solutions

Load Case: 1.2D + 1.0W 123 mph Wind
Dead Load Factor 1.20
Wind Load Factor 1.00



Iterations 29

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-56.46	-45.76	0.00	-5490.3	0.00	5490.30	5123.29	1522.04	7808.40	6435.29	0.00	0.000	0.000	0.865
2.00	-55.69	-45.49	0.00	-5398.7	0.00	5398.78	5107.67	1509.78	7683.09	6363.61	0.02	-0.074	0.000	0.860
4.00	-54.91	-45.21	0.00	-5307.8	0.00	5307.81	5091.62	1497.52	7558.79	6291.73	0.06	-0.148	0.000	0.855
6.00	-54.11	-44.94	0.00	-5217.3	0.00	5217.39	5075.16	1485.26	7435.50	6219.67	0.14	-0.223	0.000	0.850
8.00	-53.32	-44.67	0.00	-5127.5	0.00	5127.50	5058.29	1472.99	7313.22	6147.44	0.25	-0.299	0.000	0.846
10.00	-52.53	-44.40	0.00	-5038.1	0.00	5038.16	5041.00	1460.73	7191.96	6075.05	0.39	-0.375	0.000	0.841
12.00	-51.74	-44.14	0.00	-4949.3	0.00	4949.35	5023.29	1448.47	7071.72	6002.51	0.57	-0.451	0.000	0.836
14.00	-50.97	-43.87	0.00	-4861.0	0.00	4861.08	5005.16	1436.20	6952.48	5929.84	0.77	-0.529	0.000	0.831
16.00	-50.20	-43.60	0.00	-4773.3	0.00	4773.33	4986.62	1423.94	6834.27	5857.05	1.01	-0.606	0.000	0.826
18.00	-49.43	-43.33	0.00	-4686.1	0.00	4686.13	4967.66	1411.68	6717.06	5784.16	1.28	-0.685	0.000	0.821
20.00	-48.67	-43.05	0.00	-4599.4	0.00	4599.47	4948.29	1399.42	6600.87	5711.17	1.59	-0.764	0.000	0.816
22.00	-47.92	-42.76	0.00	-4513.3	0.00	4513.38	4928.49	1387.15	6485.69	5638.10	1.93	-0.843	0.000	0.811
24.00	-47.18	-42.47	0.00	-4427.8	0.00	4427.86	4908.28	1374.89	6371.53	5564.95	2.30	-0.923	0.000	0.806
26.00	-46.44	-42.17	0.00	-4342.9	0.00	4342.93	4887.66	1362.63	6258.37	5491.76	2.70	-1.004	0.000	0.801
28.00	-45.70	-41.87	0.00	-4258.5	0.00	4258.59	4866.62	1350.36	6146.24	5418.52	3.14	-1.085	0.000	0.796
30.00	-44.98	-41.57	0.00	-4174.8	0.00	4174.84	4845.16	1338.10	6035.11	5345.24	3.61	-1.167	0.000	0.791
32.00	-44.25	-41.26	0.00	-4091.7	0.00	4091.70	4823.28	1325.84	5925.00	5271.95	4.12	-1.250	0.000	0.786
34.00	-43.54	-40.96	0.00	-4009.1	0.00	4009.17	4800.99	1313.58	5815.91	5198.66	4.66	-1.333	0.000	0.781
36.00	-42.83	-40.65	0.00	-3927.2	0.00	3927.26	4778.28	1301.31	5707.83	5125.37	5.24	-1.416	0.000	0.776
38.00	-42.13	-40.33	0.00	-3845.9	0.00	3845.97	4755.15	1289.05	5600.76	5052.10	5.85	-1.501	0.000	0.771
40.00	-41.43	-40.02	0.00	-3765.3	0.00	3765.31	4731.61	1276.79	5494.70	4978.87	6.50	-1.586	0.000	0.766
42.00	-40.75	-39.70	0.00	-3685.2	0.00	3685.27	4707.65	1264.52	5389.66	4905.68	7.18	-1.671	0.000	0.761
43.92	-40.12	-39.37	0.00	-3609.1	0.00	3609.18	4684.30	1252.77	5289.95	4835.60	7.87	-1.754	0.000	0.756
44.00	-40.04	-39.38	0.00	-3605.9	0.00	3605.90	4683.27	1252.26	5285.64	4832.55	7.90	-1.758	0.000	0.756
46.00	-38.81	-39.04	0.00	-3527.1	0.00	3527.14	4658.48	1240.00	5182.62	4759.49	8.65	-1.844	0.000	0.750
48.00	-37.60	-38.69	0.00	-3449.0	0.00	3449.06	4633.27	1227.74	5080.62	4686.52	9.45	-1.932	0.000	0.745
50.00	-36.42	-38.33	0.00	-3371.6	0.00	3371.67	4607.64	1215.47	4979.64	4613.64	10.27	-2.020	0.000	0.740
51.00	-35.82	-38.16	0.00	-3333.3	0.00	3333.34	4157.28	1142.33	4736.69	4216.21	10.70	-2.065	0.000	0.800
52.00	-35.49	-38.01	0.00	-3295.1	0.00	3295.18	4146.96	1136.64	4689.60	4184.61	11.14	-2.110	0.000	0.797
54.00	-34.87	-37.68	0.00	-3219.1	0.00	3219.17	4126.01	1125.25	4596.10	4121.41	12.04	-2.201	0.000	0.791
56.00	-34.26	-37.35	0.00	-3143.8	0.00	3143.81	4104.64	1113.86	4503.55	4058.23	12.99	-2.293	0.000	0.784
58.00	-33.65	-37.02	0.00	-3069.1	0.00	3069.11	4082.85	1102.48	4411.95	3995.08	13.97	-2.386	0.000	0.778
60.00	-33.04	-36.69	0.00	-2995.0	0.00	2995.07	4060.64	1091.09	4321.28	3931.97	14.99	-2.479	0.000	0.771
62.00	-32.44	-36.36	0.00	-2921.6	0.00	2921.68	4038.02	1079.70	4231.55	3868.91	16.05	-2.573	0.000	0.764
64.00	-31.85	-36.03	0.00	-2848.9	0.00	2848.96	4014.98	1068.31	4142.77	3805.92	17.14	-2.668	0.000	0.758
66.00	-31.27	-35.70	0.00	-2776.8	0.00	2776.89	3991.52	1056.93	4054.92	3743.01	18.28	-2.763	0.000	0.751
68.00	-30.69	-35.37	0.00	-2705.4	0.00	2705.49	3967.65	1045.54	3968.02	3680.19	19.46	-2.858	0.000	0.744
70.00	-30.11	-35.05	0.00	-2634.7	0.00	2634.74	3943.36	1034.15	3882.06	3617.47	20.68	-2.955	0.000	0.737
72.00	-29.55	-34.72	0.00	-2564.6	0.00	2564.65	3918.66	1022.77	3797.04	3554.87	21.94	-3.052	0.000	0.730
74.00	-28.99	-34.39	0.00	-2495.2	0.00	2495.22	3893.54	1011.38	3712.96	3492.40	23.23	-3.149	0.000	0.723
76.00	-28.43	-34.06	0.00	-2426.4	0.00	2426.44	3868.00	999.99	3629.83	3430.07	24.57	-3.247	0.000	0.716
78.00	-27.88	-33.74	0.00	-2358.3	0.00	2358.32	3842.04	988.61	3547.63	3367.90	25.96	-3.346	0.000	0.709
80.00	-27.34	-33.41	0.00	-2290.8	0.00	2290.84	3815.67	977.22	3466.38	3305.90	27.38	-3.445	0.000	0.701
82.00	-26.80	-33.09	0.00	-2224.0	0.00	2224.02	3788.88	965.83	3386.07	3244.07	28.84	-3.545	0.000	0.694
84.00	-26.27	-32.76	0.00	-2157.8	0.00	2157.85	3761.67	954.44	3306.69	3182.44	30.35	-3.645	0.000	0.686
86.00	-25.74	-32.44	0.00	-2092.3	0.00	2092.32	3734.05	943.06	3228.26	3121.02	31.90	-3.746	0.000	0.678
88.00	-25.22	-32.12	0.00	-2027.4	0.00	2027.44	3706.01	931.67	3150.77	3059.82	33.49	-3.847	0.000	0.671
90.00	-24.74	-31.78	0.00	-1963.1	0.00	1963.19	3677.55	920.28	3074.23	2998.84	35.12	-3.949	0.000	0.663

Calculated Forces

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 15	

TES Tower Engineering Solutions

90.17	-24.67	-31.77	0.00	-1957.9	0.00	1957.90	3675.16	919.33	3067.89	2993.77	35.26	-3.958	0.000	0.662
92.00	-23.87	-31.45	0.00	-1899.6	0.00	1899.65	3648.68	908.90	2998.62	2938.12	36.79	-4.051	0.000	0.654
94.00	-23.01	-31.10	0.00	-1836.7	0.00	1836.74	3619.39	897.51	2923.96	2877.64	38.51	-4.154	0.000	0.646
96.00	-22.16	-30.76	0.00	-1774.5	0.00	1774.53	2873.56	764.37	2506.37	2303.28	40.27	-4.257	0.000	0.780
98.00	-21.72	-30.44	0.00	-1713.0	0.00	1713.02	2853.66	754.73	2443.58	2258.25	42.08	-4.360	0.000	0.768
100.00	-21.29	-30.13	0.00	-1652.1	0.00	1652.14	2833.34	745.10	2381.59	2213.29	43.93	-4.476	0.000	0.756
102.00	-20.86	-29.82	0.00	-1591.8	0.00	1591.88	2812.61	735.46	2320.39	2168.43	45.83	-4.592	0.000	0.743
104.00	-20.44	-29.51	0.00	-1532.2	0.00	1532.24	2791.46	725.83	2259.99	2123.68	47.77	-4.708	0.000	0.730
106.00	-20.02	-29.21	0.00	-1473.2	0.00	1473.21	2769.89	716.19	2200.39	2079.04	49.77	-4.824	0.000	0.717
108.00	-19.61	-28.90	0.00	-1414.8	0.00	1414.80	2747.90	706.55	2141.58	2034.53	51.81	-4.940	0.000	0.704
110.00	-19.21	-28.60	0.00	-1356.9	0.00	1356.99	2725.50	696.92	2083.57	1990.17	53.90	-5.056	0.000	0.691
112.00	-18.81	-28.30	0.00	-1299.7	0.00	1299.79	2702.68	687.28	2026.36	1945.97	56.04	-5.171	0.000	0.677
114.00	-18.41	-28.00	0.00	-1243.1	0.00	1243.19	2679.45	677.65	1969.94	1901.93	58.23	-5.287	0.000	0.662
116.00	-18.03	-27.70	0.00	-1187.1	0.00	1187.19	2655.79	668.01	1914.32	1858.08	60.47	-5.402	0.000	0.647
118.00	-17.64	-27.41	0.00	-1131.7	0.00	1131.78	2631.73	658.38	1859.50	1814.42	62.76	-5.517	0.000	0.632
120.00	-17.27	-27.12	0.00	-1076.9	0.00	1076.96	2607.24	648.74	1805.47	1770.96	65.09	-5.631	0.000	0.616
122.00	-16.90	-26.83	0.00	-1022.7	0.00	1022.73	2582.34	639.11	1752.24	1727.73	67.47	-5.745	0.000	0.600
124.00	-16.53	-26.54	0.00	-969.08	0.00	969.08	2557.02	629.47	1699.80	1684.74	69.90	-5.858	0.000	0.583
126.00	-16.17	-26.25	0.00	-916.00	0.00	916.00	2531.28	619.84	1648.16	1641.98	72.37	-5.969	0.000	0.566
128.00	-15.82	-25.97	0.00	-863.49	0.00	863.49	2505.13	610.20	1597.32	1599.49	74.89	-6.079	0.000	0.548
130.00	-15.47	-25.69	0.00	-811.56	0.00	811.56	2478.56	600.57	1547.28	1557.27	77.46	-6.188	0.000	0.529
132.00	-15.14	-25.40	0.00	-760.18	0.00	760.18	2451.58	590.93	1498.03	1515.33	80.07	-6.295	0.000	0.510
133.33	-14.92	-25.21	0.00	-726.31	0.00	726.31	2433.35	584.51	1465.64	1487.53	81.83	-6.366	0.000	0.496
134.00	-14.73	-25.12	0.00	-709.51	0.00	709.51	2424.17	581.30	1449.58	1473.69	82.72	-6.402	0.000	0.489
136.00	-14.20	-24.82	0.00	-659.26	0.00	659.26	2396.35	571.66	1401.92	1432.35	85.42	-6.505	0.000	0.468
138.00	-13.68	-24.52	0.00	-609.63	0.00	609.63	1545.45	417.14	1026.36	929.77	88.16	-6.605	0.000	0.668
140.00	-13.43	-24.26	0.00	-560.59	0.00	560.59	1531.69	410.13	992.17	905.88	90.94	-6.702	0.000	0.631
142.00	-13.17	-24.00	0.00	-512.08	0.00	512.08	1517.50	403.12	958.56	882.03	93.77	-6.823	0.000	0.593
144.00	-12.92	-23.74	0.00	-464.09	0.00	464.09	1502.90	396.11	925.52	858.22	96.65	-6.940	0.000	0.553
146.00	-12.68	-23.48	0.00	-416.61	0.00	416.61	1487.88	389.11	893.06	834.49	99.57	-7.050	0.000	0.511
148.00	-12.44	-23.23	0.00	-369.64	0.00	369.64	1472.45	382.10	861.19	810.82	102.54	-7.155	0.000	0.468
150.00	-9.92	-17.52	0.00	-323.18	0.00	323.18	1456.60	375.09	829.89	787.25	105.56	-7.252	0.000	0.420
152.00	-9.72	-17.27	0.00	-288.14	0.00	288.14	1440.33	368.08	799.17	763.78	108.61	-7.342	0.000	0.386
154.00	-9.53	-17.02	0.00	-253.61	0.00	253.61	1423.65	361.08	769.03	740.42	111.69	-7.427	0.000	0.351
156.00	-9.34	-16.78	0.00	-219.56	0.00	219.56	1406.55	354.07	739.47	717.20	114.81	-7.505	0.000	0.315
158.00	-7.97	-14.12	0.00	-186.01	0.00	186.01	1389.03	347.06	710.49	694.11	117.96	-7.577	0.000	0.275
160.00	-7.81	-13.88	0.00	-157.77	0.00	157.77	1371.10	340.05	682.09	671.17	121.14	-7.641	0.000	0.242
162.00	-7.66	-13.65	0.00	-130.00	0.00	130.00	1352.75	333.05	654.27	648.41	124.35	-7.698	0.000	0.208
164.00	-7.52	-13.42	0.00	-102.70	0.00	102.70	1333.98	326.04	627.03	625.81	127.57	-7.747	0.000	0.171
166.00	-3.76	-6.84	0.00	-75.87	0.00	75.87	1314.79	319.03	600.37	603.42	130.82	-7.787	0.000	0.129
168.00	-3.64	-6.62	0.00	-62.19	0.00	62.19	1295.19	312.03	574.28	581.22	134.08	-7.821	0.000	0.110
170.00	-3.52	-6.39	0.00	-48.96	0.00	48.96	1275.17	305.02	548.78	559.24	137.35	-7.849	0.000	0.091
172.00	-3.40	-6.17	0.00	-36.17	0.00	36.17	1251.65	298.01	523.85	536.17	140.63	-7.873	0.000	0.071
174.00	-3.28	-5.96	0.00	-23.82	0.00	23.82	1222.21	291.00	499.51	511.11	143.93	-7.890	0.000	0.050
176.00	-3.17	-5.75	0.00	-11.90	0.00	11.90	1192.78	284.00	475.74	486.64	147.22	-7.902	0.000	0.028
178.00	-0.10	-0.20	0.00	-0.40	0.00	0.40	1163.35	276.99	452.55	462.78	150.53	-7.906	0.000	0.001
180.00	0.00	-0.18	0.00	0.00	0.00	0.00	1133.92	269.98	429.95	439.52	153.83	-7.906	0.000	0.000

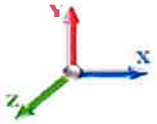
Wind Loading - Shaft

Structure: CT46130-A-SBA
Site Name: Deep River-winthrop Rd
Height: 180.00 (ft)
Base Elev: 0.000 (ft)
Gh: 1.1 **Topography:** 1

Code: EIA/TIA-222-H 12/5/2019
Exposure: C
Crest Height: 0.00
Site Class: D - Stiff Soil
Struct Class: II Page: 16

Tower Engineering Solutions

Load Case: 0.9D + 1.0W 123 mph Wind
Dead Load Factor 0.90
Wind Load Factor 1.00



Iterations 29

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	31.009	34.11	603.99	0.950	0.000	0.00	0.000	0.00	0.0	0.0	0.0
2.00		1.00	0.85	31.009	34.11	599.16	0.950	0.000	2.00	10.655	10.12	345.3	0.0	529.1
4.00		1.00	0.85	31.009	34.11	594.33	0.950	0.000	2.00	10.569	10.04	342.5	0.0	524.8
6.00		1.00	0.85	31.009	34.11	589.49	0.950	0.000	2.00	10.484	9.96	339.7	0.0	520.5
8.00		1.00	0.85	31.009	34.11	584.66	0.950	0.000	2.00	10.398	9.88	337.0	0.0	516.2
10.00		1.00	0.85	31.009	34.11	579.83	0.950	0.000	2.00	10.313	9.80	334.2	0.0	511.9
12.00		1.00	0.85	31.009	34.11	575.00	0.950	0.000	2.00	10.227	9.72	331.4	0.0	507.7
14.00		1.00	0.85	31.009	34.11	570.17	0.950	0.000	2.00	10.142	9.63	328.6	0.0	503.4
16.00		1.00	0.86	31.392	34.53	568.81	0.950	0.000	2.00	10.056	9.55	329.9	0.0	499.1
18.00		1.00	0.88	32.180	35.40	570.99	0.950	0.000	2.00	9.970	9.47	335.3	0.0	494.8
20.00		1.00	0.90	32.902	36.19	572.38	0.950	0.000	2.00	9.885	9.39	339.9	0.0	490.5
22.00		1.00	0.92	33.569	36.93	573.12	0.950	0.000	2.00	9.799	9.31	343.8	0.0	486.3
24.00		1.00	0.94	34.189	37.61	573.32	0.950	0.000	2.00	9.714	9.23	347.0	0.0	482.0
26.00		1.00	0.95	34.770	38.25	573.06	0.950	0.000	2.00	9.628	9.15	349.8	0.0	477.7
28.00		1.00	0.97	35.317	38.85	572.39	0.950	0.000	2.00	9.542	9.07	352.2	0.0	473.4
30.00		1.00	0.98	35.834	39.42	571.37	0.950	0.000	2.00	9.457	8.98	354.1	0.0	469.1
32.00		1.00	1.00	36.324	39.96	570.03	0.950	0.000	2.00	9.371	8.90	355.7	0.0	464.9
34.00		1.00	1.01	36.791	40.47	568.42	0.950	0.000	2.00	9.286	8.82	357.0	0.0	460.6
36.00		1.00	1.02	37.236	40.96	566.55	0.950	0.000	2.00	9.200	8.74	358.0	0.0	456.3
38.00		1.00	1.03	37.662	41.43	564.46	0.950	0.000	2.00	9.115	8.66	358.7	0.0	452.0
40.00		1.00	1.04	38.071	41.88	562.16	0.950	0.000	2.00	9.029	8.58	359.2	0.0	447.7
42.00		1.00	1.05	38.464	42.31	559.68	0.950	0.000	2.00	8.943	8.50	359.5	0.0	443.5
43.92	Bot - Section 2	1.00	1.06	38.827	42.71	557.13	0.950	0.000	1.92	8.490	8.07	344.5	0.0	421.0
44.00		1.00	1.06	38.843	42.73	557.02	0.950	0.000	0.08	0.373	0.35	15.1	0.0	35.4
46.00		1.00	1.07	39.208	43.13	554.19	0.950	0.000	2.00	8.912	8.47	365.2	0.0	845.5
48.00		1.00	1.08	39.561	43.52	551.23	0.950	0.000	2.00	8.827	8.39	364.9	0.0	837.2
50.00		1.00	1.09	39.902	43.89	548.12	0.950	0.000	2.00	8.741	8.30	364.5	0.0	829.0
51.00	Top - Section 1	1.00	1.10	40.069	44.08	546.52	0.950	0.000	1.00	4.339	4.12	181.7	0.0	411.4
52.00		1.00	1.10	40.233	44.26	553.90	0.950	0.000	1.00	4.317	4.10	181.5	0.0	198.8
54.00		1.00	1.11	40.554	44.61	550.58	0.950	0.000	2.00	8.570	8.14	363.2	0.0	394.7
56.00		1.00	1.12	40.866	44.95	547.14	0.950	0.000	2.00	8.485	8.06	362.3	0.0	390.7
58.00		1.00	1.13	41.169	45.29	543.60	0.950	0.000	2.00	8.399	7.98	361.3	0.0	386.8
60.00		1.00	1.14	41.464	45.61	539.95	0.950	0.000	2.00	8.313	7.90	360.2	0.0	382.8
62.00		1.00	1.14	41.751	45.93	536.21	0.950	0.000	2.00	8.228	7.82	359.0	0.0	378.8
64.00		1.00	1.15	42.031	46.23	532.38	0.950	0.000	2.00	8.142	7.74	357.6	0.0	374.8
66.00		1.00	1.16	42.304	46.53	528.47	0.950	0.000	2.00	8.057	7.65	356.2	0.0	370.9
68.00		1.00	1.17	42.571	46.83	524.47	0.950	0.000	2.00	7.971	7.57	354.6	0.0	366.9
70.00		1.00	1.17	42.831	47.11	520.39	0.950	0.000	2.00	7.885	7.49	352.9	0.0	362.9
72.00		1.00	1.18	43.086	47.39	516.24	0.950	0.000	2.00	7.800	7.41	351.2	0.0	358.9
74.00		1.00	1.19	43.335	47.67	512.02	0.950	0.000	2.00	7.714	7.33	349.3	0.0	355.0
76.00		1.00	1.19	43.579	47.94	507.73	0.950	0.000	2.00	7.629	7.25	347.4	0.0	351.0
78.00		1.00	1.20	43.818	48.20	503.38	0.950	0.000	2.00	7.543	7.17	345.4	0.0	347.0
80.00		1.00	1.21	44.053	48.46	498.96	0.950	0.000	2.00	7.458	7.08	343.3	0.0	343.0
82.00		1.00	1.21	44.282	48.71	494.49	0.950	0.000	2.00	7.372	7.00	341.1	0.0	339.1
84.00		1.00	1.22	44.507	48.96	489.96	0.950	0.000	2.00	7.286	6.92	338.9	0.0	335.1
86.00		1.00	1.23	44.728	49.20	485.37	0.950	0.000	2.00	7.201	6.84	336.6	0.0	331.1
88.00		1.00	1.23	44.945	49.44	480.73	0.950	0.000	2.00	7.115	6.76	334.2	0.0	327.1

Wind Loading - Shaft

Structure: CT46130-A-SBA | **Code:** EIA/TIA-222-H | 12/5/2019
Site Name: Deep River-winthrop Rd | **Exposure:** C
Height: 180.00 (ft) | **Crest Height:** 0.00
Base Elev: 0.000 (ft) | **Site Class:** D - Stiff Soil
Gh: 1.1 | **Topography:** 1 | **Struct Class:** II | Page: 17

Tower Engineering Solutions

90.00	1.00	1.24	45.159	49.67	476.03	0.950	0.000	2.00	7.030	6.68	331.7	0.0	323.2
90.17 Bot - Section 3	1.00	1.24	45.176	49.69	475.64	0.950	0.000	0.17	0.582	0.55	27.5	0.0	26.8
92.00	1.00	1.24	45.368	49.90	471.29	0.950	0.000	1.83	6.471	6.15	306.8	0.0	544.6
94.00	1.00	1.25	45.574	50.13	466.50	0.950	0.000	2.00	6.977	6.63	332.3	0.0	587.0
96.00 Top - Section 2	1.00	1.25	45.776	50.35	461.67	0.950	0.000	2.00	6.891	6.55	329.7	0.0	579.7
98.00	1.00	1.26	45.975	50.57	464.94	0.950	0.000	2.00	6.806	6.47	327.0	0.0	265.1
100.00	1.00	1.27	46.171	50.79	460.03	0.950	0.000	2.00	6.720	6.38	324.2	0.0	261.7
102.00	1.00	1.27	46.364	51.00	455.09	0.950	0.000	2.00	6.635	6.30	321.5	0.0	258.4
104.00	1.00	1.28	46.554	51.21	450.10	0.950	0.000	2.00	6.549	6.22	318.6	0.0	255.0
106.00	1.00	1.28	46.741	51.42	445.07	0.950	0.000	2.00	6.464	6.14	315.7	0.0	251.6
108.00	1.00	1.29	46.926	51.62	440.00	0.950	0.000	2.00	6.378	6.06	312.8	0.0	248.3
110.00	1.00	1.29	47.107	51.82	434.90	0.950	0.000	2.00	6.292	5.98	309.8	0.0	244.9
112.00	1.00	1.30	47.286	52.01	429.75	0.950	0.000	2.00	6.207	5.90	306.7	0.0	241.5
114.00	1.00	1.30	47.463	52.21	424.58	0.950	0.000	2.00	6.121	5.82	303.6	0.0	238.2
116.00	1.00	1.31	47.637	52.40	419.37	0.950	0.000	2.00	6.036	5.73	300.5	0.0	234.8
118.00	1.00	1.31	47.809	52.59	414.12	0.950	0.000	2.00	5.950	5.65	297.3	0.0	231.5
120.00	1.00	1.32	47.978	52.78	408.85	0.950	0.000	2.00	5.864	5.57	294.0	0.0	228.1
122.00	1.00	1.32	48.145	52.96	403.54	0.950	0.000	2.00	5.779	5.49	290.7	0.0	224.7
124.00	1.00	1.32	48.310	53.14	398.20	0.950	0.000	2.00	5.693	5.41	287.4	0.0	221.4
126.00	1.00	1.33	48.473	53.32	392.83	0.950	0.000	2.00	5.608	5.33	284.1	0.0	218.0
128.00	1.00	1.33	48.634	53.50	387.43	0.950	0.000	2.00	5.522	5.25	280.7	0.0	214.6
130.00	1.00	1.34	48.793	53.67	382.00	0.950	0.000	2.00	5.437	5.16	277.2	0.0	211.3
132.00	1.00	1.34	48.950	53.85	376.54	0.950	0.000	2.00	5.351	5.08	273.7	0.0	207.9
133.33 Bot - Section 4	1.00	1.34	49.054	53.96	372.89	0.950	0.000	1.33	3.520	3.34	180.4	0.0	136.7
134.00	1.00	1.35	49.106	54.02	371.06	0.950	0.000	0.67	1.774	1.69	91.1	0.0	118.1
136.00	1.00	1.35	49.259	54.19	365.55	0.950	0.000	2.00	5.266	5.00	271.1	0.0	350.4
138.00 Top - Section 3	1.00	1.35	49.411	54.35	360.01	0.950	0.000	2.00	5.181	4.92	267.5	0.0	344.6
140.00	1.00	1.36	49.561	54.52	360.61	0.950	0.000	2.00	5.095	4.84	263.9	0.0	144.4
142.00	1.00	1.36	49.709	54.68	355.03	0.950	0.000	2.00	5.009	4.76	260.2	0.0	141.9
144.00	1.00	1.37	49.855	54.84	349.42	0.950	0.000	2.00	4.924	4.68	256.5	0.0	139.5
146.00	1.00	1.37	50.000	55.00	343.80	0.950	0.000	2.00	4.838	4.60	252.8	0.0	137.0
148.00	1.00	1.37	50.144	55.16	338.14	0.950	0.000	2.00	4.753	4.51	249.0	0.0	134.6
150.00 Appurtenance(s)	1.00	1.38	50.286	55.31	332.47	0.950	0.000	2.00	4.667	4.43	245.2	0.0	132.1
152.00	1.00	1.38	50.426	55.47	326.77	0.950	0.000	2.00	4.581	4.35	241.4	0.0	129.7
154.00	1.00	1.39	50.565	55.62	321.05	0.950	0.000	2.00	4.496	4.27	237.6	0.0	127.2
156.00	1.00	1.39	50.703	55.77	315.31	0.950	0.000	2.00	4.410	4.19	233.7	0.0	124.8
158.00 Appurtenance(s)	1.00	1.39	50.839	55.92	309.54	0.950	0.000	2.00	4.325	4.11	229.8	0.0	122.3
160.00	1.00	1.40	50.974	56.07	303.76	0.950	0.000	2.00	4.239	4.03	225.8	0.0	119.9
162.00	1.00	1.40	51.107	56.22	297.95	0.950	0.000	2.00	4.154	3.95	221.8	0.0	117.5
164.00	1.00	1.40	51.239	56.36	292.13	0.950	0.000	2.00	4.068	3.86	217.8	0.0	115.0
166.00 Appurtenance(s)	1.00	1.41	51.370	56.51	286.28	0.950	0.000	2.00	3.982	3.78	213.8	0.0	112.6
168.00	1.00	1.41	51.500	56.65	280.42	0.950	0.000	2.00	3.897	3.70	209.7	0.0	110.1
170.00	1.00	1.42	51.628	56.79	274.53	0.950	0.000	2.00	3.811	3.62	205.6	0.0	107.7
172.00	1.00	1.42	51.756	56.93	268.63	0.950	0.000	2.00	3.726	3.54	201.5	0.0	105.2
174.00	1.00	1.42	51.882	57.07	262.70	0.950	0.000	2.00	3.640	3.46	197.3	0.0	102.8
176.00	1.00	1.43	52.007	57.21	256.76	0.950	0.000	2.00	3.554	3.38	193.2	0.0	100.3
178.00 Appurtenance(s)	1.00	1.43	52.131	57.34	250.80	0.950	0.000	2.00	3.469	3.30	189.0	0.0	97.9
180.00	1.00	1.43	52.253	57.48	244.83	0.950	0.000	2.00	3.383	3.21	184.7	0.0	95.4
							Totals:	**180.00**			**27,684.8**		**30,072.5**

Discrete Appurtenance Forces

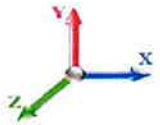
Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 18	

Tower Engineering Solutions

Load Case: 0.9D + 1.0W 123 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.00



Iterations 29

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	178.00	Samsung B5/B13 RRH	3	52.131	57.344	0.50	0.75	3.35	189.81	0.000	0.000	191.91	0.00	0.00
2	178.00	Samsung B2/B66A RRH	3	52.131	57.344	0.50	0.75	2.83	227.88	0.000	0.000	162.52	0.00	0.00
3	178.00	JMA MX06FRO660-03	6	52.131	57.344	0.61	0.75	36.42	324.00	0.000	0.000	2088.48	0.00	0.00
4	178.00	Platform w/ Handrails w/	1	52.131	57.344	1.00	1.00	40.00	1981.98	0.000	0.000	2293.75	0.00	0.00
5	178.00	Raycap	1	52.131	57.344	1.00	1.00	2.61	28.80	0.000	0.000	149.67	0.00	0.00
6	166.00	ALU 800 Mhz	6	51.370	56.507	0.38	0.75	5.60	286.20	0.000	0.000	316.58	0.00	0.00
7	166.00	RFS APXVTM14-C-I20	3	51.370	56.507	0.58	0.75	10.98	151.74	0.000	0.000	620.68	0.00	0.00
8	166.00	Commscope	3	51.370	56.507	0.55	0.75	20.43	208.98	0.000	0.000	1154.42	0.00	0.00
9	166.00	ALU 1900 Mhz	3	51.370	56.507	0.50	0.75	5.73	118.80	0.000	0.000	323.70	0.00	0.00
10	166.00	Sitepro	1	51.370	56.507	1.00	1.00	7.00	365.95	0.000	0.000	395.55	0.00	0.00
11	166.00	ALU TD-RRH8x20-25	3	51.370	56.507	0.50	0.75	6.11	189.00	0.000	0.000	345.00	0.00	0.00
12	166.00	Sitepro	1	51.370	56.507	1.00	1.00	6.70	207.00	0.000	0.000	378.60	0.00	0.00
13	166.00	Platform w/ Hand Rails	1	51.370	56.507	1.00	1.00	40.00	1800.00	0.000	0.000	2260.29	0.00	0.00
14	158.00	PCS1900 G3 TMA	6	50.839	55.923	0.40	0.80	2.50	108.00	0.000	0.000	139.58	0.00	0.00
15	158.00	T-Arms	3	50.839	55.923	0.56	0.75	13.50	945.00	0.000	0.000	754.96	0.00	0.00
16	158.00	EMS RR90-17-02DP	6	50.839	55.923	0.54	0.80	23.96	72.90	0.000	0.000	1339.78	0.00	0.00
17	150.00	Powerwave 7770	3	50.286	55.314	0.55	0.75	9.05	94.50	0.000	0.000	500.60	0.00	0.00
18	150.00	Cci HPA-65R-BUU-H6	2	50.286	55.314	0.77	0.90	14.78	91.80	0.000	0.000	817.53	0.00	0.00
19	150.00	SBNHH-1D65A	1	50.286	55.314	1.00	1.00	5.88	30.15	0.000	0.000	325.25	0.00	0.00
20	150.00	RRUS-32	3	50.286	55.314	0.50	0.75	5.83	207.90	0.000	0.000	322.71	0.00	0.00
21	150.00	KMW AM-X-CD-16-65-00T	2	50.286	55.314	0.56	0.75	9.02	87.30	0.000	0.000	499.07	0.00	0.00
22	150.00	Powerwave LGP21401	6	50.286	55.314	0.38	0.75	2.75	76.14	0.000	0.000	151.84	0.00	0.00
23	150.00	KMW AM-X-CD-14-65-00T	1	50.286	55.314	0.75	0.75	5.29	32.76	0.000	0.000	292.47	0.00	0.00
24	150.00	Ericsson RRUS-11	3	50.286	55.314	0.50	0.75	3.80	136.89	0.000	0.000	210.13	0.00	0.00
25	150.00	Raycap DC6-48-60-18-8F	1	50.286	55.314	0.67	1.00	1.21	28.62	0.000	0.000	67.08	0.00	0.00
26	150.00	Platform w/ Hand Rail	1	50.286	55.314	1.00	1.00	35.00	1440.00	0.000	0.000	1936.00	0.00	0.00
							Totals:		**9,432.10**			**18,038.15**		

Total Applied Force Summary

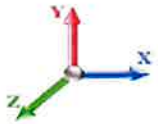
Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Load Case: 0.9D + 1.0W 123 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.00



Iterations 29

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
2.00		345.27	529.06	0.00	0.00
4.00		342.50	543.22	0.00	0.00
6.00		339.73	557.37	0.00	0.00
8.00		336.95	553.09	0.00	0.00
10.00		334.18	548.81	0.00	0.00
12.00		331.41	544.53	0.00	0.00
14.00		328.63	540.25	0.00	0.00
16.00		329.88	535.97	0.00	0.00
18.00		335.29	531.69	0.00	0.00
20.00		339.86	527.41	0.00	0.00
22.00		343.75	523.13	0.00	0.00
24.00		347.05	518.86	0.00	0.00
26.00		349.84	514.58	0.00	0.00
28.00		352.18	510.30	0.00	0.00
30.00		354.13	506.02	0.00	0.00
32.00		355.72	501.74	0.00	0.00
34.00		357.00	497.46	0.00	0.00
36.00		357.99	493.18	0.00	0.00
38.00		358.72	488.90	0.00	0.00
40.00		359.21	484.62	0.00	0.00
42.00		359.48	480.34	0.00	0.00
43.92		344.50	456.31	0.00	0.00
44.00		15.15	36.94	0.00	0.00
46.00		365.16	882.38	0.00	0.00
48.00		364.91	874.12	0.00	0.00
50.00		364.49	865.87	0.00	0.00
51.00		181.66	429.84	0.00	0.00
52.00		181.51	217.28	0.00	0.00
54.00		363.19	431.58	0.00	0.00
56.00		362.33	427.60	0.00	0.00
58.00		361.33	423.63	0.00	0.00
60.00		360.21	419.65	0.00	0.00
62.00		358.98	415.68	0.00	0.00
64.00		357.62	411.71	0.00	0.00
66.00		356.16	407.73	0.00	0.00
68.00		354.60	403.76	0.00	0.00
70.00		352.94	399.78	0.00	0.00
72.00		351.19	395.81	0.00	0.00
74.00		349.34	391.84	0.00	0.00
76.00		347.41	387.86	0.00	0.00
78.00		345.40	383.89	0.00	0.00
80.00		343.31	379.91	0.00	0.00
82.00		341.14	375.94	0.00	0.00
84.00		338.89	371.97	0.00	0.00
86.00		336.57	367.99	0.00	0.00
88.00		334.19	364.02	0.00	0.00

Total Applied Force Summary

Structure:	CT46130-A-SBA		**Code:**	EIA/TIA-222-H	12/5/2019
Site Name:	Deep River-winthrop Rd		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 20

Tower Engineering Solutions

90.00		331.73	360.04	0.00	0.00
90.17		27.47	29.82	0.00	0.00
92.00		306.78	578.36	0.00	0.00
94.00		332.28	623.91	0.00	0.00
96.00		329.66	616.57	0.00	0.00
98.00		326.99	301.96	0.00	0.00
100.00		324.25	298.60	0.00	0.00
102.00		321.46	295.23	0.00	0.00
104.00		318.61	291.87	0.00	0.00
106.00		315.71	288.51	0.00	0.00
108.00		312.76	285.15	0.00	0.00
110.00		309.76	281.78	0.00	0.00
112.00		306.70	278.42	0.00	0.00
114.00		303.61	275.06	0.00	0.00
116.00		300.46	271.70	0.00	0.00
118.00		297.27	268.33	0.00	0.00
120.00		294.03	264.97	0.00	0.00
122.00		290.75	261.61	0.00	0.00
124.00		287.42	258.24	0.00	0.00
126.00		284.06	254.88	0.00	0.00
128.00		280.65	251.52	0.00	0.00
130.00		277.21	248.16	0.00	0.00
132.00		273.72	244.79	0.00	0.00
133.33		180.43	161.33	0.00	0.00
134.00		91.05	130.40	0.00	0.00
136.00		271.08	387.32	0.00	0.00
138.00		267.49	381.51	0.00	0.00
140.00		263.87	181.23	0.00	0.00
142.00		260.21	178.79	0.00	0.00
144.00		256.52	176.34	0.00	0.00
146.00		252.80	173.90	0.00	0.00
148.00		249.04	171.45	0.00	0.00
150.00	(23) attachments	5367.94	2395.07	0.00	0.00
152.00		241.42	151.53	0.00	0.00
154.00		237.56	149.08	0.00	0.00
156.00		233.68	146.64	0.00	0.00
158.00	(15) attachments	2464.08	1270.09	0.00	0.00
160.00		225.81	130.52	0.00	0.00
162.00		221.83	128.07	0.00	0.00
164.00		217.82	125.62	0.00	0.00
166.00	(21) attachments	6008.60	3450.85	0.00	0.00
168.00		209.71	113.86	0.00	0.00
170.00		205.62	111.42	0.00	0.00
172.00		201.50	108.97	0.00	0.00
174.00		197.35	106.53	0.00	0.00
176.00		193.17	104.08	0.00	0.00
178.00	(14) attachments	5075.29	2854.11	0.00	0.00
180.00		184.74	95.45	0.00	0.00
	Totals:	**45,722.93**	**42,367.24**	**0.00**	**0.00**

Calculated Forces

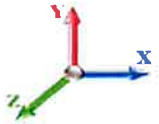
Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 0.9D + 1.0W 123 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.00



Iterations 29

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-42.34	-45.75	0.00	-5425.5	0.00	5425.51	5123.29	1522.04	7808.40	6435.29	0.00	0.000	0.000	0.852
2.00	-41.75	-45.46	0.00	-5334.0	0.00	5334.01	5107.67	1509.78	7683.09	6363.61	0.02	-0.073	0.000	0.847
4.00	-41.15	-45.17	0.00	-5243.0	0.00	5243.09	5091.62	1497.52	7558.79	6291.73	0.06	-0.146	0.000	0.842
6.00	-40.53	-44.88	0.00	-5152.7	0.00	5152.76	5075.16	1485.26	7435.50	6219.67	0.14	-0.220	0.000	0.837
8.00	-39.92	-44.59	0.00	-5063.0	0.00	5063.00	5058.29	1472.99	7313.22	6147.44	0.25	-0.295	0.000	0.832
10.00	-39.32	-44.31	0.00	-4973.8	0.00	4973.82	5041.00	1460.73	7191.96	6075.05	0.39	-0.370	0.000	0.827
12.00	-38.72	-44.02	0.00	-4885.2	0.00	4885.21	5023.29	1448.47	7071.72	6002.51	0.56	-0.446	0.000	0.822
14.00	-38.12	-43.74	0.00	-4797.1	0.00	4797.17	5005.16	1436.20	6952.48	5929.84	0.77	-0.522	0.000	0.818
16.00	-37.53	-43.45	0.00	-4709.6	0.00	4709.69	4986.62	1423.94	6834.27	5857.05	1.00	-0.599	0.000	0.813
18.00	-36.95	-43.16	0.00	-4622.7	0.00	4622.78	4967.66	1411.68	6717.06	5784.16	1.27	-0.676	0.000	0.808
20.00	-36.36	-42.87	0.00	-4536.4	0.00	4536.46	4948.29	1399.42	6600.87	5711.17	1.57	-0.754	0.000	0.803
22.00	-35.79	-42.57	0.00	-4450.7	0.00	4450.72	4928.49	1387.15	6485.69	5638.10	1.90	-0.832	0.000	0.798
24.00	-35.22	-42.26	0.00	-4365.5	0.00	4365.59	4908.28	1374.89	6371.53	5564.95	2.27	-0.911	0.000	0.793
26.00	-34.65	-41.95	0.00	-4281.0	0.00	4281.08	4887.66	1362.63	6258.37	5491.76	2.67	-0.991	0.000	0.788
28.00	-34.09	-41.64	0.00	-4197.1	0.00	4197.18	4866.62	1350.36	6146.24	5418.52	3.10	-1.071	0.000	0.783
30.00	-33.53	-41.32	0.00	-4113.9	0.00	4113.91	4845.16	1338.10	6035.11	5345.24	3.57	-1.152	0.000	0.778
32.00	-32.98	-41.00	0.00	-4031.2	0.00	4031.27	4823.28	1325.84	5925.00	5271.95	4.07	-1.233	0.000	0.772
34.00	-32.43	-40.68	0.00	-3949.2	0.00	3949.27	4800.99	1313.58	5815.91	5198.66	4.60	-1.315	0.000	0.767
36.00	-31.89	-40.36	0.00	-3867.9	0.00	3867.92	4778.28	1301.31	5707.83	5125.37	5.17	-1.397	0.000	0.762
38.00	-31.35	-40.03	0.00	-3787.2	0.00	3787.21	4755.15	1289.05	5600.76	5052.10	5.77	-1.480	0.000	0.757
40.00	-30.81	-39.70	0.00	-3707.1	0.00	3707.15	4731.61	1276.79	5494.70	4978.87	6.41	-1.564	0.000	0.752
42.00	-30.29	-39.37	0.00	-3627.7	0.00	3627.75	4707.65	1264.52	5389.66	4905.68	7.09	-1.648	0.000	0.747
43.92	-29.81	-39.04	0.00	-3552.2	0.00	3552.28	4684.30	1252.77	5289.95	4835.60	7.76	-1.730	0.000	0.742
44.00	-29.75	-39.05	0.00	-3549.0	0.00	3549.03	4683.27	1252.26	5285.64	4832.55	7.80	-1.733	0.000	0.742
46.00	-28.82	-38.70	0.00	-3470.9	0.00	3470.94	4658.48	1240.00	5182.62	4759.49	8.54	-1.819	0.000	0.736
48.00	-27.90	-38.35	0.00	-3393.5	0.00	3393.55	4633.27	1227.74	5080.62	4686.52	9.32	-1.905	0.000	0.731
50.00	-27.00	-37.98	0.00	-3316.8	0.00	3316.86	4607.64	1215.47	4979.64	4613.64	10.14	-1.991	0.000	0.726
51.00	-26.55	-37.81	0.00	-3278.8	0.00	3278.87	4157.28	1142.33	4736.69	4216.21	10.56	-2.035	0.000	0.785
52.00	-26.29	-37.65	0.00	-3241.0	0.00	3241.07	4146.96	1136.64	4689.60	4184.61	10.99	-2.079	0.000	0.782
54.00	-25.82	-37.31	0.00	-3165.7	0.00	3165.77	4126.01	1125.25	4596.10	4121.41	11.88	-2.169	0.000	0.775
56.00	-25.35	-36.97	0.00	-3091.1	0.00	3091.16	4104.64	1113.86	4503.55	4058.23	12.81	-2.260	0.000	0.769
58.00	-24.88	-36.63	0.00	-3017.2	0.00	3017.22	4082.85	1102.48	4411.95	3995.08	13.78	-2.351	0.000	0.762
60.00	-24.42	-36.29	0.00	-2943.9	0.00	2943.95	4060.64	1091.09	4321.28	3931.97	14.78	-2.443	0.000	0.756
62.00	-23.96	-35.96	0.00	-2871.3	0.00	2871.36	4038.02	1079.70	4231.55	3868.91	15.82	-2.535	0.000	0.749
64.00	-23.51	-35.62	0.00	-2799.4	0.00	2799.45	4014.98	1068.31	4142.77	3805.92	16.91	-2.628	0.000	0.743
66.00	-23.06	-35.28	0.00	-2728.2	0.00	2728.22	3991.52	1056.93	4054.92	3743.01	18.03	-2.721	0.000	0.736
68.00	-22.61	-34.95	0.00	-2657.6	0.00	2657.65	3967.65	1045.54	3968.02	3680.19	19.19	-2.815	0.000	0.729
70.00	-22.18	-34.61	0.00	-2587.7	0.00	2587.76	3943.36	1034.15	3882.06	3617.47	20.39	-2.910	0.000	0.722
72.00	-21.74	-34.27	0.00	-2518.5	0.00	2518.54	3918.66	1022.77	3797.04	3554.87	21.63	-3.005	0.000	0.715
74.00	-21.31	-33.94	0.00	-2449.9	0.00	2449.99	3893.54	1011.38	3712.96	3492.40	22.91	-3.101	0.000	0.708
76.00	-20.89	-33.61	0.00	-2382.1	0.00	2382.11	3868.00	999.99	3629.83	3430.07	24.23	-3.197	0.000	0.701
78.00	-20.47	-33.28	0.00	-2314.9	0.00	2314.90	3842.04	988.61	3547.63	3367.90	25.59	-3.294	0.000	0.694
80.00	-20.05	-32.95	0.00	-2248.3	0.00	2248.35	3815.67	977.22	3466.38	3305.90	26.99	-3.392	0.000	0.686
82.00	-19.64	-32.62	0.00	-2182.4	0.00	2182.46	3788.88	965.83	3386.07	3244.07	28.43	-3.489	0.000	0.679
84.00	-19.23	-32.29	0.00	-2117.2	0.00	2117.23	3761.67	954.44	3306.69	3182.44	29.91	-3.588	0.000	0.672
86.00	-18.83	-31.96	0.00	-2052.6	0.00	2052.65	3734.05	943.06	3228.26	3121.02	31.43	-3.687	0.000	0.664
88.00	-18.44	-31.64	0.00	-1988.7	0.00	1988.73	3706.01	931.67	3150.77	3059.82	33.00	-3.786	0.000	0.656
90.00	-18.07	-31.30	0.00	-1925.4	0.00	1925.46	3677.55	920.28	3074.23	2998.84	34.61	-3.886	0.000	0.648

Calculated Forces

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H
Site Name:	Deep River-winthrop Rd	**Exposure:**	C
Height:	180.00 (ft)	**Crest Height:**	0.00
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil
Gh:	1.1	**Topography:** 1	**Struct Class:** II

12/5/2019

Page: 22

TES Tower Engineering Solutions

90.17	-18.02	-31.28	0.00	-1920.2	0.00	1920.24	3675.16	919.33	3067.89	2993.77	34.74	-3.894	0.000	0.647
92.00	-17.41	-30.97	0.00	-1862.8	0.00	1862.89	3648.68	908.90	2998.62	2938.12	36.25	-3.986	0.000	0.640
94.00	-16.75	-30.62	0.00	-1800.9	0.00	1800.95	3619.39	897.51	2923.96	2877.64	37.94	-4.087	0.000	0.632
96.00	-16.11	-30.28	0.00	-1739.7	0.00	1739.71	2873.56	764.37	2506.37	2303.28	39.68	-4.188	0.000	0.762
98.00	-15.78	-29.96	0.00	-1679.1	0.00	1679.15	2853.66	754.73	2443.58	2258.25	41.45	-4.289	0.000	0.751
100.00	-15.44	-29.64	0.00	-1619.2	0.00	1619.23	2833.34	745.10	2381.59	2213.29	43.27	-4.402	0.000	0.739
102.00	-15.12	-29.33	0.00	-1559.9	0.00	1559.95	2812.61	735.46	2320.39	2168.43	45.14	-4.516	0.000	0.726
104.00	-14.79	-29.02	0.00	-1501.2	0.00	1501.29	2791.46	725.83	2259.99	2123.68	47.05	-4.630	0.000	0.714
106.00	-14.48	-28.71	0.00	-1443.2	0.00	1443.25	2769.89	716.19	2200.39	2079.04	49.02	-4.743	0.000	0.701
108.00	-14.16	-28.40	0.00	-1385.8	0.00	1385.83	2747.90	706.55	2141.58	2034.53	51.03	-4.857	0.000	0.688
110.00	-13.85	-28.10	0.00	-1329.0	0.00	1329.03	2725.50	696.92	2083.57	1990.17	53.08	-4.970	0.000	0.675
112.00	-13.55	-27.79	0.00	-1272.8	0.00	1272.84	2702.68	687.28	2026.36	1945.97	55.19	-5.084	0.000	0.661
114.00	-13.25	-27.49	0.00	-1217.2	0.00	1217.25	2679.45	677.65	1969.94	1901.93	57.34	-5.197	0.000	0.647
116.00	-12.95	-27.19	0.00	-1162.2	0.00	1162.27	2655.79	668.01	1914.32	1858.08	59.54	-5.310	0.000	0.632
118.00	-12.66	-26.90	0.00	-1107.8	0.00	1107.88	2631.73	658.38	1859.50	1814.42	61.78	-5.422	0.000	0.617
120.00	-12.37	-26.60	0.00	-1054.0	0.00	1054.09	2607.24	648.74	1805.47	1770.96	64.08	-5.534	0.000	0.602
122.00	-12.09	-26.31	0.00	-1000.8	0.00	1000.88	2582.34	639.11	1752.24	1727.73	66.41	-5.645	0.000	0.586
124.00	-11.81	-26.02	0.00	-948.25	0.00	948.25	2557.02	629.47	1699.80	1684.74	68.80	-5.756	0.000	0.569
126.00	-11.53	-25.74	0.00	-896.21	0.00	896.21	2531.28	619.84	1648.16	1641.98	71.23	-5.865	0.000	0.552
128.00	-11.27	-25.45	0.00	-844.74	0.00	844.74	2505.13	610.20	1597.32	1599.49	73.71	-5.973	0.000	0.534
130.00	-11.00	-25.17	0.00	-793.83	0.00	793.83	2478.56	600.57	1547.28	1557.27	76.23	-6.079	0.000	0.516
132.00	-10.75	-24.89	0.00	-743.49	0.00	743.49	2451.58	590.93	1498.03	1515.33	78.79	-6.184	0.000	0.497
133.33	-10.59	-24.70	0.00	-710.30	0.00	710.30	2433.35	584.51	1465.64	1487.53	80.53	-6.253	0.000	0.484
134.00	-10.44	-24.61	0.00	-693.83	0.00	693.83	2424.17	581.30	1449.58	1473.69	81.40	-6.288	0.000	0.477
136.00	-10.04	-24.32	0.00	-644.61	0.00	644.61	2396.35	571.66	1401.92	1432.35	84.05	-6.388	0.000	0.456
138.00	-9.65	-24.02	0.00	-595.98	0.00	595.98	1545.45	417.14	1026.36	929.77	86.74	-6.486	0.000	0.651
140.00	-9.46	-23.76	0.00	-547.94	0.00	547.94	1531.69	410.13	992.17	905.88	89.48	-6.582	0.000	0.614
142.00	-9.26	-23.50	0.00	-500.42	0.00	500.42	1517.50	403.12	958.56	882.03	92.25	-6.700	0.000	0.577
144.00	-9.07	-23.24	0.00	-453.43	0.00	453.43	1502.90	396.11	925.52	858.22	95.08	-6.814	0.000	0.538
146.00	-8.89	-22.98	0.00	-406.95	0.00	406.95	1487.88	389.11	893.06	834.49	97.95	-6.922	0.000	0.497
148.00	-8.71	-22.73	0.00	-360.98	0.00	360.98	1472.45	382.10	861.19	810.82	100.87	-7.024	0.000	0.455
150.00	-6.97	-17.12	0.00	-315.52	0.00	315.52	1456.60	375.09	829.89	787.25	103.82	-7.118	0.000	0.408
152.00	-6.82	-16.87	0.00	-281.28	0.00	281.28	1440.33	368.08	799.17	763.78	106.82	-7.207	0.000	0.375
154.00	-6.68	-16.63	0.00	-247.53	0.00	247.53	1423.65	361.08	769.03	740.42	109.85	-7.290	0.000	0.341
156.00	-6.54	-16.39	0.00	-214.28	0.00	214.28	1406.55	354.07	739.47	717.20	112.91	-7.366	0.000	0.306
158.00	-5.58	-13.78	0.00	-181.51	0.00	181.51	1389.03	347.06	710.49	694.11	116.00	-7.436	0.000	0.267
160.00	-5.47	-13.55	0.00	-153.94	0.00	153.94	1371.10	340.05	682.09	671.17	119.12	-7.498	0.000	0.235
162.00	-5.36	-13.32	0.00	-126.84	0.00	126.84	1352.75	333.05	654.27	648.41	122.27	-7.554	0.000	0.201
164.00	-5.25	-13.09	0.00	-100.21	0.00	100.21	1333.98	326.04	627.03	625.81	125.44	-7.602	0.000	0.166
166.00	-2.63	-6.68	0.00	-74.03	0.00	74.03	1314.79	319.03	600.37	603.42	128.62	-7.641	0.000	0.125
168.00	-2.54	-6.46	0.00	-60.68	0.00	60.68	1295.19	312.03	574.28	581.22	131.82	-7.674	0.000	0.107
170.00	-2.45	-6.24	0.00	-47.77	0.00	47.77	1275.17	305.02	548.78	559.24	135.03	-7.702	0.000	0.088
172.00	-2.37	-6.02	0.00	-35.29	0.00	35.29	1251.65	298.01	523.85	536.17	138.25	-7.724	0.000	0.068
174.00	-2.29	-5.82	0.00	-23.24	0.00	23.24	1222.21	291.00	499.51	511.11	141.48	-7.742	0.000	0.048
176.00	-2.21	-5.61	0.00	-11.61	0.00	11.61	1192.78	284.00	475.74	486.64	144.72	-7.753	0.000	0.026
178.00	-0.07	-0.20	0.00	-0.39	0.00	0.39	1163.35	276.99	452.55	462.78	147.96	-7.757	0.000	0.001
180.00	0.00	-0.18	0.00	0.00	0.00	0.00	1133.92	269.98	429.95	439.52	151.20	-7.757	0.000	0.000

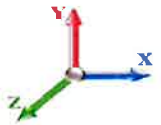
Wind Loading - Shaft

Structure: CT46130-A-SBA
Site Name: Deep River-winthrop Rd
Height: 180.00 (ft)
Base Elev: 0.000 (ft)
Gh: 1.1 **Topography:** 1

Code: EIA/TIA-222-H 12/5/2019
Exposure: C
Crest Height: 0.00
Site Class: D - Stiff Soil
Struct Class: II Page: 23

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind
Dead Load Factor 1.20
Wind Load Factor 1.00



Iterations 27

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	5.124	5.64	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
2.00		1.00	0.85	5.124	5.64	0.00	1.200	0.567	2.00	10.844	13.01	73.3	91.2	796.6
4.00		1.00	0.85	5.124	5.64	0.00	1.200	0.607	2.00	10.772	12.93	72.9	97.0	796.7
6.00		1.00	0.85	5.124	5.64	0.00	1.200	0.632	2.00	10.695	12.83	72.3	100.2	794.2
8.00		1.00	0.85	5.124	5.64	0.00	1.200	0.651	2.00	10.615	12.74	71.8	102.3	790.6
10.00		1.00	0.85	5.124	5.64	0.00	1.200	0.666	2.00	10.535	12.64	71.3	103.8	786.4
12.00		1.00	0.85	5.124	5.64	0.00	1.200	0.678	2.00	10.453	12.54	70.7	104.9	781.8
14.00		1.00	0.85	5.124	5.64	0.00	1.200	0.688	2.00	10.371	12.45	70.1	105.6	776.8
16.00		1.00	0.86	5.187	5.71	0.00	1.200	0.698	2.00	10.289	12.35	70.4	106.2	771.7
18.00		1.00	0.88	5.318	5.85	0.00	1.200	0.706	2.00	10.206	12.25	71.6	106.6	766.3
20.00		1.00	0.90	5.437	5.98	0.00	1.200	0.713	2.00	10.123	12.15	72.6	106.8	760.8
22.00		1.00	0.92	5.547	6.10	0.00	1.200	0.720	2.00	10.039	12.05	73.5	106.9	755.2
24.00		1.00	0.94	5.650	6.21	0.00	1.200	0.726	2.00	9.956	11.95	74.2	106.9	749.5
26.00		1.00	0.95	5.746	6.32	0.00	1.200	0.732	2.00	9.872	11.85	74.9	106.8	743.8
28.00		1.00	0.97	5.836	6.42	0.00	1.200	0.738	2.00	9.788	11.75	75.4	106.7	737.9
30.00		1.00	0.98	5.921	6.51	0.00	1.200	0.743	2.00	9.705	11.65	75.9	106.5	732.0
32.00		1.00	1.00	6.002	6.60	0.00	1.200	0.748	2.00	9.621	11.54	76.2	106.2	726.0
34.00		1.00	1.01	6.079	6.69	0.00	1.200	0.752	2.00	9.536	11.44	76.5	105.9	720.0
36.00		1.00	1.02	6.153	6.77	0.00	1.200	0.757	2.00	9.452	11.34	76.8	105.5	713.9
38.00		1.00	1.03	6.224	6.85	0.00	1.200	0.761	2.00	9.368	11.24	77.0	105.1	707.8
40.00		1.00	1.04	6.291	6.92	0.00	1.200	0.765	2.00	9.284	11.14	77.1	104.7	701.7
42.00		1.00	1.05	6.356	6.99	0.00	1.200	0.768	2.00	9.200	11.04	77.2	104.2	695.5
43.92	Bot - Section 2	1.00	1.06	6.416	7.06	0.00	1.200	0.772	1.92	8.737	10.48	74.0	99.4	660.7
44.00		1.00	1.06	6.419	7.06	0.00	1.200	0.772	0.08	0.384	0.46	3.3	4.4	51.6
46.00		1.00	1.07	6.479	7.13	0.00	1.200	0.775	2.00	9.171	11.01	78.4	104.8	1232.2
48.00		1.00	1.08	6.537	7.19	0.00	1.200	0.779	2.00	9.086	10.90	78.4	104.3	1220.6
50.00		1.00	1.09	6.594	7.25	0.00	1.200	0.782	2.00	9.002	10.80	78.3	103.7	1209.0
51.00	Top - Section 1	1.00	1.10	6.621	7.28	0.00	1.200	0.783	1.00	4.469	5.36	39.1	51.7	600.2
52.00		1.00	1.10	6.648	7.31	0.00	1.200	0.785	1.00	4.448	5.34	39.0	51.6	316.7
54.00		1.00	1.11	6.701	7.37	0.00	1.200	0.788	2.00	8.833	10.60	78.1	102.5	628.8
56.00		1.00	1.12	6.753	7.43	0.00	1.200	0.791	2.00	8.748	10.50	78.0	101.9	622.8
58.00		1.00	1.13	6.803	7.48	0.00	1.200	0.794	2.00	8.663	10.40	77.8	101.2	616.9
60.00		1.00	1.14	6.852	7.54	0.00	1.200	0.796	2.00	8.579	10.29	77.6	100.5	610.9
62.00		1.00	1.14	6.899	7.59	0.00	1.200	0.799	2.00	8.494	10.19	77.4	99.8	604.9
64.00		1.00	1.15	6.945	7.64	0.00	1.200	0.801	2.00	8.409	10.09	77.1	99.1	598.9
66.00		1.00	1.16	6.991	7.69	0.00	1.200	0.804	2.00	8.325	9.99	76.8	98.4	592.9
68.00		1.00	1.17	7.035	7.74	0.00	1.200	0.806	2.00	8.240	9.89	76.5	97.7	586.9
70.00		1.00	1.17	7.078	7.79	0.00	1.200	0.809	2.00	8.155	9.79	76.2	96.9	580.8
72.00		1.00	1.18	7.120	7.83	0.00	1.200	0.811	2.00	8.070	9.68	75.8	96.2	574.7
74.00		1.00	1.19	7.161	7.88	0.00	1.200	0.813	2.00	7.985	9.58	75.5	95.4	568.7
76.00		1.00	1.19	7.201	7.92	0.00	1.200	0.815	2.00	7.900	9.48	75.1	94.6	562.6
78.00		1.00	1.20	7.241	7.96	0.00	1.200	0.817	2.00	7.816	9.38	74.7	93.8	556.5
80.00		1.00	1.21	7.279	8.01	0.00	1.200	0.819	2.00	7.731	9.28	74.3	93.0	550.4
82.00		1.00	1.21	7.317	8.05	0.00	1.200	0.821	2.00	7.646	9.17	73.9	92.2	544.2
84.00		1.00	1.22	7.355	8.09	0.00	1.200	0.823	2.00	7.561	9.07	73.4	91.3	538.1
86.00		1.00	1.23	7.391	8.13	0.00	1.200	0.825	2.00	7.476	8.97	72.9	90.5	532.0
88.00		1.00	1.23	7.427	8.17	0.00	1.200	0.827	2.00	7.391	8.87	72.5	89.6	525.8

Wind Loading - Shaft

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 24	

Tower Engineering Solutions

90.00	1.00	1.24	7.462	8.21	0.00	1.200	0.829	2.00	7.306	8.77	72.0	88.8	519.7
90.17 Bot - Section 3	1.00	1.24	7.465	8.21	0.00	1.200	0.829	0.17	0.605	0.73	6.0	7.4	43.1
92.00	1.00	1.24	7.497	8.25	0.00	1.200	0.831	1.83	6.725	8.07	66.5	81.9	808.0
94.00	1.00	1.25	7.531	8.28	0.00	1.200	0.833	2.00	7.255	8.71	72.1	88.5	871.2
96.00 Top - Section 2	1.00	1.25	7.564	8.32	0.00	1.200	0.835	2.00	7.170	8.60	71.6	87.6	860.6
98.00	1.00	1.26	7.597	8.36	0.00	1.200	0.836	2.00	7.085	8.50	71.0	86.7	440.2
100.00	1.00	1.27	7.630	8.39	0.00	1.200	0.838	2.00	7.000	8.40	70.5	85.8	434.8
102.00	1.00	1.27	7.661	8.43	0.00	1.200	0.840	2.00	6.915	8.30	69.9	84.9	429.4
104.00	1.00	1.28	7.693	8.46	0.00	1.200	0.841	2.00	6.830	8.20	69.4	84.0	424.0
106.00	1.00	1.28	7.724	8.50	0.00	1.200	0.843	2.00	6.745	8.09	68.8	83.1	418.6
108.00	1.00	1.29	7.754	8.53	0.00	1.200	0.844	2.00	6.659	7.99	68.2	82.2	413.2
110.00	1.00	1.29	7.784	8.56	0.00	1.200	0.846	2.00	6.574	7.89	67.6	81.2	407.8
112.00	1.00	1.30	7.814	8.60	0.00	1.200	0.847	2.00	6.489	7.79	66.9	80.3	402.4
114.00	1.00	1.30	7.843	8.63	0.00	1.200	0.849	2.00	6.404	7.69	66.3	79.4	396.9
116.00	1.00	1.31	7.872	8.66	0.00	1.200	0.850	2.00	6.319	7.58	65.7	78.4	391.5
118.00	1.00	1.31	7.900	8.69	0.00	1.200	0.852	2.00	6.234	7.48	65.0	77.4	386.0
120.00	1.00	1.32	7.928	8.72	0.00	1.200	0.853	2.00	6.149	7.38	64.3	76.5	380.6
122.00	1.00	1.32	7.956	8.75	0.00	1.200	0.855	2.00	6.064	7.28	63.7	75.5	375.1
124.00	1.00	1.32	7.983	8.78	0.00	1.200	0.856	2.00	5.979	7.17	63.0	74.5	369.7
126.00	1.00	1.33	8.010	8.81	0.00	1.200	0.858	2.00	5.894	7.07	62.3	73.6	364.2
128.00	1.00	1.33	8.037	8.84	0.00	1.200	0.859	2.00	5.808	6.97	61.6	72.6	358.8
130.00	1.00	1.34	8.063	8.87	0.00	1.200	0.860	2.00	5.723	6.87	60.9	71.6	353.3
132.00	1.00	1.34	8.089	8.90	0.00	1.200	0.862	2.00	5.638	6.77	60.2	70.6	347.8
133.33 Bot - Section 4	1.00	1.34	8.106	8.92	0.00	1.200	0.862	1.33	3.711	4.45	39.7	46.6	228.9
134.00	1.00	1.35	8.115	8.93	0.00	1.200	0.863	0.67	1.870	2.24	20.0	23.6	181.0
136.00	1.00	1.35	8.140	8.95	0.00	1.200	0.864	2.00	5.554	6.66	59.7	69.7	537.0
138.00 Top - Section 3	1.00	1.35	8.165	8.98	0.00	1.200	0.865	2.00	5.469	6.56	58.9	68.7	528.2
140.00	1.00	1.36	8.190	9.01	0.00	1.200	0.867	2.00	5.384	6.46	58.2	67.7	260.1
142.00	1.00	1.36	8.214	9.04	0.00	1.200	0.868	2.00	5.299	6.36	57.5	66.7	255.9
144.00	1.00	1.37	8.238	9.06	0.00	1.200	0.869	2.00	5.213	6.26	56.7	65.6	251.6
146.00	1.00	1.37	8.262	9.09	0.00	1.200	0.870	2.00	5.128	6.15	55.9	64.6	247.3
148.00	1.00	1.37	8.286	9.11	0.00	1.200	0.871	2.00	5.043	6.05	55.2	63.6	243.0
150.00 Appurtenance(s)	1.00	1.38	8.309	9.14	0.00	1.200	0.873	2.00	4.958	5.95	54.4	62.5	238.7
152.00	1.00	1.38	8.333	9.17	0.00	1.200	0.874	2.00	4.873	5.85	53.6	61.5	234.4
154.00	1.00	1.39	8.356	9.19	0.00	1.200	0.875	2.00	4.787	5.74	52.8	60.5	230.1
156.00	1.00	1.39	8.378	9.22	0.00	1.200	0.876	2.00	4.702	5.64	52.0	59.4	225.8
158.00 Appurtenance(s)	1.00	1.39	8.401	9.24	0.00	1.200	0.877	2.00	4.617	5.54	51.2	58.4	221.5
160.00	1.00	1.40	8.423	9.27	0.00	1.200	0.878	2.00	4.532	5.44	50.4	57.3	217.2
162.00	1.00	1.40	8.445	9.29	0.00	1.200	0.879	2.00	4.447	5.34	49.6	56.3	212.9
164.00	1.00	1.40	8.467	9.31	0.00	1.200	0.880	2.00	4.361	5.23	48.7	55.2	208.5
166.00 Appurtenance(s)	1.00	1.41	8.489	9.34	0.00	1.200	0.881	2.00	4.276	5.13	47.9	54.1	204.2
168.00	1.00	1.41	8.510	9.36	0.00	1.200	0.883	2.00	4.191	5.03	47.1	53.1	199.9
170.00	1.00	1.42	8.531	9.38	0.00	1.200	0.884	2.00	4.106	4.93	46.2	52.0	195.6
172.00	1.00	1.42	8.552	9.41	0.00	1.200	0.885	2.00	4.020	4.82	45.4	50.9	191.2
174.00	1.00	1.42	8.573	9.43	0.00	1.200	0.886	2.00	3.935	4.72	44.5	49.8	186.9
176.00	1.00	1.43	8.594	9.45	0.00	1.200	0.887	2.00	3.850	4.62	43.7	48.8	182.5
178.00 Appurtenance(s)	1.00	1.43	8.614	9.48	0.00	1.200	0.888	2.00	3.765	4.52	42.8	47.7	178.2
180.00	1.00	1.43	8.635	9.50	0.00	1.200	0.889	2.00	3.680	4.42	41.9	46.6	173.8
							Totals:	**180.00**			**6,013.4**		**47,724.7**

Discrete Appurtenance Forces

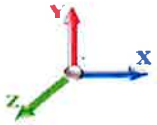
Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 25	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 27

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	178.00	Samsung B5/B13 RRH	3	8.614	9.476	0.50	0.75	3.82	289.84	0.000	0.000	36.22	0.00	0.00
2	178.00	Samsung B2/B66A RRH	3	8.614	9.476	0.50	0.75	3.51	533.26	0.000	0.000	33.23	0.00	0.00
3	178.00	JMA MX06FRO660-03	6	8.614	9.476	0.61	0.75	38.75	1189.18	0.000	0.000	367.17	0.00	0.00
4	178.00	Platform w/ Handrails w/	1	8.614	9.476	1.00	1.00	50.65	3417.74	0.000	0.000	479.97	0.00	0.00
5	178.00	Raycap	1	8.614	9.476	1.00	1.00	2.94	57.76	0.000	0.000	27.83	0.00	0.00
6	166.00	ALU 800 Mhz	6	8.489	9.338	0.38	0.75	6.90	479.14	0.000	0.000	64.45	0.00	0.00
7	166.00	RFS APXVTM14-C-I20	3	8.489	9.338	0.58	0.75	11.93	421.57	0.000	0.000	111.37	0.00	0.00
8	166.00	Commscope	3	8.489	9.338	0.55	0.75	21.65	513.94	0.000	0.000	202.20	0.00	0.00
9	166.00	ALU 1900 Mhz	3	8.489	9.338	0.50	0.75	6.79	230.21	0.000	0.000	63.37	0.00	0.00
10	166.00	Sitepro	1	8.489	9.338	1.00	1.00	10.46	1138.27	0.000	0.000	97.63	0.00	0.00
11	166.00	ALU TD-RRH8x20-25	3	8.489	9.338	0.50	0.75	6.70	402.61	0.000	0.000	62.55	0.00	0.00
12	166.00	Sitepro	1	8.489	9.338	1.00	1.00	10.24	337.20	0.000	0.000	95.65	0.00	0.00
13	166.00	Platform w/ Hand Rails	1	8.489	9.338	1.00	1.00	50.58	2857.80	0.000	0.000	472.28	0.00	0.00
14	158.00	PCS1900 G3 TMA	6	8.401	9.241	0.40	0.80	3.46	173.64	0.000	0.000	31.95	0.00	0.00
15	158.00	T-Arms	3	8.401	9.241	0.56	0.75	19.42	1418.40	0.000	0.000	179.47	0.00	0.00
16	158.00	EMS RR90-17-02DP	6	8.401	9.241	0.54	0.80	25.89	524.52	0.000	0.000	239.22	0.00	0.00
17	150.00	Powerwave 7770	3	8.309	9.140	0.55	0.75	9.88	306.19	0.000	0.000	90.33	0.00	0.00
18	150.00	Cci HPA-65R-BUU-H6	2	8.309	9.140	0.77	0.90	15.79	350.56	0.000	0.000	144.35	0.00	0.00
19	150.00	SBNHH-1D65A	1	8.309	9.140	1.00	1.00	6.40	111.56	0.000	0.000	58.52	0.00	0.00
20	150.00	RRUS-32	3	8.309	9.140	0.50	0.75	5.57	430.43	0.000	0.000	50.92	0.00	0.00
21	150.00	KMW AM-X-CD-16-65-00T	2	8.309	9.140	0.56	0.75	10.59	185.68	0.000	0.000	96.83	0.00	0.00
22	150.00	Powerwave LGP21401	6	8.309	9.140	0.38	0.75	3.63	133.92	0.000	0.000	33.22	0.00	0.00
23	150.00	KMW AM-X-CD-14-65-00T	1	8.309	9.140	0.75	0.75	6.28	67.54	0.000	0.000	57.39	0.00	0.00
24	150.00	Ericsson RRUS-11	3	8.309	9.140	0.50	0.75	4.27	289.33	0.000	0.000	39.02	0.00	0.00
25	150.00	Raycap DC6-48-60-18-8F	1	8.309	9.140	0.67	1.00	1.50	51.37	0.000	0.000	13.72	0.00	0.00
26	150.00	Platform w/ Hand Rail	1	8.309	9.140	1.00	1.00	50.27	2369.92	0.000	0.000	459.50	0.00	0.00
							Totals:		**18,281.57**			**3,608.35**		

Total Applied Force Summary

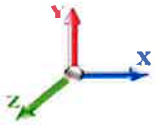
Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 26	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 27

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
2.00		73.35	796.58	0.00	0.00
4.00		72.86	821.28	0.00	0.00
6.00		72.34	843.39	0.00	0.00
8.00		71.80	839.81	0.00	0.00
10.00		71.25	835.58	0.00	0.00
12.00		70.70	830.93	0.00	0.00
14.00		70.15	825.99	0.00	0.00
16.00		70.45	820.82	0.00	0.00
18.00		71.64	815.48	0.00	0.00
20.00		72.65	810.00	0.00	0.00
22.00		73.51	804.40	0.00	0.00
24.00		74.25	798.70	0.00	0.00
26.00		74.87	792.92	0.00	0.00
28.00		75.41	787.07	0.00	0.00
30.00		75.85	781.16	0.00	0.00
32.00		76.23	775.19	0.00	0.00
34.00		76.53	769.17	0.00	0.00
36.00		76.77	763.11	0.00	0.00
38.00		76.96	757.00	0.00	0.00
40.00		77.10	750.86	0.00	0.00
42.00		77.18	744.69	0.00	0.00
43.92		74.00	707.84	0.00	0.00
44.00		3.25	53.65	0.00	0.00
46.00		78.43	1281.34	0.00	0.00
48.00		78.41	1269.79	0.00	0.00
50.00		78.35	1258.21	0.00	0.00
51.00		39.06	624.83	0.00	0.00
52.00		39.03	341.27	0.00	0.00
54.00		78.13	677.94	0.00	0.00
56.00		77.98	672.01	0.00	0.00
58.00		77.80	666.05	0.00	0.00
60.00		77.59	660.08	0.00	0.00
62.00		77.35	654.09	0.00	0.00
64.00		77.10	648.08	0.00	0.00
66.00		76.82	642.06	0.00	0.00
68.00		76.51	636.02	0.00	0.00
70.00		76.19	629.97	0.00	0.00
72.00		75.84	623.91	0.00	0.00
74.00		75.48	617.83	0.00	0.00
76.00		75.10	611.75	0.00	0.00
78.00		74.70	605.65	0.00	0.00
80.00		74.28	599.53	0.00	0.00
82.00		73.85	593.41	0.00	0.00
84.00		73.40	587.28	0.00	0.00
86.00		72.94	581.14	0.00	0.00
88.00		72.46	574.99	0.00	0.00

Total Applied Force Summary

Structure:	CT46130-A-SBA		**Code:**	EIA/TIA-222-H	12/5/2019
Site Name:	Deep River-winthrop Rd		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 27

Tower Engineering Solutions

90.00		71.97	568.83	0.00	0.00
90.17		5.96	47.16	0.00	0.00
92.00		66.55	853.08	0.00	0.00
94.00		72.12	920.38	0.00	0.00
96.00		71.59	909.72	0.00	0.00
98.00		71.05	489.35	0.00	0.00
100.00		70.49	483.97	0.00	0.00
102.00		69.93	478.58	0.00	0.00
104.00		69.35	473.18	0.00	0.00
106.00		68.76	467.78	0.00	0.00
108.00		68.16	462.37	0.00	0.00
110.00		67.55	456.95	0.00	0.00
112.00		66.93	451.52	0.00	0.00
114.00		66.30	446.09	0.00	0.00
116.00		65.66	440.66	0.00	0.00
118.00		65.01	435.22	0.00	0.00
120.00		64.35	429.77	0.00	0.00
122.00		63.68	424.32	0.00	0.00
124.00		63.00	418.86	0.00	0.00
126.00		62.31	413.39	0.00	0.00
128.00		61.62	407.92	0.00	0.00
130.00		60.91	402.45	0.00	0.00
132.00		60.20	396.97	0.00	0.00
133.33		39.71	261.71	0.00	0.00
134.00		20.03	197.43	0.00	0.00
136.00		59.68	586.12	0.00	0.00
138.00		58.94	577.36	0.00	0.00
140.00		58.20	309.32	0.00	0.00
142.00		57.45	305.04	0.00	0.00
144.00		56.69	300.76	0.00	0.00
146.00		55.93	296.47	0.00	0.00
148.00		55.16	292.18	0.00	0.00
150.00	(23) attachments	1098.17	4584.38	0.00	0.00
152.00		53.60	263.54	0.00	0.00
154.00		52.80	259.24	0.00	0.00
156.00		52.00	254.93	0.00	0.00
158.00	(15) attachments	501.84	2367.19	0.00	0.00
160.00		50.39	231.33	0.00	0.00
162.00		49.57	227.01	0.00	0.00
164.00		48.75	222.69	0.00	0.00
166.00	(21) attachments	1217.42	6599.10	0.00	0.00
168.00		47.08	204.88	0.00	0.00
170.00		46.24	200.55	0.00	0.00
172.00		45.39	196.21	0.00	0.00
174.00		44.53	191.88	0.00	0.00
176.00		43.67	187.53	0.00	0.00
178.00	(14) attachments	987.23	5670.96	0.00	0.00
180.00		41.94	173.85	0.00	0.00
	Totals:	**9,621.76**	**69,823.03**	**0.00**	**0.00**

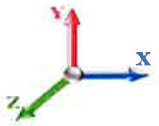
Calculated Forces

Structure: CT46130-A-SBA
Site Name: Deep River-winthrop Rd
Height: 180.00 (ft)
Base Elev: 0.000 (ft)
Gh: 1.1 **Topography:** 1

Code: EIA/TIA-222-H 12/5/2019
Exposure: C
Crest Height: 0.00
Site Class: D - Stiff Soil
Struct Class: II

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind
Dead Load Factor 1.20
Wind Load Factor 1.00



Iterations 27

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-69.82	-9.63	0.00	-1165.4	0.00	1165.43	5123.29	1522.04	7808.40	6435.29	0.00	0.000	0.000	0.195
2.00	-69.02	-9.58	0.00	-1146.1	0.00	1146.17	5107.67	1509.78	7683.09	6363.61	0.00	-0.016	0.000	0.194
4.00	-68.20	-9.52	0.00	-1127.0	0.00	1127.02	5091.62	1497.52	7558.79	6291.73	0.01	-0.031	0.000	0.193
6.00	-67.35	-9.47	0.00	-1107.9	0.00	1107.98	5075.16	1485.26	7435.50	6219.67	0.03	-0.047	0.000	0.191
8.00	-66.51	-9.41	0.00	-1089.0	0.00	1089.05	5058.29	1472.99	7313.22	6147.44	0.05	-0.063	0.000	0.190
10.00	-65.67	-9.36	0.00	-1070.2	0.00	1070.22	5041.00	1460.73	7191.96	6075.05	0.08	-0.080	0.000	0.189
12.00	-64.84	-9.31	0.00	-1051.5	0.00	1051.51	5023.29	1448.47	7071.72	6002.51	0.12	-0.096	0.000	0.188
14.00	-64.01	-9.25	0.00	-1032.9	0.00	1032.90	5005.16	1436.20	6952.48	5929.84	0.16	-0.112	0.000	0.187
16.00	-63.19	-9.20	0.00	-1014.3	0.00	1014.39	4986.62	1423.94	6834.27	5857.05	0.22	-0.129	0.000	0.186
18.00	-62.37	-9.14	0.00	-996.00	0.00	996.00	4967.66	1411.68	6717.06	5784.16	0.27	-0.145	0.000	0.185
20.00	-61.56	-9.09	0.00	-977.71	0.00	977.71	4948.29	1399.42	6600.87	5711.17	0.34	-0.162	0.000	0.184
22.00	-60.75	-9.03	0.00	-959.54	0.00	959.54	4928.49	1387.15	6485.69	5638.10	0.41	-0.179	0.000	0.183
24.00	-59.95	-8.97	0.00	-941.48	0.00	941.48	4908.28	1374.89	6371.53	5564.95	0.49	-0.196	0.000	0.181
26.00	-59.15	-8.91	0.00	-923.54	0.00	923.54	4887.66	1362.63	6258.37	5491.76	0.57	-0.213	0.000	0.180
28.00	-58.36	-8.85	0.00	-905.73	0.00	905.73	4866.62	1350.36	6146.24	5418.52	0.67	-0.231	0.000	0.179
30.00	-57.58	-8.79	0.00	-888.03	0.00	888.03	4845.16	1338.10	6035.11	5345.24	0.77	-0.248	0.000	0.178
32.00	-56.80	-8.72	0.00	-870.46	0.00	870.46	4823.28	1325.84	5925.00	5271.95	0.88	-0.266	0.000	0.177
34.00	-56.03	-8.66	0.00	-853.01	0.00	853.01	4800.99	1313.58	5815.91	5198.66	0.99	-0.283	0.000	0.176
36.00	-55.27	-8.60	0.00	-835.68	0.00	835.68	4778.28	1301.31	5707.83	5125.37	1.11	-0.301	0.000	0.175
38.00	-54.51	-8.53	0.00	-818.49	0.00	818.49	4755.15	1289.05	5600.76	5052.10	1.24	-0.319	0.000	0.174
40.00	-53.75	-8.47	0.00	-801.42	0.00	801.42	4731.61	1276.79	5494.70	4978.87	1.38	-0.337	0.000	0.172
42.00	-53.01	-8.41	0.00	-784.48	0.00	784.48	4707.65	1264.52	5389.66	4905.68	1.53	-0.355	0.000	0.171
43.92	-52.30	-8.34	0.00	-768.37	0.00	768.37	4684.30	1252.77	5289.95	4835.60	1.67	-0.373	0.000	0.170
44.00	-52.24	-8.34	0.00	-767.67	0.00	767.67	4683.27	1252.26	5285.64	4832.55	1.68	-0.374	0.000	0.170
46.00	-50.96	-8.27	0.00	-750.99	0.00	750.99	4658.48	1240.00	5182.62	4759.49	1.84	-0.392	0.000	0.169
48.00	-49.69	-8.20	0.00	-734.46	0.00	734.46	4633.27	1227.74	5080.62	4686.52	2.01	-0.411	0.000	0.167
50.00	-48.43	-8.12	0.00	-718.06	0.00	718.06	4607.64	1215.47	4979.64	4613.64	2.18	-0.430	0.000	0.166
51.00	-47.80	-8.09	0.00	-709.94	0.00	709.94	4157.28	1142.33	4736.69	4216.21	2.27	-0.439	0.000	0.180
52.00	-47.46	-8.06	0.00	-701.85	0.00	701.85	4146.96	1136.64	4689.60	4184.61	2.37	-0.449	0.000	0.179
54.00	-46.78	-7.99	0.00	-685.73	0.00	685.73	4126.01	1125.25	4596.10	4121.41	2.56	-0.468	0.000	0.178
56.00	-46.10	-7.92	0.00	-669.75	0.00	669.75	4104.64	1113.86	4503.55	4058.23	2.76	-0.488	0.000	0.176
58.00	-45.44	-7.85	0.00	-653.91	0.00	653.91	4082.85	1102.48	4411.95	3995.08	2.97	-0.507	0.000	0.175
60.00	-44.77	-7.79	0.00	-638.20	0.00	638.20	4060.64	1091.09	4321.28	3931.97	3.19	-0.527	0.000	0.173
62.00	-44.12	-7.72	0.00	-622.63	0.00	622.63	4038.02	1079.70	4231.55	3868.91	3.41	-0.547	0.000	0.172
64.00	-43.47	-7.65	0.00	-607.19	0.00	607.19	4014.98	1068.31	4142.77	3805.92	3.65	-0.567	0.000	0.170
66.00	-42.82	-7.58	0.00	-591.89	0.00	591.89	3991.52	1056.93	4054.92	3743.01	3.89	-0.588	0.000	0.169
68.00	-42.19	-7.51	0.00	-576.73	0.00	576.73	3967.65	1045.54	3968.02	3680.19	4.14	-0.608	0.000	0.167
70.00	-41.56	-7.45	0.00	-561.70	0.00	561.70	3943.36	1034.15	3882.06	3617.47	4.40	-0.629	0.000	0.166
72.00	-40.93	-7.38	0.00	-546.81	0.00	546.81	3918.66	1022.77	3797.04	3554.87	4.67	-0.649	0.000	0.164
74.00	-40.31	-7.31	0.00	-532.05	0.00	532.05	3893.54	1011.38	3712.96	3492.40	4.94	-0.670	0.000	0.163
76.00	-39.70	-7.24	0.00	-517.43	0.00	517.43	3868.00	999.99	3629.83	3430.07	5.23	-0.691	0.000	0.161
78.00	-39.09	-7.17	0.00	-502.95	0.00	502.95	3842.04	988.61	3547.63	3367.90	5.52	-0.712	0.000	0.160
80.00	-38.49	-7.11	0.00	-488.60	0.00	488.60	3815.67	977.22	3466.38	3305.90	5.82	-0.733	0.000	0.158
82.00	-37.89	-7.04	0.00	-474.39	0.00	474.39	3788.88	965.83	3386.07	3244.07	6.14	-0.755	0.000	0.156
84.00	-37.30	-6.97	0.00	-460.31	0.00	460.31	3761.67	954.44	3306.69	3182.44	6.46	-0.776	0.000	0.155
86.00	-36.72	-6.91	0.00	-446.36	0.00	446.36	3734.05	943.06	3228.26	3121.02	6.79	-0.797	0.000	0.153
88.00	-36.14	-6.84	0.00	-432.55	0.00	432.55	3706.01	931.67	3150.77	3059.82	7.13	-0.819	0.000	0.151
90.00	-35.58	-6.77	0.00	-418.88	0.00	418.88	3677.55	920.28	3074.23	2998.84	7.47	-0.841	0.000	0.149

Calculated Forces

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H
Site Name:	Deep River-winthrop Rd	**Exposure:**	C
Height:	180.00 (ft)	**Crest Height:**	0.00
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil
Gh:	1.1	**Topography:** 1	**Struct Class:** II

12/5/2019

Tower Engineering Solutions

90.17	-35.53	-6.77	0.00	-417.75	0.00	417.75	3675.16	919.33	3067.89	2993.77	7.50	-0.843	0.000	0.149
92.00	-34.67	-6.70	0.00	-405.35	0.00	405.35	3648.68	908.90	2998.62	2938.12	7.83	-0.863	0.000	0.148
94.00	-33.75	-6.63	0.00	-391.95	0.00	391.95	3619.39	897.51	2923.96	2877.64	8.20	-0.885	0.000	0.146
96.00	-32.84	-6.55	0.00	-378.70	0.00	378.70	2873.56	764.37	2506.37	2303.28	8.57	-0.906	0.000	0.176
98.00	-32.35	-6.49	0.00	-365.59	0.00	365.59	2853.66	754.73	2443.58	2258.25	8.96	-0.929	0.000	0.173
100.00	-31.86	-6.42	0.00	-352.62	0.00	352.62	2833.34	745.10	2381.59	2213.29	9.35	-0.953	0.000	0.171
102.00	-31.38	-6.36	0.00	-339.77	0.00	339.77	2812.61	735.46	2320.39	2168.43	9.76	-0.978	0.000	0.168
104.00	-30.91	-6.29	0.00	-327.06	0.00	327.06	2791.46	725.83	2259.99	2123.68	10.17	-1.003	0.000	0.165
106.00	-30.44	-6.23	0.00	-314.47	0.00	314.47	2769.89	716.19	2200.39	2079.04	10.60	-1.027	0.000	0.162
108.00	-29.98	-6.17	0.00	-302.01	0.00	302.01	2747.90	706.55	2141.58	2034.53	11.03	-1.052	0.000	0.159
110.00	-29.52	-6.10	0.00	-289.68	0.00	289.68	2725.50	696.92	2083.57	1990.17	11.48	-1.077	0.000	0.156
112.00	-29.07	-6.04	0.00	-277.47	0.00	277.47	2702.68	687.28	2026.36	1945.97	11.93	-1.102	0.000	0.153
114.00	-28.62	-5.98	0.00	-265.39	0.00	265.39	2679.45	677.65	1969.94	1901.93	12.40	-1.126	0.000	0.150
116.00	-28.18	-5.92	0.00	-253.43	0.00	253.43	2655.79	668.01	1914.32	1858.08	12.88	-1.151	0.000	0.147
118.00	-27.74	-5.85	0.00	-241.60	0.00	241.60	2631.73	658.38	1859.50	1814.42	13.37	-1.175	0.000	0.144
120.00	-27.31	-5.79	0.00	-229.90	0.00	229.90	2607.24	648.74	1805.47	1770.96	13.86	-1.200	0.000	0.140
122.00	-26.88	-5.73	0.00	-218.31	0.00	218.31	2582.34	639.11	1752.24	1727.73	14.37	-1.224	0.000	0.137
124.00	-26.46	-5.67	0.00	-206.85	0.00	206.85	2557.02	629.47	1699.80	1684.74	14.89	-1.248	0.000	0.133
126.00	-26.05	-5.61	0.00	-195.52	0.00	195.52	2531.28	619.84	1648.16	1641.98	15.42	-1.272	0.000	0.129
128.00	-25.64	-5.55	0.00	-184.30	0.00	184.30	2505.13	610.20	1597.32	1599.49	15.96	-1.296	0.000	0.126
130.00	-25.24	-5.49	0.00	-173.20	0.00	173.20	2478.56	600.57	1547.28	1557.27	16.50	-1.319	0.000	0.121
132.00	-24.84	-5.43	0.00	-162.22	0.00	162.22	2451.58	590.93	1498.03	1515.33	17.06	-1.342	0.000	0.117
133.33	-24.58	-5.39	0.00	-154.99	0.00	154.99	2433.35	584.51	1465.64	1487.53	17.44	-1.357	0.000	0.114
134.00	-24.38	-5.37	0.00	-151.40	0.00	151.40	2424.17	581.30	1449.58	1473.69	17.63	-1.364	0.000	0.113
136.00	-23.79	-5.30	0.00	-140.66	0.00	140.66	2396.35	571.66	1401.92	1432.35	18.20	-1.386	0.000	0.108
138.00	-23.22	-5.24	0.00	-130.05	0.00	130.05	1545.45	417.14	1026.36	929.77	18.79	-1.408	0.000	0.155
140.00	-22.91	-5.18	0.00	-119.57	0.00	119.57	1531.69	410.13	992.17	905.88	19.38	-1.428	0.000	0.147
142.00	-22.60	-5.13	0.00	-109.21	0.00	109.21	1517.50	403.12	958.56	882.03	19.99	-1.454	0.000	0.139
144.00	-22.30	-5.07	0.00	-98.95	0.00	98.95	1502.90	396.11	925.52	858.22	20.60	-1.479	0.000	0.130
146.00	-22.00	-5.02	0.00	-88.81	0.00	88.81	1487.88	389.11	893.06	834.49	21.23	-1.503	0.000	0.121
148.00	-21.71	-4.96	0.00	-78.77	0.00	78.77	1472.45	382.10	861.19	810.82	21.86	-1.525	0.000	0.112
150.00	-17.16	-3.75	0.00	-68.84	0.00	68.84	1456.60	375.09	829.89	787.25	22.51	-1.546	0.000	0.099
152.00	-16.89	-3.69	0.00	-61.35	0.00	61.35	1440.33	368.08	799.17	763.78	23.16	-1.565	0.000	0.092
154.00	-16.63	-3.64	0.00	-53.96	0.00	53.96	1423.65	361.08	769.03	740.42	23.82	-1.583	0.000	0.085
156.00	-16.38	-3.58	0.00	-46.68	0.00	46.68	1406.55	354.07	739.47	717.20	24.48	-1.600	0.000	0.077
158.00	-14.03	-3.02	0.00	-39.51	0.00	39.51	1389.03	347.06	710.49	694.11	25.16	-1.615	0.000	0.067
160.00	-13.80	-2.97	0.00	-33.48	0.00	33.48	1371.10	340.05	682.09	671.17	25.84	-1.628	0.000	0.060
162.00	-13.57	-2.91	0.00	-27.54	0.00	27.54	1352.75	333.05	654.27	648.41	26.52	-1.640	0.000	0.053
164.00	-13.35	-2.86	0.00	-21.72	0.00	21.72	1333.98	326.04	627.03	625.81	27.21	-1.651	0.000	0.045
166.00	-6.79	-1.45	0.00	-16.00	0.00	16.00	1314.79	319.03	600.37	603.42	27.90	-1.659	0.000	0.032
168.00	-6.58	-1.40	0.00	-13.09	0.00	13.09	1295.19	312.03	574.28	581.22	28.60	-1.666	0.000	0.028
170.00	-6.38	-1.35	0.00	-10.29	0.00	10.29	1275.17	305.02	548.78	559.24	29.30	-1.672	0.000	0.023
172.00	-6.19	-1.30	0.00	-7.59	0.00	7.59	1251.65	298.01	523.85	536.17	30.00	-1.677	0.000	0.019
174.00	-6.00	-1.25	0.00	-4.99	0.00	4.99	1222.21	291.00	499.51	511.11	30.71	-1.681	0.000	0.015
176.00	-5.81	-1.20	0.00	-2.49	0.00	2.49	1192.78	284.00	475.74	486.64	31.41	-1.683	0.000	0.010
178.00	-0.17	-0.05	0.00	-0.09	0.00	0.09	1163.35	276.99	452.55	462.78	32.12	-1.684	0.000	0.000
180.00	0.00	-0.04	0.00	0.00	0.00	0.00	1133.92	269.98	429.95	439.52	32.82	-1.684	0.000	0.000

Seismic Segment Forces (Factored)

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 30	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Ev + 1.0Eh

Gust Response Factor	1.10			**Sds**	0.22			**Iterations**	26
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.09			**Ss**	0.21
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.31	**SA**	0.03	**Seismic Importance Factor**	1.00	**S1**	0.05

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
2.00		587.84	0.00	0.01	0.01	33.92	
4.00		583.09	0.00	0.02	0.01	38.47	
6.00		578.33	0.00	0.03	0.02	41.53	
8.00		573.58	0.00	0.04	0.02	43.66	
10.00		568.82	0.01	0.05	0.03	45.15	
12.00		564.07	0.01	0.05	0.03	46.19	
14.00		559.31	0.01	0.06	0.03	46.88	
16.00		554.55	0.01	0.06	0.04	47.32	
18.00		549.80	0.02	0.06	0.04	47.57	
20.00		545.04	0.02	0.07	0.04	47.67	
22.00		540.29	0.03	0.07	0.04	47.66	
24.00		535.53	0.03	0.07	0.04	47.57	
26.00		530.78	0.04	0.07	0.04	47.42	
28.00		526.02	0.05	0.07	0.04	47.23	
30.00		521.27	0.05	0.07	0.04	47.01	
32.00		516.51	0.06	0.07	0.04	46.78	
34.00		511.76	0.07	0.07	0.04	46.54	
36.00		507.00	0.08	0.07	0.04	46.29	
38.00		502.25	0.08	0.07	0.04	46.05	
40.00		497.49	0.09	0.07	0.04	45.81	
42.00		492.74	0.10	0.07	0.04	45.58	
43.92	Bot - Section 2	467.74	0.11	0.07	0.04	43.45	
44.00		39.34	0.11	0.07	0.04	3.66	
46.00		939.45	0.12	0.07	0.03	87.70	
48.00		930.27	0.13	0.07	0.03	87.24	
50.00		921.10	0.15	0.07	0.03	86.76	
51.00	Top - Section 1	457.11	0.15	0.07	0.03	43.15	
52.00		220.93	0.16	0.07	0.03	20.89	
54.00		438.56	0.17	0.07	0.03	41.62	
56.00		434.14	0.18	0.06	0.03	41.31	
58.00		429.73	0.20	0.06	0.02	40.95	
60.00		425.31	0.21	0.06	0.02	40.53	
62.00		420.90	0.22	0.06	0.02	40.04	
64.00		416.48	0.24	0.06	0.02	39.46	
66.00		412.06	0.25	0.05	0.02	38.76	
68.00		407.65	0.27	0.05	0.02	37.94	
70.00		403.23	0.29	0.05	0.01	36.97	
72.00		398.82	0.30	0.04	0.01	35.83	
74.00		394.40	0.32	0.04	0.01	34.50	
76.00		389.99	0.34	0.04	0.01	32.96	
78.00		385.57	0.35	0.03	0.01	31.20	
80.00		381.15	0.37	0.03	0.01	29.21	
82.00		376.74	0.39	0.02	0.01	26.98	
84.00		372.32	0.41	0.01	0.01	24.54	
86.00		367.91	0.43	0.01	0.01	21.92	

Seismic Segment Forces (Factored)

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 31	

Tower Engineering Solutions

88.00		363.49	0.45	0.00	0.01	19.16		
90.00		359.08	0.47	-0.01	0.01	16.31		
90.17	Bot - Section 3	29.72	0.47	-0.01	0.01	1.33		
92.00		605.06	0.49	-0.01	0.01	22.97		
94.00		652.26	0.52	-0.02	0.01	19.89		
96.00	Top - Section 2	644.10	0.54	-0.03	0.01	14.96		
98.00		294.54	0.56	-0.04	0.01	4.83		
100.00		290.80	0.58	-0.05	0.01	2.94		
102.00		287.07	0.61	-0.06	0.02	1.29		
104.00		283.33	0.63	-0.06	0.02	-0.10		
106.00		279.59	0.66	-0.07	0.02	-1.23		
108.00		275.86	0.68	-0.08	0.03	-2.11		
110.00		272.12	0.71	-0.09	0.03	-2.74		
112.00		268.38	0.73	-0.10	0.04	-3.15		
114.00		264.65	0.76	-0.10	0.04	-3.34		
116.00		260.91	0.78	-0.11	0.05	-3.32		
118.00		257.18	0.81	-0.11	0.06	-3.13		
120.00		253.44	0.84	-0.12	0.07	-2.76		
122.00		249.70	0.87	-0.12	0.08	-2.24		
124.00		245.97	0.90	-0.12	0.09	-1.57		
126.00		242.23	0.93	-0.12	0.10	-0.76		
128.00		238.49	0.96	-0.12	0.11	0.17		
130.00		234.76	0.99	-0.11	0.12	1.22		
132.00		231.02	1.02	-0.11	0.14	2.38		
133.33	Bot - Section 4	151.94	1.04	-0.10	0.15	2.13		
134.00		131.23	1.05	-0.09	0.16	2.10		
136.00		389.38	1.08	-0.08	0.17	8.70		
138.00	Top - Section 3	382.93	1.11	-0.06	0.19	11.21		
140.00		160.40	1.14	-0.04	0.21	5.90		
142.00		157.68	1.18	-0.02	0.24	7.09		
144.00		154.96	1.21	0.01	0.26	8.33		
146.00		152.25	1.24	0.05	0.29	9.61		
148.00		149.53	1.28	0.09	0.32	10.94		
150.00	Appurtenance(s)	2620.2	1.31	0.14	0.35	219.68		
152.00		144.09	1.35	0.19	0.38	13.71		
154.00		141.38	1.38	0.25	0.41	15.14		
156.00		138.66	1.42	0.32	0.45	16.59		
158.00	Appurtenance(s)	1386.9	1.46	0.40	0.49	184.36		
160.00		133.23	1.49	0.48	0.53	19.56		
162.00		130.51	1.53	0.58	0.58	21.07		
164.00		127.79	1.57	0.69	0.63	22.58		
166.00	Appurtenance(s)	3822.4	1.61	0.80	0.68	736.27		
168.00		122.36	1.65	0.93	0.73	25.60		
170.00		119.64	1.69	1.07	0.79	27.11		
172.00		116.92	1.73	1.22	0.85	28.60		
174.00		114.20	1.77	1.39	0.92	30.07		
176.00		111.49	1.81	1.57	0.99	31.52		
178.00	Appurtenance(s)	3167.0	1.85	1.77	1.06	959.34		
180.00		106.05	1.89	1.98	1.14	34.34		
	Totals:	**43,894.1**				**4,452.4**	**Total Wind:**	**45,722.9**

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 32	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Ev + 1.0Eh

Gust Response Factor 1.10

Dead Load Factor 1.20

Wind Load Factor 0.00

Seismic Load Factor 1.00

Structure Frequency (f1) 0.31

Sds 0.22

Sd1 0.09

SA 0.03

Iterations 26

Ss 0.21

S1 0.05

Seismic Importance Factor 1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-56.49	-4.48	0.00	-527.40	0.00	527.40	5123.29	1522.04	7808.40	6435.29		0.00	0.00	0.093
2.00	-55.78	-4.45	0.00	-518.44	0.00	518.44	5107.67	1509.78	7683.09	6363.61		0.00	-0.01	0.092
4.00	-55.06	-4.42	0.00	-509.54	0.00	509.54	5091.62	1497.52	7558.79	6291.73		0.01	-0.01	0.092
6.00	-54.31	-4.39	0.00	-500.69	0.00	500.69	5075.16	1485.26	7435.50	6219.67		0.01	-0.02	0.091
8.00	-53.58	-4.35	0.00	-491.92	0.00	491.92	5058.29	1472.99	7313.22	6147.44		0.02	-0.03	0.091
10.00	-52.84	-4.31	0.00	-483.22	0.00	483.22	5041.00	1460.73	7191.96	6075.05		0.04	-0.04	0.090
12.00	-52.12	-4.27	0.00	-474.60	0.00	474.60	5023.29	1448.47	7071.72	6002.51		0.05	-0.04	0.089
14.00	-51.40	-4.23	0.00	-466.06	0.00	466.06	5005.16	1436.20	6952.48	5929.84		0.07	-0.05	0.089
16.00	-50.68	-4.19	0.00	-457.60	0.00	457.60	4986.62	1423.94	6834.27	5857.05		0.10	-0.06	0.088
18.00	-49.97	-4.15	0.00	-449.23	0.00	449.23	4967.66	1411.68	6717.06	5784.16		0.12	-0.07	0.088
20.00	-49.27	-4.10	0.00	-440.93	0.00	440.93	4948.29	1399.42	6600.87	5711.17		0.15	-0.07	0.087
22.00	-48.57	-4.06	0.00	-432.73	0.00	432.73	4928.49	1387.15	6485.69	5638.10		0.18	-0.08	0.087
24.00	-47.88	-4.02	0.00	-424.60	0.00	424.60	4908.28	1374.89	6371.53	5564.95		0.22	-0.09	0.086
26.00	-47.19	-3.98	0.00	-416.56	0.00	416.56	4887.66	1362.63	6258.37	5491.76		0.26	-0.10	0.086
28.00	-46.51	-3.94	0.00	-408.60	0.00	408.60	4866.62	1350.36	6146.24	5418.52		0.30	-0.10	0.085
30.00	-45.84	-3.89	0.00	-400.73	0.00	400.73	4845.16	1338.10	6035.11	5345.24		0.35	-0.11	0.084
32.00	-45.17	-3.85	0.00	-392.95	0.00	392.95	4823.28	1325.84	5925.00	5271.95		0.40	-0.12	0.084
34.00	-44.50	-3.81	0.00	-385.24	0.00	385.24	4800.99	1313.58	5815.91	5198.66		0.45	-0.13	0.083
36.00	-43.84	-3.77	0.00	-377.62	0.00	377.62	4778.28	1301.31	5707.83	5125.37		0.50	-0.14	0.083
38.00	-43.19	-3.73	0.00	-370.08	0.00	370.08	4755.15	1289.05	5600.76	5052.10		0.56	-0.14	0.082
40.00	-42.55	-3.69	0.00	-362.63	0.00	362.63	4731.61	1276.79	5494.70	4978.87		0.62	-0.15	0.082
42.00	-41.91	-3.64	0.00	-355.26	0.00	355.26	4707.65	1264.52	5389.66	4905.68		0.69	-0.16	0.081
43.92	-41.30	-3.60	0.00	-348.27	0.00	348.27	4684.30	1252.77	5289.95	4835.60		0.76	-0.17	0.081
44.00	-41.25	-3.60	0.00	-347.97	0.00	347.97	4683.27	1252.26	5285.64	4832.55		0.76	-0.17	0.081
46.00	-40.07	-3.52	0.00	-340.77	0.00	340.77	4658.48	1240.00	5182.62	4759.49		0.83	-0.18	0.080
48.00	-38.90	-3.43	0.00	-333.74	0.00	333.74	4633.27	1227.74	5080.62	4686.52		0.91	-0.19	0.080
50.00	-37.75	-3.34	0.00	-326.87	0.00	326.87	4607.64	1215.47	4979.64	4613.64		0.99	-0.19	0.079
51.00	-37.18	-3.30	0.00	-323.53	0.00	323.53	4157.28	1142.33	4736.69	4216.21		1.03	-0.20	0.086
52.00	-36.89	-3.28	0.00	-320.23	0.00	320.23	4146.96	1136.64	4689.60	4184.61		1.07	-0.20	0.085
54.00	-36.31	-3.25	0.00	-313.66	0.00	313.66	4126.01	1125.25	4596.10	4121.41		1.16	-0.21	0.085
56.00	-35.74	-3.21	0.00	-307.16	0.00	307.16	4104.64	1113.86	4503.55	4058.23		1.25	-0.22	0.084
58.00	-35.18	-3.17	0.00	-300.75	0.00	300.75	4082.85	1102.48	4411.95	3995.08		1.34	-0.23	0.084
60.00	-34.62	-3.13	0.00	-294.40	0.00	294.40	4060.64	1091.09	4321.28	3931.97		1.44	-0.24	0.083
62.00	-34.06	-3.10	0.00	-288.13	0.00	288.13	4038.02	1079.70	4231.55	3868.91		1.54	-0.25	0.083
64.00	-33.51	-3.06	0.00	-281.94	0.00	281.94	4014.98	1068.31	4142.77	3805.92		1.65	-0.26	0.082
66.00	-32.97	-3.03	0.00	-275.82	0.00	275.82	3991.52	1056.93	4054.92	3743.01		1.76	-0.27	0.082
68.00	-32.43	-2.99	0.00	-269.77	0.00	269.77	3967.65	1045.54	3968.02	3680.19		1.87	-0.28	0.081
70.00	-31.90	-2.96	0.00	-263.79	0.00	263.79	3943.36	1034.15	3882.06	3617.47		1.99	-0.29	0.081
72.00	-31.37	-2.92	0.00	-257.88	0.00	257.88	3918.66	1022.77	3797.04	3554.87		2.11	-0.30	0.081
74.00	-30.84	-2.89	0.00	-252.03	0.00	252.03	3893.54	1011.38	3712.96	3492.40		2.24	-0.31	0.080
76.00	-30.33	-2.86	0.00	-246.25	0.00	246.25	3868.00	999.99	3629.83	3430.07		2.37	-0.32	0.080
78.00	-29.82	-2.83	0.00	-240.53	0.00	240.53	3842.04	988.61	3547.63	3367.90		2.50	-0.33	0.079
80.00	-29.31	-2.80	0.00	-234.87	0.00	234.87	3815.67	977.22	3466.38	3305.90		2.64	-0.34	0.079
82.00	-28.81	-2.78	0.00	-229.26	0.00	229.26	3788.88	965.83	3386.07	3244.07		2.78	-0.35	0.078
84.00	-28.31	-2.76	0.00	-223.70	0.00	223.70	3761.67	954.44	3306.69	3182.44		2.93	-0.36	0.078
86.00	-27.82	-2.74	0.00	-218.18	0.00	218.18	3734.05	943.06	3228.26	3121.02		3.08	-0.37	0.077
88.00	-27.33	-2.72	0.00	-212.71	0.00	212.71	3706.01	931.67	3150.77	3059.82		3.24	-0.38	0.077

Calculated Forces

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 33	

Tower Engineering Solutions

90.00	-26.85	-2.70	0.00	-207.27	0.00	207.27	3677.55	920.28	3074.23	2998.84	3.40	-0.39	0.076
90.17	-26.81	-2.70	0.00	-206.82	0.00	206.82	3675.16	919.33	3067.89	2993.77	3.41	-0.39	0.076
92.00	-26.04	-2.68	0.00	-201.86	0.00	201.86	3648.68	908.90	2998.62	2938.12	3.56	-0.40	0.076
94.00	-25.21	-2.66	0.00	-196.49	0.00	196.49	3619.39	897.51	2923.96	2877.64	3.73	-0.41	0.075
96.00	-24.39	-2.64	0.00	-191.17	0.00	191.17	2873.56	764.37	2506.37	2303.28	3.91	-0.42	0.091
98.00	-23.98	-2.64	0.00	-185.89	0.00	185.89	2853.66	754.73	2443.58	2258.25	4.09	-0.43	0.091
100.00	-23.59	-2.64	0.00	-180.60	0.00	180.60	2833.34	745.10	2381.59	2213.29	4.27	-0.44	0.090
102.00	-23.19	-2.64	0.00	-175.32	0.00	175.32	2812.61	735.46	2320.39	2168.43	4.46	-0.46	0.089
104.00	-22.80	-2.64	0.00	-170.04	0.00	170.04	2791.46	725.83	2259.99	2123.68	4.65	-0.47	0.088
106.00	-22.42	-2.65	0.00	-164.75	0.00	164.75	2769.89	716.19	2200.39	2079.04	4.85	-0.48	0.087
108.00	-22.04	-2.65	0.00	-159.46	0.00	159.46	2747.90	706.55	2141.58	2034.53	5.06	-0.50	0.086
110.00	-21.66	-2.65	0.00	-154.17	0.00	154.17	2725.50	696.92	2083.57	1990.17	5.27	-0.51	0.085
112.00	-21.29	-2.65	0.00	-148.87	0.00	148.87	2702.68	687.28	2026.36	1945.97	5.49	-0.52	0.084
114.00	-20.92	-2.65	0.00	-143.57	0.00	143.57	2679.45	677.65	1969.94	1901.93	5.71	-0.54	0.083
116.00	-20.56	-2.65	0.00	-138.27	0.00	138.27	2655.79	668.01	1914.32	1858.08	5.93	-0.55	0.082
118.00	-20.20	-2.65	0.00	-132.96	0.00	132.96	2631.73	658.38	1859.50	1814.42	6.17	-0.56	0.081
120.00	-19.85	-2.66	0.00	-127.66	0.00	127.66	2607.24	648.74	1805.47	1770.96	6.41	-0.58	0.080
122.00	-19.50	-2.66	0.00	-122.34	0.00	122.34	2582.34	639.11	1752.24	1727.73	6.65	-0.59	0.078
124.00	-19.15	-2.66	0.00	-117.03	0.00	117.03	2557.02	629.47	1699.80	1684.74	6.90	-0.60	0.077
126.00	-18.81	-2.66	0.00	-111.71	0.00	111.71	2531.28	619.84	1648.16	1641.98	7.16	-0.62	0.075
128.00	-18.47	-2.66	0.00	-106.40	0.00	106.40	2505.13	610.20	1597.32	1599.49	7.42	-0.63	0.074
130.00	-18.14	-2.66	0.00	-101.08	0.00	101.08	2478.56	600.57	1547.28	1557.27	7.68	-0.64	0.072
132.00	-17.82	-2.66	0.00	-95.76	0.00	95.76	2451.58	590.93	1498.03	1515.33	7.96	-0.66	0.070
133.33	-17.60	-2.65	0.00	-92.22	0.00	92.22	2433.35	584.51	1465.64	1487.53	8.14	-0.67	0.069
134.00	-17.43	-2.65	0.00	-90.45	0.00	90.45	2424.17	581.30	1449.58	1473.69	8.24	-0.67	0.069
136.00	-16.91	-2.64	0.00	-85.15	0.00	85.15	2396.35	571.66	1401.92	1432.35	8.52	-0.68	0.067
138.00	-16.40	-2.63	0.00	-79.87	0.00	79.87	1545.45	417.14	1026.36	929.77	8.81	-0.70	0.097
140.00	-16.16	-2.62	0.00	-74.61	0.00	74.61	1531.69	410.13	992.17	905.88	9.10	-0.71	0.093
142.00	-15.92	-2.62	0.00	-69.36	0.00	69.36	1517.50	403.12	958.56	882.03	9.40	-0.73	0.089
144.00	-15.68	-2.61	0.00	-64.13	0.00	64.13	1502.90	396.11	925.52	858.22	9.71	-0.74	0.085
146.00	-15.45	-2.60	0.00	-58.91	0.00	58.91	1487.88	389.11	893.06	834.49	10.03	-0.76	0.081
148.00	-15.22	-2.59	0.00	-53.71	0.00	53.71	1472.45	382.10	861.19	810.82	10.35	-0.77	0.077
150.00	-12.03	-2.33	0.00	-48.52	0.00	48.52	1456.60	375.09	829.89	787.25	10.67	-0.79	0.070
152.00	-11.83	-2.32	0.00	-43.86	0.00	43.86	1440.33	368.08	799.17	763.78	11.01	-0.80	0.066
154.00	-11.63	-2.30	0.00	-39.22	0.00	39.22	1423.65	361.08	769.03	740.42	11.34	-0.81	0.061
156.00	-11.43	-2.29	0.00	-34.62	0.00	34.62	1406.55	354.07	739.47	717.20	11.69	-0.83	0.056
158.00	-9.74	-2.08	0.00	-30.05	0.00	30.05	1389.03	347.06	710.49	694.11	12.04	-0.84	0.050
160.00	-9.57	-2.06	0.00	-25.89	0.00	25.89	1371.10	340.05	682.09	671.17	12.39	-0.85	0.046
162.00	-9.40	-2.04	0.00	-21.77	0.00	21.77	1352.75	333.05	654.27	648.41	12.75	-0.86	0.041
164.00	-9.23	-2.01	0.00	-17.70	0.00	17.70	1333.98	326.04	627.03	625.81	13.11	-0.87	0.035
166.00	-4.64	-1.21	0.00	-13.67	0.00	13.67	1314.79	319.03	600.37	603.42	13.47	-0.87	0.026
168.00	-4.49	-1.18	0.00	-11.26	0.00	11.26	1295.19	312.03	574.28	581.22	13.84	-0.88	0.023
170.00	-4.34	-1.15	0.00	-8.90	0.00	8.90	1275.17	305.02	548.78	559.24	14.21	-0.88	0.019
172.00	-4.20	-1.12	0.00	-6.60	0.00	6.60	1251.65	298.01	523.85	536.17	14.58	-0.89	0.016
174.00	-4.06	-1.09	0.00	-4.36	0.00	4.36	1222.21	291.00	499.51	511.11	14.95	-0.89	0.012
176.00	-3.92	-1.05	0.00	-2.18	0.00	2.18	1192.78	284.00	475.74	486.64	15.32	-0.89	0.008
178.00	-0.13	-0.04	0.00	-0.07	0.00	0.07	1163.35	276.99	452.55	462.78	15.70	-0.89	0.000
180.00	0.00	-0.03	0.00	0.00	0.00	0.00	1133.92	269.98	429.95	439.52	16.07	-0.89	0.000

Seismic Segment Forces (Factored)

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 34	

Tower Engineering Solutions

Load Case: 0.9D + 1.0Ev + 1.0Eh

Gust Response Factor	1.10			**Sds**	0.22	**Iterations**	26
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.09	**Ss**	0.21
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.31	**SA**	0.03	**S1**	0.05
						Seismic Importance Factor	1.00

R: 1.50

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)
0.00		0.00	0.00	0.00	0.00	0.00
2.00		587.84	0.00	0.01	0.01	33.92
4.00		583.09	0.00	0.02	0.01	38.47
6.00		578.33	0.00	0.03	0.02	41.53
8.00		573.58	0.00	0.04	0.02	43.66
10.00		568.82	0.01	0.05	0.03	45.15
12.00		564.07	0.01	0.05	0.03	46.19
14.00		559.31	0.01	0.06	0.03	46.88
16.00		554.55	0.01	0.06	0.04	47.32
18.00		549.80	0.02	0.06	0.04	47.57
20.00		545.04	0.02	0.07	0.04	47.67
22.00		540.29	0.03	0.07	0.04	47.66
24.00		535.53	0.03	0.07	0.04	47.57
26.00		530.78	0.04	0.07	0.04	47.42
28.00		526.02	0.05	0.07	0.04	47.23
30.00		521.27	0.05	0.07	0.04	47.01
32.00		516.51	0.06	0.07	0.04	46.78
34.00		511.76	0.07	0.07	0.04	46.54
36.00		507.00	0.08	0.07	0.04	46.29
38.00		502.25	0.08	0.07	0.04	46.05
40.00		497.49	0.09	0.07	0.04	45.81
42.00		492.74	0.10	0.07	0.04	45.58
43.92	Bot - Section 2	467.74	0.11	0.07	0.04	43.45
44.00		39.34	0.11	0.07	0.04	3.66
46.00		939.45	0.12	0.07	0.03	87.70
48.00		930.27	0.13	0.07	0.03	87.24
50.00		921.10	0.15	0.07	0.03	86.76
51.00	Top - Section 1	457.11	0.15	0.07	0.03	43.15
52.00		220.93	0.16	0.07	0.03	20.89
54.00		438.56	0.17	0.07	0.03	41.62
56.00		434.14	0.18	0.06	0.03	41.31
58.00		429.73	0.20	0.06	0.02	40.95
60.00		425.31	0.21	0.06	0.02	40.53
62.00		420.90	0.22	0.06	0.02	40.04
64.00		416.48	0.24	0.06	0.02	39.46
66.00		412.06	0.25	0.05	0.02	38.76
68.00		407.65	0.27	0.05	0.02	37.94
70.00		403.23	0.29	0.05	0.01	36.97
72.00		398.82	0.30	0.04	0.01	35.83
74.00		394.40	0.32	0.04	0.01	34.50
76.00		389.99	0.34	0.04	0.01	32.96
78.00		385.57	0.35	0.03	0.01	31.20
80.00		381.15	0.37	0.03	0.01	29.21
82.00		376.74	0.39	0.02	0.01	26.98
84.00		372.32	0.41	0.01	0.01	24.54
86.00		367.91	0.43	0.01	0.01	21.92

Seismic Segment Forces (Factored)

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 35	

Tower Engineering Solutions

88.00		363.49	0.45	0.00	0.01	19.16		
90.00		359.08	0.47	-0.01	0.01	16.31		
90.17	Bot - Section 3	29.72	0.47	-0.01	0.01	1.33		
92.00		605.06	0.49	-0.01	0.01	22.97		
94.00		652.26	0.52	-0.02	0.01	19.89		
96.00	Top - Section 2	644.10	0.54	-0.03	0.01	14.96		
98.00		294.54	0.56	-0.04	0.01	4.83		
100.00		290.80	0.58	-0.05	0.01	2.94		
102.00		287.07	0.61	-0.06	0.02	1.29		
104.00		283.33	0.63	-0.06	0.02	-0.10		
106.00		279.59	0.66	-0.07	0.02	-1.23		
108.00		275.86	0.68	-0.08	0.03	-2.11		
110.00		272.12	0.71	-0.09	0.03	-2.74		
112.00		268.38	0.73	-0.10	0.04	-3.15		
114.00		264.65	0.76	-0.10	0.04	-3.34		
116.00		260.91	0.78	-0.11	0.05	-3.32		
118.00		257.18	0.81	-0.11	0.06	-3.13		
120.00		253.44	0.84	-0.12	0.07	-2.76		
122.00		249.70	0.87	-0.12	0.08	-2.24		
124.00		245.97	0.90	-0.12	0.09	-1.57		
126.00		242.23	0.93	-0.12	0.10	-0.76		
128.00		238.49	0.96	-0.12	0.11	0.17		
130.00		234.76	0.99	-0.11	0.12	1.22		
132.00		231.02	1.02	-0.11	0.14	2.38		
133.33	Bot - Section 4	151.94	1.04	-0.10	0.15	2.13		
134.00		131.23	1.05	-0.09	0.16	2.10		
136.00		389.38	1.08	-0.08	0.17	8.70		
138.00	Top - Section 3	382.93	1.11	-0.06	0.19	11.21		
140.00		160.40	1.14	-0.04	0.21	5.90		
142.00		157.68	1.18	-0.02	0.24	7.09		
144.00		154.96	1.21	0.01	0.26	8.33		
146.00		152.25	1.24	0.05	0.29	9.61		
148.00		149.53	1.28	0.09	0.32	10.94		
150.00	Appurtenance(s)	2620.2	1.31	0.14	0.35	219.68		
152.00		144.09	1.35	0.19	0.38	13.71		
154.00		141.38	1.38	0.25	0.41	15.14		
156.00		138.66	1.42	0.32	0.45	16.59		
158.00	Appurtenance(s)	1386.9	1.46	0.40	0.49	184.36		
160.00		133.23	1.49	0.48	0.53	19.56		
162.00		130.51	1.53	0.58	0.58	21.07		
164.00		127.79	1.57	0.69	0.63	22.58		
166.00	Appurtenance(s)	3822.4	1.61	0.80	0.68	736.27		
168.00		122.36	1.65	0.93	0.73	25.60		
170.00		119.64	1.69	1.07	0.79	27.11		
172.00		116.92	1.73	1.22	0.85	28.60		
174.00		114.20	1.77	1.39	0.92	30.07		
176.00		111.49	1.81	1.57	0.99	31.52		
178.00	Appurtenance(s)	3167.0	1.85	1.77	1.06	959.34		
180.00		106.05	1.89	1.98	1.14	34.34		
	Totals:	**43,894.1**				**4,452.4**	**Total Wind:**	**45,722.9**

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 36	

Tower Engineering Solutions

Load Case: 0.9D + 1.0Ev + 1.0Eh

Gust Response Factor	1.10			**Sds**	0.22			**Iterations**	26
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.09			**Ss**	0.21
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.31	**SA**	0.03	**Seismic Importance Factor**	1.00	**S1**	0.05

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-42.37	-4.48	0.00	-520.82	0.00	520.82	5123.29	1522.04	7808.40	6435.29		0.00	0.00	0.089
2.00	-41.84	-4.45	0.00	-511.86	0.00	511.86	5107.67	1509.78	7683.09	6363.61		0.00	-0.01	0.089
4.00	-41.29	-4.42	0.00	-502.96	0.00	502.96	5091.62	1497.52	7558.79	6291.73		0.01	-0.01	0.088
6.00	-40.74	-4.38	0.00	-494.13	0.00	494.13	5075.16	1485.26	7435.50	6219.67		0.01	-0.02	0.087
8.00	-40.18	-4.34	0.00	-485.37	0.00	485.37	5058.29	1472.99	7313.22	6147.44		0.02	-0.03	0.087
10.00	-39.63	-4.30	0.00	-476.68	0.00	476.68	5041.00	1460.73	7191.96	6075.05		0.04	-0.04	0.086
12.00	-39.09	-4.26	0.00	-468.08	0.00	468.08	5023.29	1448.47	7071.72	6002.51		0.05	-0.04	0.086
14.00	-38.55	-4.22	0.00	-459.56	0.00	459.56	5005.16	1436.20	6952.48	5929.84		0.07	-0.05	0.085
16.00	-38.01	-4.17	0.00	-451.13	0.00	451.13	4986.62	1423.94	6834.27	5857.05		0.10	-0.06	0.085
18.00	-37.48	-4.13	0.00	-442.78	0.00	442.78	4967.66	1411.68	6717.06	5784.16		0.12	-0.06	0.084
20.00	-36.95	-4.09	0.00	-434.52	0.00	434.52	4948.29	1399.42	6600.87	5711.17		0.15	-0.07	0.084
22.00	-36.43	-4.04	0.00	-426.35	0.00	426.35	4928.49	1387.15	6485.69	5638.10		0.18	-0.08	0.083
24.00	-35.91	-4.00	0.00	-418.26	0.00	418.26	4908.28	1374.89	6371.53	5564.95		0.22	-0.09	0.082
26.00	-35.39	-3.96	0.00	-410.26	0.00	410.26	4887.66	1362.63	6258.37	5491.76		0.26	-0.09	0.082
28.00	-34.88	-3.91	0.00	-402.34	0.00	402.34	4866.62	1350.36	6146.24	5418.52		0.30	-0.10	0.081
30.00	-34.38	-3.87	0.00	-394.52	0.00	394.52	4845.16	1338.10	6035.11	5345.24		0.34	-0.11	0.081
32.00	-33.87	-3.83	0.00	-386.78	0.00	386.78	4823.28	1325.84	5925.00	5271.95		0.39	-0.12	0.080
34.00	-33.38	-3.78	0.00	-379.12	0.00	379.12	4800.99	1313.58	5815.91	5198.66		0.44	-0.13	0.080
36.00	-32.88	-3.74	0.00	-371.56	0.00	371.56	4778.28	1301.31	5707.83	5125.37		0.50	-0.13	0.079
38.00	-32.39	-3.70	0.00	-364.07	0.00	364.07	4755.15	1289.05	5600.76	5052.10		0.55	-0.14	0.079
40.00	-31.91	-3.66	0.00	-356.68	0.00	356.68	4731.61	1276.79	5494.70	4978.87		0.61	-0.15	0.078
42.00	-31.43	-3.61	0.00	-349.37	0.00	349.37	4707.65	1264.52	5389.66	4905.68		0.68	-0.16	0.078
43.92	-30.97	-3.57	0.00	-342.44	0.00	342.44	4684.30	1252.77	5289.95	4835.60		0.74	-0.17	0.077
44.00	-30.93	-3.57	0.00	-342.14	0.00	342.14	4683.27	1252.26	5285.64	4832.55		0.75	-0.17	0.077
46.00	-30.05	-3.48	0.00	-335.00	0.00	335.00	4658.48	1240.00	5182.62	4759.49		0.82	-0.17	0.077
48.00	-29.18	-3.40	0.00	-328.04	0.00	328.04	4633.27	1227.74	5080.62	4686.52		0.89	-0.18	0.076
50.00	-28.31	-3.31	0.00	-321.24	0.00	321.24	4607.64	1215.47	4979.64	4613.64		0.97	-0.19	0.076
51.00	-27.88	-3.27	0.00	-317.93	0.00	317.93	4157.28	1142.33	4736.69	4216.21		1.01	-0.20	0.082
52.00	-27.66	-3.25	0.00	-314.66	0.00	314.66	4146.96	1136.64	4689.60	4184.61		1.05	-0.20	0.082
54.00	-27.23	-3.21	0.00	-308.16	0.00	308.16	4126.01	1125.25	4596.10	4121.41		1.14	-0.21	0.081
56.00	-26.80	-3.17	0.00	-301.74	0.00	301.74	4104.64	1113.86	4503.55	4058.23		1.23	-0.22	0.081
58.00	-26.38	-3.13	0.00	-295.40	0.00	295.40	4082.85	1102.48	4411.95	3995.08		1.32	-0.23	0.080
60.00	-25.96	-3.10	0.00	-289.13	0.00	289.13	4060.64	1091.09	4321.28	3931.97		1.42	-0.24	0.080
62.00	-25.54	-3.06	0.00	-282.94	0.00	282.94	4038.02	1079.70	4231.55	3868.91		1.52	-0.24	0.079
64.00	-25.13	-3.02	0.00	-276.82	0.00	276.82	4014.98	1068.31	4142.77	3805.92		1.62	-0.25	0.079
66.00	-24.72	-2.98	0.00	-270.78	0.00	270.78	3991.52	1056.93	4054.92	3743.01		1.73	-0.26	0.079
68.00	-24.32	-2.95	0.00	-264.81	0.00	264.81	3967.65	1045.54	3968.02	3680.19		1.84	-0.27	0.078
70.00	-23.92	-2.91	0.00	-258.91	0.00	258.91	3943.36	1034.15	3882.06	3617.47		1.96	-0.28	0.078
72.00	-23.52	-2.88	0.00	-253.09	0.00	253.09	3918.66	1022.77	3797.04	3554.87		2.08	-0.29	0.077
74.00	-23.13	-2.85	0.00	-247.33	0.00	247.33	3893.54	1011.38	3712.96	3492.40		2.20	-0.30	0.077
76.00	-22.74	-2.82	0.00	-241.63	0.00	241.63	3868.00	999.99	3629.83	3430.07		2.33	-0.31	0.076
78.00	-22.36	-2.79	0.00	-236.00	0.00	236.00	3842.04	988.61	3547.63	3367.90		2.46	-0.32	0.076
80.00	-21.98	-2.76	0.00	-230.43	0.00	230.43	3815.67	977.22	3466.38	3305.90		2.60	-0.33	0.075
82.00	-21.60	-2.73	0.00	-224.91	0.00	224.91	3788.88	965.83	3386.07	3244.07		2.74	-0.34	0.075
84.00	-21.23	-2.71	0.00	-219.44	0.00	219.44	3761.67	954.44	3306.69	3182.44		2.89	-0.35	0.075
86.00	-20.86	-2.69	0.00	-214.02	0.00	214.02	3734.05	943.06	3228.26	3121.02		3.04	-0.36	0.074
88.00	-20.50	-2.67	0.00	-208.64	0.00	208.64	3706.01	931.67	3150.77	3059.82		3.19	-0.37	0.074

Calculated Forces

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 37	

Tower Engineering Solutions

90.00	-20.14	-2.66	0.00	-203.29	0.00	203.29	3677.55	920.28	3074.23	2998.84	3.35	-0.38	0.073
90.17	-20.11	-2.66	0.00	-202.85	0.00	202.85	3675.16	919.33	3067.89	2993.77	3.36	-0.38	0.073
92.00	-19.53	-2.63	0.00	-197.98	0.00	197.98	3648.68	908.90	2998.62	2938.12	3.51	-0.39	0.073
94.00	-18.90	-2.61	0.00	-192.72	0.00	192.72	3619.39	897.51	2923.96	2877.64	3.68	-0.40	0.072
96.00	-18.29	-2.60	0.00	-187.49	0.00	187.49	2873.56	764.37	2506.37	2303.28	3.85	-0.41	0.088
98.00	-17.98	-2.59	0.00	-182.30	0.00	182.30	2853.66	754.73	2443.58	2258.25	4.02	-0.42	0.087
100.00	-17.68	-2.59	0.00	-177.11	0.00	177.11	2833.34	745.10	2381.59	2213.29	4.20	-0.44	0.086
102.00	-17.39	-2.59	0.00	-171.93	0.00	171.93	2812.61	735.46	2320.39	2168.43	4.39	-0.45	0.085
104.00	-17.10	-2.59	0.00	-166.75	0.00	166.75	2791.46	725.83	2259.99	2123.68	4.58	-0.46	0.085
106.00	-16.81	-2.59	0.00	-161.56	0.00	161.56	2769.89	716.19	2200.39	2079.04	4.78	-0.47	0.084
108.00	-16.52	-2.60	0.00	-156.37	0.00	156.37	2747.90	706.55	2141.58	2034.53	4.98	-0.49	0.083
110.00	-16.24	-2.60	0.00	-151.18	0.00	151.18	2725.50	696.92	2083.57	1990.17	5.18	-0.50	0.082
112.00	-15.96	-2.60	0.00	-145.98	0.00	145.98	2702.68	687.28	2026.36	1945.97	5.40	-0.51	0.081
114.00	-15.68	-2.60	0.00	-140.78	0.00	140.78	2679.45	677.65	1969.94	1901.93	5.62	-0.53	0.080
116.00	-15.41	-2.60	0.00	-135.59	0.00	135.59	2655.79	668.01	1914.32	1858.08	5.84	-0.54	0.079
118.00	-15.14	-2.60	0.00	-130.38	0.00	130.38	2631.73	658.38	1859.50	1814.42	6.07	-0.55	0.078
120.00	-14.88	-2.60	0.00	-125.18	0.00	125.18	2607.24	648.74	1805.47	1770.96	6.30	-0.57	0.076
122.00	-14.62	-2.60	0.00	-119.98	0.00	119.98	2582.34	639.11	1752.24	1727.73	6.54	-0.58	0.075
124.00	-14.36	-2.60	0.00	-114.77	0.00	114.77	2557.02	629.47	1699.80	1684.74	6.79	-0.59	0.074
126.00	-14.10	-2.60	0.00	-109.56	0.00	109.56	2531.28	619.84	1648.16	1641.98	7.04	-0.61	0.072
128.00	-13.85	-2.61	0.00	-104.35	0.00	104.35	2505.13	610.20	1597.32	1599.49	7.30	-0.62	0.071
130.00	-13.60	-2.60	0.00	-99.14	0.00	99.14	2478.56	600.57	1547.28	1557.27	7.56	-0.63	0.069
132.00	-13.36	-2.60	0.00	-93.93	0.00	93.93	2451.58	590.93	1498.03	1515.33	7.83	-0.65	0.067
133.33	-13.19	-2.60	0.00	-90.46	0.00	90.46	2433.35	584.51	1465.64	1487.53	8.01	-0.65	0.066
134.00	-13.06	-2.60	0.00	-88.73	0.00	88.73	2424.17	581.30	1449.58	1473.69	8.10	-0.66	0.066
136.00	-12.68	-2.59	0.00	-83.53	0.00	83.53	2396.35	571.66	1401.92	1432.35	8.38	-0.67	0.064
138.00	-12.29	-2.57	0.00	-78.36	0.00	78.36	1545.45	417.14	1026.36	929.77	8.66	-0.68	0.092
140.00	-12.11	-2.57	0.00	-73.21	0.00	73.21	1531.69	410.13	992.17	905.88	8.95	-0.70	0.089
142.00	-11.93	-2.56	0.00	-68.07	0.00	68.07	1517.50	403.12	958.56	882.03	9.25	-0.71	0.085
144.00	-11.76	-2.56	0.00	-62.94	0.00	62.94	1502.90	396.11	925.52	858.22	9.55	-0.73	0.081
146.00	-11.58	-2.55	0.00	-57.83	0.00	57.83	1487.88	389.11	893.06	834.49	9.86	-0.74	0.077
148.00	-11.41	-2.54	0.00	-52.74	0.00	52.74	1472.45	382.10	861.19	810.82	10.17	-0.76	0.073
150.00	-9.02	-2.29	0.00	-47.66	0.00	47.66	1456.60	375.09	829.89	787.25	10.49	-0.77	0.067
152.00	-8.86	-2.27	0.00	-43.09	0.00	43.09	1440.33	368.08	799.17	763.78	10.82	-0.79	0.063
154.00	-8.72	-2.26	0.00	-38.54	0.00	38.54	1423.65	361.08	769.03	740.42	11.15	-0.80	0.058
156.00	-8.57	-2.24	0.00	-34.02	0.00	34.02	1406.55	354.07	739.47	717.20	11.49	-0.81	0.054
158.00	-7.30	-2.04	0.00	-29.54	0.00	29.54	1389.03	347.06	710.49	694.11	11.83	-0.82	0.048
160.00	-7.17	-2.02	0.00	-25.45	0.00	25.45	1371.10	340.05	682.09	671.17	12.18	-0.83	0.043
162.00	-7.04	-2.00	0.00	-21.41	0.00	21.41	1352.75	333.05	654.27	648.41	12.53	-0.84	0.038
164.00	-6.92	-1.98	0.00	-17.41	0.00	17.41	1333.98	326.04	627.03	625.81	12.88	-0.85	0.033
166.00	-3.48	-1.19	0.00	-13.46	0.00	13.46	1314.79	319.03	600.37	603.42	13.24	-0.86	0.025
168.00	-3.36	-1.16	0.00	-11.09	0.00	11.09	1295.19	312.03	574.28	581.22	13.60	-0.86	0.022
170.00	-3.25	-1.13	0.00	-8.76	0.00	8.76	1275.17	305.02	548.78	559.24	13.96	-0.87	0.018
172.00	-3.14	-1.10	0.00	-6.50	0.00	6.50	1251.65	298.01	523.85	536.17	14.33	-0.87	0.015
174.00	-3.04	-1.07	0.00	-4.29	0.00	4.29	1222.21	291.00	499.51	511.11	14.69	-0.88	0.011
176.00	-2.93	-1.04	0.00	-2.15	0.00	2.15	1192.78	284.00	475.74	486.64	15.06	-0.88	0.007
178.00	-0.09	-0.04	0.00	-0.07	0.00	0.07	1163.35	276.99	452.55	462.78	15.43	-0.88	0.000
180.00	0.00	-0.03	0.00	0.00	0.00	0.00	1133.92	269.98	429.95	439.52	15.80	-0.88	0.000

Wind Loading - Shaft

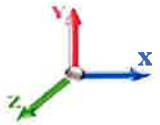
Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 38	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 27

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	7.379	8.12	294.63	0.950	0.000	0.00	0.000	0.00	0.0	0.0	0.0
2.00		1.00	0.85	7.379	8.12	292.27	0.950	0.000	2.00	10.655	10.12	82.2	0.0	587.8
4.00		1.00	0.85	7.379	8.12	289.91	0.950	0.000	2.00	10.569	10.04	81.5	0.0	583.1
6.00		1.00	0.85	7.379	8.12	287.56	0.950	0.000	2.00	10.484	9.96	80.8	0.0	578.3
8.00		1.00	0.85	7.379	8.12	285.20	0.950	0.000	2.00	10.398	9.88	80.2	0.0	573.6
10.00		1.00	0.85	7.379	8.12	282.84	0.950	0.000	2.00	10.313	9.80	79.5	0.0	568.8
12.00		1.00	0.85	7.379	8.12	280.49	0.950	0.000	2.00	10.227	9.72	78.9	0.0	564.1
14.00		1.00	0.85	7.379	8.12	278.13	0.950	0.000	2.00	10.142	9.63	78.2	0.0	559.3
16.00		1.00	0.86	7.470	8.22	277.47	0.950	0.000	2.00	10.056	9.55	78.5	0.0	554.6
18.00		1.00	0.88	7.657	8.42	278.53	0.950	0.000	2.00	9.970	9.47	79.8	0.0	549.8
20.00		1.00	0.90	7.829	8.61	279.21	0.950	0.000	2.00	9.885	9.39	80.9	0.0	545.0
22.00		1.00	0.92	7.988	8.79	279.57	0.950	0.000	2.00	9.799	9.31	81.8	0.0	540.3
24.00		1.00	0.94	8.135	8.95	279.67	0.950	0.000	2.00	9.714	9.23	82.6	0.0	535.5
26.00		1.00	0.95	8.274	9.10	279.54	0.950	0.000	2.00	9.628	9.15	83.2	0.0	530.8
28.00		1.00	0.97	8.404	9.24	279.21	0.950	0.000	2.00	9.542	9.07	83.8	0.0	526.0
30.00		1.00	0.98	8.527	9.38	278.72	0.950	0.000	2.00	9.457	8.98	84.3	0.0	521.3
32.00		1.00	1.00	8.643	9.51	278.06	0.950	0.000	2.00	9.371	8.90	84.6	0.0	516.5
34.00		1.00	1.01	8.754	9.63	277.28	0.950	0.000	2.00	9.286	8.82	84.9	0.0	511.8
36.00		1.00	1.02	8.860	9.75	276.37	0.950	0.000	2.00	9.200	8.74	85.2	0.0	507.0
38.00		1.00	1.03	8.962	9.86	275.35	0.950	0.000	2.00	9.115	8.66	85.4	0.0	502.2
40.00		1.00	1.04	9.059	9.97	274.23	0.950	0.000	2.00	9.029	8.58	85.5	0.0	497.5
42.00		1.00	1.05	9.153	10.07	273.01	0.950	0.000	2.00	8.943	8.50	85.5	0.0	492.7
43.92	Bot - Section 2	1.00	1.06	9.239	10.16	271.77	0.950	0.000	1.92	8.490	8.07	82.0	0.0	467.7
44.00		1.00	1.06	9.243	10.17	271.71	0.950	0.000	0.08	0.373	0.35	3.6	0.0	39.3
46.00		1.00	1.07	9.330	10.26	270.34	0.950	0.000	2.00	8.912	8.47	86.9	0.0	939.4
48.00		1.00	1.08	9.414	10.36	268.89	0.950	0.000	2.00	8.827	8.39	86.8	0.0	930.3
50.00		1.00	1.09	9.495	10.44	267.37	0.950	0.000	2.00	8.741	8.30	86.7	0.0	921.1
51.00	Top - Section 1	1.00	1.10	9.535	10.49	266.59	0.950	0.000	1.00	4.339	4.12	43.2	0.0	457.1
52.00		1.00	1.10	9.574	10.53	270.19	0.950	0.000	1.00	4.317	4.10	43.2	0.0	220.9
54.00		1.00	1.11	9.650	10.61	268.57	0.950	0.000	2.00	8.570	8.14	86.4	0.0	438.6
56.00		1.00	1.12	9.724	10.70	266.90	0.950	0.000	2.00	8.485	8.06	86.2	0.0	434.1
58.00		1.00	1.13	9.796	10.78	265.17	0.950	0.000	2.00	8.399	7.98	86.0	0.0	429.7
60.00		1.00	1.14	9.866	10.85	263.39	0.950	0.000	2.00	8.313	7.90	85.7	0.0	425.3
62.00		1.00	1.14	9.935	10.93	261.57	0.950	0.000	2.00	8.228	7.82	85.4	0.0	420.9
64.00		1.00	1.15	10.001	11.00	259.70	0.950	0.000	2.00	8.142	7.74	85.1	0.0	416.5
66.00		1.00	1.16	10.066	11.07	257.79	0.950	0.000	2.00	8.057	7.65	84.8	0.0	412.1
68.00		1.00	1.17	10.130	11.14	255.84	0.950	0.000	2.00	7.971	7.57	84.4	0.0	407.6
70.00		1.00	1.17	10.192	11.21	253.85	0.950	0.000	2.00	7.885	7.49	84.0	0.0	403.2
72.00		1.00	1.18	10.253	11.28	251.83	0.950	0.000	2.00	7.800	7.41	83.6	0.0	398.8
74.00		1.00	1.19	10.312	11.34	249.77	0.950	0.000	2.00	7.714	7.33	83.1	0.0	394.4
76.00		1.00	1.19	10.370	11.41	247.67	0.950	0.000	2.00	7.629	7.25	82.7	0.0	390.0
78.00		1.00	1.20	10.427	11.47	245.55	0.950	0.000	2.00	7.543	7.17	82.2	0.0	385.6
80.00		1.00	1.21	10.482	11.53	243.40	0.950	0.000	2.00	7.458	7.08	81.7	0.0	381.2
82.00		1.00	1.21	10.537	11.59	241.21	0.950	0.000	2.00	7.372	7.00	81.2	0.0	376.7
84.00		1.00	1.22	10.591	11.65	239.00	0.950	0.000	2.00	7.286	6.92	80.6	0.0	372.3
86.00		1.00	1.23	10.643	11.71	236.76	0.950	0.000	2.00	7.201	6.84	80.1	0.0	367.9
88.00		1.00	1.23	10.695	11.76	234.50	0.950	0.000	2.00	7.115	6.76	79.5	0.0	363.5

Wind Loading - Shaft

Structure: CT46130-A-SBA | **Code:** EIA/TIA-222-H | 12/5/2019
Site Name: Deep River-winthrop Rd | **Exposure:** C
Height: 180.00 (ft) | **Crest Height:** 0.00
Base Elev: 0.000 (ft) | **Site Class:** D - Stiff Soil
Gh: 1.1 | **Topography:** 1 | **Struct Class:** II | Page: 39

Tower Engineering Solutions

90.00	1.00	1.24	10.746	11.82	232.21	0.950	0.000	2.00	7.030	6.68	78.9	0.0	359.1
90.17 Bot - Section 3	1.00	1.24	10.750	11.82	232.02	0.950	0.000	0.17	0.582	0.55	6.5	0.0	29.7
92.00	1.00	1.24	10.795	11.88	229.90	0.950	0.000	1.83	6.471	6.15	73.0	0.0	605.1
94.00	1.00	1.25	10.844	11.93	227.56	0.950	0.000	2.00	6.977	6.63	79.1	0.0	652.3
96.00 Top - Section 2	1.00	1.25	10.893	11.98	225.20	0.950	0.000	2.00	6.891	6.55	78.4	0.0	644.1
98.00	1.00	1.26	10.940	12.03	226.80	0.950	0.000	2.00	6.806	6.47	77.8	0.0	294.5
100.00	1.00	1.27	10.987	12.09	224.41	0.950	0.000	2.00	6.720	6.38	77.2	0.0	290.8
102.00	1.00	1.27	11.033	12.14	221.99	0.950	0.000	2.00	6.635	6.30	76.5	0.0	287.1
104.00	1.00	1.28	11.078	12.19	219.56	0.950	0.000	2.00	6.549	6.22	75.8	0.0	283.3
106.00	1.00	1.28	11.122	12.23	217.11	0.950	0.000	2.00	6.464	6.14	75.1	0.0	279.6
108.00	1.00	1.29	11.166	12.28	214.63	0.950	0.000	2.00	6.378	6.06	74.4	0.0	275.9
110.00	1.00	1.29	11.209	12.33	212.14	0.950	0.000	2.00	6.292	5.98	73.7	0.0	272.1
112.00	1.00	1.30	11.252	12.38	209.64	0.950	0.000	2.00	6.207	5.90	73.0	0.0	268.4
114.00	1.00	1.30	11.294	12.42	207.11	0.950	0.000	2.00	6.121	5.82	72.2	0.0	264.6
116.00	1.00	1.31	11.335	12.47	204.57	0.950	0.000	2.00	6.036	5.73	71.5	0.0	260.9
118.00	1.00	1.31	11.376	12.51	202.01	0.950	0.000	2.00	5.950	5.65	70.7	0.0	257.2
120.00	1.00	1.32	11.417	12.56	199.44	0.950	0.000	2.00	5.864	5.57	70.0	0.0	253.4
122.00	1.00	1.32	11.456	12.60	196.85	0.950	0.000	2.00	5.779	5.49	69.2	0.0	249.7
124.00	1.00	1.32	11.496	12.65	194.24	0.950	0.000	2.00	5.693	5.41	68.4	0.0	246.0
126.00	1.00	1.33	11.534	12.69	191.62	0.950	0.000	2.00	5.608	5.33	67.6	0.0	242.2
128.00	1.00	1.33	11.573	12.73	188.99	0.950	0.000	2.00	5.522	5.25	66.8	0.0	238.5
130.00	1.00	1.34	11.611	12.77	186.34	0.950	0.000	2.00	5.437	5.16	66.0	0.0	234.8
132.00	1.00	1.34	11.648	12.81	183.68	0.950	0.000	2.00	5.351	5.08	65.1	0.0	231.0
133.33 Bot - Section 4	1.00	1.34	11.673	12.84	181.90	0.950	0.000	1.33	3.520	3.34	42.9	0.0	151.9
134.00	1.00	1.35	11.685	12.85	181.00	0.950	0.000	0.67	1.774	1.69	21.7	0.0	131.2
136.00	1.00	1.35	11.721	12.89	178.32	0.950	0.000	2.00	5.266	5.00	64.5	0.0	389.4
138.00 Top - Section 3	1.00	1.35	11.757	12.93	175.62	0.950	0.000	2.00	5.181	4.92	63.7	0.0	382.9
140.00	1.00	1.36	11.793	12.97	175.91	0.950	0.000	2.00	5.095	4.84	62.8	0.0	160.4
142.00	1.00	1.36	11.828	13.01	173.18	0.950	0.000	2.00	5.009	4.76	61.9	0.0	157.7
144.00	1.00	1.37	11.863	13.05	170.45	0.950	0.000	2.00	4.924	4.68	61.0	0.0	155.0
146.00	1.00	1.37	11.898	13.09	167.70	0.950	0.000	2.00	4.838	4.60	60.2	0.0	152.2
148.00	1.00	1.37	11.932	13.13	164.95	0.950	0.000	2.00	4.753	4.51	59.3	0.0	149.5
150.00 Appurtenance(s)	1.00	1.38	11.966	13.16	162.18	0.950	0.000	2.00	4.667	4.43	58.4	0.0	146.8
152.00	1.00	1.38	11.999	13.20	159.40	0.950	0.000	2.00	4.581	4.35	57.4	0.0	144.1
154.00	1.00	1.39	12.032	13.24	156.61	0.950	0.000	2.00	4.496	4.27	56.5	0.0	141.4
156.00	1.00	1.39	12.065	13.27	153.81	0.950	0.000	2.00	4.410	4.19	55.6	0.0	138.7
158.00 Appurtenance(s)	1.00	1.39	12.097	13.31	151.00	0.950	0.000	2.00	4.325	4.11	54.7	0.0	135.9
160.00	1.00	1.40	12.129	13.34	148.18	0.950	0.000	2.00	4.239	4.03	53.7	0.0	133.2
162.00	1.00	1.40	12.161	13.38	145.34	0.950	0.000	2.00	4.154	3.95	52.8	0.0	130.5
164.00	1.00	1.40	12.193	13.41	142.50	0.950	0.000	2.00	4.068	3.86	51.8	0.0	127.8
166.00 Appurtenance(s)	1.00	1.41	12.224	13.45	139.65	0.950	0.000	2.00	3.982	3.78	50.9	0.0	125.1
168.00	1.00	1.41	12.255	13.48	136.79	0.950	0.000	2.00	3.897	3.70	49.9	0.0	122.4
170.00	1.00	1.42	12.285	13.51	133.92	0.950	0.000	2.00	3.811	3.62	48.9	0.0	119.6
172.00	1.00	1.42	12.315	13.55	131.04	0.950	0.000	2.00	3.726	3.54	47.9	0.0	116.9
174.00	1.00	1.42	12.345	13.58	128.15	0.950	0.000	2.00	3.640	3.46	47.0	0.0	114.2
176.00	1.00	1.43	12.375	13.61	125.25	0.950	0.000	2.00	3.554	3.38	46.0	0.0	111.5
178.00 Appurtenance(s)	1.00	1.43	12.405	13.65	122.34	0.950	0.000	2.00	3.469	3.30	45.0	0.0	108.8
180.00	1.00	1.43	12.434	13.68	119.43	0.950	0.000	2.00	3.383	3.21	44.0	0.0	106.1
							Totals:	**180.00**			**6,587.7**		**33,413.9**

Discrete Appurtenance Forces

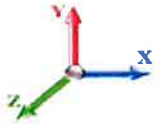
Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 40	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 27

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	178.00	Samsung B5/B13 RRH	3	12.405	13.645	0.50	0.75	3.35	210.90	0.000	0.000	45.67	0.00	0.00
2	178.00	Samsung B2/B66A RRH	3	12.405	13.645	0.50	0.75	2.83	253.20	0.000	0.000	38.67	0.00	0.00
3	178.00	JMA MX06FRO660-03	6	12.405	13.645	0.61	0.75	36.42	360.00	0.000	0.000	496.96	0.00	0.00
4	178.00	Platform w/ Handrails w/	1	12.405	13.645	1.00	1.00	40.00	2202.20	0.000	0.000	545.81	0.00	0.00
5	178.00	Raycap	1	12.405	13.645	1.00	1.00	2.61	32.00	0.000	0.000	35.61	0.00	0.00
6	166.00	ALU 800 Mhz	6	12.224	13.446	0.38	0.75	5.60	318.00	0.000	0.000	75.33	0.00	0.00
7	166.00	RFS APXVTM14-C-I20	3	12.224	13.446	0.58	0.75	10.98	168.60	0.000	0.000	147.69	0.00	0.00
8	166.00	Commscope	3	12.224	13.446	0.55	0.75	20.43	232.20	0.000	0.000	274.70	0.00	0.00
9	166.00	ALU 1900 Mhz	3	12.224	13.446	0.50	0.75	5.73	132.00	0.000	0.000	77.03	0.00	0.00
10	166.00	Sitepro	1	12.224	13.446	1.00	1.00	7.00	406.61	0.000	0.000	94.12	0.00	0.00
11	166.00	ALU TD-RRH8x20-25	3	12.224	13.446	0.50	0.75	6.11	210.00	0.000	0.000	82.09	0.00	0.00
12	166.00	Sitepro	1	12.224	13.446	1.00	1.00	6.70	230.00	0.000	0.000	90.09	0.00	0.00
13	166.00	Platform w/ Hand Rails	1	12.224	13.446	1.00	1.00	40.00	2000.00	0.000	0.000	537.84	0.00	0.00
14	158.00	PCS1900 G3 TMA	6	12.097	13.307	0.40	0.80	2.50	120.00	0.000	0.000	33.21	0.00	0.00
15	158.00	T-Arms	3	12.097	13.307	0.56	0.75	13.50	1050.00	0.000	0.000	179.64	0.00	0.00
16	158.00	EMS RR90-17-02DP	6	12.097	13.307	0.54	0.80	23.96	81.00	0.000	0.000	318.81	0.00	0.00
17	150.00	Powerwave 7770	3	11.966	13.162	0.55	0.75	9.05	105.00	0.000	0.000	119.12	0.00	0.00
18	150.00	Cci HPA-65R-BUU-H6	2	11.966	13.162	0.77	0.90	14.78	102.00	0.000	0.000	194.54	0.00	0.00
19	150.00	SBNHH-1D65A	1	11.966	13.162	1.00	1.00	5.88	33.50	0.000	0.000	77.39	0.00	0.00
20	150.00	RRUS-32	3	11.966	13.162	0.50	0.75	5.83	231.00	0.000	0.000	76.79	0.00	0.00
21	150.00	KMW AM-X-CD-16-65-00T	2	11.966	13.162	0.56	0.75	9.02	97.00	0.000	0.000	118.76	0.00	0.00
22	150.00	Powerwave LGP21401	6	11.966	13.162	0.38	0.75	2.75	84.60	0.000	0.000	36.13	0.00	0.00
23	150.00	KMW AM-X-CD-14-65-00T	1	11.966	13.162	0.75	0.75	5.29	36.40	0.000	0.000	69.60	0.00	0.00
24	150.00	Ericsson RRUS-11	3	11.966	13.162	0.50	0.75	3.80	152.10	0.000	0.000	50.00	0.00	0.00
25	150.00	Raycap DC6-48-60-18-8F	1	11.966	13.162	0.67	1.00	1.21	31.80	0.000	0.000	15.96	0.00	0.00
26	150.00	Platform w/ Hand Rail	1	11.966	13.162	1.00	1.00	35.00	1600.00	0.000	0.000	460.68	0.00	0.00
							Totals:		**10,480.11**			**4,292.24**		

Total Applied Force Summary

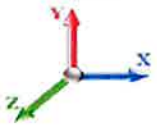
Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 41	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 27

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
2.00		82.16	587.84	0.00	0.00
4.00		81.50	603.57	0.00	0.00
6.00		80.84	619.30	0.00	0.00
8.00		80.18	614.55	0.00	0.00
10.00		79.52	609.79	0.00	0.00
12.00		78.86	605.04	0.00	0.00
14.00		78.20	600.28	0.00	0.00
16.00		78.50	595.53	0.00	0.00
18.00		79.78	590.77	0.00	0.00
20.00		80.87	586.02	0.00	0.00
22.00		81.80	581.26	0.00	0.00
24.00		82.58	576.51	0.00	0.00
26.00		83.24	571.75	0.00	0.00
28.00		83.80	567.00	0.00	0.00
30.00		84.27	562.24	0.00	0.00
32.00		84.65	557.48	0.00	0.00
34.00		84.95	552.73	0.00	0.00
36.00		85.19	547.97	0.00	0.00
38.00		85.36	543.22	0.00	0.00
40.00		85.48	538.46	0.00	0.00
42.00		85.54	533.71	0.00	0.00
43.92		81.97	507.01	0.00	0.00
44.00		3.60	41.05	0.00	0.00
46.00		86.89	980.42	0.00	0.00
48.00		86.83	971.25	0.00	0.00
50.00		86.73	962.08	0.00	0.00
51.00		43.23	477.60	0.00	0.00
52.00		43.19	241.42	0.00	0.00
54.00		86.42	479.53	0.00	0.00
56.00		86.22	475.11	0.00	0.00
58.00		85.98	470.70	0.00	0.00
60.00		85.71	466.28	0.00	0.00
62.00		85.42	461.87	0.00	0.00
64.00		85.10	457.45	0.00	0.00
66.00		84.75	453.04	0.00	0.00
68.00		84.38	448.62	0.00	0.00
70.00		83.98	444.20	0.00	0.00
72.00		83.57	439.79	0.00	0.00
74.00		83.13	435.37	0.00	0.00
76.00		82.67	430.96	0.00	0.00
78.00		82.19	426.54	0.00	0.00
80.00		81.69	422.13	0.00	0.00
82.00		81.17	417.71	0.00	0.00
84.00		80.64	413.30	0.00	0.00
86.00		80.09	408.88	0.00	0.00
88.00		79.52	404.46	0.00	0.00

Total Applied Force Summary

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019
Site Name:	Deep River-winthrop Rd	**Exposure:**	C	
Height:	180.00 (ft)	**Crest Height:**	0.00	
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil	
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 42

Tower Engineering Solutions

90.00		78.94	400.05	0.00	0.00
90.17		6.54	33.14	0.00	0.00
92.00		73.00	642.62	0.00	0.00
94.00		79.07	693.23	0.00	0.00
96.00		78.44	685.08	0.00	0.00
98.00		77.81	335.51	0.00	0.00
100.00		77.16	331.77	0.00	0.00
102.00		76.49	328.04	0.00	0.00
104.00		75.81	324.30	0.00	0.00
106.00		75.12	320.56	0.00	0.00
108.00		74.42	316.83	0.00	0.00
110.00		73.71	313.09	0.00	0.00
112.00		72.98	309.36	0.00	0.00
114.00		72.24	305.62	0.00	0.00
116.00		71.50	301.88	0.00	0.00
118.00		70.74	298.15	0.00	0.00
120.00		69.97	294.41	0.00	0.00
122.00		69.18	290.67	0.00	0.00
124.00		68.39	286.94	0.00	0.00
126.00		67.59	283.20	0.00	0.00
128.00		66.78	279.47	0.00	0.00
130.00		65.96	275.73	0.00	0.00
132.00		65.13	271.99	0.00	0.00
133.33		42.93	179.25	0.00	0.00
134.00		21.67	144.89	0.00	0.00
136.00		64.50	430.35	0.00	0.00
138.00		63.65	423.90	0.00	0.00
140.00		62.79	201.37	0.00	0.00
142.00		61.92	198.65	0.00	0.00
144.00		61.04	195.94	0.00	0.00
146.00		60.15	193.22	0.00	0.00
148.00		59.26	190.50	0.00	0.00
150.00	(23) attachments	1277.32	2661.18	0.00	0.00
152.00		57.45	168.37	0.00	0.00
154.00		56.53	165.65	0.00	0.00
156.00		55.60	162.93	0.00	0.00
158.00	(15) attachments	586.34	1411.21	0.00	0.00
160.00		53.73	145.02	0.00	0.00
162.00		52.78	142.30	0.00	0.00
164.00		51.83	139.58	0.00	0.00
166.00	(21) attachments	1429.77	3834.28	0.00	0.00
168.00		49.90	126.52	0.00	0.00
170.00		48.93	123.80	0.00	0.00
172.00		47.95	121.08	0.00	0.00
174.00		46.96	118.36	0.00	0.00
176.00		45.97	115.65	0.00	0.00
178.00	(14) attachments	1207.68	3171.23	0.00	0.00
180.00		43.96	106.05	0.00	0.00
	Totals:	**10,879.94**	**47,074.71**	**0.00**	**0.00**

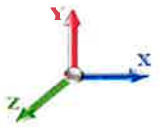
Calculated Forces

Structure: CT46130-A-SBA
Site Name: Deep River-winthrop Rd
Height: 180.00 (ft)
Base Elev: 0.000 (ft)
Gh: 1.1 **Topography:** 1

Code: EIA/TIA-222-H 12/5/2019
Exposure: C
Crest Height: 0.00
Site Class: D - Stiff Soil
Struct Class: II

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind
Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations 27

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-47.07	-10.89	0.00	-1298.7	0.00	1298.75	5123.29	1522.04	7808.40	6435.29	0.00	0.000	0.000	0.211
2.00	-46.48	-10.82	0.00	-1276.9	0.00	1276.97	5107.67	1509.78	7683.09	6363.61	0.00	-0.017	0.000	0.210
4.00	-45.87	-10.75	0.00	-1255.3	0.00	1255.34	5091.62	1497.52	7558.79	6291.73	0.02	-0.035	0.000	0.209
6.00	-45.25	-10.68	0.00	-1233.8	0.00	1233.84	5075.16	1485.26	7435.50	6219.67	0.03	-0.053	0.000	0.207
8.00	-44.63	-10.62	0.00	-1212.4	0.00	1212.48	5058.29	1472.99	7313.22	6147.44	0.06	-0.071	0.000	0.206
10.00	-44.02	-10.55	0.00	-1191.2	0.00	1191.25	5041.00	1460.73	7191.96	6075.05	0.09	-0.089	0.000	0.205
12.00	-43.41	-10.48	0.00	-1170.1	0.00	1170.15	5023.29	1448.47	7071.72	6002.51	0.13	-0.107	0.000	0.204
14.00	-42.81	-10.42	0.00	-1149.1	0.00	1149.18	5005.16	1436.20	6952.48	5929.84	0.18	-0.125	0.000	0.202
16.00	-42.21	-10.35	0.00	-1128.3	0.00	1128.35	4986.62	1423.94	6834.27	5857.05	0.24	-0.143	0.000	0.201
18.00	-41.62	-10.28	0.00	-1107.6	0.00	1107.65	4967.66	1411.68	6717.06	5784.16	0.30	-0.162	0.000	0.200
20.00	-41.03	-10.21	0.00	-1087.0	0.00	1087.08	4948.29	1399.42	6600.87	5711.17	0.38	-0.181	0.000	0.199
22.00	-40.44	-10.14	0.00	-1066.6	0.00	1066.65	4928.49	1387.15	6485.69	5638.10	0.46	-0.199	0.000	0.197
24.00	-39.86	-10.07	0.00	-1046.3	0.00	1046.37	4908.28	1374.89	6371.53	5564.95	0.54	-0.218	0.000	0.196
26.00	-39.29	-10.00	0.00	-1026.2	0.00	1026.22	4887.66	1362.63	6258.37	5491.76	0.64	-0.237	0.000	0.195
28.00	-38.72	-9.93	0.00	-1006.2	0.00	1006.22	4866.62	1350.36	6146.24	5418.52	0.74	-0.257	0.000	0.194
30.00	-38.15	-9.85	0.00	-986.37	0.00	986.37	4845.16	1338.10	6035.11	5345.24	0.85	-0.276	0.000	0.192
32.00	-37.59	-9.78	0.00	-966.67	0.00	966.67	4823.28	1325.84	5925.00	5271.95	0.97	-0.295	0.000	0.191
34.00	-37.04	-9.70	0.00	-947.11	0.00	947.11	4800.99	1313.58	5815.91	5198.66	1.10	-0.315	0.000	0.190
36.00	-36.49	-9.63	0.00	-927.71	0.00	927.71	4778.28	1301.31	5707.83	5125.37	1.24	-0.335	0.000	0.189
38.00	-35.94	-9.55	0.00	-908.45	0.00	908.45	4755.15	1289.05	5600.76	5052.10	1.38	-0.355	0.000	0.187
40.00	-35.40	-9.47	0.00	-889.35	0.00	889.35	4731.61	1276.79	5494.70	4978.87	1.54	-0.375	0.000	0.186
42.00	-34.86	-9.40	0.00	-870.40	0.00	870.40	4707.65	1264.52	5389.66	4905.68	1.70	-0.395	0.000	0.185
43.92	-34.36	-9.32	0.00	-852.39	0.00	852.39	4684.30	1252.77	5289.95	4835.60	1.86	-0.415	0.000	0.184
44.00	-34.31	-9.32	0.00	-851.62	0.00	851.62	4683.27	1252.26	5285.64	4832.55	1.87	-0.415	0.000	0.184
46.00	-33.33	-9.24	0.00	-832.97	0.00	832.97	4658.48	1240.00	5182.62	4759.49	2.05	-0.436	0.000	0.182
48.00	-32.36	-9.16	0.00	-814.50	0.00	814.50	4633.27	1227.74	5080.62	4686.52	2.23	-0.457	0.000	0.181
50.00	-31.39	-9.07	0.00	-796.19	0.00	796.19	4607.64	1215.47	4979.64	4613.64	2.43	-0.477	0.000	0.179
51.00	-30.91	-9.03	0.00	-787.12	0.00	787.12	4157.28	1142.33	4736.69	4216.21	2.53	-0.488	0.000	0.194
52.00	-30.67	-8.99	0.00	-778.09	0.00	778.09	4146.96	1136.64	4689.60	4184.61	2.63	-0.498	0.000	0.193
54.00	-30.19	-8.91	0.00	-760.11	0.00	760.11	4126.01	1125.25	4596.10	4121.41	2.85	-0.520	0.000	0.192
56.00	-29.71	-8.83	0.00	-742.28	0.00	742.28	4104.64	1113.86	4503.55	4058.23	3.07	-0.542	0.000	0.190
58.00	-29.24	-8.75	0.00	-724.62	0.00	724.62	4082.85	1102.48	4411.95	3995.08	3.30	-0.564	0.000	0.189
60.00	-28.77	-8.67	0.00	-707.11	0.00	707.11	4060.64	1091.09	4321.28	3931.97	3.54	-0.586	0.000	0.187
62.00	-28.30	-8.60	0.00	-689.76	0.00	689.76	4038.02	1079.70	4231.55	3868.91	3.79	-0.608	0.000	0.185
64.00	-27.84	-8.52	0.00	-672.57	0.00	672.57	4014.98	1068.31	4142.77	3805.92	4.05	-0.630	0.000	0.184
66.00	-27.39	-8.44	0.00	-655.54	0.00	655.54	3991.52	1056.93	4054.92	3743.01	4.32	-0.653	0.000	0.182
68.00	-26.94	-8.36	0.00	-638.67	0.00	638.67	3967.65	1045.54	3968.02	3680.19	4.60	-0.675	0.000	0.180
70.00	-26.49	-8.28	0.00	-621.95	0.00	621.95	3943.36	1034.15	3882.06	3617.47	4.89	-0.698	0.000	0.179
72.00	-26.05	-8.20	0.00	-605.39	0.00	605.39	3918.66	1022.77	3797.04	3554.87	5.19	-0.721	0.000	0.177
74.00	-25.61	-8.12	0.00	-588.99	0.00	588.99	3893.54	1011.38	3712.96	3492.40	5.49	-0.744	0.000	0.175
76.00	-25.18	-8.04	0.00	-572.75	0.00	572.75	3868.00	999.99	3629.83	3430.07	5.81	-0.767	0.000	0.174
78.00	-24.75	-7.97	0.00	-556.66	0.00	556.66	3842.04	988.61	3547.63	3367.90	6.14	-0.790	0.000	0.172
80.00	-24.33	-7.89	0.00	-540.73	0.00	540.73	3815.67	977.22	3466.38	3305.90	6.47	-0.814	0.000	0.170
82.00	-23.91	-7.81	0.00	-524.95	0.00	524.95	3788.88	965.83	3386.07	3244.07	6.82	-0.837	0.000	0.168
84.00	-23.49	-7.73	0.00	-509.33	0.00	509.33	3761.67	954.44	3306.69	3182.44	7.17	-0.861	0.000	0.166
86.00	-23.08	-7.66	0.00	-493.86	0.00	493.86	3734.05	943.06	3228.26	3121.02	7.54	-0.885	0.000	0.164
88.00	-22.67	-7.58	0.00	-478.54	0.00	478.54	3706.01	931.67	3150.77	3059.82	7.92	-0.909	0.000	0.163
90.00	-22.27	-7.50	0.00	-463.38	0.00	463.38	3677.55	920.28	3074.23	2998.84	8.30	-0.933	0.000	0.161

Calculated Forces

Structure:	CT46130-A-SBA	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 44	

Tower Engineering Solutions

90.17	-22.24	-7.50	0.00	-462.13	0.00	462.13	3675.16	919.33	3067.89	2993.77	8.33	-0.935	0.000	0.160
92.00	-21.59	-7.42	0.00	-448.38	0.00	448.38	3648.68	908.90	2998.62	2938.12	8.70	-0.957	0.000	0.159
94.00	-20.90	-7.34	0.00	-433.54	0.00	433.54	3619.39	897.51	2923.96	2877.64	9.10	-0.981	0.000	0.156
96.00	-20.21	-7.26	0.00	-418.85	0.00	418.85	2873.56	764.37	2506.37	2303.28	9.52	-1.005	0.000	0.189
98.00	-19.88	-7.19	0.00	-404.33	0.00	404.33	2853.66	754.73	2443.58	2258.25	9.95	-1.030	0.000	0.186
100.00	-19.54	-7.11	0.00	-389.96	0.00	389.96	2833.34	745.10	2381.59	2213.29	10.38	-1.057	0.000	0.183
102.00	-19.21	-7.04	0.00	-375.74	0.00	375.74	2812.61	735.46	2320.39	2168.43	10.83	-1.084	0.000	0.180
104.00	-18.89	-6.97	0.00	-361.66	0.00	361.66	2791.46	725.83	2259.99	2123.68	11.29	-1.112	0.000	0.177
106.00	-18.56	-6.89	0.00	-347.73	0.00	347.73	2769.89	716.19	2200.39	2079.04	11.76	-1.139	0.000	0.174
108.00	-18.25	-6.82	0.00	-333.95	0.00	333.95	2747.90	706.55	2141.58	2034.53	12.25	-1.167	0.000	0.171
110.00	-17.93	-6.75	0.00	-320.31	0.00	320.31	2725.50	696.92	2083.57	1990.17	12.74	-1.194	0.000	0.168
112.00	-17.62	-6.68	0.00	-306.81	0.00	306.81	2702.68	687.28	2026.36	1945.97	13.25	-1.221	0.000	0.164
114.00	-17.31	-6.61	0.00	-293.45	0.00	293.45	2679.45	677.65	1969.94	1901.93	13.77	-1.249	0.000	0.161
116.00	-17.01	-6.54	0.00	-280.24	0.00	280.24	2655.79	668.01	1914.32	1858.08	14.29	-1.276	0.000	0.157
118.00	-16.71	-6.47	0.00	-267.16	0.00	267.16	2631.73	658.38	1859.50	1814.42	14.83	-1.303	0.000	0.154
120.00	-16.41	-6.40	0.00	-254.23	0.00	254.23	2607.24	648.74	1805.47	1770.96	15.39	-1.330	0.000	0.150
122.00	-16.12	-6.33	0.00	-241.43	0.00	241.43	2582.34	639.11	1752.24	1727.73	15.95	-1.357	0.000	0.146
124.00	-15.83	-6.26	0.00	-228.77	0.00	228.77	2557.02	629.47	1699.80	1684.74	16.52	-1.383	0.000	0.142
126.00	-15.55	-6.20	0.00	-216.25	0.00	216.25	2531.28	619.84	1648.16	1641.98	17.11	-1.410	0.000	0.138
128.00	-15.27	-6.13	0.00	-203.86	0.00	203.86	2505.13	610.20	1597.32	1599.49	17.71	-1.436	0.000	0.134
130.00	-14.99	-6.06	0.00	-191.60	0.00	191.60	2478.56	600.57	1547.28	1557.27	18.31	-1.461	0.000	0.129
132.00	-14.72	-6.00	0.00	-179.47	0.00	179.47	2451.58	590.93	1498.03	1515.33	18.93	-1.487	0.000	0.125
133.33	-14.54	-5.95	0.00	-171.48	0.00	171.48	2433.35	584.51	1465.64	1487.53	19.35	-1.503	0.000	0.121
134.00	-14.39	-5.93	0.00	-167.51	0.00	167.51	2424.17	581.30	1449.58	1473.69	19.56	-1.512	0.000	0.120
136.00	-13.96	-5.86	0.00	-155.65	0.00	155.65	2396.35	571.66	1401.92	1432.35	20.20	-1.536	0.000	0.115
138.00	-13.54	-5.79	0.00	-143.93	0.00	143.93	1545.45	417.14	1026.36	929.77	20.85	-1.560	0.000	0.164
140.00	-13.34	-5.73	0.00	-132.35	0.00	132.35	1531.69	410.13	992.17	905.88	21.50	-1.583	0.000	0.155
142.00	-13.14	-5.67	0.00	-120.90	0.00	120.90	1517.50	403.12	958.56	882.03	22.17	-1.611	0.000	0.146
144.00	-12.94	-5.61	0.00	-109.56	0.00	109.56	1502.90	396.11	925.52	858.22	22.85	-1.639	0.000	0.136
146.00	-12.75	-5.55	0.00	-98.35	0.00	98.35	1487.88	389.11	893.06	834.49	23.55	-1.665	0.000	0.127
148.00	-12.56	-5.49	0.00	-87.26	0.00	87.26	1472.45	382.10	861.19	810.82	24.25	-1.689	0.000	0.116
150.00	-9.93	-4.14	0.00	-76.28	0.00	76.28	1456.60	375.09	829.89	787.25	24.96	-1.712	0.000	0.104
152.00	-9.76	-4.08	0.00	-68.01	0.00	68.01	1440.33	368.08	799.17	763.78	25.68	-1.734	0.000	0.096
154.00	-9.60	-4.02	0.00	-59.86	0.00	59.86	1423.65	361.08	769.03	740.42	26.41	-1.754	0.000	0.088
156.00	-9.44	-3.96	0.00	-51.82	0.00	51.82	1406.55	354.07	739.47	717.20	27.15	-1.772	0.000	0.079
158.00	-8.04	-3.33	0.00	-43.90	0.00	43.90	1389.03	347.06	710.49	694.11	27.90	-1.789	0.000	0.069
160.00	-7.90	-3.28	0.00	-37.24	0.00	37.24	1371.10	340.05	682.09	671.17	28.65	-1.804	0.000	0.061
162.00	-7.76	-3.22	0.00	-30.69	0.00	30.69	1352.75	333.05	654.27	648.41	29.41	-1.818	0.000	0.053
164.00	-7.62	-3.17	0.00	-24.24	0.00	24.24	1333.98	326.04	627.03	625.81	30.18	-1.829	0.000	0.045
166.00	-3.83	-1.62	0.00	-17.91	0.00	17.91	1314.79	319.03	600.37	603.42	30.94	-1.839	0.000	0.033
168.00	-3.71	-1.56	0.00	-14.68	0.00	14.68	1295.19	312.03	574.28	581.22	31.72	-1.847	0.000	0.028
170.00	-3.59	-1.51	0.00	-11.56	0.00	11.56	1275.17	305.02	548.78	559.24	32.49	-1.853	0.000	0.024
172.00	-3.47	-1.46	0.00	-8.54	0.00	8.54	1251.65	298.01	523.85	536.17	33.27	-1.859	0.000	0.019
174.00	-3.35	-1.41	0.00	-5.62	0.00	5.62	1222.21	291.00	499.51	511.11	34.05	-1.863	0.000	0.014
176.00	-3.23	-1.36	0.00	-2.81	0.00	2.81	1192.78	284.00	475.74	486.64	34.83	-1.866	0.000	0.009
178.00	-0.10	-0.05	0.00	-0.09	0.00	0.09	1163.35	276.99	452.55	462.78	35.61	-1.867	0.000	0.000
180.00	0.00	-0.04	0.00	0.00	0.00	0.00	1133.92	269.98	429.95	439.52	36.39	-1.867	0.000	0.000

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.0W 123 mph Wind	45.8	0.00	56.46	0.00	0.00	5490.30
0.9D + 1.0W 123 mph Wind	45.8	0.00	42.34	0.00	0.00	5425.51
1.2D + 1.0Di + 1.0Wi 50 mph Wind	9.6	0.00	69.82	0.00	0.00	1165.43
1.2D + 1.0Ev + 1.0Eh	4.5	0.00	56.49	0.00	0.00	527.40
0.9D + 1.0Ev + 1.0Eh	4.5	0.00	42.37	0.00	0.00	520.82
1.0D + 1.0W 60 mph Wind	10.9	0.00	47.07	0.00	0.00	1298.75

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.0W 123 mph Wind	-56.46	-45.76	0.00	-5490.3	0.00	-5490.3	5123.29	1522.0	7808.40	6435.29	0.00	0.865
0.9D + 1.0W 123 mph Wind	-42.34	-45.75	0.00	-5425.5	0.00	-5425.5	5123.29	1522.0	7808.40	6435.29	0.00	0.852
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-69.82	-9.63	0.00	-1165.4	0.00	-1165.4	5123.29	1522.0	7808.40	6435.29	0.00	0.195
1.2D + 1.0Ev + 1.0Eh	-16.40	-2.63	0.00	-79.87	0.00	-79.87	1545.45	417.14	1026.36	929.77	138.00	0.097
0.9D + 1.0Ev + 1.0Eh	-12.29	-2.57	0.00	-78.36	0.00	-78.36	1545.45	417.14	1026.36	929.77	138.00	0.092
1.0D + 1.0W 60 mph Wind	-47.07	-10.89	0.00	-1298.7	0.00	-1298.7	5123.29	1522.0	7808.40	6435.29	0.00	0.211

Base Plate Summary

Structure:	CT46130-A-SB	**Code:**	EIA/TIA-222-H	12/5/2019	
Site Name:	Deep River-winthrop Rd	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 46	

TES Tower Engineering Solutions

Reactions		Base Plate		Anchor Bolts	
Original Design		**Yield (ksi):**	60.00	**Bolt Circle:**	70.69
Moment (kip-ft):	5076.00	**Width (in):**	76.69	**Number Bolts:**	20.00
Axial (kip):	59.10	**Style:**	Polygon	**Bolt Type:**	2.25" 18J
Shear (kip):	41.70	**Polygon Sides:**	12.00	**Bolt Diameter (in):**	2.25
Analysis		**Clip Length (in):**	0.00	**Yield (ksi):**	75.00
Moment (kip-ft):	5490.30	**Effective Len (in):**	14.14	**Ultimate (ksi):**	100.00
Axial (kip):	69.82	**Moment (kip-in):**	825.08	**Arrangement:**	Radial
Shear (kip):	45.76	**Allow Stress (ksi):**	81.00	**Cluster Dist (in):**	0.00
		Applied Stress (ksi):	0.00	**Start Angle (deg):**	0.00
Moment Design %:	108.16	**Stress Ratio:**	0.57	Compression	
				Force (kip):	189.89
				Allowable (kip):	243.75
				Ratio:	0.78
				Tension	
				Force (kip):	182.91
				Allowable (kip):	243.75
				Ratio:	0.75

Monopole Mat Foundation Design

				Date
				12/5/2019
	Customer Name:	SBA Communcations Corp	EIA/TIA Standard:	EIA-222-H
	Site Name:	Deep River-winthrop Rd	Structure Height (Ft.):	180
	Site Number:	CT46130-A-SBA	Engineer Name:	D. Zhou
	Engr. Number:	90244	Engineer Login ID:	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

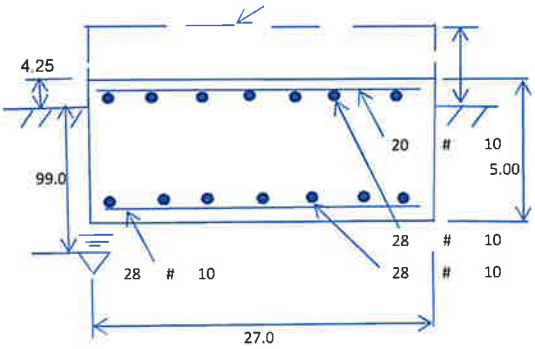
Analysis or Design? Analysis

Base Reactions (Factored):

Axial Load (Kips):	56.5	Shear Force (Kips):	45.8
Uplift Force (Kips):	0.0	Moment (Kips-ft):	5490.3

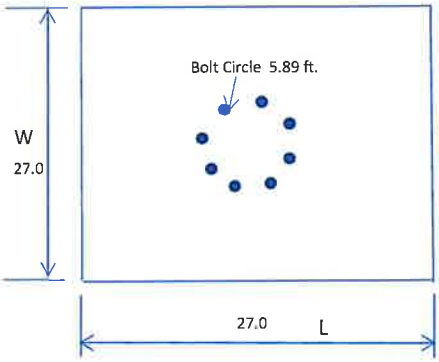
Foundation Geometries:

		Mods required- Yes/No ?:	No
Anchor Bolt Circle (ft.):	5.89	Depth of Base BG (ft.):	0.75
Thickness of Pad (ft):	5.00		
Length of Pad (ft.):	27	Width of Pad (ft.):	27
Final Length of pad (ft)	27.0	Final width of pad (ft):	27.0



Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Pad Rebar Yield (Ksi):	60	Tie Spacing (in):	12.0	
Pad Steel Rebar Size (#):	10			
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	20	Qty. of Rebar in Pad (W):	20	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	28	Qty. of Rebar in Pad (W):	28	



Soil Design Parameters:

Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Ultimate Bearing Pressure (psf):	120000	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	No	Reduction factor on the maximum soil bearing pressure:	1.00			

Foundation Analysis and Design: Uplift Strength Reduction Factor: 0.75 — Compression Strength Reduction Factor: 0.75

Total Dry Soil Volume (cu. Ft.):	0.00	Total Dry Soil Weight (Kips):	0.00
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	0.00	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	3645.00	Total Dry Concrete Weight (Kips):	546.75
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	546.75	Total Vertical Load on Base (Kips):	603.21

Check Soil Capacities:

					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	3782	<	Allowable Factored Soil Bearing (psf):	90000	0.04	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	7405.2	>	Design Factored Momont (kips-ft):	5722	0.77	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.29	OK!				

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75		
Strength reduction factor (Axial compresion):	0.65	Wind Load Factor on Concrete Design:	1.00		

Concrete Pad:

One-Way Design Shear Capacity (L-Direction, Kips):	1732.8	>	One-Way Factored Shear (L-D. Kips):	341.2	0.20	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	1732.8	>	One-Way Factored Shear (W-D., Kips):	341.2	0.20	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	2040.5	>	One-Way Factored Shear (C-C, Kips):	740.1	0.36	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0014	OK!	Lower Steel Pad Reinf. Ratio (W-Direct	0.0014		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	6364.6	>	Moment at Bottom (L-Direct. K-Ft):	956.5	0.15	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	6364.6	>	Moment at Bottom (W-Direct. K-Ft):	956.5	0.15	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	8978.4	>	Moment at Bottom (C-C Dir. K-Ft):	1352.7	0.15	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0019	OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0019		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	8866.2	>	Moment at the top (L-Dir Kips-Ft):	45.2	0.01	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	8866.2	>	Moment at the top (W-Dir Kips-Ft):	45.2	0.01	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	12494.6	>	Moment at the top (C-C Direc. K-Ft):	776.2	0.06	OK!

PAUL J. FORD & COMPANY

Report Date:	December 13, 2019
Client:	On Air Engineering, LLC 88 Foundry Pond Road Cold Spring, NY 10516 Attn: David Weinpahl, P.E. (201) 456-4624
Structure:	Existing 180-ft Monopole
Carrier:	Verizon Wireless
Carrier Site Name:	Deep River West CT
Mount Type:	(1) 13.5 Foot Platform
Site Address:	220 Winthrop Rd
City, County, State:	Deep River, Middlesex County, CT
Latitude, Longitude:	41.365772, -72.475314
PJF Project:	A42919-0016.001.7190

Paul J. Ford and Company is pleased to submit this "**Mount Structural Analysis Report**". The purpose of this analysis is to determine if the mount has sufficient capacity to support the equipment described herein. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point is not part of this document.

Analysis Criteria:

Reference Standard:	2018 Connecticut State Building Code with the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1.
Ultimate Wind Speed:	130 mph 3-second gust wind speed without ice
Nominal Wind Speed:	101 mph 3-second gust wind speed without ice
Ice Wind Speed:	50 mph 3-second gust wind speed with 0.75" ice

Summary of Analysis Results:

Antenna Mount:	**>200%**	**INSUFFICIENT**

We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and On Air Engineering, LLC. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully Submitted by:
Paul J. Ford and Company

Gowtham Penumatsa
Structural Designer
gpenumatsa@pauljford.com

STATE OF CONNECTICUT · JUSTIN T. KLINE · No. 30301 · LICENSED PROFESSIONAL ENGINEER

2019.12.17 13:30-05'00'

TABLE OF CONTENTS

1) INTRODUCTION

The existing mount under consideration is (1) 13.5 Platform installed at the 178' elevation on a 180' Monopole tower. The existing mount considered in this analysis is identified as a Valmont DCA152Z based on photos.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 130 mph converted to a nominal 3-second gust wind speed of 101 mph per section 1609.3.1 as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. and 50 mph with 0.75 inch ice thickness. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1 were used in this analysis.

In addition, the mount has been analyzed for various live loading conditions consisting of a 250-pound maintenance live load applied individually at the midpoint and cantilevered ends of horizontal members as well as a 250 pound maintenance live load applied individually at mount pipe locations using a 3-second wind speed of 30 mph.

Table 1 – Equipment Configuration

Mounting Level (feet)	Center Line Elevation (feet)	Quantity	Manufacturer	Model	Status	Mount Type
178	178	1	Raycap	RRFDC-6627-PF-48	Proposed	Tower Mounted
		3	JMA	9190314 Dual Bracket Mounts		(1)13.5' Platform
		6	JMA Wireless	MX06FRO660-03		
		3	Samsung Telecomm	B2/B66A RRH BR049		
		3	Samsung Telecomm	B15/B13 RRH BR04C		
		6	Antel	BXA-70063-6CF-2	Equipment to be removed	
		6	Antel	BXA-171063-12CF-EDIN-2		
		3	Nokia	B13 RRH 2X40		
		2	RFS	DB-B1-6C-8AB-0Z		

3) ANALYSIS PROCEDURE

Table 2 – Documents Provided

Document	Remarks	Reference	Source
Mount Manufacturer Drawings	Valmont, 10/30/1997	DCA152Z	Valmont
Site Photos	Dated 12/9/2019	-	On Air Engineering
Radio Frequency Data Sheet	Verizon, 10/15/2019	15284229	On Air Engineering

3.1) Analysis Method

RISA-3D (version 17.0.3), a commercially available analysis software package, was used to create a three-dimensional model of the mount and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix C. In addition, this analysis is in accordance with Verizon's NSTD-446 *Antenna Mount Analysis and Modification Process (dated 03/29/19).*

3.2) Assumptions

1) *The analysis of the existing monopole tower or the effect of the mount attachment to the tower is not within the current scope of work.*
2) *The antenna mounting system was properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications and all bolts are tightened as specified by the manufacturer and AISC requirements.*
3) *The configuration of antennas, mounts, and other appurtenances are as specified in Table 1.*
4) *All member connections have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report. All U-Bolt connections have been properly tightened. This analysis will be required to be revised if the existing conditions in the field differ from those shown in the above referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.*
5) *Steel grades have been assumed as follows:*
   - *a) Channel, Solid Round, Angle, Plate, Unistrut* — *ASTM A36 (GR 36)*
   - *b) Pipe* — *ASTM A53 (GR 35)*
   - *c) HSS (Rectangular)* — *ASTM 500 (GR B-46)*
   - *d) HSS (Round)* — *ASTM 500 (GR B-42)*
   - *e) Connection Bolts* — *ASTM A325*
   - *f) Threaded Rods* — *ASTM F1554 (GR 36)*
   - *g) U-Bolts* — *SAE J429 (GR2)*
6) *Proposed equipment is to be installed in the locations specified in Appendix A. Any changes to the proposed equipment locations will render this report invalid.*
7) *Mount has been modeled based on the photographs referenced in Table 2, indicating a match to the Valmont mount model #DCA152Z. Member information and dimensions not provided have been assumed to match those specified in the manufacturer drawings referenced in Table 2. No guarantee can be made as to the accuracy of these assumptions without a complete mount mapping.*

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

4) ANALYSIS RESULTS

Table 3 – Mount Component Capacity

Notes	Component	% Capacity	Pass / Fail
1	Mount Pipes	157.4	Fail
1	Face Horizontal	>200	Fail
1	Standoff Members	159.1	Fail
1	Support Rail	188.1	Fail
1	Corner Plates	171.4	Fail
1	Grating Support Members	12.2	Pass
1	Mount to Tower Connection (bolts/welds)	>200	Fail

Mount Rating (max from all components) =	>200.0%

Notes:
1. See additional documentation in "Appendix C – Software analysis Output" for calculations supporting the % capacity consumed.

4.1) Recommendations

The mount does not have sufficient capacity to carry the proposed loading configuration. Modifications will be required to bring the mount into compliance with the TIA-222-G Standard for the proposed loading configuration. Listed below is a brief description of the required modification:

- Provide kickers
- Provide hand rail kits
- Provide bracing kits
- Custom Modification reinforcement
  - Estimated Cost: >$10,000

  Or

- Mount Replacement is recommended due to the severity of insufficiency.

Further engineering and detailing is required to design the necessary modifications. Connection from the mount to the tower and local stresses on the tower are insufficient.

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

1) It is the responsibility of the client to ensure that the information provided to Paul J. Ford and Company is accurate and complete. Paul J. Ford and Company will rely on the accuracy and completeness of such information in performing or furnishing services under this project.

2) If the existing conditions are not as represented on the referenced drawings and/or documents, Paul J. Ford and Company should be contacted immediately to evaluate the significance of the deviation.

3) The mount has been analyzed according to the minimum design loads recommended by the Reference Standard. If additional design loads are required, Paul J. Ford and Company should be made aware of this prior to the start of the project.

4) The standard of care for all Professional Engineering Services performed or furnished by Paul J. Ford and Company under this project will be the skill and care used by members of the Consultant's profession practicing under similar circumstances at the same time and in the same locality.

5) All Services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Paul J. Ford and Company is not responsible for the conclusions, opinions and/or recommendations made by others based on the information supplied herein.

****

APPENDIX A

WIRE FRAME AND RENDERED MODELS

APPENDIX B

SOFTWARE INPUT CALCULATIONS

LEGEND
EXISTING: BLUE
PROPOSED: RED

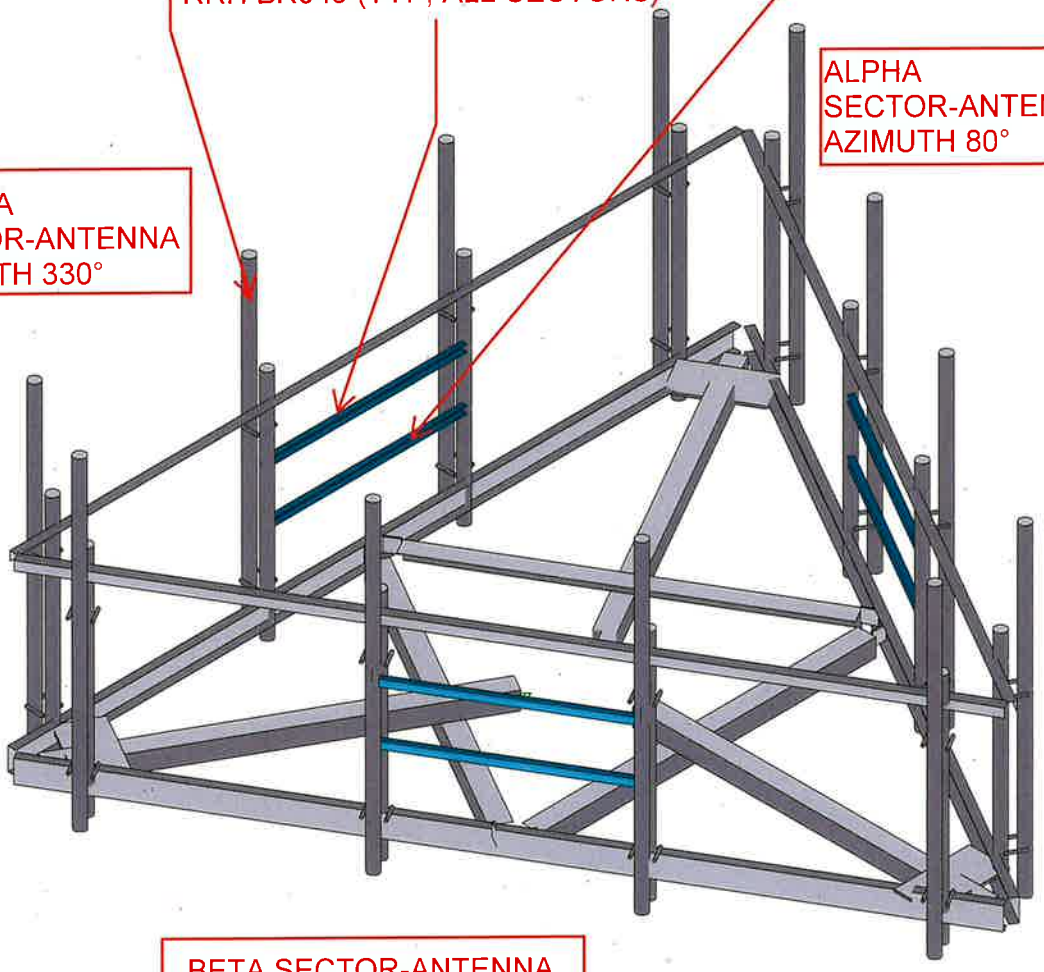
(2) JMA WIRELESS MX06FRO660-3 ON JMA BRACKET #91900314 (TYP, ALL SECTORS)

(1) SAMSUMG TELECOMM B15/B13 RRH BR04C (TYP, ALL SECTORS)

(1) SAMSUMG TELECOMM B2/B66A RRH BR049 (TYP, ALL SECTORS)

ALPHA SECTOR-ANTENNA AZIMUTH 80°

GAMMA SECTOR-ANTENNA AZIMUTH 330°



BETA SECTOR-ANTENNA AZIMUTH 220°

NOTES:
1) A 6" VERTICAL TOLERANCE FOR PROPOSED EQUIPMENT IS ACCEPTABLE.
2) CONTRACTOR TO VERIFY LOCATION OF EXISTING EQUIPMENT PRIOR TO INSTALLATION OF PROPOSED EQUIPMENT. NOTIFY EOR FOR ANY DEVIATIONS.
3) INSTALL SHALL NOT CAUSE HARM TO THE STRUCTURE, CLIMBING FACILITY, SAFETY CLIMB OR ANY SYSTEM INSTALLED ON THE STRUCTURE.

Envelope Only Solution

Paul J. Ford and Company	DEEP RIVER WEST CT	SK - 2
GP		Dec 13, 2019 at 3:44 PM
42919-0016.001.7190		42919-0016.001.7190_MA..r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Project # A42919-0016.001.7190
By GP

Analysis 30 degrees
File

Mount Loading per TIA-222-G-2

Structure & Wind Speed

Client =		
Structure Type =	Mount	
Mount Type =	3 Sectors	
Mount Centerline, z =	178	ft
Centerline Y Coordinate =	20	in
Wind Speed =	101	mph
Service Wind Speed =	30	mph
Const. Duration =		
Non-Op Wind Speed =	#N/A	mph
Op Wind Speed =	30	mph
Ice Wind Speed =	50	mph
Ice Thickness =	0.75	in

Topo

Exposure Cat =	C	
Structure Class =	II	
Topographic Cat =	1	
Crest Height =	0	ft

Velocity Pressure Coefficients

z_g =	900	ft	
a =	9.50		
K_{zmin} =	0.85		
K_z =	1.43		Calculated Value
K_z =	1.43		Section 2.6.5.2
K_{zt} =	1.00		Section 2.6.6.4
Gh =	1.00		Section 2.6.7
K_d =	0.95		Table 2-2
I =	1.00		Table 2-3
q_z =	35.45	psf	Section 2.6.9.6

Ice Loading

Ii =	1.00	
Iwi =	1.00	
q_z =	8.69	psf
K_{iz} =	1.18	
T_{iz} =	1.78	in
h =	1.00	in
W_i =	12.95	psf

Wind Pressures

Pressure =	35.451
Ice Pressure =	8.688

Antennas

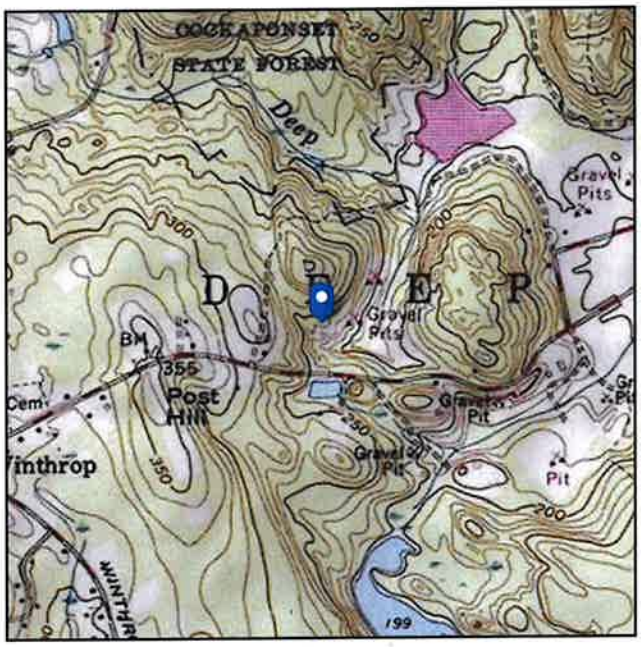
Item	Status	Manufacturer	Antenna	Height (in)	Width (in)	Depth (in)	Flat or Round	Weight (lbs)	Sector / Face	Position	Top/Bottom Mounting Point Spacing	Override Spacing (in)	Max Antenna C/L (ft)	Min Antenna C/L (ft)	Antenna C/L (ft)	Antenna Top Mount Location from Mount Pipe Bottom (in)	Antenna Bottom Mount Location from Mount Pipe Bottom (in)
1	P	JMA WIRELESS	MX06FRO660-03	71.3	15.4	10.7	Flat	73.4	A	2	65.30	50	179.75	177.92	178	26.00	68.00
2	P	JMA WIRELESS	MX06FRO660-03	71.3	15.4	10.7	Flat	73.4	A	2	65.30	50	179.75	177.92	178	26.00	68.00
3	P	JMA WIRELESS	MX06FRO660-03	71.3	15.4	10.7	Flat	73.4	B	2	65.30	50	179.75	177.92	178	26.00	68.00
4	P	JMA WIRELESS	MX06FRO660-03	71.3	15.4	10.7	Flat	73.4	B	2	65.30	50	179.75	177.92	178	26.00	68.00
5	P	JMA WIRELESS	MX06FRO660-03	71.3	15.4	10.7	Flat	73.4	C	2	65.30	50	179.75	177.92	178	26.00	68.00
6	P	JMA WIRELESS	MX06FRO660-03	71.3	15.4	10.7	Flat	73.4	C	2	65.30	50	179.75	177.92	178	26.00	68.00
7	P	SAMSUNG TELECOMMUNICATIONS	B2/B66A RRH-BR049	15	15	8.1	Flat	70.3	A	A1	9.00		178.29	179.04		24.00	24.00
8	P	SAMSUNG TELECOMMUNICATIONS	B5/B13 RRH-BR04C	15	15	8.1	Flat	70.3	A	A2	9.00		177.29	178.04		24.00	24.00
9	P	SAMSUNG TELECOMMUNICATIONS	B2/B66A RRH-BR049	15	15	8.1	Flat	70.3	B	B1	9.00		178.29	179.04		24.00	24.00
10	P	SAMSUNG TELECOMMUNICATIONS	B5/B13 RRH-BR04C	15	15	8.1	Flat	70.3	B	B2	9.00		177.29	178.04		24.00	24.00
11	P	SAMSUNG TELECOMMUNICATIONS	B2/B66A RRH-BR049	15	15	8.1	Flat	70.3	C	C1	9.00		178.29	179.04		24.00	24.00
12	P	SAMSUNG TELECOMMUNICATIONS	B5/B13 RRH-BR04C	15	15	8.1	Flat	70.3	C	C2	9.00		177.29	178.04		24.00	24.00

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 241.52 ft (NAVD 88)
Latitude: 41.365772
Longitude: -72.475314



Wind

Results:

Wind Speed:	130 Vmph
10-year MRI	78 Vmph
25-year MRI	88 Vmph
50-year MRI	96 Vmph
100-year MRI	106 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Thu Dec 12 2019

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

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

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

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	0.17	S_{DS} :	0.182
S_1 :	0.06	S_{D1} :	0.096
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.086
S_{MS} :	0.272	PGA_M :	0.137
S_{M1} :	0.144	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B

Data Accessed: Thu Dec 12 2019

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

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Ice

Results:

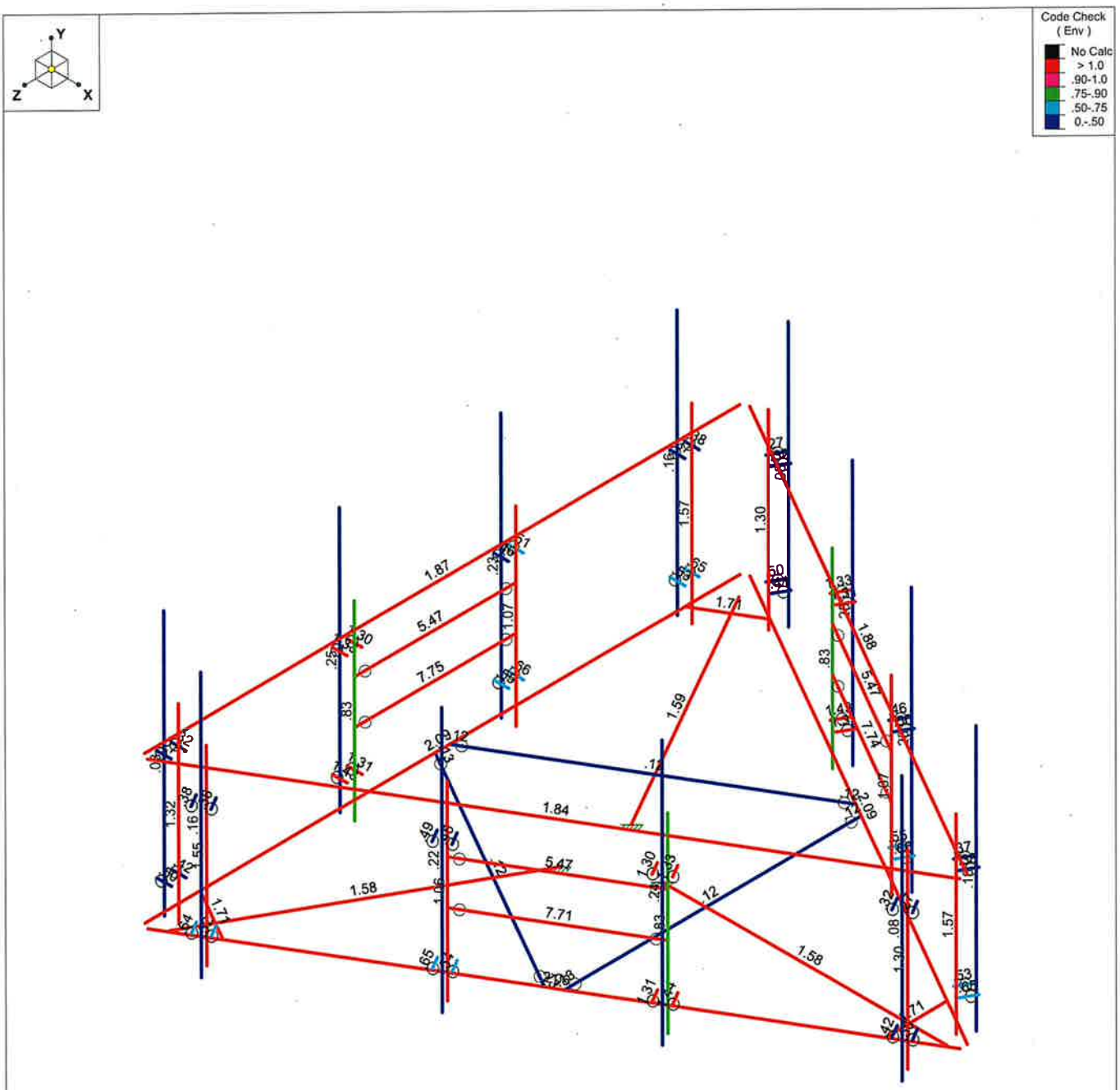
Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Thu Dec 12 2019

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

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

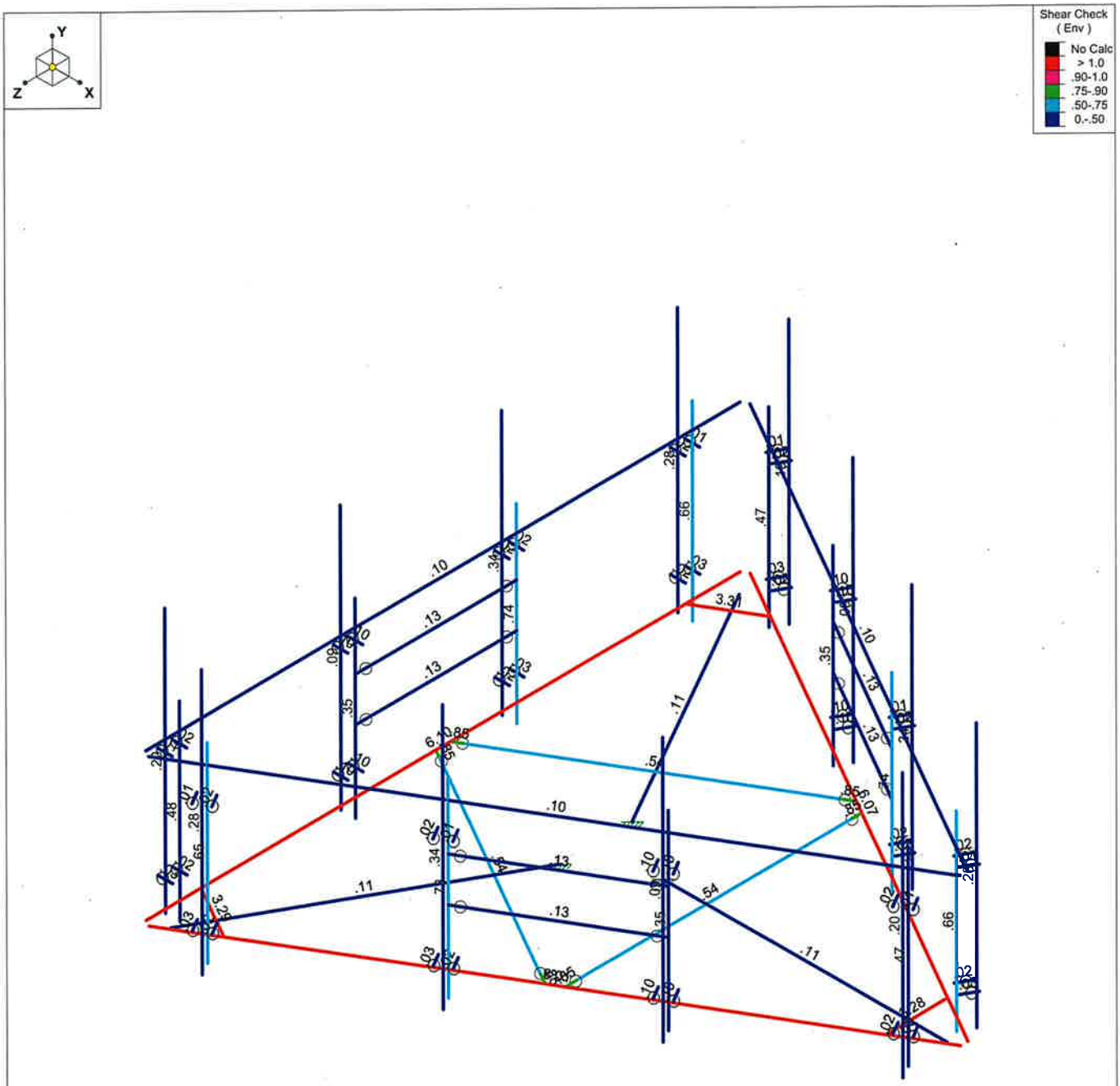
APPENDIX C

SOFTWARE ANALYSIS OUTPUT



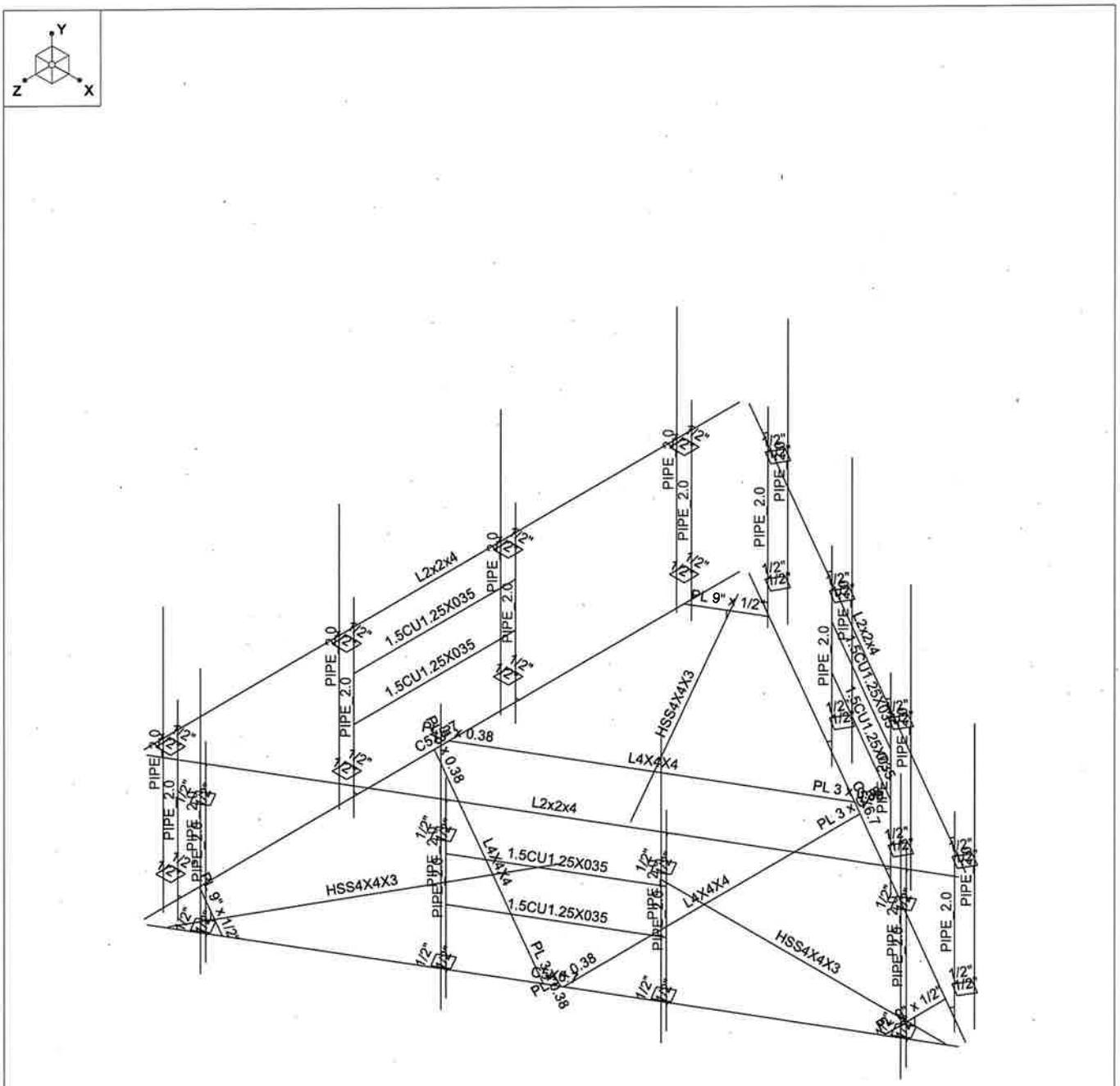
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford and Company	DEEP RIVER WEST CT	SK - 3
GP		Dec 13, 2019 at 3:44 PM
42919-0016.001.7190		42919-0016.001.7190_MA..r3d



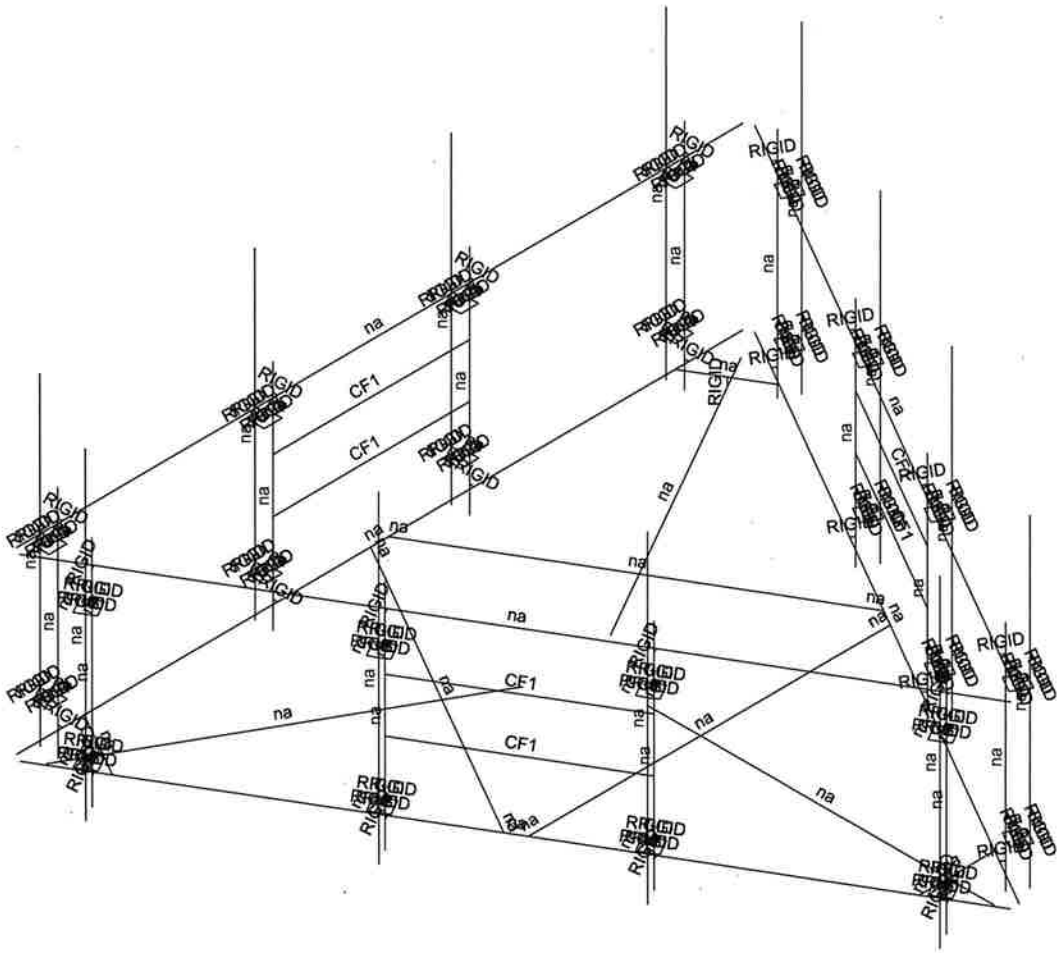
Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford and Company	DEEP RIVER WEST CT	SK - 4
GP		Dec 13, 2019 at 3:45 PM
42919-0016.001.7190		42919-0016.001.7190_MA..r3d



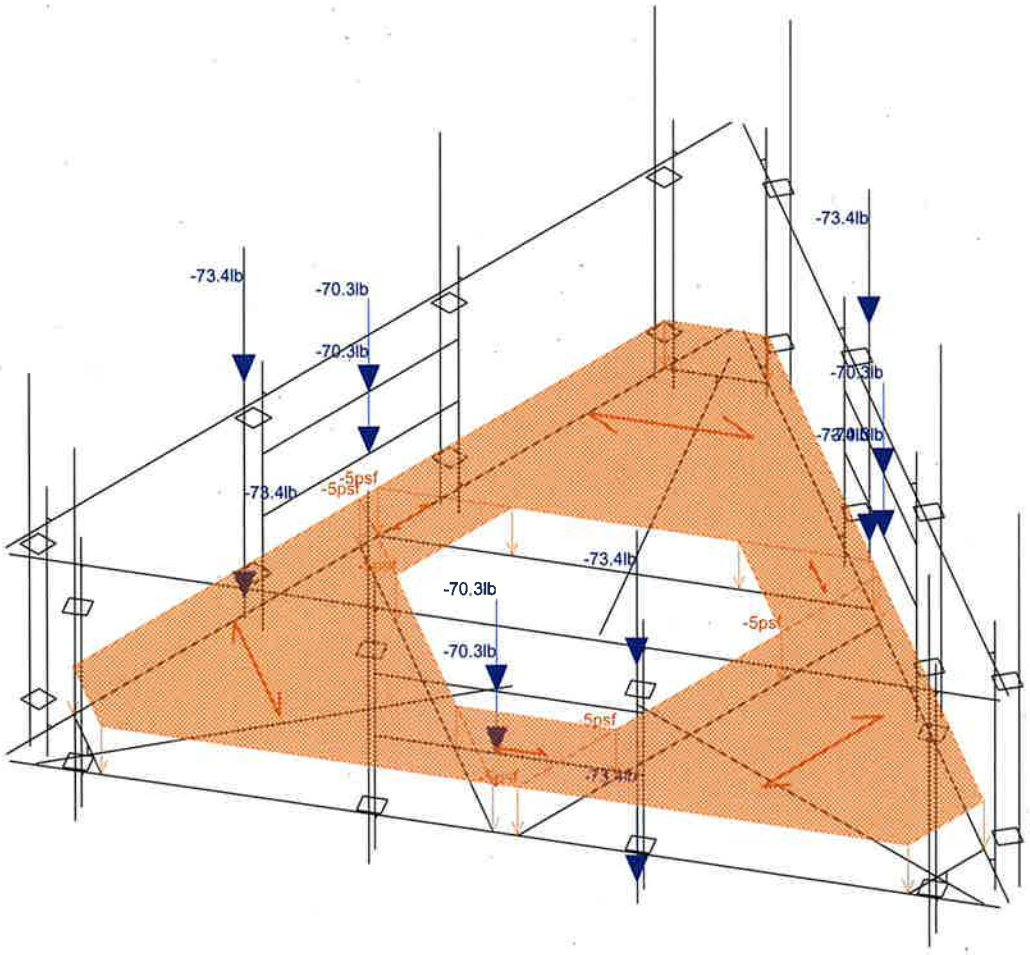
Envelope Only Solution

Paul J. Ford and Company	DEEP RIVER WEST CT	SK - 5
GP		Dec 13, 2019 at 3:47 PM
42919-0016.001.7190		42919-0016.001.7190_MA..r3d



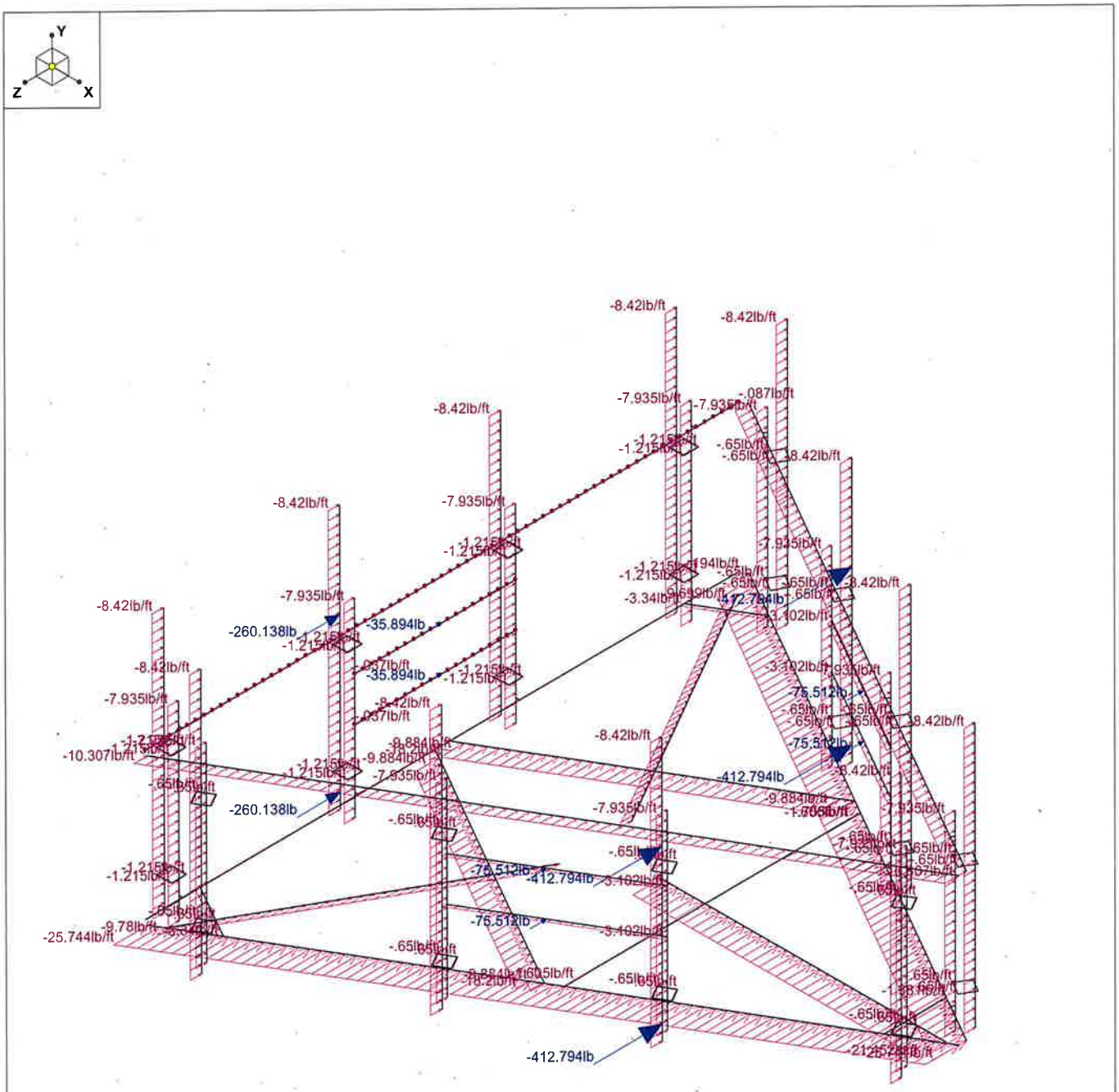
Envelope Only Solution

Paul J. Ford and Company	DEEP RIVER WEST CT	SK - 6
GP		Dec 13, 2019 at 3:47 PM
42919-0016.001.7190		42919-0016.001.7190_MA..r3d



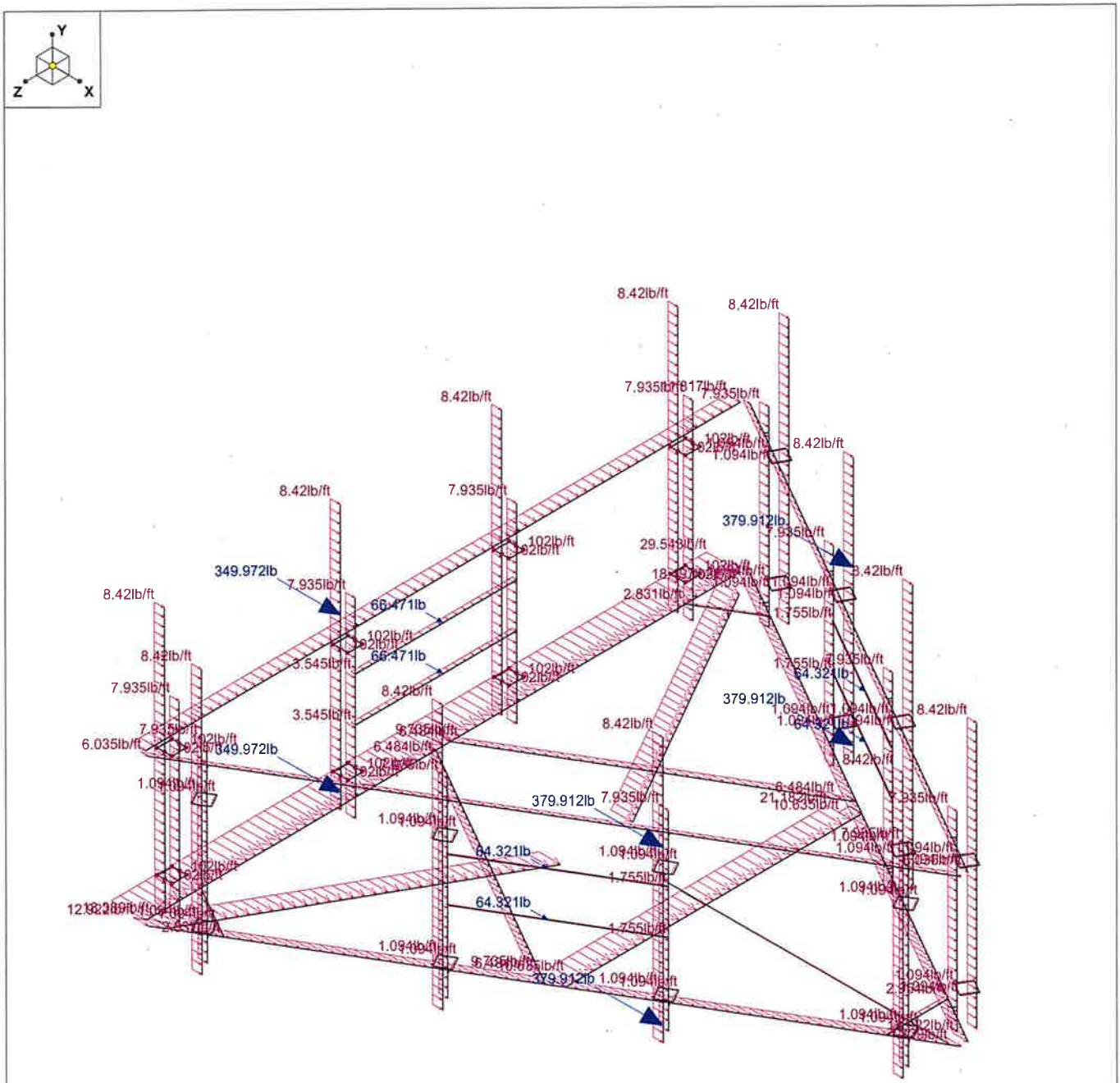
Loads: BLC 1, Dead
Envelope Only Solution

Paul J. Ford and Company	DEEP RIVER WEST CT	SK - 7
GP		Dec 13, 2019 at 3:48 PM
42919-0016.001.7190		42919-0016.001.7190_MA..r3d



Loads: BLC 3, Wind 0
Envelope Only Solution

Paul J. Ford and Company	DEEP RIVER WEST CT	SK - 8
GP		Dec 13, 2019 at 3:48 PM
42919-0016.001.7190		42919-0016.001.7190_MA..r3d



Loads: BLC 6, Wind 90
Envelope Only Solution

Paul J. Ford and Company	DEEP RIVER WEST CT	SK - 9
GP		Dec 13, 2019 at 3:51 PM
42919-0016.001.7190		42919-0016.001.7190_MA..r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	None
Cold Formed Steel Code	AISI S100-12: LRFD
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

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

(Global) Model Settings, Continued

Seismic Code	ASCE 7-05
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Occupancy Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.4	58	1.3
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.4	58	1.3
6	A53 Gr. B (35 ksi)	29000	11154	.3	.65	.49	35	1.5	60	1.2

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2		180	C5X6.7	None	None	A36 Gr.36	Typical
2	M5	N170	N171		90	L4X4X4	None	None	A36 Gr.36	Typical
3	M6	N170	N166B			PL 3 x 0.38	None	None	A36 Gr.36	Typical
4	M7	N171	N168A			PL 3 x 0.38	None	None	A36 Gr.36	Typical
5	M8	N16	N17		90	PL 9" x 1/2"	None	None	A36 Gr.36	Typical
6	M10	N24	N25		90	PL 9" x 1/2"	None	None	A36 Gr.36	Typical
7	M12	N32	N33		90	PL 9" x 1/2"	None	None	A36 Gr.36	Typical
8	M13	N156A	N157A		90	L4X4X4	None	None	A36 Gr.36	Typical
9	M14	N156A	N154A			PL 3 x 0.38	None	None	A36 Gr.36	Typical
10	M15	N157A	N169A			PL 3 x 0.38	None	None	A36 Gr.36	Typical
11	M16	N161A	N162A		90	L4X4X4	None	None	A36 Gr.36	Typical
12	M17	N161A	N159A			PL 3 x 0.38	None	None	A36 Gr.36	Typical
13	M18	N162A	N160A			PL 3 x 0.38	None	None	A36 Gr.36	Typical
14	M19	N43	N44			RIGID	None	None	RIGID	Typical
15	M20	N45	N46			RIGID	None	None	RIGID	Typical
16	M21	N47	N48			RIGID	None	None	RIGID	Typical
17	M22	N49	N50			RIGID	None	None	RIGID	Typical
18	M23	N66A	N65A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
19	CC3	N70	N69			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
20	M25	N74	N73			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design Rules
21	M29	N74A	N73A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
22	M30	N58	N59			RIGID	None	None	RIGID	Typical
23	M31	N60	N61			RIGID	None	None	RIGID	Typical
24	M32	N62	N63			RIGID	None	None	RIGID	Typical
25	M33	N64	N65			RIGID	None	None	RIGID	Typical
26	M34	N67	N66			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
27	BB3	N69A	N68			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
28	M25B	N71	N70A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
29	M40	N73B	N72			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
30	M41	N75	N76			RIGID	None	None	RIGID	Typical
31	M42	N77	N78			RIGID	None	None	RIGID	Typical
32	M43	N79	N80			RIGID	None	None	RIGID	Typical
33	M44	N81	N82			RIGID	None	None	RIGID	Typical
34	M45	N84	N83			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
35	AA3	N86	N85			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
36	25A	N88	N87			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
37	M51	N90	N89			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
38	M52	N89A	N90A		180	L2x2x4	None	None	A36 Gr.36	Typical
39	M55	N95	N96			RIGID	None	None	RIGID	Typical
40	M56	N97	N98			RIGID	None	None	RIGID	Typical
41	M57	N99	N100			RIGID	None	None	RIGID	Typical
42	M58	N101	N102			RIGID	None	None	RIGID	Typical
43	M62	N104	N105			RIGID	None	None	RIGID	Typical
44	M63	N106	N107			RIGID	None	None	RIGID	Typical
45	M64	N108	N109			RIGID	None	None	RIGID	Typical
46	M65	N110A	N111			RIGID	None	None	RIGID	Typical
47	M69	N113	N114			RIGID	None	None	RIGID	Typical
48	M70	N115	N116			RIGID	None	None	RIGID	Typical
49	M71	N117	N118			RIGID	None	None	RIGID	Typical
50	M72	N119	N120			RIGID	None	None	RIGID	Typical
51	C4	N120A	N119A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
52	C3	N122	N121			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
53	C2	N124	N123			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
54	C1	N126	N125			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
55	B4	N145	N144			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
56	B3	N147	N146			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
57	B2	N149	N148			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
58	B1	N151	N150			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
59	A4	N170A	N169			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
60	A3	N172	N171A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
61	A2	N174	N173			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
62	A1	N176	N175			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
63	M90	N191A	N192A		180	C5X6.7	None	None	A36 Gr.36	Typical
64	M91	N194	N195		180	L2x2x4	None	None	A36 Gr.36	Typical
65	M92A	N196	N197		180	C5X6.7	None	None	A36 Gr.36	Typical
66	M93A	N199	N200		180	L2x2x4	None	None	A36 Gr.36	Typical
67	M94A	N199A	N200A		90	HSS4X4X3	None	None	A500 Gr.46	Typical
68	M95A	N201	N202		90	HSS4X4X3	None	None	A500 Gr.46	Typical
69	M96A	N203	N204		90	HSS4X4X3	None	None	A500 Gr.46	Typical
70	M94B	N207	N167			RIGID	None	None	RIGID	Typical
71	M95B	N206	N165			RIGID	None	None	RIGID	Typical
72	M96B	N205	N163			RIGID	None	None	RIGID	Typical
73	M97A	N209	N217			1/2"	None	None	A36 Gr.36	Typical
74	M98A	N205A	N213			1/2"	None	None	A36 Gr.36	Typical
75	M105A	N225	N233			1/2"	None	None	A36 Gr.36	Typical
76	M106A	N221	N229			1/2"	None	None	A36 Gr.36	Typical
77	M105B	N229	N138			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design Rules
78	M106B	N213	N138			RIGID	None	None	RIGID	Typical
79	M107B	N221	N130			RIGID	None	None	RIGID	Typical
80	M108B	N205A	N130			RIGID	None	None	RIGID	Typical
81	M109B	N233	N142			RIGID	None	None	RIGID	Typical
82	M110B	N217	N142			RIGID	None	None	RIGID	Typical
83	M111B	N225	N134			RIGID	None	None	RIGID	Typical
84	M112A	N209	N134			RIGID	None	None	RIGID	Typical
85	M101	N203A	N205B			1/2"	None	None	A36 Gr.36	Typical
86	M102	N202A	N204A			1/2"	None	None	A36 Gr.36	Typical
87	M103	N207A	N209A			1/2"	None	None	A36 Gr.36	Typical
88	M104A	N206A	N208			1/2"	None	None	A36 Gr.36	Typical
89	M105C	N208	N200B			RIGID	None	None	RIGID	Typical
90	M106C	N204A	N200B			RIGID	None	None	RIGID	Typical
91	M107A	N206A	N198			RIGID	None	None	RIGID	Typical
92	M108A	N202A	N198			RIGID	None	None	RIGID	Typical
93	M109A	N209A	N201A			RIGID	None	None	RIGID	Typical
94	M110A	N205B	N201A			RIGID	None	None	RIGID	Typical
95	M111A	N207A	N199B			RIGID	None	None	RIGID	Typical
96	M112	N203A	N199B			RIGID	None	None	RIGID	Typical
97	M113	N215	N217A			1/2"	None	None	A36 Gr.36	Typical
98	M114	N214	N216			1/2"	None	None	A36 Gr.36	Typical
99	M115	N219	N221A			1/2"	None	None	A36 Gr.36	Typical
100	M116	N218	N220			1/2"	None	None	A36 Gr.36	Typical
101	M117	N220	N212			RIGID	None	None	RIGID	Typical
102	M118	N216	N212			RIGID	None	None	RIGID	Typical
103	M119	N218	N210			RIGID	None	None	RIGID	Typical
104	M120	N214	N210			RIGID	None	None	RIGID	Typical
105	M121	N221A	N213A			RIGID	None	None	RIGID	Typical
106	M122	N217A	N213A			RIGID	None	None	RIGID	Typical
107	M123	N219	N211			RIGID	None	None	RIGID	Typical
108	M124	N215	N211			RIGID	None	None	RIGID	Typical
109	M125	N227	N229A			1/2"	None	None	A36 Gr.36	Typical
110	M126	N226	N228			1/2"	None	None	A36 Gr.36	Typical
111	M127	N231	N233A			1/2"	None	None	A36 Gr.36	Typical
112	M128	N230	N232			1/2"	None	None	A36 Gr.36	Typical
113	M129	N232	N224			RIGID	None	None	RIGID	Typical
114	M130	N228	N224			RIGID	None	None	RIGID	Typical
115	M131	N230	N222			RIGID	None	None	RIGID	Typical
116	M132	N226	N222			RIGID	None	None	RIGID	Typical
117	M133	N233A	N225A			RIGID	None	None	RIGID	Typical
118	M134	N229A	N225A			RIGID	None	None	RIGID	Typical
119	M135	N231	N223			RIGID	None	None	RIGID	Typical
120	M136	N227	N223			RIGID	None	None	RIGID	Typical
121	M121A	N240	N242			1/2"	None	None	A36 Gr.36	Typical
122	M122A	N239	N241			1/2"	None	None	A36 Gr.36	Typical
123	M123A	N244	N246			1/2"	None	None	A36 Gr.36	Typical
124	M124A	N243	N245			1/2"	None	None	A36 Gr.36	Typical
125	M125A	N245	N163A			RIGID	None	None	RIGID	Typical
126	M126A	N241	N163A			RIGID	None	None	RIGID	Typical
127	M127A	N243	N155			RIGID	None	None	RIGID	Typical
128	M128A	N239	N155			RIGID	None	None	RIGID	Typical
129	M129A	N246	N167B			RIGID	None	None	RIGID	Typical
130	M130A	N242	N167B			RIGID	None	None	RIGID	Typical
131	M131A	N244	N159			RIGID	None	None	RIGID	Typical
132	M132A	N240	N159			RIGID	None	None	RIGID	Typical
133	M133A	N252	N254			1/2"	None	None	A36 Gr.36	Typical
134	M134A	N251	N253			1/2"	None	None	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design Rules
135	M135A	N256	N258			1/2"	None	None	A36 Gr.36	Typical
136	M136A	N255	N257			1/2"	None	None	A36 Gr.36	Typical
137	M137	N257	N162			RIGID	None	None	RIGID	Typical
138	M138	N253	N162			RIGID	None	None	RIGID	Typical
139	M139	N255	N154			RIGID	None	None	RIGID	Typical
140	M140	N251	N154			RIGID	None	None	RIGID	Typical
141	M141	N258	N166A			RIGID	None	None	RIGID	Typical
142	M142	N254	N166A			RIGID	None	None	RIGID	Typical
143	M143	N256	N158			RIGID	None	None	RIGID	Typical
144	M144	N252	N158			RIGID	None	None	RIGID	Typical
145	M145	N264	N266			1/2"	None	None	A36 Gr.36	Typical
146	M146	N263	N265			1/2"	None	None	A36 Gr.36	Typical
147	M147	N268	N270			1/2"	None	None	A36 Gr.36	Typical
148	M148	N267	N269			1/2"	None	None	A36 Gr.36	Typical
149	M149	N269	N161			RIGID	None	None	RIGID	Typical
150	M150	N265	N161			RIGID	None	None	RIGID	Typical
151	M151	N267	N153			RIGID	None	None	RIGID	Typical
152	M152	N263	N153			RIGID	None	None	RIGID	Typical
153	M153	N270	N165A			RIGID	None	None	RIGID	Typical
154	M154	N266	N165A			RIGID	None	None	RIGID	Typical
155	M155	N268	N157			RIGID	None	None	RIGID	Typical
156	M156	N264	N157			RIGID	None	None	RIGID	Typical
157	M157	N276	N278			1/2"	None	None	A36 Gr.36	Typical
158	M158	N275	N277			1/2"	None	None	A36 Gr.36	Typical
159	M159	N280	N282			1/2"	None	None	A36 Gr.36	Typical
160	M160	N279	N281			1/2"	None	None	A36 Gr.36	Typical
161	M161	N281	N160			RIGID	None	None	RIGID	Typical
162	M162	N277	N160			RIGID	None	None	RIGID	Typical
163	M163	N279	N152			RIGID	None	None	RIGID	Typical
164	M164	N275	N152			RIGID	None	None	RIGID	Typical
165	M165	N282	N164A			RIGID	None	None	RIGID	Typical
166	M166	N278	N164A			RIGID	None	None	RIGID	Typical
167	M167	N280	N156			RIGID	None	None	RIGID	Typical
168	M168	N276	N156			RIGID	None	None	RIGID	Typical
169	M169	N289	N291			1/2"	None	None	A36 Gr.36	Typical
170	M170	N288	N290			1/2"	None	None	A36 Gr.36	Typical
171	M171	N293	N295			1/2"	None	None	A36 Gr.36	Typical
172	M172	N292	N294			1/2"	None	None	A36 Gr.36	Typical
173	M173	N294	N188			RIGID	None	None	RIGID	Typical
174	M174	N290	N188			RIGID	None	None	RIGID	Typical
175	M175	N292	N180			RIGID	None	None	RIGID	Typical
176	M176	N288	N180			RIGID	None	None	RIGID	Typical
177	M177	N295	N192			RIGID	None	None	RIGID	Typical
178	M178	N291	N192			RIGID	None	None	RIGID	Typical
179	M179	N293	N184			RIGID	None	None	RIGID	Typical
180	M180	N289	N184			RIGID	None	None	RIGID	Typical
181	M181	N301	N303			1/2"	None	None	A36 Gr.36	Typical
182	M182	N300	N302			1/2"	None	None	A36 Gr.36	Typical
183	M183	N305	N307			1/2"	None	None	A36 Gr.36	Typical
184	M184	N304	N306			1/2"	None	None	A36 Gr.36	Typical
185	M185	N306	N187			RIGID	None	None	RIGID	Typical
186	M186	N302	N187			RIGID	None	None	RIGID	Typical
187	M187	N304	N179			RIGID	None	None	RIGID	Typical
188	M188	N300	N179			RIGID	None	None	RIGID	Typical
189	M189	N307	N191			RIGID	None	None	RIGID	Typical
190	M190	N303	N191			RIGID	None	None	RIGID	Typical
191	M191	N305	N183			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design Rules
192	M192	N301	N183			RIGID	None	None	RIGID	Typical
193	M193	N313	N315			1/2"	None	None	A36 Gr.36	Typical
194	M194	N312	N314			1/2"	None	None	A36 Gr.36	Typical
195	M195	N317	N319			1/2"	None	None	A36 Gr.36	Typical
196	M196	N316	N318			1/2"	None	None	A36 Gr.36	Typical
197	M197	N318	N186			RIGID	None	None	RIGID	Typical
198	M198	N314	N186			RIGID	None	None	RIGID	Typical
199	M199	N316	N178			RIGID	None	None	RIGID	Typical
200	M200	N312	N178			RIGID	None	None	RIGID	Typical
201	M201	N319	N190			RIGID	None	None	RIGID	Typical
202	M202	N315	N190			RIGID	None	None	RIGID	Typical
203	M203	N317	N182			RIGID	None	None	RIGID	Typical
204	M204	N313	N182			RIGID	None	None	RIGID	Typical
205	M205	N325	N327			1/2"	None	None	A36 Gr.36	Typical
206	M206	N324	N326			1/2"	None	None	A36 Gr.36	Typical
207	M207	N329	N331			1/2"	None	None	A36 Gr.36	Typical
208	M208	N328	N330			1/2"	None	None	A36 Gr.36	Typical
209	M209	N330	N185			RIGID	None	None	RIGID	Typical
210	M210	N326	N185			RIGID	None	None	RIGID	Typical
211	M211	N328	N177			RIGID	None	None	RIGID	Typical
212	M212	N324	N177			RIGID	None	None	RIGID	Typical
213	M213	N331	N189			RIGID	None	None	RIGID	Typical
214	M214	N327	N189			RIGID	None	None	RIGID	Typical
215	M215	N329	N181			RIGID	None	None	RIGID	Typical
216	M216	N325	N181			RIGID	None	None	RIGID	Typical
217	CC1	N298	N299			CF1	Beam	None	A570 Gr.33	Typical
218	CC2	N300A	N301A			CF1	Beam	None	A570 Gr.33	Typical
219	BB1	N303A	N304A			CF1	Beam	None	A570 Gr.33	Typical
220	BB2	N305A	N306A			CF1	Beam	None	A570 Gr.33	Typical
221	AA1	N308	N309			CF1	Beam	None	A570 Gr.33	Typical
222	AA2	N310	N311			CF1	Beam	None	A570 Gr.33	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes	** NA **			None
2	M5						Yes	** NA **			None
3	M6		BenPIN				Yes	** NA **			None
4	M7		BenPIN				Yes	** NA **			None
5	M8						Yes	** NA **			None
6	M10						Yes	** NA **			None
7	M12						Yes	** NA **			None
8	M13						Yes	** NA **			None
9	M14		BenPIN				Yes	** NA **			None
10	M15		BenPIN				Yes	** NA **			None
11	M16						Yes	** NA **			None
12	M17		BenPIN				Yes	** NA **			None
13	M18		BenPIN				Yes	** NA **			None
14	M19						Yes	** NA **			None
15	M20						Yes	** NA **			None
16	M21						Yes	** NA **			None
17	M22						Yes	** NA **			None
18	M23						Yes	** NA **			None
19	CC3						Yes	** NA **			None
20	M25						Yes	** NA **			None
21	M29						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
22	M30						Yes	** NA **			None
23	M31						Yes	** NA **			None
24	M32						Yes	** NA **			None
25	M33						Yes	** NA **			None
26	M34						Yes	** NA **			None
27	BB3						Yes	** NA **			None
28	M25B						Yes	** NA **			None
29	M40						Yes	** NA **			None
30	M41						Yes	** NA **			None
31	M42						Yes	** NA **			None
32	M43						Yes	** NA **			None
33	M44						Yes	** NA **			None
34	M45						Yes	** NA **			None
35	AA3						Yes	** NA **			None
36	25A						Yes	** NA **			None
37	M51						Yes	** NA **			None
38	M52						Yes	** NA **			None
39	M55	OOOXOO					Yes	** NA **			None
40	M56	OOOXOX					Yes	** NA **			None
41	M57	OOOXOX					Yes	** NA **			None
42	M58	OOOXOO					Yes	** NA **			None
43	M62	OOOXOO					Yes	** NA **			None
44	M63	OOOXOX					Yes	** NA **			None
45	M64	OOOXOX					Yes	** NA **			None
46	M65	OOOXOO					Yes	** NA **			None
47	M69	OOOXOO					Yes	** NA **			None
48	M70	OOOXOX					Yes	** NA **			None
49	M71	OOOXOX					Yes	** NA **			None
50	M72	OOOXOO					Yes	** NA **			None
51	C4						Yes	** NA **			None
52	C3						Yes	** NA **			None
53	C2						Yes	** NA **			None
54	C1						Yes	** NA **			None
55	B4						Yes	** NA **			None
56	B3						Yes	** NA **			None
57	B2						Yes	** NA **			None
58	B1						Yes	** NA **			None
59	A4						Yes	** NA **			None
60	A3						Yes	** NA **			None
61	A2						Yes	** NA **			None
62	A1						Yes	** NA **			None
63	M90						Yes	** NA **			None
64	M91						Yes	** NA **			None
65	M92A						Yes	** NA **			None
66	M93A						Yes	** NA **			None
67	M94A						Yes	** NA **			None
68	M95A						Yes	** NA **			None
69	M96A						Yes	** NA **			None
70	M94B	BenPIN					Yes	** NA **			None
71	M95B	BenPIN					Yes	** NA **			None
72	M96B	BenPIN					Yes	** NA **			None
73	M97A	OOOXOX					Yes	** NA **			None
74	M98A	OOOXOX					Yes	** NA **			None
75	M105A	OOOXOX					Yes	** NA **			None
76	M106A	OOOXOX					Yes	** NA **			None
77	M105B						Yes	** NA **			None
78	M106B						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
79	M107B						Yes	** NA **			None
80	M108B						Yes	** NA **			None
81	M109B						Yes	** NA **			None
82	M110B						Yes	** NA **			None
83	M111B						Yes	** NA **			None
84	M112A						Yes	** NA **			None
85	M101	OOOXOX					Yes	** NA **			None
86	M102	OOOXOX					Yes	** NA **			None
87	M103	OOOXOX					Yes	** NA **			None
88	M104A	OOOXOX					Yes	** NA **			None
89	M105C						Yes	** NA **			None
90	M106C						Yes	** NA **			None
91	M107A						Yes	** NA **			None
92	M108A						Yes	** NA **			None
93	M109A						Yes	** NA **			None
94	M110A						Yes	** NA **			None
95	M111A						Yes	** NA **			None
96	M112						Yes	** NA **			None
97	M113	OOOXOX					Yes	** NA **			None
98	M114	OOOXOX					Yes	** NA **			None
99	M115	OOOXOX					Yes	** NA **			None
100	M116	OOOXOX					Yes	** NA **			None
101	M117						Yes	** NA **			None
102	M118						Yes	** NA **			None
103	M119						Yes	** NA **			None
104	M120						Yes	** NA **			None
105	M121						Yes	** NA **			None
106	M122						Yes	** NA **			None
107	M123						Yes	** NA **			None
108	M124						Yes	** NA **			None
109	M125	OOOXOX					Yes	** NA **			None
110	M126	OOOXOX					Yes	** NA **			None
111	M127	OOOXOX					Yes	** NA **			None
112	M128	OOOXOX					Yes	** NA **			None
113	M129						Yes	** NA **			None
114	M130						Yes	** NA **			None
115	M131						Yes	** NA **			None
116	M132						Yes	** NA **			None
117	M133						Yes	** NA **			None
118	M134						Yes	** NA **			None
119	M135						Yes	** NA **			None
120	M136						Yes	** NA **			None
121	M121A	OOOXOX					Yes	** NA **			None
122	M122A	OOOXOX					Yes	** NA **			None
123	M123A	OOOXOX					Yes	** NA **			None
124	M124A	OOOXOX					Yes	** NA **			None
125	M125A						Yes	** NA **			None
126	M126A						Yes	** NA **			None
127	M127A						Yes	** NA **			None
128	M128A						Yes	** NA **			None
129	M129A						Yes	** NA **			None
130	M130A						Yes	** NA **			None
131	M131A						Yes	** NA **			None
132	M132A						Yes	** NA **			None
133	M133A	OOOXOX					Yes	** NA **			None
134	M134A	OOOXOX					Yes	** NA **			None
135	M135A	OOOXOX					Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
136	M136A	OOOXOX					Yes	** NA **			None
137	M137						Yes	** NA **			None
138	M138						Yes	** NA **			None
139	M139						Yes	** NA **			None
140	M140						Yes	** NA **			None
141	M141						Yes	** NA **			None
142	M142						Yes	** NA **			None
143	M143						Yes	** NA **			None
144	M144						Yes	** NA **			None
145	M145	OOOXOX					Yes	** NA **			None
146	M146	OOOXOX					Yes	** NA **			None
147	M147	OOOXOX					Yes	** NA **			None
148	M148	OOOXOX					Yes	** NA **			None
149	M149						Yes	** NA **			None
150	M150						Yes	** NA **			None
151	M151						Yes	** NA **			None
152	M152						Yes	** NA **			None
153	M153						Yes	** NA **			None
154	M154						Yes	** NA **			None
155	M155						Yes	** NA **			None
156	M156						Yes	** NA **			None
157	M157	OOOXOX					Yes	** NA **			None
158	M158	OOOXOX					Yes	** NA **			None
159	M159	OOOXOX					Yes	** NA **			None
160	M160	OOOXOX					Yes	** NA **			None
161	M161						Yes	** NA **			None
162	M162						Yes	** NA **			None
163	M163						Yes	** NA **			None
164	M164						Yes	** NA **			None
165	M165						Yes	** NA **			None
166	M166						Yes	** NA **			None
167	M167						Yes	** NA **			None
168	M168						Yes	** NA **			None
169	M169	OOOXOX					Yes	** NA **			None
170	M170	OOOXOX					Yes	** NA **			None
171	M171	OOOXOX					Yes	** NA **			None
172	M172	OOOXOX					Yes	** NA **			None
173	M173						Yes	** NA **			None
174	M174						Yes	** NA **			None
175	M175						Yes	** NA **			None
176	M176						Yes	** NA **			None
177	M177						Yes	** NA **			None
178	M178						Yes	** NA **			None
179	M179						Yes	** NA **			None
180	M180						Yes	** NA **			None
181	M181	OOOXOX					Yes	** NA **			None
182	M182	OOOXOX					Yes	** NA **			None
183	M183	OOOXOX					Yes	** NA **			None
184	M184	OOOXOX					Yes	** NA **			None
185	M185						Yes	** NA **			None
186	M186						Yes	** NA **			None
187	M187						Yes	** NA **			None
188	M188						Yes	** NA **			None
189	M189						Yes	** NA **			None
190	M190						Yes	** NA **			None
191	M191						Yes	** NA **			None
192	M192						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
193	M193	OOOXOX					Yes	** NA **			None
194	M194	OOOXOX					Yes	** NA **			None
195	M195	OOOXOX					Yes	** NA **			None
196	M196	OOOXOX					Yes	** NA **			None
197	M197						Yes	** NA **			None
198	M198						Yes	** NA **			None
199	M199						Yes	** NA **			None
200	M200						Yes	** NA **			None
201	M201						Yes	** NA **			None
202	M202						Yes	** NA **			None
203	M203						Yes	** NA **			None
204	M204						Yes	** NA **			None
205	M205	OOOXOX					Yes	** NA **			None
206	M206	OOOXOX					Yes	** NA **			None
207	M207	OOOXOX					Yes	** NA **			None
208	M208	OOOXOX					Yes	** NA **			None
209	M209						Yes	** NA **			None
210	M210						Yes	** NA **			None
211	M211						Yes	** NA **			None
212	M212						Yes	** NA **			None
213	M213						Yes	** NA **			None
214	M214						Yes	** NA **			None
215	M215						Yes	** NA **			None
216	M216						Yes	** NA **			None
217	CC1	BenPIN	BenPIN				Yes				None
218	CC2	BenPIN	BenPIN				Yes				None
219	BB1	BenPIN	BenPIN				Yes				None
220	BB2	BenPIN	BenPIN				Yes				None
221	AA1	BenPIN	BenPIN				Yes				None
222	AA2	BenPIN	BenPIN				Yes				None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	C5X6.7	162.241			Lbyy						Lateral
2	M5	L4X4X4	75.099			Lbyy						Lateral
3	M6	PL 3 x 0.38	3			Lbyy						Lateral
4	M7	PL 3 x 0.38	3			Lbyy						Lateral
5	M8	PL 9" x 1/2"	17.006			Lbyy						Lateral
6	M10	PL 9" x 1/2"	17.006			Lbyy						Lateral
7	M12	PL 9" x 1/2"	17.006			Lbyy						Lateral
8	M13	L4X4X4	75.099			Lbyy						Lateral
9	M14	PL 3 x 0.38	3			Lbyy						Lateral
10	M15	PL 3 x 0.38	3			Lbyy						Lateral
11	M16	L4X4X4	75.099			Lbyy						Lateral
12	M17	PL 3 x 0.38	3			Lbyy						Lateral
13	M18	PL 3 x 0.38	3			Lbyy						Lateral
14	M23	PIPE_2.0	52									Lateral
15	CC3	PIPE_2.0	52									Lateral
16	M25	PIPE_2.0	52									Lateral
17	M29	PIPE_2.0	52									Lateral
18	M34	PIPE_2.0	52									Lateral
19	BB3	PIPE_2.0	52									Lateral
20	M25B	PIPE_2.0	52									Lateral
21	M40	PIPE_2.0	52									Lateral
22	M45	PIPE_2.0	52									Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
23	AA3	PIPE_2.0	52									Lateral
24	25A	PIPE_2.0	52									Lateral
25	M51	PIPE_2.0	52									Lateral
26	M52	L2x2x4	162.241			Lbyy						Lateral
27	C4	PIPE_2.0	72									Lateral
28	C3	PIPE_2.0	72									Lateral
29	C2	PIPE_2.0	72									Lateral
30	C1	PIPE_2.0	72									Lateral
31	B4	PIPE_2.0	72									Lateral
32	B3	PIPE_2.0	72									Lateral
33	B2	PIPE_2.0	72									Lateral
34	B1	PIPE_2.0	72									Lateral
35	A4	PIPE_2.0	72									Lateral
36	A3	PIPE_2.0	72									Lateral
37	A2	PIPE_2.0	72									Lateral
38	A1	PIPE_2.0	72									Lateral
39	M90	C5X6.7	162.241			Lbyy						Lateral
40	M91	L2x2x4	162.241			Lbyy						Lateral
41	M92A	C5X6.7	162.241			Lbyy						Lateral
42	M93A	L2x2x4	162.241			Lbyy						Lateral
43	M94A	HSS4X4X3	77.844			Lbyy						Lateral
44	M95A	HSS4X4X3	78.514			Lbyy						Lateral
45	M96A	HSS4X4X3	77.844			Lbyy						Lateral
46	M97A	1/2"	4									Lateral
47	M98A	1/2"	4									Lateral
48	M105A	1/2"	4									Lateral
49	M106A	1/2"	4									Lateral
50	M101	1/2"	4									Lateral
51	M102	1/2"	4									Lateral
52	M103	1/2"	4									Lateral
53	M104A	1/2"	4									Lateral
54	M113	1/2"	4									Lateral
55	M114	1/2"	4									Lateral
56	M115	1/2"	4									Lateral
57	M116	1/2"	4									Lateral
58	M125	1/2"	4									Lateral
59	M126	1/2"	4									Lateral
60	M127	1/2"	4									Lateral
61	M128	1/2"	4									Lateral
62	M121A	1/2"	4									Lateral
63	M122A	1/2"	4									Lateral
64	M123A	1/2"	4									Lateral
65	M124A	1/2"	4									Lateral
66	M133A	1/2"	4									Lateral
67	M134A	1/2"	4									Lateral
68	M135A	1/2"	4									Lateral
69	M136A	1/2"	4									Lateral
70	M145	1/2"	4									Lateral
71	M146	1/2"	4									Lateral
72	M147	1/2"	4									Lateral
73	M148	1/2"	4									Lateral
74	M157	1/2"	4									Lateral
75	M158	1/2"	4									Lateral
76	M159	1/2"	4									Lateral
77	M160	1/2"	4									Lateral
78	M169	1/2"	4									Lateral
79	M170	1/2"	4									Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
80	M171	1/2"	4									Lateral
81	M172	1/2"	4									Lateral
82	M181	1/2"	4									Lateral
83	M182	1/2"	4									Lateral
84	M183	1/2"	4									Lateral
85	M184	1/2"	4									Lateral
86	M193	1/2"	4									Lateral
87	M194	1/2"	4									Lateral
88	M195	1/2"	4									Lateral
89	M196	1/2"	4									Lateral
90	M205	1/2"	4									Lateral
91	M206	1/2"	4									Lateral
92	M207	1/2"	4									Lateral
93	M208	1/2"	4									Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(M...	Surface...
1	Dead	None		-1.1			18		6	
2	Live	None							6	
3	Wind 0	None					36	198		
4	Wind 30	None					36	198		
5	Wind 60	None					36	198		
6	Wind 90	None					36	198		
7	Wind 120	None					36	198		
8	Wind 150	None					36	198		
9	Ice Load	None					18	99	6	
10	Ice 0	None					36	198		
11	Ice 30	None					36	198		
12	Ice 60	None					36	198		
13	Ice 90	None					36	198		
14	Ice 120	None					36	198		
15	Ice 150	None					36	198		
16	Lm	None				1				
17	Lv	None				1				
18	BLC 1 Transient Area Loads	None						69		
19	BLC 2 Transient Area Loads	None						69		
20	BLC 9 Transient Area Loads	None						69		

Load Combinations

	Description	So...	P...	S...	BLCFac...	BLCFac...	BLCFac...	BLCFac...	BLCFac...	BLCFac...	BLCFac...	BLCFac...	BLCFac...	BLCFac...	BLCFac...	BLCFac...
1	1.4 D	Yes	Y		1	1.4										
2	1.2 D + 1.6 L	Yes	Y		1	1.2	2	1.6								
3	1.2 D + 1.6 Wo @ 0	Yes	Y		1	1.2	3	1.6								
4	1.2 D + 1.6 Wo @ 30	Yes	Y		1	1.2	4	1.6								
5	1.2 D + 1.6 Wo @ 60	Yes	Y		1	1.2	5	1.6								
6	1.2 D + 1.6 Wo @ 90	Yes	Y		1	1.2	6	1.6								
7	1.2 D + 1.6 Wo @ 1...	Yes	Y		1	1.2	7	1.6								
8	1.2 D + 1.6 Wo @ 1...	Yes	Y		1	1.2	8	1.6								
9	1.2 D + 1.6 Wo @ 1...	Yes	Y		1	1.2	3	-1.6								
10	1.2 D + 1.6 Wo @ 2...	Yes	Y		1	1.2	4	-1.6								
11	1.2 D + 1.6 Wo @ 2...	Yes	Y		1	1.2	5	-1.6								
12	1.2 D + 1.6 Wo @ 2...	Yes	Y		1	1.2	6	-1.6								
13	1.2 D + 1.6 Wo @ 3...	Yes	Y		1	1.2	7	-1.6								
14	1.2 D + 1.6 Wo @ 3...	Yes	Y		1	1.2	8	-1.6								

Load Combinations (Continued)

	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..
15	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	10	1																
16	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	11	1																
17	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	12	1																
18	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	13	1																
19	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	14	1																
20	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	15	1																
21	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	10	-1																
22	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	11	-1																
23	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	12	-1																
24	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	13	-1																
25	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	14	-1																
26	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	15	-1																
27	1.2 D + 1.5 Lm + 1.0...	Yes	Y		1	1.2	3	.114	16	1.5																
28	1.2 D + 1.5 Lm + 1.0...	Yes	Y		1	1.2	4	.114	16	1.5																
29	1.2 D + 1.5 Lm + 1.0...	Yes	Y		1	1.2	5	.114	16	1.5																
30	1.2 D + 1.5 Lm + 1.0...	Yes	Y		1	1.2	6	.114	16	1.5																
31	1.2 D + 1.5 Lm + 1.0...	Yes	Y		1	1.2	7	.114	16	1.5																
32	1.2 D + 1.5 Lm + 1.0...	Yes	Y		1	1.2	8	.114	16	1.5																
33	1.2 D + 1.5 Lm + 1.0...	Yes	Y		1	1.2	3	-.114	16	1.5																
34	1.2 D + 1.5 Lm + 1.0...	Yes	Y		1	1.2	4	-.114	16	1.5																
35	1.2 D + 1.5 Lm + 1.0...	Yes	Y		1	1.2	5	-.114	16	1.5																
36	1.2 D + 1.5 Lm + 1.0...	Yes	Y		1	1.2	6	-.114	16	1.5																
37	1.2 D + 1.5 Lm + 1.0...	Yes	Y		1	1.2	7	-.114	16	1.5																
38	1.2 D + 1.5 Lm + 1.0...	Yes	Y		1	1.2	8	-.114	16	1.5																
39	1.2 D + 1.5 Lv	Yes	Y		1	1.2	17	1.5																		
40	1.0D		Y		1	1																				

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N200A	max	5905.192	12	3389.032	18	730.046	3	0	39	1.929	9	19.528	18
2		min	-5221.664	6	-345.632	12	-777.82	9	0	1	-1.839	3	-2.35	12
3	N202	max	2487.555	14	3388.89	26	4490.578	14	17.138	26	1.919	5	1.16	8
4		min	-2837.611	8	-339.698	8	-5091.615	8	-2.028	8	-1.829	11	-9.782	26
5	N204	max	2719.461	10	3389.661	22	5129.394	4	2.016	4	1.871	13	1.164	4
6		min	-3064.005	4	-341.847	4	-4542.684	10	-16.912	22	-1.806	3	-9.764	22
7	Totals:	max	8471.266	12	8844.35	18	8179.707	3						
8		min	-8471.752	6	3014.807	12	-8179.873	9						

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

	Member	Shape	Code Check	Loc...	LC	Shear Check	Loc[in]	...	L...	phi*Pn..	phi*Pn..	phi*M...	phi*M...	...	Eqn
1	M1	C5X6.7	2.093	13....	6	6.103	13.52	z	6	4033....	63828	1.604	9.585	2..	H1-1b
2	M92A	C5X6.7	2.087	13....	10	6.068	13.52	z	10	4033....	63828	1.604	9.585	2..	H1-1b
3	M90	C5X6.7	2.062	13....	14	6.010	13.52	z	14	4033....	63828	1.604	9.585	2..	H1-1b
4	M93A	L2x2x4	1.881	104...	10	.098	150.41	z	11	1213....	30585.6	.691	1.286	1..	H2-1
5	M52	L2x2x4	1.871	104...	6	.099	150.41	z	7	1213....	30585.6	.691	1.283	1..	H2-1
6	M91	L2x2x4	1.845	104...	14	.097	150.41	z	3	1213....	30585.6	.691	1.285	1..	H2-1
7	M12	PL 9" x 1..	1.714	8.5...	10	3.286	8.503	y	7	68915...	145800	1.519	27.338	1..	H1-1b
8	M8	PL 9" x 1..	1.710	8.5...	6	3.278	8.503	y	3	68915...	145800	1.519	27.338	1..	H1-1b
9	M10	PL 9" x 1...	1.709	8.5...	14	3.311	8.503	y	11	68915...	145800	1.519	27.338	1..	H1-1b
10	M95A	HSS4X4...	1.591	78....	25	.115	78.514	z	26	89908...	106812	12.662	12.662	1..	H1-1b
11	M94A	HSS4X4...	1.577	77....	17	.115	77.844	z	18	90171...	106812	12.662	12.662	1..	H1-1b
12	M96A	HSS4X4...	1.576	77....	21	.115	77.844	z	22	90171...	106812	12.662	12.662	1..	H1-1b
13	M23	PIPE_2.0	1.574	45.5	6	.659	45.5		6	25652...	32130	1.872	1.872	1..	H3-6
14	M45	PIPE_2.0	1.570	45.5	10	.661	45.5		10	25652...	32130	1.872	1.872	1..	H3-6

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

	Member	Shape	Code Check	Loc...	LC	Shear Check	Loc[in]	...	L...	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
15	M34	PIPE_2.0	1.547	45.5	14	.652	45.5		14	25652...	32130	1.872	1.872	1...	H3-6
16	M135A	1/2"	1.435	4	18	.098	0		12	6027....	6361.74	.053	.053	1...	H1-1b
17	M183	1/2"	1.434	4	26	.098	0		12	6027....	6361.74	.053	.053	1...	H1-1b
18	M103	1/2"	1.434	4	22	.098	0		4	6027....	6361.74	.053	.053	1...	H1-1b
19	M184	1/2"	1.330	4	21	.104	0		6	6027....	6361.74	.053	.053	1...	H1-1b
20	M136A	1/2"	1.330	4	25	.104	0		10	6027....	6361.74	.053	.053	1...	H1-1b
21	M104A	1/2"	1.330	4	17	.105	0		14	6027....	6361.74	.053	.053	1...	H1-1b
22	M29	PIPE_2.0	1.318	45.5	6	.481	45.5		6	25652...	32130	1.872	1.872	1...	H3-6
23	M181	1/2"	1.313	4	18	.098	0		12	6027....	6361.74	.053	.053	1...	H1-1b
24	M101	1/2"	1.309	4	26	.098	0		8	6027....	6361.74	.053	.053	1...	H1-1b
25	M133A	1/2"	1.309	4	22	.098	0		4	6027....	6361.74	.053	.053	1...	H1-1b
26	M182	1/2"	1.305	4	23	.104	0		14	6027....	6361.74	.053	.053	1...	H1-1b
27	M134A	1/2"	1.302	4	15	.104	0		6	6027....	6361.74	.053	.053	1...	H1-1b
28	M102	1/2"	1.301	4	19	.104	0		14	6027....	6361.74	.053	.053	1...	H1-1b
29	M51	PIPE_2.0	1.295	45.5	10	.466	45.5		10	25652...	32130	1.872	1.872	1...	H3-6
30	M40	PIPE_2.0	1.295	45.5	14	.474	45.5		14	25652...	32130	1.872	1.872	1...	H3-6
31	AA3	PIPE_2.0	1.073	45.5	5	.739	45.5		11	25652...	32130	1.872	1.872	2...	H3-6
32	CC3	PIPE_2.0	1.067	45.5	13	.741	6.5		6	25652...	32130	1.872	1.872	2...	H3-6
33	BB3	PIPE_2.0	1.056	45.5	9	.729	45.5		3	25652...	32130	1.872	1.872	1...	H3-6
34	M25	PIPE_2.0	.832	45.5	10	.350	45.5		11	25652...	32130	1.872	1.872	1...	H1-1b
35	M25B	PIPE_2.0	.830	45.5	6	.347	45.5		7	25652...	32130	1.872	1.872	2...	H1-1b
36	25A	PIPE_2.0	.826	45.5	14	.352	45.5		3	25652...	32130	1.872	1.872	2...	H1-1b
37	M193	1/2"	.656	4	5	.027	0		5	6027....	6361.74	.053	.053	1...	H1-1a
38	M113	1/2"	.655	4	13	.027	0		13	6027....	6361.74	.053	.053	1...	H1-1a
39	M145	1/2"	.650	4	9	.027	0		9	6027....	6361.74	.053	.053	1...	H1-1a
40	M205	1/2"	.649	4	5	.031	0		5	6027....	6361.74	.053	.053	1...	H1-1b
41	M125	1/2"	.645	4	13	.031	0		13	6027....	6361.74	.053	.053	1...	H1-1b
42	M157	1/2"	.639	4	9	.031	0		9	6027....	6361.74	.053	.053	1...	H1-1b
43	M195	1/2"	.553	4	5	.021	4		5	6027....	6361.74	.053	.053	1...	H1-1a
44	M115	1/2"	.553	4	13	.021	4		13	6027....	6361.74	.053	.053	1...	H1-1a
45	M147	1/2"	.544	4	9	.021	4		9	6027....	6361.74	.053	.053	1...	H1-1a
46	M207	1/2"	.527	4	5	.024	4		5	6027....	6361.74	.053	.053	1...	H1-1b
47	M127	1/2"	.527	4	13	.024	4		13	6027....	6361.74	.053	.053	1...	H1-1b
48	M159	1/2"	.521	4	9	.024	4		9	6027....	6361.74	.053	.053	1...	H1-1b
49	M114	1/2"	.507	4	5	.016	4		5	6027....	6361.74	.053	.053	1...	H1-1a
50	M123A	1/2"	.498	4	19	.027	0		19	6027....	6361.74	.053	.053	1...	H1-1b
51	M194	1/2"	.498	4	9	.016	4		9	6027....	6361.74	.053	.053	1...	H1-1a
52	M105A	1/2"	.498	4	23	.027	0		23	6027....	6361.74	.053	.053	1...	H1-1b
53	M171	1/2"	.498	4	15	.027	0		15	6027....	6361.74	.053	.053	1...	H1-1b
54	M146	1/2"	.493	4	13	.016	4		13	6027....	6361.74	.053	.053	1...	H1-1a
55	M116	1/2"	.464	4	5	.015	0		5	6027....	6361.74	.053	.053	1...	H1-1a
56	M196	1/2"	.458	4	9	.015	0		9	6027....	6361.74	.053	.053	1...	H1-1a
57	M148	1/2"	.454	4	13	.015	0		13	6027....	6361.74	.053	.053	1...	H1-1a
58	M97A	1/2"	.420	4	11	.021	4		11	6027....	6361.74	.053	.053	1...	H1-1b
59	M121A	1/2"	.417	4	7	.021	4		7	6027....	6361.74	.053	.053	1...	H1-1b
60	M169	1/2"	.412	4	3	.020	4		3	6027....	6361.74	.053	.053	1...	H1-1b
61	M206	1/2"	.383	4	9	.013	4		5	6027....	6361.74	.053	.053	1...	H1-1a
62	M126	1/2"	.380	4	5	.014	4		13	6027....	6361.74	.053	.053	1...	H1-1a
63	M158	1/2"	.379	4	13	.013	4		9	6027....	6361.74	.053	.053	1...	H1-1a
64	M208	1/2"	.367	4	10	.017	0		17	6027....	6361.74	.053	.053	1...	H1-1a
65	M128	1/2"	.365	4	6	.017	0		25	6027....	6361.74	.053	.053	1...	H1-1a
66	M160	1/2"	.362	4	14	.017	0		21	6027....	6361.74	.053	.053	1...	H1-1a
67	M122A	1/2"	.320	4	19	.017	0		19	6027....	6361.74	.053	.053	1...	H1-1b
68	M170	1/2"	.319	4	15	.017	0		15	6027....	6361.74	.053	.053	1...	H1-1b
69	M98A	1/2"	.319	4	23	.017	0		23	6027....	6361.74	.053	.053	1...	H1-1b
70	M106A	1/2"	.273	4	11	.013	4		11	6027....	6361.74	.053	.053	1...	H1-1b
71	M124A	1/2"	.270	4	7	.013	4		7	6027....	6361.74	.053	.053	1...	H1-1b

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

	Member	Shape	Code Check	Loc...	LC	Shear Check	Loc[in]	...	L...	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
72	M172	1/2"	.268	4	3	.013	4		3	6027....	6361.74	.053	.053	1...	H1-1b
73	C2	PIPE_2.0	.246	32....	5	.092	32.25		5	20866...	32130	1.872	1.872	1...	H1-1b
74	A2	PIPE_2.0	.246	32....	9	.095	32.25		9	20866...	32130	1.872	1.872	2...	H1-1b
75	B2	PIPE_2.0	.245	32....	13	.090	32.25		13	20866...	32130	1.872	1.872	1...	H1-1b
76	C3	PIPE_2.0	.229	32....	6	.343	32.25		6	20866...	32130	1.872	1.872	1...	H3-6
77	A3	PIPE_2.0	.226	32....	10	.340	32.25		10	20866...	32130	1.872	1.872	1...	H3-6
78	B3	PIPE_2.0	.222	32....	14	.336	32.25		14	20866...	32130	1.872	1.872	1...	H3-6
79	A4	PIPE_2.0	.161	32....	10	.283	32.25		10	20866...	32130	1.872	1.872	1...	H3-6
80	C4	PIPE_2.0	.161	32....	6	.282	32.25		6	20866...	32130	1.872	1.872	1...	H3-6
81	B4	PIPE_2.0	.157	32....	14	.279	32.25		14	20866...	32130	1.872	1.872	1...	H3-6
82	M18	PL 3 x 0....	.125	0	4	.849	3	y	7	35509...	36936	.292	2.308	1...	H1-1b
83	M7	PL 3 x 0....	.125	0	12	.848	3	y	9	35509...	36936	.292	2.308	1...	H1-1b
84	M17	PL 3 x 0....	.125	0	4	.849	3	y	7	35510...	36936	.292	2.308	1...	H1-1b
85	M6	PL 3 x 0....	.125	0	12	.848	3	y	9	35510...	36936	.292	2.308	1...	H1-1b
86	M15	PL 3 x 0....	.124	0	8	.854	3	y	5	35509...	36936	.292	2.308	1...	H1-1b
87	M14	PL 3 x 0....	.124	0	8	.854	3	y	5	35510...	36936	.292	2.308	1...	H1-1b
88	M16	L4X4X4	.122	37....	4	.536	75.099	z	7	36658...	62532	3.138	5.841	1...	H2-1
89	M5	L4X4X4	.122	37....	12	.535	75.099	z	9	36658...	62532	3.138	5.841	1...	H2-1
90	M13	L4X4X4	.121	37....	8	.539	75.099	z	5	36658...	62532	3.138	5.841	1...	H2-1
91	C1	PIPE_2.0	.078	32....	5	.199	32.25		6	20866...	32130	1.872	1.872	1...	H1-1b
92	B1	PIPE_2.0	.077	32....	13	.196	32.25		14	20866...	32130	1.872	1.872	1...	H1-1b
93	A1	PIPE_2.0	.076	32....	9	.191	32.25		10	20866...	32130	1.872	1.872	1...	H1-1b

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Project # A42919-0016.001.7190
By GP
Date: 12/13/19
v0.1, Effective 07/10/18

MOUNT TO TOWER CONNECTION CHECKS

REACTIONS

Px=	0.777	Kip
Py=	3.389	Kip
(Axial)Pz=	5.905	Kip
Mx=	234.33	Kip-in
My=	23.148	Kip-in
(Torque)Mz=	0	Kip-in

Number of Bolts	=	4	
Plate Size	b=	8.5	in
	d=	8.5	in
Edge distance for Bolts	=	1.25	in
Bolt group centroid y-coordinate, Yc		4.25	in
Bolt group centroid x-coordinate, Xc		4.25	in
Load eccentricity in x-direction, ex		0	in
Load eccentricity in y-direction, ey		0	in
Total Moment including load eccentricity ΣMx=		234.33	Kips-in
Total Moment including load eccentricity ΣMy=		23.148	Kips-in
Total Moment including load eccentricity ΣMz=		0	Kips-in

WELD CHECKS

Standoff Member Type		Square	
Width	=	4	in
Depth (only for square members)	=	4	in
Assumed Weld Size	=	0.1875	
Total Forces in X direction =		0.097	kips
Total Forces in Y direction =		0.424	kips
Total Forces in Z direction =		12.44	kips
Resultant	=	12.45	kips
Φ*Fw (Kip/in)/16" weld =		1.392	
Capacity used		298.03%	

BOLT CHECKS

Tension Reaction	22.93	kip
Shear Reaction	0.87	kip
Bolt Type	A325N	
Bolt Diameter	0.625	in
Tensile Strength	20.7	kips
Shear Strength	12.4	kips
Reduced Tensile Strength	-	kips
Tensile Capacity Used	110.7%	
Shear Capacity Used	7.0%	

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