

Date: **November 24, 2025**

TEP OH COA# COA.04749
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351

Subject: Structural Analysis Report

Carrier Designation: **AT&T Mobility Co-Locate**
Site Number: SOH3625
Site Name: N/A
FA Number: 1578363

Crown Castle Designation: **BU Number:** 875358
Site Name: Coffman High School
JDE Job Number: 2146002
Work Order Number: 2448810
Order Number: 699238 Rev. 3

Engineering Firm Designation: **TEP Project Number:** 36938.1188271

Site Data: **6780 Coffman Road, Dublin, Franklin County, OH 43016**
Latitude 40° 6' 35.39", Longitude -83° 7' 41.04"
140 Foot - Monopole Tower

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

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

LC5: Proposed Equipment Configuration

Sufficient Capacity

This analysis utilizes an ultimate 3-second gust wind speed of 108 mph as required by the 2024 Ohio Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: YJA / WAT

Respectfully submitted by:

Jordan W. Shelley, P.E.



Electronic Copy 11/24/2025

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1) INTRODUCTION

This is a 140-ft monopole tower designed by Summit.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	108 mph
Exposure Category:	C
Topographic Factor:	1.0
Ice Thickness:	1.00 in
Wind Speed with Ice:	40 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
125.0	128.0	3	Ericsson	AIR 6472 B77G B77M_20240625 w/ Mount Pipe	4 2	7/8 3/8
		3	Ericsson	4490 B5/B12		
		2	Raycap	DC9-48-60-24-8C-EV_220506		
	125.0	3	Commscope	NNHH-65B-R4_231109 w/ Mount Pipe		
		3	Commscope	NNH4-65C-R6-V3 w/ Mount Pipe		
		3	Ericsson	Radio 4494 44B14 20B29 M01_2024		
		3	Ericsson	4890 B25 B66A		
		3	Sabre	C10857001C Sector Mount		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
140.0	148.0	1	RFS Celwave	PD1151-5	2	7/8
135.0	135.0	1	North Star Lighting	Starbeam-6	10	1/4
100.0	109.0	1	Decibel	ASP-705	2	7/8
	103.0	1	Sinclair	SD314-H		
	100.0	4	Tower Mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Geotechnical Report	1519245	CCISites
Tower Foundation Drawings	1433802	CCISites
Tower Manufacturer Drawings	1610756	CCISites

3.1) Analysis Method

tnxTower (version 8.3.1.2), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (k)	ϕP_{allow} (k)	% Capacity	Pass / Fail
L1	140 - 91.75	Pole	TP29.239x22x0.25	1	-8.72	1278.94	35.5	Pass
L2	91.75 - 45.5	Pole	TP35.678x28.1764x0.3125	2	-15.37	2113.55	48.5	Pass
L3	45.5 - 0	Pole	TP41.88x34.3779x0.375	3	-26.01	3034.48	52.6	Pass
							Summary	
						Pole (L3)	52.6	Pass
						RATING =	52.6	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	52.2	Pass
1,2	Base Plate	-	39.8	Pass
1,2	Base Foundation Structural	-	39.6	Pass
1,2	Base Foundation Soil Interaction	-	11.3	Pass

Structure Rating (max from all components) =	52.6%
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Notes:

- 1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
- 2) Rating per TIA-222-H Section 15.5

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

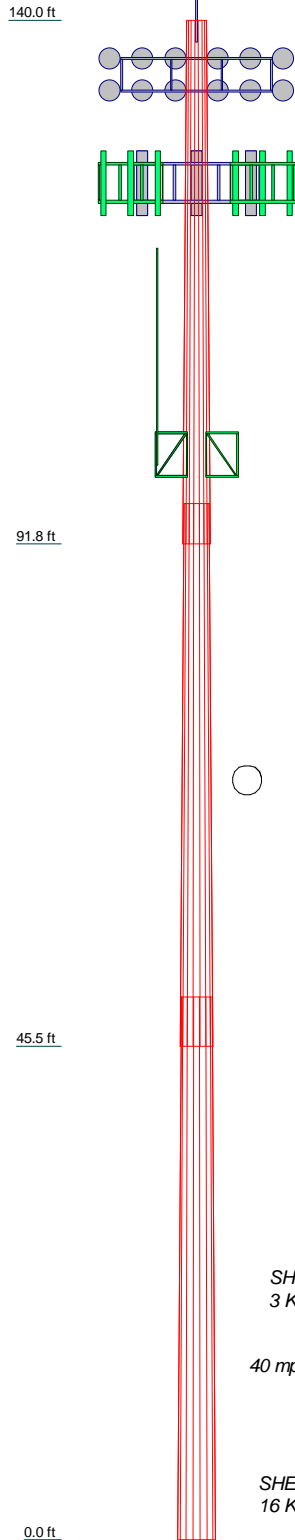
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A871-60	60 ksi	75 ksi	A871-65	65 ksi	80 ksi

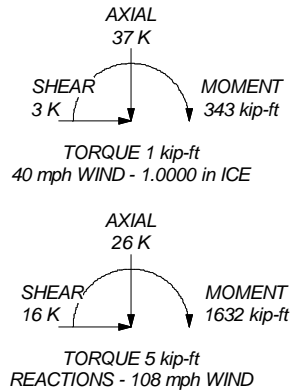
TOWER DESIGN NOTES

1. Tower is located in Franklin County, Ohio.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 108 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 52.6%

Section	1	2	3	
Length (ft)	48.25	50.00	50.00	
Number of Sides	18	18	18	
Thickness (in)	0.2500	0.3125	0.3750	
Socket Length (ft)	3.75	4.50	34.3779	
Top Dia (in)	22.0000	28.1764	41.8800	
Bot Dia (in)	29.2390	35.6780		
Grade		A871-60	A871-65	
Weight (K)	3.3	5.3	7.6	16.3



ALL REACTIONS
ARE FACTORED



	Job: COFFMAN HIGH SCHOOL (BU 875358)		
	Project: TEP No. 36938.1188271		
	Client: Crown Castle	Drawn by: onovikov	App'd:
	Code: TIA-222-H	Date: 11/24/25	Scale: NTS
	Path:		Dwg No. E-1

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	Client Crown Castle	Designed by onovikov

Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

Tower is located in Franklin County, Ohio.

Tower base elevation above sea level: 887.00 ft.

Basic wind speed of 108 mph.

Risk Category II.

Exposure Category C.

Simplified Topographic Factor Procedure for wind speed-up calculations is used.

Topographic Category: 1.

Crest Height: 0.00 ft.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 40 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

Non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Tower analysis based on target reliabilities in accordance with Annex S.

Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.

Maximum demand-capacity ratio is: 1.05.

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

Options

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

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Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	140.00-91.75	48.25	3.75	18	22.0000	29.2390	0.2500	1.0000	A871-60 (60 ksi)
L2	91.75-45.50	50.00	4.50	18	28.1764	35.6780	0.3125	1.2500	A871-65 (65 ksi)
L3	45.50-0.00	50.00		18	34.3779	41.8800	0.3750	1.5000	A871-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L1	22.3008	17.2586	1031.4832	7.7212	11.1760	92.2945	2064.3237	8.6310	3.4320	13.728
	29.6515	23.0028	2442.2161	10.2911	14.8534	164.4212	4887.6457	11.5036	4.7061	18.824
L2	29.1341	27.6375	2710.9364	9.8917	14.3136	189.3958	5425.4399	13.8214	4.4090	14.109
	36.1802	35.0782	5542.8586	12.5548	18.1244	305.8226	11093.0107	17.5424	5.7293	18.334
L3	35.5359	40.4719	5911.8278	12.0710	17.4640	338.5161	11831.4344	20.2398	5.3905	14.375
	42.4682	49.4013	10751.6940	14.7343	21.2750	505.3666	21517.5353	24.7054	6.7109	17.896

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 140.00-91.75				1	1	1			
L2 91.75-45.50				1	1	1			
L3 45.50-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
***** Safety Line 3/8	C	No	Surface Ar (CaAa)	140.00 - 0.00	1	1	0.167 0.167	0.3750		0.22
125 PWRT-606-S_20240507(7/8)	A	No	Surface Ar (CaAa)	125.00 - 0.00	4	4	0.500 0.500	0.9600		0.89
RFFT-48SM-001_2024104(3/8)	A	No	Surface Ar (CaAa)	125.00 - 0.00	2	2	0.500 0.500	0.4000		0.06
***** *****										

Feed Line/Linear Appurtenances - Entered As Area

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Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight plf
140									
LDF5-50A(7/8)	B	No	No	Inside Pole	140.00 - 0.00	2	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
135									
LDF1-50A(1/4)	A	No	No	Inside Pole	135.00 - 0.00	10	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
100									
LDF5-50A(7/8)	B	No	No	Inside Pole	100.00 - 0.00	2	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	140.00-91.75	A	0.000	0.000	15.428	0.000	0.15
		B	0.000	0.000	0.000	0.000	0.04
		C	0.000	0.000	1.809	0.000	0.01
L2	91.75-45.50	A	0.000	0.000	21.460	0.000	0.20
		B	0.000	0.000	0.000	0.000	0.06
		C	0.000	0.000	1.734	0.000	0.01
L3	45.50-0.00	A	0.000	0.000	21.112	0.000	0.19
		B	0.000	0.000	0.000	0.000	0.06
		C	0.000	0.000	1.706	0.000	0.01

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	140.00-91.75	A	0.963	0.000	0.000	35.295	0.000	0.37
		B		0.000	0.000	0.000	0.000	0.04
		C		0.000	0.000	11.103	0.000	0.09
L2	91.75-45.50	A	0.914	0.000	0.000	49.095	0.000	0.50
		B		0.000	0.000	0.000	0.000	0.06
		C		0.000	0.000	10.642	0.000	0.08
L3	45.50-0.00	A	0.820	0.000	0.000	47.184	0.000	0.47
		B		0.000	0.000	0.000	0.000	0.06
		C		0.000	0.000	10.024	0.000	0.08

Feed Line Center of Pressure

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Section	Elevation	CP _X	CP _Z	CP _X Ice	CP _Z Ice
	ft	in	in	in	in
L1	140.00-91.75	-0.0862	-2.0703	-0.2440	-1.7836
L2	91.75-45.50	-0.0841	-2.8852	-0.2383	-2.6574
L3	45.50-0.00	-0.0868	-2.9645	-0.2465	-2.8007

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L1	2	Safety Line 3/8	91.75 - 140.00	1.0000	1.0000
L1	9	PWRT-606-S_20240507(7/8)	91.75 - 125.00	1.0000	1.0000
L1	10	RFFT-48SM-001_20241104(3/8)	91.75 - 125.00	1.0000	1.0000
L2	2	Safety Line 3/8	45.50 - 91.75	1.0000	1.0000
L2	9	PWRT-606-S_20240507(7/8)	45.50 - 91.75	1.0000	1.0000
L2	10	RFFT-48SM-001_20241104(3/8)	45.50 - 91.75	1.0000	1.0000
L3	2	Safety Line 3/8	0.00 - 45.50	1.0000	1.0000
L3	9	PWRT-606-S_20240507(7/8)	0.00 - 45.50	1.0000	1.0000
L3	10	RFFT-48SM-001_20241104(3/8)	0.00 - 45.50	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
140								
PD1151-5	A	From Leg	0.00 0.00 8.00	0.0000	140.00	No Ice 3.99 1/2" Ice 5.47 1" Ice 6.97	3.99 5.47 6.97	0.02 0.04 0.08
2.4" Dia x 4-ft Mount Pipe	A	From Leg	0.00 0.00 0.00	0.0000	140.00	No Ice 0.87 1/2" Ice 1.12 1" Ice 1.37	0.87 1.12 1.37	0.01 0.02 0.03
135								
Starbeam Mount	A	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice 34.00 1/2" Ice 36.00 1" Ice 38.00	12.00 13.00 14.00	0.38 0.48 0.58
125								
AIR 6472 B77G B77M_20240625 w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	0.0000	125.00	No Ice 5.96 1/2" Ice 6.77 1" Ice 7.49	4.34 5.40 6.32	0.10 0.15 0.21

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	CAAA		Weight	
			Horz	Vert			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	K	
AIR 6472 B77G	B	From Leg	4.00	0.0000		125.00	No Ice	5.96	4.34	0.10
B77M_20240625 w/ Mount Pipe			0.00				1/2" Ice	6.77	5.40	0.15
			3.00				1" Ice	7.49	6.32	0.21
AIR 6472 B77G	C	From Leg	4.00	0.0000		125.00	No Ice	5.96	4.34	0.10
B77M_20240625 w/ Mount Pipe			0.00				1/2" Ice	6.77	5.40	0.15
			3.00				1" Ice	7.49	6.32	0.21
NNHH-65B-R4_231109 w/ Mount Pipe	A	From Leg	4.00	0.0000		125.00	No Ice	7.55	4.23	0.10
			0.00				1/2" Ice	8.04	4.67	0.19
			0.00				1" Ice	8.53	5.12	0.28
NNHH-65B-R4_231109 w/ Mount Pipe	B	From Leg	4.00	0.0000		125.00	No Ice	7.55	4.23	0.10
			0.00				1/2" Ice	8.04	4.67	0.19
			0.00				1" Ice	8.53	5.12	0.28
NNHH-65B-R4_231109 w/ Mount Pipe	C	From Leg	4.00	0.0000		125.00	No Ice	7.55	4.23	0.10
			0.00				1/2" Ice	8.04	4.67	0.19
			0.00				1" Ice	8.53	5.12	0.28
NNH4-65C-R6-V3 w/ Mount Pipe	A	From Leg	4.00	0.0000		125.00	No Ice	9.68	5.17	0.16
			0.00				1/2" Ice	10.27	5.71	0.27
			0.00				1" Ice	10.87	6.26	0.39
NNH4-65C-R6-V3 w/ Mount Pipe	B	From Leg	4.00	0.0000		125.00	No Ice	9.68	5.17	0.16
			0.00				1/2" Ice	10.27	5.71	0.27
			0.00				1" Ice	10.87	6.26	0.39
NNH4-65C-R6-V3 w/ Mount Pipe	C	From Leg	4.00	0.0000		125.00	No Ice	9.68	5.17	0.16
			0.00				1/2" Ice	10.27	5.71	0.27
			0.00				1" Ice	10.87	6.26	0.39
4490 B5/B12	A	From Leg	4.00	0.0000		125.00	No Ice	2.20	0.85	0.02
			0.00				1/2" Ice	2.39	0.98	0.04
			0.00				1" Ice	2.58	1.11	0.06
4490 B5/B12	B	From Leg	4.00	0.0000		125.00	No Ice	2.20	0.85	0.02
			0.00				1/2" Ice	2.39	0.98	0.04
			0.00				1" Ice	2.58	1.11	0.06
4490 B5/B12	C	From Leg	4.00	0.0000		125.00	No Ice	2.20	0.85	0.02
			0.00				1/2" Ice	2.39	0.98	0.04
			0.00				1" Ice	2.58	1.11	0.06
DC9-48-60-24-8C-EV_220506	A	From Leg	4.00	0.0000		125.00	No Ice	2.11	2.69	0.02
			0.00				1/2" Ice	2.30	2.91	0.04
			0.00				1" Ice	2.50	3.13	0.07
DC9-48-60-24-8C-EV_220506	B	From Leg	4.00	0.0000		125.00	No Ice	2.11	2.69	0.02
			0.00				1/2" Ice	2.30	2.91	0.04
			0.00				1" Ice	2.50	3.13	0.07
Radio 4494 44B14 20B29 M01_2024	A	From Leg	4.00	0.0000		125.00	No Ice	2.20	0.84	0.06
			0.00				1/2" Ice	2.39	0.96	0.07
			0.00				1" Ice	2.58	1.10	0.09
Radio 4494 44B14 20B29 M01_2024	B	From Leg	4.00	0.0000		125.00	No Ice	2.20	0.84	0.06
			0.00				1/2" Ice	2.39	0.96	0.07
			0.00				1" Ice	2.58	1.10	0.09
Radio 4494 44B14 20B29 M01_2024	C	From Leg	4.00	0.0000		125.00	No Ice	2.20	0.84	0.06
			0.00				1/2" Ice	2.39	0.96	0.07
			0.00				1" Ice	2.58	1.10	0.09
4890 B25 B66A	A	From Leg	4.00	0.0000		125.00	No Ice	2.20	1.01	0.07
			0.00				1/2" Ice	2.39	1.15	0.09
			0.00				1" Ice	2.58	1.30	0.11
4890 B25 B66A	B	From Leg	4.00	0.0000		125.00	No Ice	2.20	1.01	0.07
			0.00				1/2" Ice	2.39	1.15	0.09
			0.00				1" Ice	2.58	1.30	0.11
4890 B25 B66A	C	From Leg	4.00	0.0000		125.00	No Ice	2.20	1.01	0.07
			0.00				1/2" Ice	2.39	1.15	0.09
			0.00				1" Ice	2.58	1.30	0.11

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
2.4" Dia x 8-ft Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
2.4" Dia x 8-ft Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
2.4" Dia x 8-ft Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
Sabre C10857001C Sector Mount	C	None		0.0000	125.00	No Ice 1/2" Ice 1" Ice	29.82 42.21 54.43	29.82 42.21 54.43	1.67 2.27 3.05
100 SD314-H	A	From Leg	3.00 0.00 3.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	4.29 6.15 8.01	4.29 6.15 8.01	0.02 0.06 0.09
ASP-705	C	From Leg	3.00 0.00 9.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	5.88 8.01 10.16	5.88 8.01 10.16	0.03 0.07 0.12
2.4" Dia x 4-ft Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.87 1.12 1.37	0.87 1.12 1.37	0.01 0.02 0.03
2.4" Dia x 4-ft Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.87 1.12 1.37	0.87 1.12 1.37	0.01 0.02 0.03
2.4" Dia x 4-ft Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.87 1.12 1.37	0.87 1.12 1.37	0.01 0.02 0.03
2.4" Dia x 4-ft Mount Pipe	A	From Face	3.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.87 1.12 1.37	0.87 1.12 1.37	0.01 0.02 0.03
Side Arm Mount [SO 701-1]	A	From Leg	1.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
Side Arm Mount [SO 701-1]	B	From Leg	1.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
Side Arm Mount [SO 701-1]	C	From Leg	1.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
Side Arm Mount [SO 701-1]	A	From Face	1.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
**** ****									

Dishes

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Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K	
STARBEAM	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		135.00	2.00	No Ice	3.14	0.05
				2.00					1/2" Ice	3.41	0.08
				1.50					1" Ice	3.68	0.12
STARBEAM	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		135.00	2.00	No Ice	3.14	0.05
				5.00					1/2" Ice	3.41	0.08
				1.50					1" Ice	3.68	0.12
STARBEAM	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		135.00	2.00	No Ice	3.14	0.05
				8.00					1/2" Ice	3.41	0.08
				1.50					1" Ice	3.68	0.12
STARBEAM	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		135.00	2.00	No Ice	3.14	0.05
				-2.00					1/2" Ice	3.41	0.08
				1.50					1" Ice	3.68	0.12
STARBEAM	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		135.00	2.00	No Ice	3.14	0.05
				-5.00					1/2" Ice	3.41	0.08
				1.50					1" Ice	3.68	0.12
STARBEAM	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		135.00	2.00	No Ice	3.14	0.05
				-8.00					1/2" Ice	3.41	0.08
				1.50					1" Ice	3.68	0.12
STARBEAM	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		135.00	2.00	No Ice	3.14	0.05
				2.00					1/2" Ice	3.41	0.08
				-1.50					1" Ice	3.68	0.12
STARBEAM	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		135.00	2.00	No Ice	3.14	0.05
				5.00					1/2" Ice	3.41	0.08
				-1.50					1" Ice	3.68	0.12
STARBEAM	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		135.00	2.00	No Ice	3.14	0.05
				8.00					1/2" Ice	3.41	0.08
				-1.50					1" Ice	3.68	0.12
STARBEAM	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		135.00	2.00	No Ice	3.14	0.05
				-2.00					1/2" Ice	3.41	0.08
				-1.50					1" Ice	3.68	0.12
STARBEAM	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		135.00	2.00	No Ice	3.14	0.05
				-5.00					1/2" Ice	3.41	0.08
				-1.50					1" Ice	3.68	0.12
STARBEAM	A	Paraboloid w/Shroud (HP)	From Leg	2.00	0.0000		135.00	2.00	No Ice	3.14	0.05
				-8.00					1/2" Ice	3.41	0.08
				-1.50					1" Ice	3.68	0.12

**

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	140 - 91.75	Pole	Max Tension	14	0.00	-0.00	0.00
			Max. Compression	26	-15.95	0.64	6.93
			Max. Mx	20	-8.95	247.61	9.52
			Max. My	14	-8.72	0.59	-317.26
			Max. Vy	20	-8.89	247.61	9.52
			Max. Vx	14	10.78	0.59	-317.26
			Max. Torque	21			-4.55
L2	91.75 - 45.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-24.56	1.30	7.54
			Max. Mx	20	-15.50	720.28	16.72
			Max. My	14	-15.37	1.71	-875.56
			Max. Vy	20	-11.85	720.28	16.72
			Max. Vx	14	13.73	1.71	-875.56
			Max. Torque	21			-4.55
L3	45.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.26	2.07	7.95
			Max. Mx	20	-26.02	1385.14	24.27

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	14	-26.01	2.96	-1631.98
			Max. Vy	20	-14.56	1385.14	24.27
			Max. Vx	14	16.35	2.96	-1631.98
			Max. Torque	21			-4.54

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	37.26	-0.00	3.42
	Max. H _x	20	26.03	14.54	0.14
	Max. H _z	2	26.03	-0.02	15.97
	Max. M _x	2	1588.82	-0.02	15.97
	Max. M _z	8	1383.38	-14.54	0.18
	Max. Torsion	9	4.54	-14.54	0.18
	Min. Vert	23	19.52	12.44	8.27
	Min. H _x	8	26.03	-14.54	0.18
	Min. H _z	14	26.03	0.02	-16.33
	Min. M _x	14	-1631.98	0.02	-16.33
	Min. M _z	20	-1385.14	14.54	0.14
	Min. Torsion	21	-4.54	14.54	0.14

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	21.69	0.00	-0.00	-3.08	0.72	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	26.03	0.02	-15.97	-1588.82	-1.20	-0.46
0.9 Dead+1.0 Wind 0 deg - No Ice	19.52	0.02	-15.97	-1570.83	-1.41	-0.46
1.2 Dead+1.0 Wind 30 deg - No Ice	26.03	7.09	-13.95	-1393.61	-664.66	-2.11
0.9 Dead+1.0 Wind 30 deg - No Ice	19.52	7.09	-13.95	-1377.67	-657.94	-2.11
1.2 Dead+1.0 Wind 60 deg - No Ice	26.03	12.45	-8.30	-840.23	-1177.43	-3.76
0.9 Dead+1.0 Wind 60 deg - No Ice	19.52	12.45	-8.30	-830.19	-1165.31	-3.76
1.2 Dead+1.0 Wind 90 deg - No Ice	26.03	14.54	-0.18	-28.43	-1383.38	-4.54
0.9 Dead+1.0 Wind 90 deg - No Ice	19.52	14.54	-0.18	-27.14	-1369.05	-4.54
1.2 Dead+1.0 Wind 120 deg - No Ice	26.03	12.33	8.61	877.50	-1160.79	-2.69
0.9 Dead+1.0 Wind 120 deg - No Ice	19.52	12.33	8.61	868.89	-1148.87	-2.70
1.2 Dead+1.0 Wind 150 deg - No Ice	26.03	7.14	14.30	1436.33	-673.09	-1.25
0.9 Dead+1.0 Wind 150 deg - No Ice	19.52	7.14	14.30	1421.76	-666.27	-1.25

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Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 180 deg - No Ice	26.03	-0.02	16.33	1631.98	2.96	0.46
0.9 Dead+1.0 Wind 180 deg - No Ice	19.52	-0.02	16.33	1615.35	2.71	0.46
1.2 Dead+1.0 Wind 210 deg - No Ice	26.03	-7.17	14.32	1438.40	678.45	2.05
0.9 Dead+1.0 Wind 210 deg - No Ice	19.52	-7.17	14.32	1423.81	671.14	2.05
1.2 Dead+1.0 Wind 240 deg - No Ice	26.03	-12.35	8.64	881.10	1164.62	3.16
0.9 Dead+1.0 Wind 240 deg - No Ice	19.52	-12.35	8.64	872.45	1152.23	3.16
1.2 Dead+1.0 Wind 270 deg - No Ice	26.03	-14.54	-0.14	-24.27	1385.14	4.54
0.9 Dead+1.0 Wind 270 deg - No Ice	19.52	-14.54	-0.14	-23.02	1370.35	4.54
1.2 Dead+1.0 Wind 300 deg - No Ice	26.03	-12.44	-8.27	-836.63	1177.12	3.30
0.9 Dead+1.0 Wind 300 deg - No Ice	19.52	-12.44	-8.27	-826.63	1164.56	3.30
1.2 Dead+1.0 Wind 330 deg - No Ice	26.03	-7.06	-13.93	-1391.54	662.82	1.31
0.9 Dead+1.0 Wind 330 deg - No Ice	19.52	-7.06	-13.93	-1375.62	655.68	1.31
1.2 Dead+1.0 Ice+1.0 Temp	37.26	-0.00	-0.00	-7.95	2.07	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	37.26	0.00	-3.42	-342.97	1.64	-0.14
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	37.26	1.57	-2.98	-300.96	-145.07	-0.42
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	37.26	2.75	-1.76	-182.80	-256.90	-0.67
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	37.26	3.20	-0.03	-12.16	-300.81	-0.77
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	37.26	2.73	1.81	174.06	-254.06	-0.43
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	37.26	1.58	3.04	293.21	-146.31	-0.16
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	37.26	-0.00	3.48	335.39	2.52	0.14
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	37.26	-1.58	3.04	293.65	151.23	0.41
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	37.26	-2.73	1.82	174.82	258.66	0.57
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	37.26	-3.20	-0.02	-11.29	304.97	0.77
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	37.26	-2.74	-1.75	-182.04	260.63	0.53
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	37.26	-1.56	-2.98	-300.52	148.48	0.17
Dead+Wind 0 deg - Service	21.69	0.01	-4.64	-461.03	0.13	-0.13
Dead+Wind 30 deg - Service	21.69	2.06	-4.06	-404.60	-191.55	-0.62
Dead+Wind 60 deg - Service	21.69	3.62	-2.41	-244.70	-339.65	-1.10
Dead+Wind 90 deg - Service	21.69	4.23	-0.05	-10.24	-399.10	-1.33
Dead+Wind 120 deg - Service	21.69	3.58	2.50	251.40	-334.85	-0.79
Dead+Wind 150 deg - Service	21.69	2.08	4.16	412.90	-194.00	-0.36
Dead+Wind 180 deg - Service	21.69	-0.01	4.75	469.46	1.33	0.13
Dead+Wind 210 deg - Service	21.69	-2.09	4.16	413.50	196.50	0.60
Dead+Wind 240 deg - Service	21.69	-3.59	2.51	252.44	336.91	0.92
Dead+Wind 270 deg - Service	21.69	-4.23	-0.04	-9.04	400.56	1.33
Dead+Wind 300 deg - Service	21.69	-3.61	-2.40	-243.66	340.51	0.97
Dead+Wind 330 deg - Service	21.69	-2.05	-4.05	-404.00	191.97	0.39

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Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-21.69	0.00	0.00	21.69	0.00	0.000%
2	0.02	-26.03	-15.97	-0.02	26.03	15.97	0.000%
3	0.02	-19.52	-15.97	-0.02	19.52	15.97	0.000%
4	7.09	-26.03	-13.95	-7.09	26.03	13.95	0.000%
5	7.09	-19.52	-13.95	-7.09	19.52	13.95	0.000%
6	12.45	-26.03	-8.30	-12.45	26.03	8.30	0.000%
7	12.45	-19.52	-8.30	-12.45	19.52	8.30	0.000%
8	14.54	-26.03	-0.18	-14.54	26.03	0.18	0.000%
9	14.54	-19.52	-0.18	-14.54	19.52	0.18	0.000%
10	12.33	-26.03	8.61	-12.33	26.03	-8.61	0.000%
11	12.33	-19.52	8.61	-12.33	19.52	-8.61	0.000%
12	7.14	-26.03	14.30	-7.14	26.03	-14.30	0.000%
13	7.14	-19.52	14.30	-7.14	19.52	-14.30	0.000%
14	-0.02	-26.03	16.33	0.02	26.03	-16.33	0.000%
15	-0.02	-19.52	16.33	0.02	19.52	-16.33	0.000%
16	-7.17	-26.03	14.32	7.17	26.03	-14.32	0.000%
17	-7.17	-19.52	14.32	7.17	19.52	-14.32	0.000%
18	-12.35	-26.03	8.64	12.35	26.03	-8.64	0.000%
19	-12.35	-19.52	8.64	12.35	19.52	-8.64	0.000%
20	-14.54	-26.03	-0.14	14.54	26.03	0.14	0.000%
21	-14.54	-19.52	-0.14	14.54	19.52	0.14	0.000%
22	-12.44	-26.03	-8.27	12.44	26.03	8.27	0.000%
23	-12.44	-19.52	-8.27	12.44	19.52	8.27	0.000%
24	-7.06	-26.03	-13.93	7.06	26.03	13.93	0.000%
25	-7.06	-19.52	-13.93	7.06	19.52	13.93	0.000%
26	0.00	-37.26	0.00	0.00	37.26	0.00	0.000%
27	0.00	-37.26	-3.42	-0.00	37.26	3.42	0.000%
28	1.57	-37.26	-2.98	-1.57	37.26	2.98	0.000%
29	2.75	-37.26	-1.76	-2.75	37.26	1.76	0.000%
30	3.20	-37.26	-0.03	-3.20	37.26	0.03	0.000%
31	2.73	-37.26	1.81	-2.73	37.26	-1.81	0.000%
32	1.58	-37.26	3.04	-1.58	37.26	-3.04	0.000%
33	-0.00	-37.26	3.48	0.00	37.26	-3.48	0.000%
34	-1.58	-37.26	3.04	1.58	37.26	-3.04	0.000%
35	-2.73	-37.26	1.82	2.73	37.26	-1.82	0.000%
36	-3.20	-37.26	-0.02	3.20	37.26	0.02	0.000%
37	-2.74	-37.26	-1.75	2.74	37.26	1.75	0.000%
38	-1.56	-37.26	-2.98	1.56	37.26	2.98	0.000%
39	0.01	-21.69	-4.64	-0.01	21.69	4.64	0.000%
40	2.06	-21.69	-4.06	-2.06	21.69	4.06	0.000%
41	3.62	-21.69	-2.41	-3.62	21.69	2.41	0.000%
42	4.23	-21.69	-0.05	-4.23	21.69	0.05	0.000%
43	3.58	-21.69	2.50	-3.58	21.69	-2.50	0.000%
44	2.08	-21.69	4.16	-2.08	21.69	-4.16	0.000%
45	-0.01	-21.69	4.75	0.01	21.69	-4.75	0.000%
46	-2.09	-21.69	4.16	2.09	21.69	-4.16	0.000%
47	-3.59	-21.69	2.51	3.59	21.69	-2.51	0.000%
48	-4.23	-21.69	-0.04	4.23	21.69	0.04	0.000%
49	-3.61	-21.69	-2.40	3.61	21.69	2.40	0.000%
50	-2.05	-21.69	-4.05	2.05	21.69	4.05	0.000%

tnxTower TEP 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	COFFMAN HIGH SCHOOL (BU 875358)	Page	12 of 15
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	Client	Crown Castle	Designed by	onovikov

Non-Linear Convergence Results

<i>Load Combination</i>	<i>Converged?</i>	<i>Number of Cycles</i>	<i>Displacement Tolerance</i>	<i>Force Tolerance</i>
1	Yes	4	0.0000001	0.0000001
2	Yes	4	0.0000001	0.00043917
3	Yes	4	0.0000001	0.00019476
4	Yes	5	0.0000001	0.00043529
5	Yes	5	0.0000001	0.00019962
6	Yes	5	0.0000001	0.00054814
7	Yes	5	0.0000001	0.00025791
8	Yes	5	0.0000001	0.00019459
9	Yes	5	0.0000001	0.00009577
10	Yes	5	0.0000001	0.00049223
11	Yes	5	0.0000001	0.00022967
12	Yes	5	0.0000001	0.00055421
13	Yes	5	0.0000001	0.00025648
14	Yes	4	0.0000001	0.00049732
15	Yes	4	0.0000001	0.00023764
16	Yes	5	0.0000001	0.00057578
17	Yes	5	0.0000001	0.00026648
18	Yes	5	0.0000001	0.00049720
19	Yes	5	0.0000001	0.00023182
20	Yes	5	0.0000001	0.00019196
21	Yes	5	0.0000001	0.00009447
22	Yes	5	0.0000001	0.00054031
23	Yes	5	0.0000001	0.00025396
24	Yes	5	0.0000001	0.00044599
25	Yes	5	0.0000001	0.00020475
26	Yes	4	0.0000001	0.00006202
27	Yes	5	0.0000001	0.00011623
28	Yes	5	0.0000001	0.00012562
29	Yes	5	0.0000001	0.00012447
30	Yes	5	0.0000001	0.00010115
31	Yes	5	0.0000001	0.00011317
32	Yes	5	0.0000001	0.00011964
33	Yes	5	0.0000001	0.00010909
34	Yes	5	0.0000001	0.00012237
35	Yes	5	0.0000001	0.00011538
36	Yes	5	0.0000001	0.00010268
37	Yes	5	0.0000001	0.00012524
38	Yes	5	0.0000001	0.00012689
39	Yes	4	0.0000001	0.00003729
40	Yes	4	0.0000001	0.00021185
41	Yes	4	0.0000001	0.00041687
42	Yes	4	0.0000001	0.00031305
43	Yes	4	0.0000001	0.00029685
44	Yes	4	0.0000001	0.00036151
45	Yes	4	0.0000001	0.00003919
46	Yes	4	0.0000001	0.00039794
47	Yes	4	0.0000001	0.00030920
48	Yes	4	0.0000001	0.00031297
49	Yes	4	0.0000001	0.00040282
50	Yes	4	0.0000001	0.00022333

Maximum Tower Deflections - Service Wind

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 91.75	23.622	45	1.3560	0.0190
L2	95.5 - 45.5	11.665	45	1.1249	0.0082
L3	50 - 0	3.251	45	0.5946	0.0028

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140.00	PD1151-5	45	23.622	1.3560	0.0190	52442
136.50	STARBEAM	45	22.631	1.3423	0.0180	52442
135.00	Starbeam Mount	45	22.207	1.3365	0.0176	52442
133.50	STARBEAM	45	21.783	1.3305	0.0172	40340
125.00	AIR 6472 B77G B77M_20240625 w/ Mount Pipe	45	19.399	1.2950	0.0150	17480
100.00	SD314-H	45	12.762	1.1606	0.0090	6554

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 91.75	82.582	14	4.7392	0.0647
L2	95.5 - 45.5	40.674	14	3.9322	0.0278
L3	50 - 0	11.317	14	2.0721	0.0096

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140.00	PD1151-5	14	82.582	4.7392	0.0647	15459
136.50	STARBEAM	14	79.106	4.6964	0.0615	15459
135.00	Starbeam Mount	14	77.617	4.6779	0.0601	15459
133.50	STARBEAM	14	76.131	4.6592	0.0587	11891
125.00	AIR 6472 B77G B77M_20240625 w/ Mount Pipe	14	67.767	4.5463	0.0510	5151
100.00	SD314-H	14	44.514	4.0595	0.0308	1928

Compression Checks

Pole Design Data

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	Client Crown Castle	Designed by onovikov

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
L1	140 - 91.75 (1)	TP29.239x22x0.25	48.25	0.00	0.0	22.5563	-8.72	1218.04	0.007
L2	91.75 - 45.5 (2)	TP35.678x28.1764x0.3125	50.00	0.00	0.0	34.4085	-15.37	2012.90	0.008
L3	45.5 - 0 (3)	TP41.88x34.3779x0.375	50.00	0.00	0.0	49.4013	-26.01	2889.98	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{ux} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M _{uy} kip-ft	φM _{uy} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	140 - 91.75 (1)	TP29.239x22x0.25	317.26	870.91	0.364	0.00	870.91	0.000
L2	91.75 - 45.5 (2)	TP35.678x28.1764x0.3125	875.57	1748.67	0.501	0.00	1748.67	0.000
L3	45.5 - 0 (3)	TP41.88x34.3779x0.375	1631.97	3006.32	0.543	0.00	3006.32	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V _u K	φV _n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T _u kip-ft	φT _n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	140 - 91.75 (1)	TP29.239x22x0.25	10.78	365.41	0.029	0.46	909.67	0.001
L2	91.75 - 45.5 (2)	TP35.678x28.1764x0.3125	13.73	603.87	0.023	0.46	1834.56	0.000
L3	45.5 - 0 (3)	TP41.88x34.3779x0.375	16.35	866.99	0.019	0.46	3151.35	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	Ratio $\frac{M_{uy}}{\phi M_{uy}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	140 - 91.75 (1)	0.007	0.364	0.000	0.029	0.001	0.372	1.050	
L2	91.75 - 45.5 (2)	0.008	0.501	0.000	0.023	0.000	0.509	1.050	
L3	45.5 - 0 (3)	0.009	0.543	0.000	0.019	0.000	0.552	1.050	

Section Capacity Table

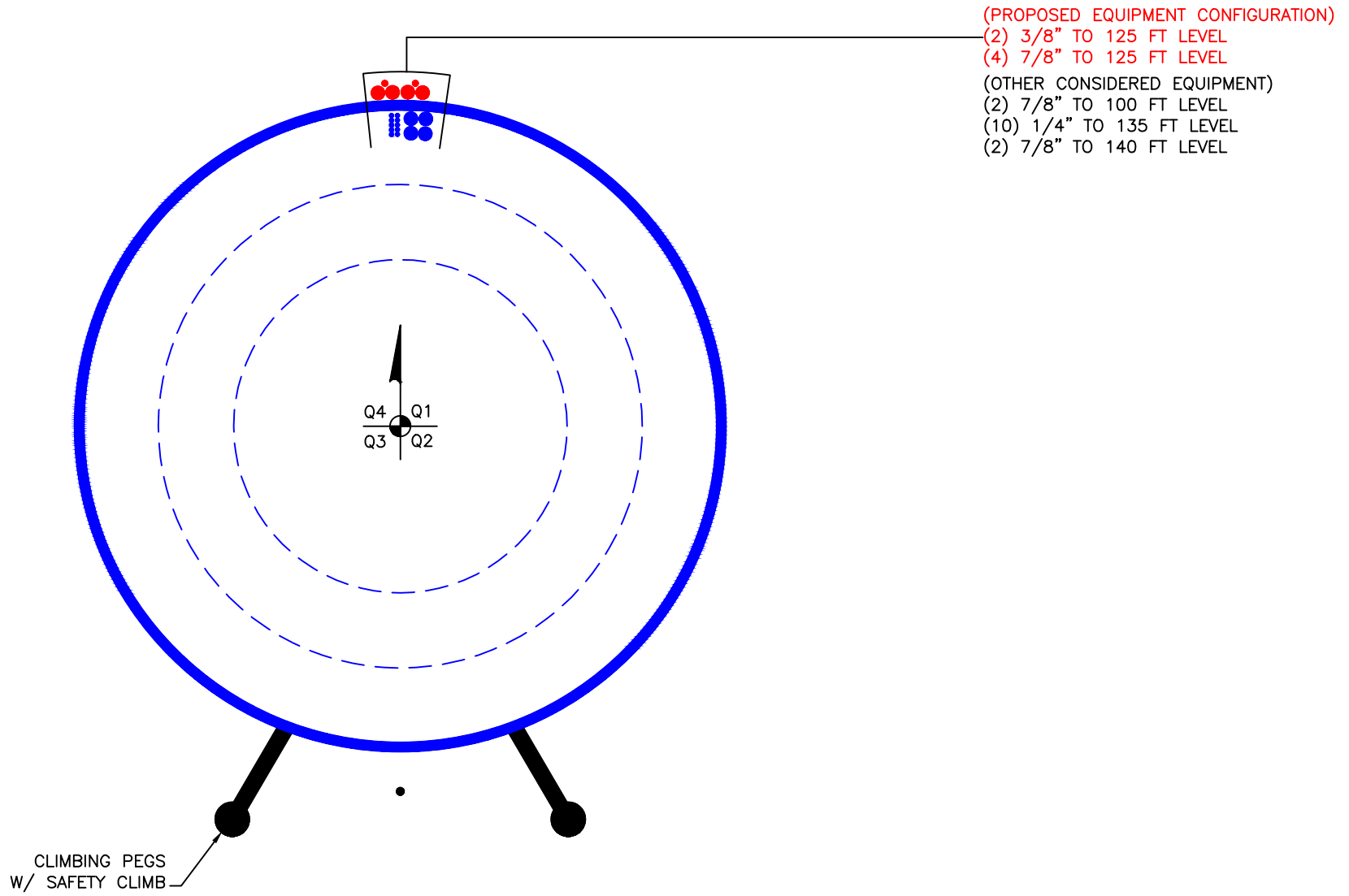
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	φP _{allow} K	% Capacity	Pass Fail
L1	140 - 91.75	Pole	TP29.239x22x0.25	1	-8.72	1278.94	35.5	Pass
L2	91.75 - 45.5	Pole	TP35.678x28.1764x0.3125	2	-15.37	2113.55	48.5	Pass
L3	45.5 - 0	Pole	TP41.88x34.3779x0.375	3	-26.01	3034.48	52.6	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
						Summary		
						Pole (L3)	52.6	Pass
						RATING =	52.6	Pass

Program Version 8.3.1.2

APPENDIX B
BASE LEVEL DRAWING



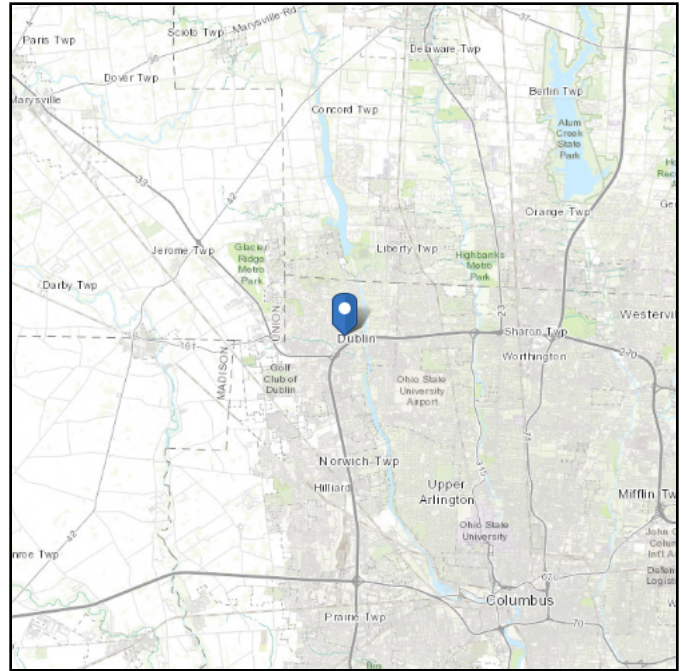
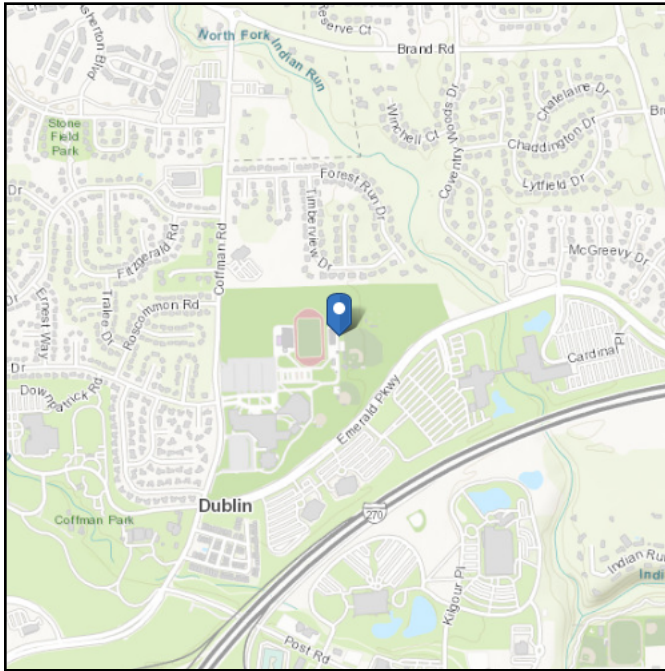
APPENDIX C
ADDITIONAL CALCULATIONS

ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Latitude: 40.109831
Longitude: -83.128067
Elevation: 886.9190449824583 ft (NAVD 88)



Wind

Results:

Wind Speed	108 Vmph
10-year MRI	75 Vmph
25-year MRI	81 Vmph
50-year MRI	85 Vmph
100-year MRI	93 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2

Date Accessed: Fri Nov 21 2025

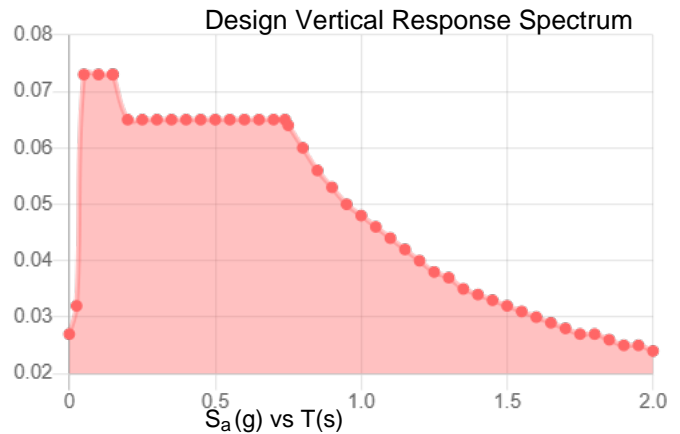
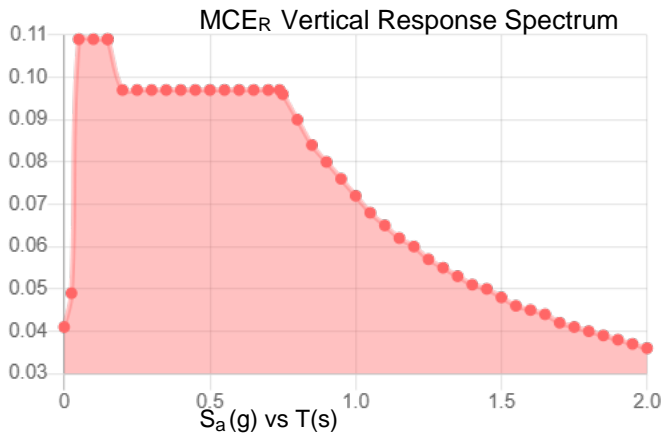
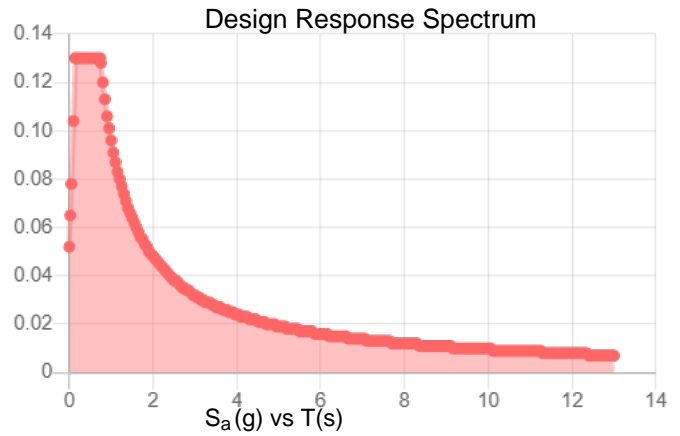
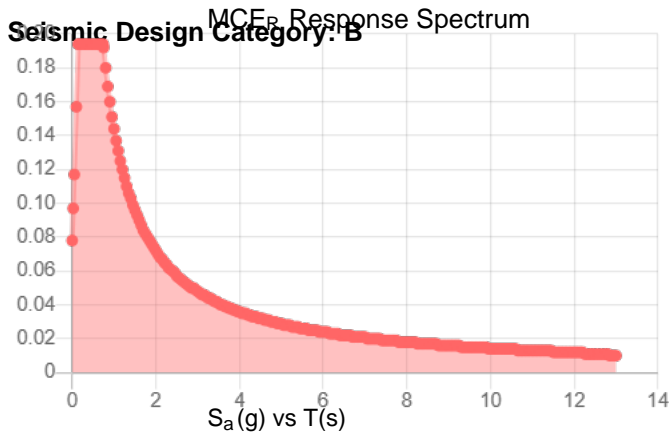
Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_s :	0.121	S_{D1} :	0.096
S_1 :	0.06	T_L :	12
F_a :	1.6	PGA :	0.062
F_v :	2.4	PGA _M :	0.098
S_{MS} :	0.194	F_{PGA} :	1.6
S_{M1} :	0.144	I_e :	1
S_{DS} :	0.13	C_v :	0.7



Data Accessed: Fri Nov 21 2025

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness: 1.00 in.
Concurrent Temperature: 5 F
Gust Speed 40 mph

Data Source: Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

Date Accessed: Fri Nov 21 2025

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

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

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

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

Monopole Base Plate Connection

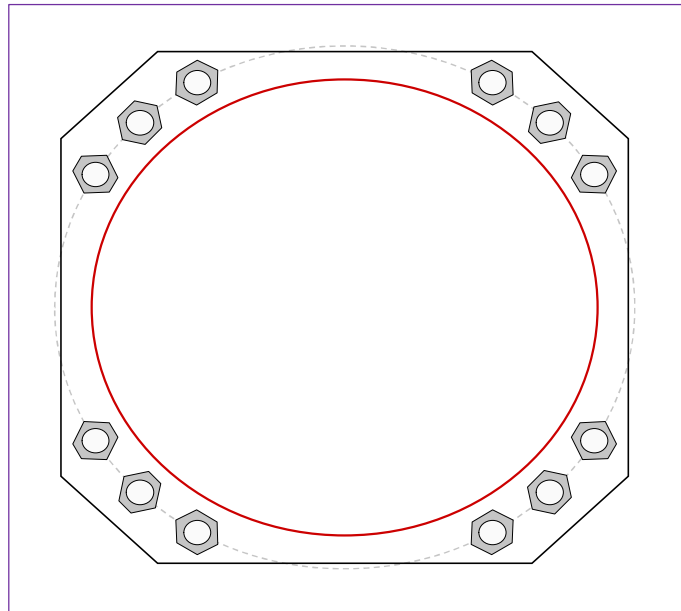


Site Info	
BU #	875358
Site Name	Coffman High School
Order #	699238 Rev. 3

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.5

Applied Loads	
Moment (kip-ft)	1631.98
Axial Force (kips)	26.01
Shear Force (kips)	16.35

*TIA-222-H Section 15.5 Applied



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

Anchor Rod Data
(12) 2-1/4" \varnothing bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 48" BC <i>Anchor Spacing: 6 in</i>
Base Plate Data
47" W x 3" Plate (A588-50; $F_y=50$ ksi, $F_u=70$ ksi); Clip: 8 in
Stiffener Data
N/A
Pole Data
41.88" x 0.375" 18-sided pole (A871-65; $F_y=65$ ksi, $F_u=80$ ksi)

Anchor Rod Summary		<i>(units of kips, kip-in)</i>
$Pu_t = 133.71$	$\phi Pn_t = 243.75$	Stress Rating
$Vu = 1.36$	$\phi Vn = 149.1$	52.2%
$Mu = n/a$	$\phi Mn = n/a$	Pass
Base Plate Summary		
Max Stress (ksi):	18.81	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	39.8%	Pass

Drilled Pier Foundation

BU # :	875358
Site Name:	Coffman High School
Order Number:	699238 Rev. 3
TIA-222 Revisor:	H
Tower Type:	Monopole

Report File: _____



Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	1631.98	
Axial Force (kips)	26.01	
Shear Force (kips)	16.35	

Material Properties	
Concrete Strength, f _c :	4 ksi
Rebar Strength, F _y :	60 ksi
Tie Yield Strength, F _y t:	60 ksi

Pier Design Data	
Depth	14 ft
Ext. Above Grade	1 ft
Pier Section 1	
<i>From 1' above grade to 14' below grade</i>	
Pier Diameter	6 ft
Rebar Quantity	32
Rebar Size	10
Rebar Cage Diameter	60 in
Tie Size	4
Tie Spacing	12 in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check		
	Compression	Uplift
D _{v=0} (ft from TOC)	5.60	-
Soil Safety Factor	11.21	-
Max Moment (kip-ft)	1758.66	-
Rating*	11.3%	-
Soil Vertical Check		
	Compression	Uplift
Skin Friction (kips)	1184.07	-
End Bearing (kips)	1060.29	-
Weight of Concrete (kips)	76.34	-
Total Capacity (kips)	2244.35	-
Axial (kips)	102.35	-
Rating*	4.3%	-
Reinforced Concrete Flexure		
	Compression	Uplift
Critical Depth (ft from TOC)	5.48	-
Critical Moment (kip-ft)	1758.56	-
Critical Moment Capacity	5203.88	-
Rating*	32.2%	-
Reinforced Concrete Shear		
	Compression	Uplift
Critical Depth (ft from TOC)	11.75	-
Critical Shear (kip)	278.82	-
Critical Shear Capacity	671.18	-
Rating*	39.6%	-

Shear-Friction Methodology is Applied

Structural Foundation Rating*	39.6%
Soil Interaction Rating*	11.3%

*Rating per TIA-222-H Section 15.5

Soil Profile			
Groundwater Depth	N/A	# of Layers	3

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ _{soil} (pcf)	γ _{concrete} (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.33	3.33	130	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.33	5	1.67	130	150	3	0	1.650	1.650					Cohesive
3	5	14	9	145	150	20	0	9.000	9.000			50		Cohesive

Check Limitation	
Apply TIA-222-H Section 15.5:	<input checked="" type="checkbox"/>
N/A	<input type="checkbox"/>
Design Options	
Input Effective Depths (else Actual):	<input type="checkbox"/>
Consider non-tapered moment capacity:	<input type="checkbox"/>
Check Shear along Depth of Pier:	<input checked="" type="checkbox"/>
Utilize Shear-Friction Methodology:	<input checked="" type="checkbox"/>
Override Critical Depth:	<input type="checkbox"/>

[Go to Soil Calculations](#)



GPD# 2026705.51
May 20, 2026

MOUNT ANALYSIS REPORT

AT&T DESIGNATION: **USID #:** **318661**
 Site FA #: **15758363**
 Client #: **SOH3625**
 Site Name: **DUBLIN COFFMAN**

ANALYSIS CRITERIA: **Codes:** **TIA-222-H & 2024 Ohio Building Code**
 108 mph (3-second gust) w/ 0" ice
 40 mph (3-second gust) w/ 1" ice

SITE DATA: **6790 Coffman Road, Dublin, OH 43017, Franklin County**
 Latitude 40° 06' 35.39" N, Longitude 83° 07' 41.04" W
 (1) Commscope MCG23RHDXL-13MB Sector Mount Kit

To whom it may concern,

GPD is pleased to submit this Mount Analysis Report to determine the structural integrity of the aforementioned mount. The purpose of the analysis is to determine the suitability of the mount with the proposed loading configuration detailed in the analysis report.

Analysis Results

Mount Stress Level with Proposed Equipment: 16.7% Pass

We at GPD appreciate the opportunity of providing our continuing professional services to you and Pyramid Network Services, LLC. If you have any questions or need further assistance on this or any other projects please do not hesitate to call.

Respectfully submitted,

Christopher J. Scheks, P.E.
Ohio #: 78306

5/20/2026

SUMMARY & RESULTS

The purpose of this analysis was to verify whether the existing mounts are capable of carrying the proposed loading configuration as specified by AT&T Mobility and commissioned by Pyramid Network Services, LLC.

This analysis has been performed in accordance with the 2024 Ohio Building Code based upon a 3-second gust wind speed of 108 mph. Applicable Standard references and design criteria are listed in Appendices A & B.

This analysis considers reduced maintenance loads of 250 lbs concurrent with 30-mph wind speeds at mounting pipe locations (L_m) and 250 lbs at horizontal members (L_v) as permitted by TIA-222-H Section 16.9.

MOUNT SUMMARY AND RESULTS

Notes	Components	Centerline	% Capacity	Results
-	Mount Pipe	125.0	12.8	Pass
-	Tieback	125.0	5.9	Pass
-	Face Horizontal	125.0	14.4	Pass
-	standoff diagonals	125.0	4.9	Pass
-	Mast Pipe	125.0	13.3	Pass
-	Mast pipe plates	125.0	14.4	Pass
-	V frame plates	125.0	10.1	Pass
-	Standoff Vertical	125.0	4.8	Pass
-	Standoff horizontal	125.0	7.5	Pass
-	Mount to Tower Connection	125.0	16.7	Pass

RECOMMENDATIONS

The mount has sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

ANALYSIS METHOD

RISA-3D (Version 23.0.0), a commercially available analysis software package, and hand calculations were used to create a three-dimensional model of the mount and calculate member stresses for the proposed loading configuration. Selected calculations from this analysis are included in Appendices B & C. The following table details the information provided to complete this structural analysis. This analysis is based solely on this information.

DOCUMENTS PROVIDED

Document	Remarks	Source
RF Data Sheet	Not Provided	N/A
DE130 Site Scoping Form	DE130 Site ID: SOH3625, dated 07/31/2025	Pyramid Network Services, LLC
Mount Design	Commscope Document #: MCG23RHDXL-13MB Rev. D, dated 7/25/2024	Commscope
Mount Mapping	Not Provided	N/A
Previous Mount Analysis	GPD Project #: 2025705.79, dated 12/17/2025	AT&T Mobility
Mount Modification Drawings	Not Provided	N/A
Tower Design	Not Provided	N/A
Previous Tower Analysis	Not Provided	N/A

ASSUMPTIONS

This mount structural analysis is based on the theoretical capacity of the members and is not a condition assessment of the mount. This analysis is from information supplied, and therefore, its results are based on and are as accurate as that supplied data. GPD has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural analysis.

1. The mount member sizes and shapes are considered accurate as supplied. Material grades not supplied have been assumed based on previous experience with similar mounts.
2. The antenna configuration is as supplied and/or as modeled in the analysis. When information was not provided, the configuration was modeled based upon past experience with similar loading.
3. Some assumptions are made regarding antennas and mount sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type and industry practice.
4. The mount has been properly maintained in accordance with TIA Standards and/or with manufacturer's specifications.
5. All welds and connections are assumed to develop at least the member capacity unless determined otherwise and explicitly stated in this report.
6. This report analyzes a proposed mount; therefore, the following assumptions concerning the mount must be correct in order for the results to be valid.
 - A. This analysis is valid for equipment installed with a maximum vertical offset of 0' from the mount centerline.
 - B. The tiebacks were modeled based on the referenced mount design. See the RISA diagrams in Appendix B for clarification on tieback location.
 - C. Pipe mounts are not provided in the kit for the proposed mounting system. (4) 10'-6" P2.5 Std. pipes have been assumed per sector for the purpose of this analysis.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and GPD should be allowed to review any new information to determine its effect on the structural integrity of the mount.

DISCLAIMER OF WARRANTIES

GPD has not performed a site visit to the mount to verify the member sizes and antenna/coax loading. If the existing conditions are not as represented on the mount elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the mount. This report does not replace a full mount inspection. The mount is assumed to have been properly fabricated, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD in connection with this Mount Analysis are limited to a computer analysis of the mount structure and theoretical capacity of its main structural members. All mount components have been assumed to only resist dead loads when no other loads are applied. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

This analysis is limited to the designated maximum wind and seismic conditions per the governing mount standards and code. Wind forces resulting in tower vibrations near the structure's resonant frequencies were not considered in this analysis and are outside the scope of this analysis. Lateral loading from any dynamic response was not evaluated under a time-domain based fatigue analysis.

GPD does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing mount. GPD provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the specified code recommended amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed mount. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD, but are beyond the scope of this report.

Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

GPD makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this mount. GPD will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

Mount Analysis Summary Form

Mount Analysis Summary Form

General Info

Site Name	DUBLIN COFFMAN (SOH3625)
Site USID Number	318661
Site FA Number	15758363
Date of Analysis	5/20/2026
Company Performing Analysis	GPD

The information contained in this summary report is not to be used independently from the PE stamped mount analysis.

Structure Info

Structure Info	Description	Date
Tower Type (G, SST, MP)	MP	
Tower Height (top of steel AGL)	140'	
Mount Manufacturer	n/a	
Mount Model	n/a	
Mount Design	Commscope Document #: MCG23RHDXL-13MB Rev. D	7/25/2024
Mount Mapping	n/a	
Previous Mount Analysis	GPD Project #: 2025705.79	12/17/2025
Mount Modification Design	n/a	
Tower Design	n/a	
Previous Tower Analysis	n/a	

Design Parameters

Design Code Used	TIA-222-H & 2024 Ohio Building Code
Location of Tower (County, State)	Franklin, OH
Wind Speed (mph)	108 (3-second gust)
Ice Thickness (in)	1
Risk Category (I, II, III)	II
Exposure Category (B, C, D)	C
Topographic Category (1 to 5)	1

Analysis Results (% Maximum Usage)

Proposed Condition	
Mount (%)	14.4%
Mount to Tower Connection (%)	16.7%

Proposed Configuration

Antenna							Mount			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type
AT&T Mobility	125	127.5	3	Panel	Ericsson	AIR6472 B77G B77M	40/155/295	1	Commscope	MCG23RHDXL-13MB Sector Mount Kit
AT&T Mobility	125	125	3	Panel	Commscope	NNH4-65C-R6-V3	40/155/295			on the same mounts
AT&T Mobility	125	125	3	Panel	Commscope	NNH4-65C-R4	40/155/295			on the same mounts
AT&T Mobility	125	125	3	RRH	Ericsson	4490 B5/B12A				on the same mounts
AT&T Mobility	125	125	3	RRH	Ericsson	4494 B14/B29				on the same mounts
AT&T Mobility	125	125	3	RRH	Ericsson	4890 B25/B66				on the same mounts
AT&T Mobility	125	125	2	Squid	Raycap	DC9-48-60-24-8C-EV				on the same mounts

APPENDIX B

Wind Calculations and RISA-3D Output File



Structure Information	
Supporting Structure Type:	Monopole
Structure Height:	140 ft
z (Mount Centerline) =	125 ft
G _h (Mount Gust Effect Factor) =	1.00
Risk Category:	II

Code Specifications		
IBC Edition:	2021	
TIA/EIA Code:	H	
Basic Wind Speed (No Ice) =	108	mph (3-s gust)
Basic Wind Speed (With Ice) =	40	mph (3-s gust)
Ice Thickness	1	in
Exposure Category	C	
Tower Base Elevation (AMSL)	887	ft

Topographic Inputs	
Topographic Feature:	N/A

Seismic Inputs	
Soil Class:	D (Default)
S _S :	0.121
S ₁ :	0.060
S _{D5} :	0.129
S _{D1} :	0.096
R:	2
C _S :	0.065
A _S :	1.0

Section Sets										No Ice	Ice Output		Seismic Output		
Mount Components	Member Type	Length (in)	Side (Longest seeing wind) (in)	Other Side (in)	Calculated Dc, for ice weight (in)	Dc, for ice weight (in)	Area Type (Round or Flat)	K _s	User's Wind Multiplier	Normal Wind Force (lb/ft)*	Normal Ice Wind Force (lb/ft)*	Ice Weight (lb/ft)*	Member Weight (lb/ft)	Seismic Shear Force, V _s (lb/ft)	Vertical Seismic Load Effect, E _v (lb/ft)
Mount Pipe	Pipe	126.00	2.88	2.88		2.88	Round	0.90	1.00	9.43	2.30	5.61	5.80	0.37	0.15
Tieback	Pipe	88.56	2.88	2.88		2.88	Round	0.90	1.00	9.43	1.98	5.61	3.53	0.23	0.09
Face Horizontal	Pipe	156.00	2.88	2.88		2.88	Round	0.90	1.00	9.43	2.32	5.61	7.67	0.49	0.20
standoff diagonals	Pipe	45.14	0.75	0.75		0.75	Round	0.90	1.00	2.46	1.11	2.64	1.50	0.10	0.04
Mast Pipe	Pipe	120.00	3.50	3.50		3.50	Round	0.90	1.00	11.48	2.40	6.48	7.04	0.45	0.18
Mast pipe plates	Square/Rect.	2.00	0.63	5.00		5.04	Flat	0.90	1.00	2.10	0.88	8.63	10.63	0.69	0.27
V frame plates	Square/Rect.	2.69	0.63	5.00		5.04	Flat	0.90	1.00	2.19	0.88	8.63	10.63	0.69	0.27
Standoff Vertical	Pipe	33.00	1.00	1.00		1.00	Round	0.90	1.00	3.28	1.07	2.99	2.67	0.17	0.07
Standoff horizontal	Pipe	63.00	2.88	2.88		2.88	Round	0.90	1.00	8.90	1.77	5.61	5.41	0.35	0.14

*All forces are unfactored.

Appurtenances								Shielding			No Ice		Ice Output		Seismic Output		
QTY	Appurtenance Model	Loading Elevation (ft)	Height (in)	Front Width (in)	Side Depth (in)	Wt (lbs)	Type for Area	Front Shielding (%)	Side Shielding (%)	K _s and/or block shielding	Normal Wind Force (lbs)*	Wt (lbs) (no ice)*	Normal Wind Force (lbs) (w/ ice)*	Wt (lbs) (only ice)*	Appurtenance Wt (lbs)	Seismic Shear Force, V _s (lbs)	Vertical Seismic Load Effect, E _v (lbs)
(3)	AIR 6472 B77G B77M	127.5	36.3	15.8	7.4	77.2	CFD	0%	0%	1.00	180.76	77.20	28.12	81.84	77.20	4.98	1.99
(3)	NNH4-65C-R6-V3	125	96	19.6	7.8	125.7	CFD	0%	0%	1.00	351.64	125.70	92.54	229.34	125.70	8.11	3.24
(3)	NNHH-65C-R4	125	96	19.6	7.8	99.2	CFD	0%	0%	1.00	351.64	99.20	92.54	229.34	99.20	6.40	2.56
(3)	4490 B5/B12A	125	20.6	15.6	7	65	Flat	0%	0%	0.90	87.83	65.00	13.97	50.26	65.00	4.19	1.68
(3)	4494 B14/B29	125	20.6	15.6	5.9	57.3	Flat	0%	0%	0.90	87.83	57.30	13.97	47.12	57.30	3.70	1.48
(3)	4890 B25/B66	125	17.5	15.1	6.9	68	Flat	0%	0%	0.90	72.22	68.00	11.65	43.29	68.00	4.39	1.76
(2)	DC9-48-60-24-8C-EV	125	31.5	13.5	10.25	26.2	Round	0%	0%	0.90	67.79	26.20	11.66	75.38	26.20	1.69	0.68

Note: Computational Fluid Dynamics (CFD) antenna EPA data provided by AT&T has been used in this analysis.

*All forces are unfactored.

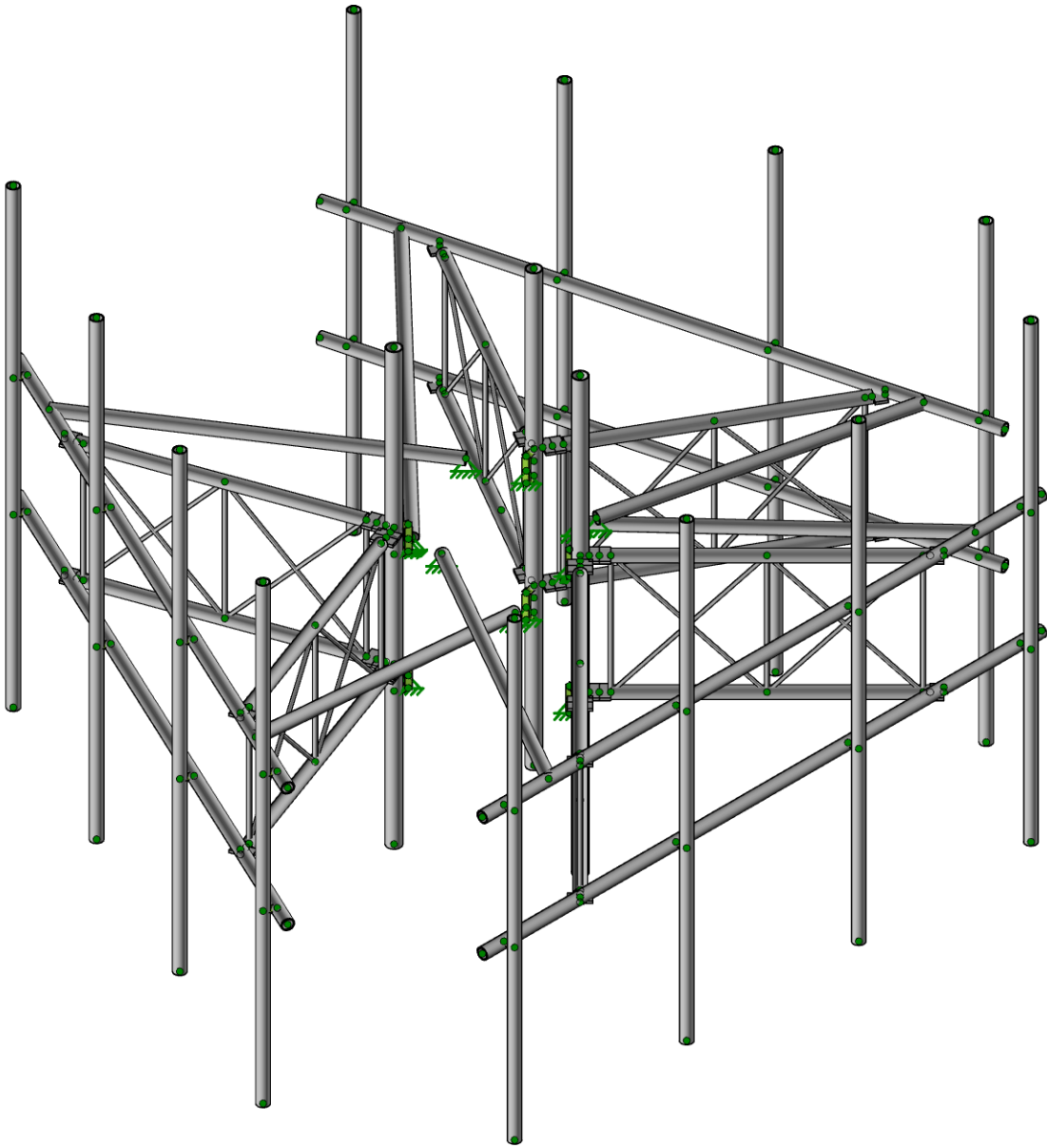


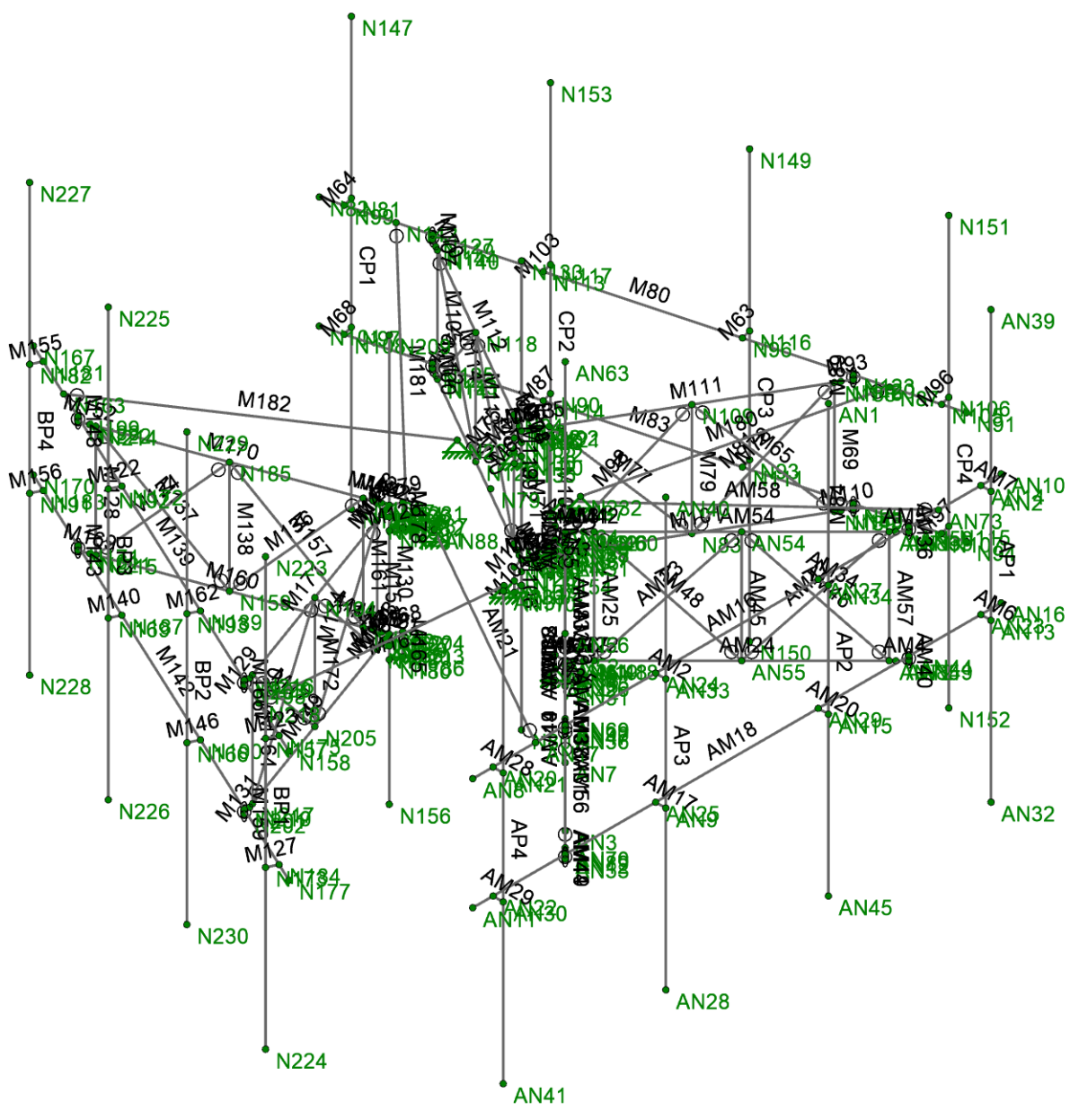
Structure Information	
Supporting Structure Type:	Monopole
Structure Height:	140 ft
z (Mount Centerline) =	125 ft
G _n (Mount Gust Effect Factor) =	1.00
Risk Category:	II

Design Factors	
z _g =	900
α =	9.5
K _{zmin} =	0.85
K _c =	1
K _{zt} =	1.00
K _d =	0.95
K _e =	0.97
K _s =	N/A

Appurtenances		Wind Pressure		Wind EPA (No Ice)				Design Wind Forces (lbs) @ 30° Increments (No Ice)												Wind EPA (with Ice)							
QTY	Appurtenance Model	k _z	q _z , no ice (psf)	Ca Front	Ca Side	Front CaAa (ft ²)	Side CaAa (ft ²)	0	30	60	90	120	150	180	210	240	270	300	330	q _z , with ice (psf)	height factored ice thickness (in)	Ca Front (app considering ice)	Ca Side (app considering ice)	Ca Front (ice)	Ca Side (ice)	Front CaAa (ft ²)	Side CaAa (ft ²)
(3)	AIR 6472 B77G B77M	1.332	36.592	CFD	CFD	4.94	1.65	180.8	141.2	88.6	60.4	89.6	121.1	113.4	121.1	89.6	60.4	88.6	141.2	5.019	1.145	CFD	CFD	0.700	0.733	5.60	3.03
(3)	NNH4-65C-R6-V3	1.326	36.439	CFD	CFD	9.65	3.35	351.6	430.3	266.0	122.1	334.5	417.6	289.3	417.6	334.5	122.1	266.0	430.3	4.999	1.142	CFD	CFD	0.744	0.861	18.51	9.57
(3)	NNHH-65C-R4	1.326	36.439	CFD	CFD	9.65	3.35	351.6	430.3	266.0	122.1	334.5	417.6	289.3	417.6	334.5	122.1	266.0	430.3	4.999	1.142	CFD	CFD	0.744	0.861	18.51	9.57
(3)	4490 B5/B12A	1.326	36.439	1.200	1.220	2.68	1.22	87.8	75.9	52.0	40.1	52.0	75.9	87.8	75.9	52.0	40.1	52.0	75.9	4.999	1.142	1.200	1.200	0.700	0.700	3.11	1.53
(3)	4494 B14/B29	1.326	36.439	1.200	1.244	2.68	1.05	87.8	74.5	47.8	34.4	47.8	74.5	87.8	74.5	47.8	34.4	47.8	74.5	4.999	1.142	1.200	1.213	0.700	0.707	3.11	1.35
(3)	4890 B25/B66	1.326	36.439	1.200	1.202	2.20	1.01	72.2	62.4	42.8	33.0	42.8	62.4	72.2	62.4	42.8	33.0	42.8	62.4	4.999	1.142	1.200	1.200	0.700	0.700	2.59	1.30
(2)	DC9-48-60-24-8C-EV	1.326	36.439	0.700	0.713	2.07	1.60	67.8	63.9	56.3	52.4	56.3	63.9	67.8	63.9	56.3	52.4	56.3	63.9	4.999	1.142	0.700	0.704	0.700	0.704	2.59	2.07

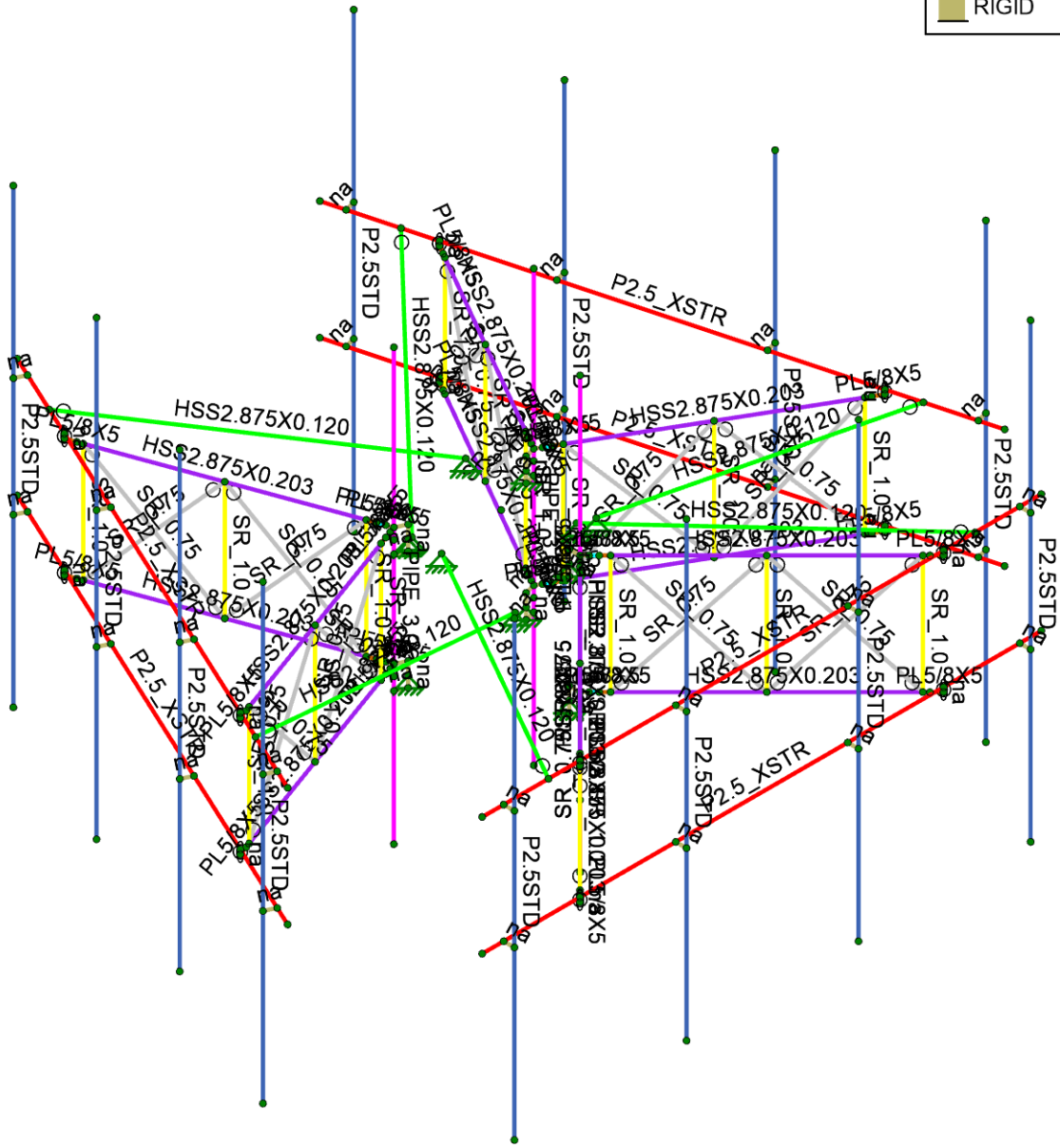
Note: Computational Fluid Dynamics (CFD) antenna EPA data provided by AT&T has been used in this analysis.

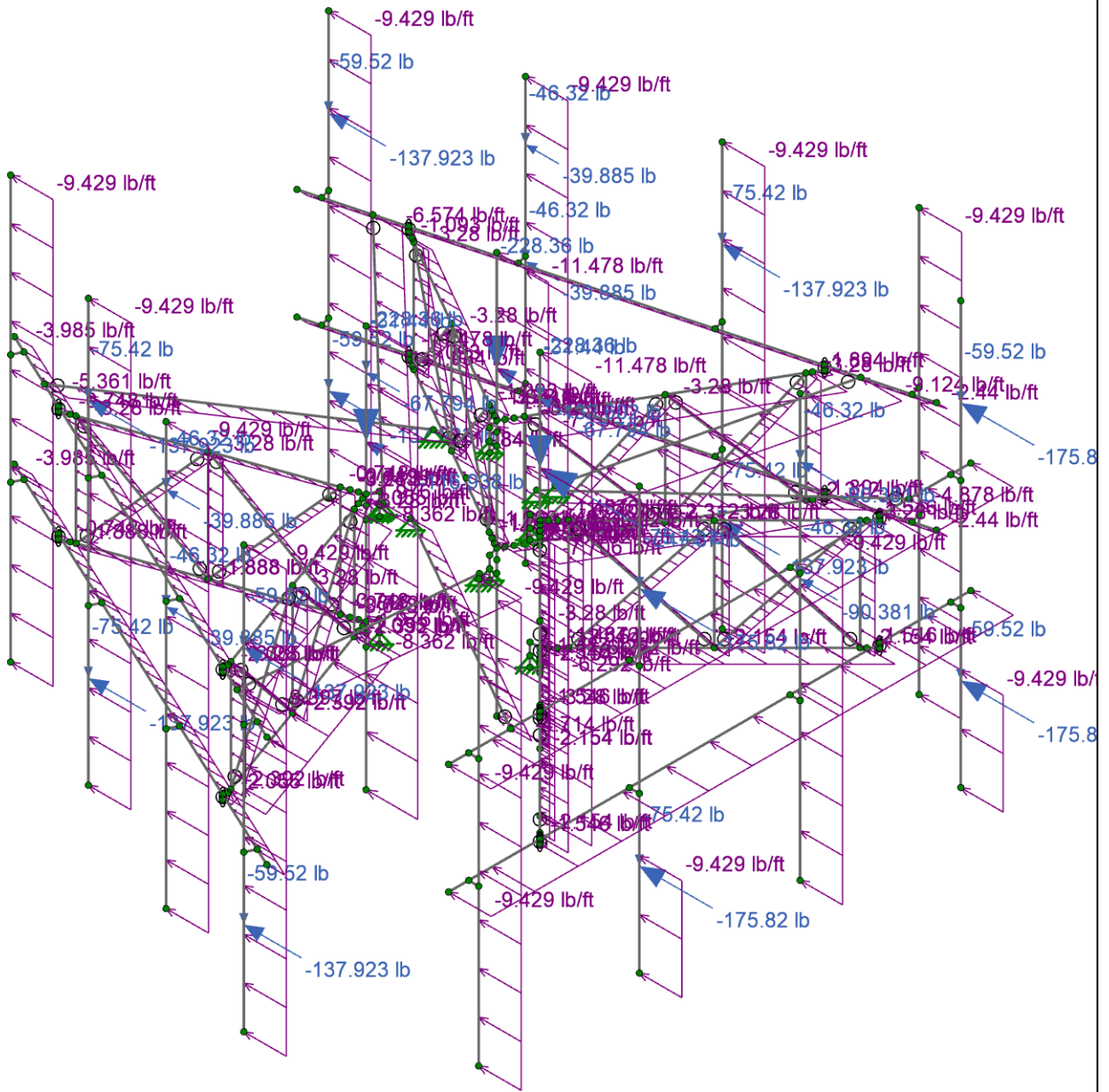






Section Sets	
Blue	Mount Pipe
Green	Tieback
Red	Face Horizontal
Grey	standoff diagonals
Magenta	Mast Pipe
Cyan	Mast pipe plates
Brown	V frame plates
Yellow	Standoff Vertical
Purple	Standoff horizontal
Olive	RIGID

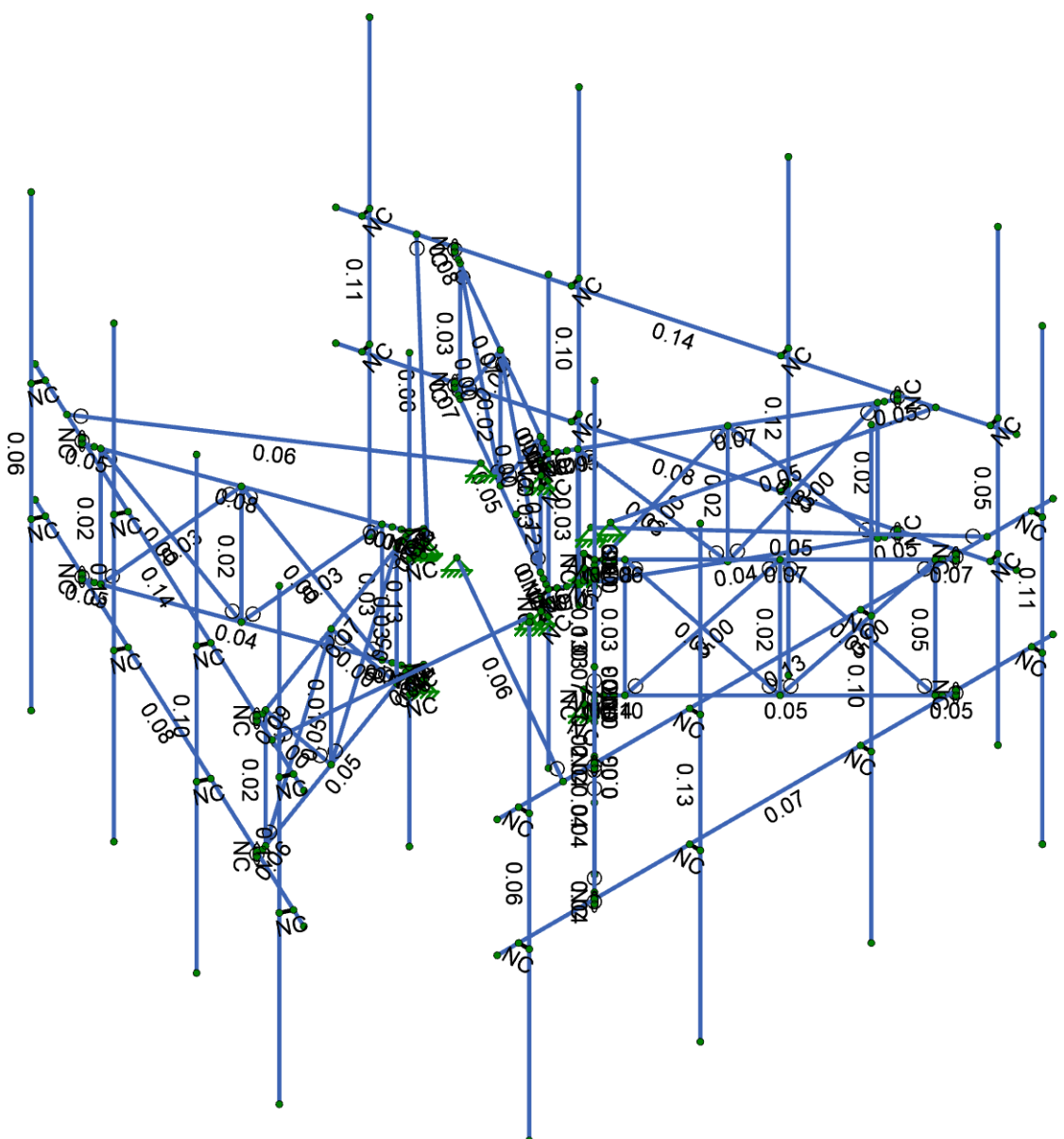




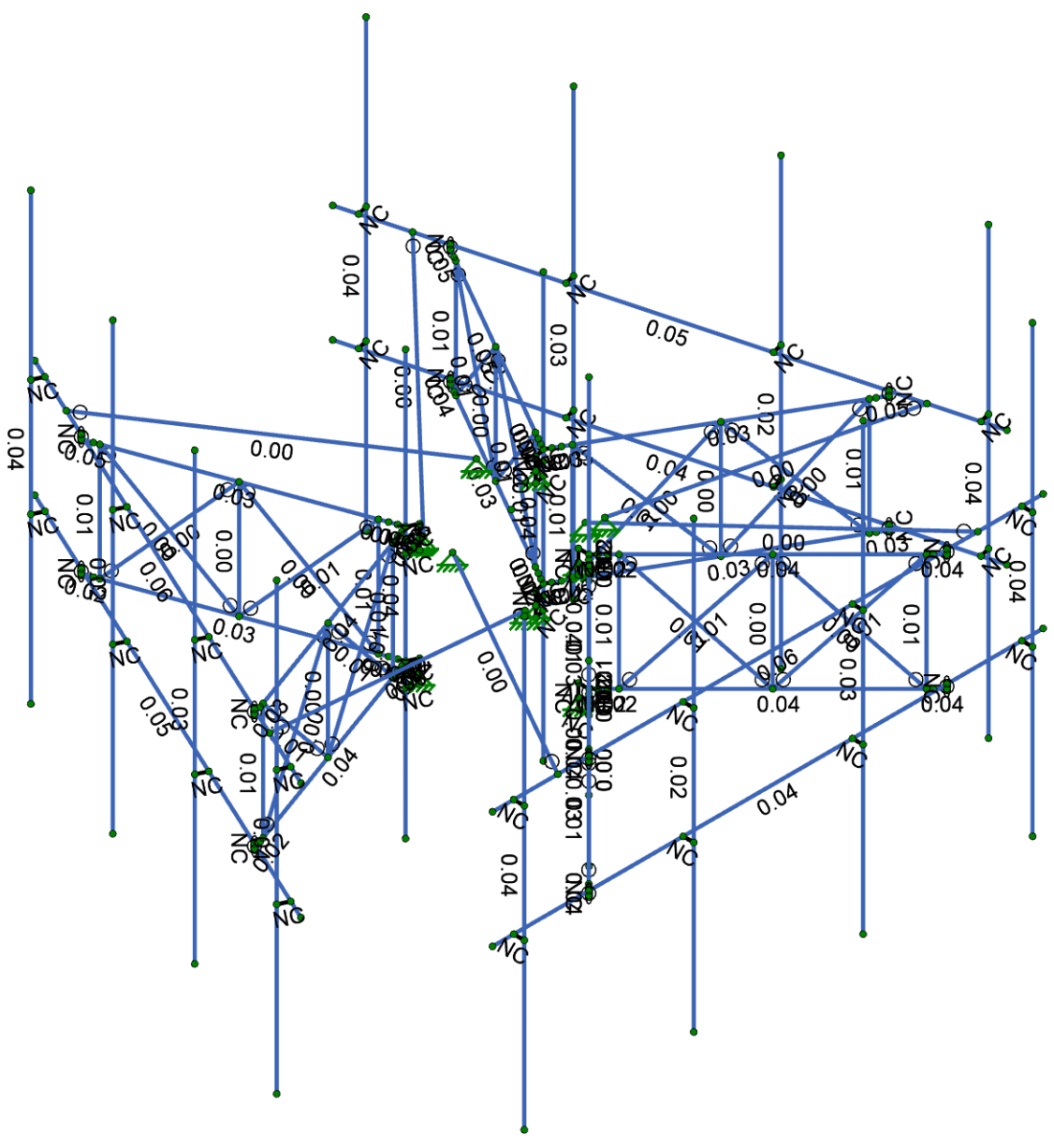
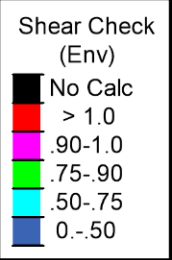
Loads: LC 2, 1.2 Dead + 1.0 Wind @ 0 - No Ice



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



Member Code Checks Displayed (Enveloped)



Member Shear Checks Displayed (Enveloped)



Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [$1e^{-5}F^{-1}$]	Density [k/ft ³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
2	A53 Gr. B	29000	11154	0.3	0.65	0.49	35	1.5	60	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
5	A500 Gr. B 42	29000	11154	0.3	0.65	0.49	42	1.4	58	1.3
6	A500 Gr. B 46	29000	11154	0.3	0.65	0.49	46	1.4	58	1.3
7	A500 Gr. C 46	29000	11154	0.3	0.65	0.49	46	1.5	62	1.2
8	A529 Gr 50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in ²]	Iyy [in ⁴]	Izz [in ⁴]	J [in ⁴]
1	Mount Pipe	P2.5STD	Column	Pipe	A53 Gr. B	Typical	1.704	1.53	1.53	3.059
2	Tieback	HSS2.875X0.120	HBrace	Pipe	A500 Gr. C 46	Typical	1.039	0.987	0.987	1.975
3	Face Horizontal	P2.5 XSTR	Beam	Pipe	A500 Gr. C 46	Typical	2.254	1.924	1.924	3.848
4	standoff diagonals	SR 0.75	VBrace	BAR	A529 Gr 50	Typical	0.442	0.016	0.016	0.031
5	Mast Pipe	PIPE 3.0	Column	Pipe	A500 Gr. C 46	Typical	2.07	2.85	2.85	5.69
6	Mast pipe plates	PL5/8X5	Beam	RECT	A572 Gr.50	Typical	3.125	0.102	6.51	0.375
7	V frame plates	PL5/8X5	Beam	RECT	A572 Gr.50	Typical	3.125	0.102	6.51	0.375
8	Standoff Vertical	SR 1.0	Column	BAR	A529 Gr 50	Typical	0.785	0.049	0.049	0.098
9	Standoff horizontal	HSS2.875X0.203	Beam	Pipe	A500 Gr. C 46	Typical	1.59	1.45	1.45	2.89
10	Standoff Mount Pipe	P2.0STD	Column	Pipe	A53 Gr. B	Typical	1.075	0.666	0.666	1.331

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	AM1	AN5	AN58		RIGID	None	None	RIGID	Typical
2	AM2	AN24	AN33		RIGID	None	None	RIGID	Typical
3	AM3	AN51	AN66		RIGID	None	None	RIGID	Typical
4	AM4	AN85	AN49	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
5	AM5	AN86	AN35	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
6	AM6	AN23	AN13		RIGID	None	None	RIGID	Typical
7	AM7	AN14	AN2		RIGID	None	None	RIGID	Typical
8	AM8	AN63	AN3		Mast Pipe	Column	Pipe	A500 Gr. C 46	Typical
9	AM10	AN59	AN5	90	Mast pipe plates	Beam	RECT	A572 Gr.50	Typical
10	AM11	AN6	AN61		RIGID	None	None	RIGID	Typical
11	AM12	AN43	AN6	90	Mast pipe plates	Beam	RECT	A572 Gr.50	Typical
12	AM13	AN7	AN57		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
13	AM14	AN7	AN69		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
14	AM15	AN56	AN7		Standoff Vertical	Column	BAR	A529 Gr 50	Typical
15	AM16	AN8	AN10		Face Horizontal	Beam	Pipe	A500 Gr. C 46	Typical
16	AM17	AN25	AN9		RIGID	None	None	RIGID	Typical
17	AM18	AN11	AN16		Face Horizontal	Beam	Pipe	A500 Gr. C 46	Typical
18	AM19	AN12	AN53		RIGID	None	None	RIGID	Typical
19	AM20	AN29	AN15		RIGID	None	None	RIGID	Typical
20	AM21	AN17	AN88	1.447	Tieback	HBrace	Pipe	A500 Gr. C 46	Typical
21	AM22	AN18	AN48	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
22	AM23	AN18	AN54		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
23	AM24	AN18	AN85		Standoff horizontal	Beam	Pipe	A500 Gr. C 46	Typical
24	AM25	AN60	AN18	45	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
25	AM26	AN19	AN61		RIGID	None	None	RIGID	Typical
26	AM27	AN48	AN19	90	Mast pipe plates	Beam	RECT	A572 Gr.50	Typical
27	AM28	AN20	AN21		RIGID	None	None	RIGID	Typical
28	AM29	AN22	AN30		RIGID	None	None	RIGID	Typical



Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
29	AM30	AN26	AN43	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
30	AM31	AN26	AN89		Standoff horizontal	Beam	Pipe	A500 Gr. C 46	Typical
31	AM32	AN26	AN56		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
32	AM33	AN57	AN26	45	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
33	AM34	AN27	AN34		RIGID	None	None	RIGID	Typical
34	AM35	AN31	AN42		RIGID	None	None	RIGID	Typical
35	AM36	AN50	AN35		RIGID	None	None	RIGID	Typical
36	AM37	AN90	AN36	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
37	AM38	AN47	AN36		RIGID	None	None	RIGID	Typical
38	AM39	AN52	AN42		RIGID	None	None	RIGID	Typical
39	AM40	AN44	AN49		RIGID	None	None	RIGID	Typical
40	AM41	AN46	AN62	90	Mast pipe plates	Beam	RECT	A572 Gr.50	Typical
41	AM42	AN60	AN46	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
42	AM43	AN61	AN52		RIGID	None	None	RIGID	Typical
43	AM44	AN89	AN53	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
44	AM45	AN54	AN55		Standoff Vertical	Column	BAR	A529 Gr 50	Typical
45	AM46	AN72	AN54		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
46	AM47	AN55	AN71		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
47	AM48	AN55	AN60		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
48	AM49	AN70	AN56		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
49	AM50	AN57	AN90		Standoff horizontal	Beam	Pipe	A500 Gr. C 46	Typical
50	AM51	AN57	AN59	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
51	AM52	AN58	AN64		RIGID	None	None	RIGID	Typical
52	AM53	AN62	AN58		RIGID	None	None	RIGID	Typical
53	AM54	AN60	AN86		Standoff horizontal	Beam	Pipe	A500 Gr. C 46	Typical
54	AM55	AN64	AN66		RIGID	None	None	RIGID	Typical
55	AM56	AN69	AN70		Standoff Vertical	Column	BAR	A529 Gr 50	Typical
56	AM57	AN71	AN72		Standoff Vertical	Column	BAR	A529 Gr 50	Typical
57	AM58	AN73	AN87	1.629	Tieback	HBrace	Pipe	A500 Gr. C 46	Typical
58	AP1	AN39	AN32		Mount Pipe	Column	Pipe	A53 Gr. B	Typical
59	AP2	AN1	AN45		Mount Pipe	Column	Pipe	A53 Gr. B	Typical
60	AP3	AN40	AN28		Mount Pipe	Column	Pipe	A53 Gr. B	Typical
61	AP4	AN37	AN41		Mount Pipe	Column	Pipe	A53 Gr. B	Typical
62	BP1	N223	N224	355	Mount Pipe	Column	Pipe	A53 Gr. B	Typical
63	BP2	N229	N230	355	Mount Pipe	Column	Pipe	A53 Gr. B	Typical
64	BP3	N225	N226	355	Mount Pipe	Column	Pipe	A53 Gr. B	Typical
65	BP4	N227	N228	355	Mount Pipe	Column	Pipe	A53 Gr. B	Typical
66	CP1	N147	N148	15	Mount Pipe	Column	Pipe	A53 Gr. B	Typical
67	CP2	N153	N154	15	Mount Pipe	Column	Pipe	A53 Gr. B	Typical
68	CP3	N149	N150	15	Mount Pipe	Column	Pipe	A53 Gr. B	Typical
69	CP4	N151	N152	15	Mount Pipe	Column	Pipe	A53 Gr. B	Typical
70	M62	N86	N131		RIGID	None	None	RIGID	Typical
71	M63	N96	N116		RIGID	None	None	RIGID	Typical
72	M64	N99	N81		RIGID	None	None	RIGID	Typical
73	M65	N139	N109		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
74	M66	N88	N130		RIGID	None	None	RIGID	Typical
75	M67	N100	N135		RIGID	None	None	RIGID	Typical
76	M68	N108	N97		RIGID	None	None	RIGID	Typical
77	M69	N138	N139	15	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
78	M70	N144	N119	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
79	M71	N133	N80	15	Mast Pipe	Column	Pipe	A500 Gr. C 46	Typical
80	M72	N143	N126	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
81	M73	N121	N88	90	Mast pipe plates	Beam	RECT	A572 Gr.50	Typical
82	M74	N132	N130		RIGID	None	None	RIGID	Typical
83	M75	N129	N84		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical



Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
84	M76	N124	N86	90	Mast pipe plates	Beam	RECT	A572 Gr.50	Typical
85	M77	N83	N92		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
86	M78	N83	N138		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
87	M79	N109	N83	15	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
88	M80	N91	N82		Face Horizontal	Beam	Pipe	A500 Gr. C 46	Typical
89	M81	N111	N93		RIGID	None	None	RIGID	Typical
90	M82	N84	N98	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
91	M83	N94	N101		Face Horizontal	Beam	Pipe	A500 Gr. C 46	Typical
92	M84	N95	N85	300	RIGID	None	None	RIGID	Typical
93	M85	N92	N121	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
94	M86	N102	N118		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
95	M87	N114	N90		RIGID	None	None	RIGID	Typical
96	M88	N102	N89	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
97	M89	N123	N120	300	RIGID	None	None	RIGID	Typical
98	M90	N102	N143		Standoff horizontal	Beam	Pipe	A500 Gr. C 46	Typical
99	M91	N141	N118		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
100	M92	N84	N102	60	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
101	M93	N146	N120	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
102	M94	N103	N131		RIGID	None	None	RIGID	Typical
103	M95	N89	N103	90	Mast pipe plates	Beam	RECT	A572 Gr.50	Typical
104	M96	N105	N106		RIGID	None	None	RIGID	Typical
105	M97	N107	N115		RIGID	None	None	RIGID	Typical
106	M98	N112	N109		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
107	M99	N112	N124	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
108	M100	N125	N126	15	RIGID	None	None	RIGID	Typical
109	M101	N112	N145		Standoff horizontal	Beam	Pipe	A500 Gr. C 46	Typical
110	M102	N92	N112	60	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
111	M103	N113	N117		RIGID	None	None	RIGID	Typical
112	M104	N104	N110		RIGID	None	None	RIGID	Typical
113	M105	N140	N141	15	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
114	M106	N128	N110	15	RIGID	None	None	RIGID	Typical
115	M107	N127	N119	15	RIGID	None	None	RIGID	Typical
116	M108	N98	N132	90	Mast pipe plates	Beam	RECT	A572 Gr.50	Typical
117	M109	N131	N128		RIGID	None	None	RIGID	Typical
118	M110	N145	N85	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
119	M111	N92	N146		Standoff horizontal	Beam	Pipe	A500 Gr. C 46	Typical
120	M112	N84	N144		Standoff horizontal	Beam	Pipe	A500 Gr. C 46	Typical
121	M113	N118	N129	15	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
122	M114	N129	N140		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
123	M119	N155	N135	15	RIGID	None	None	RIGID	Typical
124	M120	N130	N155		RIGID	None	None	RIGID	Typical
125	M121	N162	N207		RIGID	None	None	RIGID	Typical
126	M122	N172	N192		RIGID	None	None	RIGID	Typical
127	M123	N175	N157		RIGID	None	None	RIGID	Typical
128	M124	N215	N185		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
129	M125	N164	N206		RIGID	None	None	RIGID	Typical
130	M126	N176	N211		RIGID	None	None	RIGID	Typical
131	M127	N184	N173		RIGID	None	None	RIGID	Typical
132	M128	N214	N215	355	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
133	M129	N220	N195	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
134	M130	N209	N156	355	Mast Pipe	Column	Pipe	A500 Gr. C 46	Typical
135	M131	N219	N202	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
136	M132	N197	N164	90	Mast pipe plates	Beam	RECT	A572 Gr.50	Typical
137	M133	N208	N206		RIGID	None	None	RIGID	Typical
138	M134	N205	N160		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical



Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
139	M135	N200	N162	90	Mast pipe plates	Beam	RECT	A572 Gr.50	Typical
140	M136	N159	N168		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
141	M137	N159	N214		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
142	M138	N185	N159	355	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
143	M139	N167	N158		Face Horizontal	Beam	Pipe	A500 Gr. C 46	Typical
144	M140	N187	N169		RIGID	None	None	RIGID	Typical
145	M141	N160	N174	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
146	M142	N170	N177		Face Horizontal	Beam	Pipe	A500 Gr. C 46	Typical
147	M143	N171	N161		RIGID	None	None	RIGID	Typical
148	M144	N168	N197	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
149	M145	N178	N194		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
150	M146	N190	N166		RIGID	None	None	RIGID	Typical
151	M147	N178	N165	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
152	M148	N199	N196		RIGID	None	None	RIGID	Typical
153	M149	N178	N219		Standoff horizontal	Beam	Pipe	A500 Gr. C 46	Typical
154	M150	N217	N194		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
155	M151	N160	N178	40	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
156	M152	N222	N196	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
157	M153	N179	N207		RIGID	None	None	RIGID	Typical
158	M154	N165	N179	90	Mast pipe plates	Beam	RECT	A572 Gr.50	Typical
159	M155	N181	N182		RIGID	None	None	RIGID	Typical
160	M156	N183	N191		RIGID	None	None	RIGID	Typical
161	M157	N188	N185		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
162	M158	N188	N200	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
163	M159	N201	N202	355	RIGID	None	None	RIGID	Typical
164	M160	N188	N221		Standoff horizontal	Beam	Pipe	A500 Gr. C 46	Typical
165	M161	N168	N188	40	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
166	M162	N189	N193		RIGID	None	None	RIGID	Typical
167	M163	N180	N186		RIGID	None	None	RIGID	Typical
168	M164	N216	N217	355	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
169	M165	N204	N186	355	RIGID	None	None	RIGID	Typical
170	M166	N203	N195	355	RIGID	None	None	RIGID	Typical
171	M167	N174	N208	90	Mast pipe plates	Beam	RECT	A572 Gr.50	Typical
172	M168	N207	N204		RIGID	None	None	RIGID	Typical
173	M169	N221	N161	90	V frame plates	Beam	RECT	A572 Gr.50	Typical
174	M170	N168	N222		Standoff horizontal	Beam	Pipe	A500 Gr. C 46	Typical
175	M171	N160	N220		Standoff horizontal	Beam	Pipe	A500 Gr. C 46	Typical
176	M172	N194	N205	355	Standoff Vertical	Column	BAR	A529 Gr 50	Typical
177	M173	N205	N216		standoff diagonals	VBrace	BAR	A529 Gr 50	Typical
178	M178	N231	N211	355	RIGID	None	None	RIGID	Typical
179	M179	N206	N231		RIGID	None	None	RIGID	Typical
180	M180	N87	N232	1.53	Tieback	HBrace	Pipe	A500 Gr. C 46	Typical
181	M181	N142	N237	2.248	Tieback	HBrace	Pipe	A500 Gr. C 46	Typical
182	M182	N163	N234	1.416	Tieback	HBrace	Pipe	A500 Gr. C 46	Typical
183	M183	N218	N233	1.394	Tieback	HBrace	Pipe	A500 Gr. C 46	Typical

Basic Load Cases

	BLC Description	Category	Y Gravity	Point	Distributed
1	Dead	DL	-1	34	
2	No Ice Wind 0 deg	None		34	117
3	No Ice Wind 30 deg	None		68	218
4	No Ice Wind 60 deg	None		68	234
5	No Ice Wind 90 deg	None		34	115
6	No Ice Wind 120 deg	None		68	218
7	No Ice Wind 150 deg	None		68	234



Basic Load Cases (Continued)

	BLC Description	Category	Y Gravity	Point	Distributed
8	No Ice Wind 180 deg	None		34	117
9	No Ice Wind 210 deg	None		68	218
10	No Ice Wind 240 deg	None		68	234
11	No Ice Wind 270 deg	None		34	115
12	No Ice Wind 300 deg	None		68	218
13	No Ice Wind 330 deg	None		68	234
14	Ice Weight	None		34	117
15	Ice Wind 0 deg	None		34	117
16	Ice Wind 30 deg	None		68	218
17	Ice Wind 60 deg	None		68	234
18	Ice Wind 90 deg	None		34	115
19	Ice Wind 120 deg	None		68	218
20	Ice Wind 150 deg	None		68	234
21	Ice Wind 180 deg	None		34	117
22	Ice Wind 210 deg	None		68	218
23	Ice Wind 240 deg	None		68	234
24	Ice Wind 270 deg	None		34	115
25	Ice Wind 300 deg	None		68	218
26	Ice Wind 330 deg	None		68	234
27	Vertical Seismic	None		34	117
28	Seismic 0 deg	None		34	117
29	Seismic 30 deg	None		68	234
30	Seismic 60 deg	None		68	234
31	Seismic 90 deg	None		34	117
32	Seismic 120 deg	None		68	234
33	Seismic 150 deg	None		68	234
34	Seismic 180 deg	None		34	117
35	Seismic 210 deg	None		68	234
36	Seismic 240 deg	None		68	234
37	Seismic 270 deg	None		34	117
38	Seismic 300 deg	None		68	234
39	Seismic 330 deg	None		68	234
40	Live Load - AM8	None		1	
41	Live Load - AP1	None		1	
42	Live Load - AP2	None		1	
43	Live Load - AP3	None		1	
44	Live Load - AP4	None		1	
45	Live Load - BP1	None		1	
46	Live Load - BP2	None		1	
47	Live Load - BP3	None		1	
48	Live Load - BP4	None		1	
49	Live Load - CP1	None		1	
50	Live Load - CP2	None		1	
51	Live Load - CP3	None		1	
52	Live Load - CP4	None		1	
53	Live Load - M71	None		1	
54	Live Load - M130	None		1	
55	Live Load - AM16 (Start)	None		1	
56	Live Load - AM16 (Middle)	None		1	
57	Live Load - AM16 (End)	None		1	
58	Live Load - AM18 (Start)	None		1	
59	Live Load - AM18 (Middle)	None		1	
60	Live Load - AM18 (End)	None		1	
61	Live Load - AM24 (Start)	None		1	
62	Live Load - AM24 (Middle)	None		1	



Basic Load Cases (Continued)

	BLC Description	Category	Y Gravity	Point	Distributed
63	Live Load - AM24 (End)	None		1	
64	Live Load - AM31 (Start)	None		1	
65	Live Load - AM31 (Middle)	None		1	
66	Live Load - AM31 (End)	None		1	
67	Live Load - AM50 (Start)	None		1	
68	Live Load - AM50 (Middle)	None		1	
69	Live Load - AM50 (End)	None		1	
70	Live Load - AM54 (Start)	None		1	
71	Live Load - AM54 (Middle)	None		1	
72	Live Load - AM54 (End)	None		1	
73	Live Load - M80 (Start)	None		1	
74	Live Load - M80 (Middle)	None		1	
75	Live Load - M80 (End)	None		1	
76	Live Load - M83 (Start)	None		1	
77	Live Load - M83 (Middle)	None		1	
78	Live Load - M83 (End)	None		1	
79	Live Load - M90 (Start)	None		1	
80	Live Load - M90 (Middle)	None		1	
81	Live Load - M90 (End)	None		1	
82	Live Load - M101 (Start)	None		1	
83	Live Load - M101 (Middle)	None		1	
84	Live Load - M101 (End)	None		1	
85	Live Load - M111 (Start)	None		1	
86	Live Load - M111 (Middle)	None		1	
87	Live Load - M111 (End)	None		1	
88	Live Load - M112 (Start)	None		1	
89	Live Load - M112 (Middle)	None		1	
90	Live Load - M112 (End)	None		1	
91	Live Load - M139 (Start)	None		1	
92	Live Load - M139 (Middle)	None		1	
93	Live Load - M139 (End)	None		1	
94	Live Load - M142 (Start)	None		1	
95	Live Load - M142 (Middle)	None		1	
96	Live Load - M142 (End)	None		1	
97	Live Load - M149 (Start)	None		1	
98	Live Load - M149 (Middle)	None		1	
99	Live Load - M149 (End)	None		1	
100	Live Load - M160 (Start)	None		1	
101	Live Load - M160 (Middle)	None		1	
102	Live Load - M160 (End)	None		1	
103	Live Load - M170 (Start)	None		1	
104	Live Load - M170 (Middle)	None		1	
105	Live Load - M170 (End)	None		1	
106	Live Load - M171 (Start)	None		1	
107	Live Load - M171 (Middle)	None		1	
108	Live Load - M171 (End)	None		1	

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4 Dead	Yes	Y	1	1.4				
2	1.2 Dead + 1.0 Wind @ 0° - No Ice	Yes	Y	1	1.2	2	1		
3	0.9 Dead + 1.0 Wind @ 0° - No Ice	Yes	Y	1	0.9	2	1		
4	1.2 Dead + 1.0 Wind @ 30° - No Ice	Yes	Y	1	1.2	3	1		
5	0.9 Dead + 1.0 Wind @ 30° - No Ice	Yes	Y	1	0.9	3	1		
6	1.2 Dead + 1.0 Wind @ 60° - No Ice	Yes	Y	1	1.2	4	1		



Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
7	0.9 Dead + 1.0 Wind @ 60° - No Ice	Yes	Y	1	0.9	4	1		
8	1.2 Dead + 1.0 Wind @ 90° - No Ice	Yes	Y	1	1.2	5	1		
9	0.9 Dead + 1.0 Wind @ 90° - No Ice	Yes	Y	1	0.9	5	1		
10	1.2 Dead + 1.0 Wind @ 120° - No Ice	Yes	Y	1	1.2	6	1		
11	0.9 Dead + 1.0 Wind @ 120° - No Ice	Yes	Y	1	0.9	6	1		
12	1.2 Dead + 1.0 Wind @ 150° - No Ice	Yes	Y	1	1.2	7	1		
13	0.9 Dead + 1.0 Wind @ 150° - No Ice	Yes	Y	1	0.9	7	1		
14	1.2 Dead + 1.0 Wind @ 180° - No Ice	Yes	Y	1	1.2	8	1		
15	0.9 Dead + 1.0 Wind @ 180° - No Ice	Yes	Y	1	0.9	8	1		
16	1.2 Dead + 1.0 Wind @ 210° - No Ice	Yes	Y	1	1.2	9	1		
17	0.9 Dead + 1.0 Wind @ 210° - No Ice	Yes	Y	1	0.9	9	1		
18	1.2 Dead + 1.0 Wind @ 240° - No Ice	Yes	Y	1	1.2	10	1		
19	0.9 Dead + 1.0 Wind @ 240° - No Ice	Yes	Y	1	0.9	10	1		
20	1.2 Dead + 1.0 Wind @ 270° - No Ice	Yes	Y	1	1.2	11	1		
21	0.9 Dead + 1.0 Wind @ 270° - No Ice	Yes	Y	1	0.9	11	1		
22	1.2 Dead + 1.0 Wind @ 300° - No Ice	Yes	Y	1	1.2	12	1		
23	0.9 Dead + 1.0 Wind @ 300° - No Ice	Yes	Y	1	0.9	12	1		
24	1.2 Dead + 1.0 Wind @ 330° - No Ice	Yes	Y	1	1.2	13	1		
25	0.9 Dead + 1.0 Wind @ 330° - No Ice	Yes	Y	1	0.9	13	1		
26	1.2 Dead + 1.0 Ice Wind @ 0°+ 1.0 Ice	Yes	Y	1	1.2	15	1	14	1
27	1.2 Dead + 1.0 Ice Wind @ 30°+ 1.0 Ice	Yes	Y	1	1.2	16	1	14	1
28	1.2 Dead + 1.0 Ice Wind @ 60°+ 1.0 Ice	Yes	Y	1	1.2	17	1	14	1
29	1.2 Dead + 1.0 Ice Wind @ 90°+ 1.0 Ice	Yes	Y	1	1.2	18	1	14	1
30	1.2 Dead + 1.0 Ice Wind @ 120°+ 1.0 Ice	Yes	Y	1	1.2	19	1	14	1
31	1.2 Dead + 1.0 Ice Wind @ 150°+ 1.0 Ice	Yes	Y	1	1.2	20	1	14	1
32	1.2 Dead + 1.0 Ice Wind @ 180°+ 1.0 Ice	Yes	Y	1	1.2	21	1	14	1
33	1.2 Dead + 1.0 Ice Wind @ 210°+ 1.0 Ice	Yes	Y	1	1.2	22	1	14	1
34	1.2 Dead + 1.0 Ice Wind @ 240°+ 1.0 Ice	Yes	Y	1	1.2	23	1	14	1
35	1.2 Dead + 1.0 Ice Wind @ 270°+ 1.0 Ice	Yes	Y	1	1.2	24	1	14	1
36	1.2 Dead + 1.0 Ice Wind @ 300°+ 1.0 Ice	Yes	Y	1	1.2	25	1	14	1
37	1.2 Dead + 1.0 Ice Wind @ 330°+ 1.0 Ice	Yes	Y	1	1.2	26	1	14	1
38	1.2 Dead + 1.0 Seismic V + 1.0 Seismic H @ 0°	Yes	Y	1	1.2	27	1	28	1
39	0.9 Dead - 1.0 Seismic V + 1.0 Seismic H @ 0°	Yes	Y	1	0.9	27	-1	28	1
40	1.2 Dead + 1.0 Seismic V + 1.0 Seismic H @ 30°	Yes	Y	1	1.2	27	1	29	1
41	0.9 Dead - 1.0 Seismic V + 1.0 Seismic H @ 30°	Yes	Y	1	0.9	27	-1	29	1
42	1.2 Dead + 1.0 Seismic V + 1.0 Seismic H @ 60°	Yes	Y	1	1.2	27	1	30	1
43	0.9 Dead - 1.0 Seismic V + 1.0 Seismic H @ 60°	Yes	Y	1	0.9	27	-1	30	1
44	1.2 Dead + 1.0 Seismic V + 1.0 Seismic H @ 90°	Yes	Y	1	1.2	27	1	31	1
45	0.9 Dead - 1.0 Seismic V + 1.0 Seismic H @ 90°	Yes	Y	1	0.9	27	-1	31	1
46	1.2 Dead + 1.0 Seismic V + 1.0 Seismic H @ 120°	Yes	Y	1	1.2	27	1	32	1
47	0.9 Dead - 1.0 Seismic V + 1.0 Seismic H @ 120°	Yes	Y	1	0.9	27	-1	32	1
48	1.2 Dead + 1.0 Seismic V + 1.0 Seismic H @ 150°	Yes	Y	1	1.2	27	1	33	1
49	0.9 Dead - 1.0 Seismic V + 1.0 Seismic H @ 150°	Yes	Y	1	0.9	27	-1	33	1
50	1.2 Dead + 1.0 Seismic V + 1.0 Seismic H @ 180°	Yes	Y	1	1.2	27	1	34	1
51	0.9 Dead - 1.0 Seismic V + 1.0 Seismic H @ 180°	Yes	Y	1	0.9	27	-1	34	1
52	1.2 Dead + 1.0 Seismic V + 1.0 Seismic H @ 210°	Yes	Y	1	1.2	27	1	35	1
53	0.9 Dead - 1.0 Seismic V + 1.0 Seismic H @ 210°	Yes	Y	1	0.9	27	-1	35	1
54	1.2 Dead + 1.0 Seismic V + 1.0 Seismic H @ 240°	Yes	Y	1	1.2	27	1	36	1
55	0.9 Dead - 1.0 Seismic V + 1.0 Seismic H @ 240°	Yes	Y	1	0.9	27	-1	36	1
56	1.2 Dead + 1.0 Seismic V + 1.0 Seismic H @ 270°	Yes	Y	1	1.2	27	1	37	1
57	0.9 Dead - 1.0 Seismic V + 1.0 Seismic H @ 270°	Yes	Y	1	0.9	27	-1	37	1
58	1.2 Dead + 1.0 Seismic V + 1.0 Seismic H @ 300°	Yes	Y	1	1.2	27	1	38	1
59	0.9 Dead - 1.0 Seismic V + 1.0 Seismic H @ 300°	Yes	Y	1	0.9	27	-1	38	1
60	1.2 Dead + 1.0 Seismic V + 1.0 Seismic H @ 330°	Yes	Y	1	1.2	27	1	39	1
61	0.9 Dead - 1.0 Seismic V + 1.0 Seismic H @ 330°	Yes	Y	1	0.9	27	-1	39	1



Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
62	1.2 Dead + 1.5 Live M - AM8 + 1.0 Wind @ 0°	Yes	Y	1	1.2	40	1.5	2	0.077
63	1.2 Dead + 1.5 Live M - AM8 + 1.0 Wind @ 30°	Yes	Y	1	1.2	40	1.5	3	0.077
64	1.2 Dead + 1.5 Live M - AM8 + 1.0 Wind @ 60°	Yes	Y	1	1.2	40	1.5	4	0.077
65	1.2 Dead + 1.5 Live M - AM8 + 1.0 Wind @ 90°	Yes	Y	1	1.2	40	1.5	5	0.077
66	1.2 Dead + 1.5 Live M - AM8 + 1.0 Wind @ 120°	Yes	Y	1	1.2	40	1.5	6	0.077
67	1.2 Dead + 1.5 Live M - AM8 + 1.0 Wind @ 150°	Yes	Y	1	1.2	40	1.5	7	0.077
68	1.2 Dead + 1.5 Live M - AM8 + 1.0 Wind @ 180°	Yes	Y	1	1.2	40	1.5	8	0.077
69	1.2 Dead + 1.5 Live M - AM8 + 1.0 Wind @ 210°	Yes	Y	1	1.2	40	1.5	9	0.077
70	1.2 Dead + 1.5 Live M - AM8 + 1.0 Wind @ 240°	Yes	Y	1	1.2	40	1.5	10	0.077
71	1.2 Dead + 1.5 Live M - AM8 + 1.0 Wind @ 270°	Yes	Y	1	1.2	40	1.5	11	0.077
72	1.2 Dead + 1.5 Live M - AM8 + 1.0 Wind @ 300°	Yes	Y	1	1.2	40	1.5	12	0.077
73	1.2 Dead + 1.5 Live M - AM8 + 1.0 Wind @ 330°	Yes	Y	1	1.2	40	1.5	13	0.077
74	1.2 Dead + 1.5 Live M - AP1 + 1.0 Wind @ 0°	Yes	Y	1	1.2	41	1.5	2	0.077
75	1.2 Dead + 1.5 Live M - AP1 + 1.0 Wind @ 30°	Yes	Y	1	1.2	41	1.5	3	0.077
76	1.2 Dead + 1.5 Live M - AP1 + 1.0 Wind @ 60°	Yes	Y	1	1.2	41	1.5	4	0.077
77	1.2 Dead + 1.5 Live M - AP1 + 1.0 Wind @ 90°	Yes	Y	1	1.2	41	1.5	5	0.077
78	1.2 Dead + 1.5 Live M - AP1 + 1.0 Wind @ 120°	Yes	Y	1	1.2	41	1.5	6	0.077
79	1.2 Dead + 1.5 Live M - AP1 + 1.0 Wind @ 150°	Yes	Y	1	1.2	41	1.5	7	0.077
80	1.2 Dead + 1.5 Live M - AP1 + 1.0 Wind @ 180°	Yes	Y	1	1.2	41	1.5	8	0.077
81	1.2 Dead + 1.5 Live M - AP1 + 1.0 Wind @ 210°	Yes	Y	1	1.2	41	1.5	9	0.077
82	1.2 Dead + 1.5 Live M - AP1 + 1.0 Wind @ 240°	Yes	Y	1	1.2	41	1.5	10	0.077
83	1.2 Dead + 1.5 Live M - AP1 + 1.0 Wind @ 270°	Yes	Y	1	1.2	41	1.5	11	0.077
84	1.2 Dead + 1.5 Live M - AP1 + 1.0 Wind @ 300°	Yes	Y	1	1.2	41	1.5	12	0.077
85	1.2 Dead + 1.5 Live M - AP1 + 1.0 Wind @ 330°	Yes	Y	1	1.2	41	1.5	13	0.077
86	1.2 Dead + 1.5 Live M - AP2 + 1.0 Wind @ 0°	Yes	Y	1	1.2	42	1.5	2	0.077
87	1.2 Dead + 1.5 Live M - AP2 + 1.0 Wind @ 30°	Yes	Y	1	1.2	42	1.5	3	0.077
88	1.2 Dead + 1.5 Live M - AP2 + 1.0 Wind @ 60°	Yes	Y	1	1.2	42	1.5	4	0.077
89	1.2 Dead + 1.5 Live M - AP2 + 1.0 Wind @ 90°	Yes	Y	1	1.2	42	1.5	5	0.077
90	1.2 Dead + 1.5 Live M - AP2 + 1.0 Wind @ 120°	Yes	Y	1	1.2	42	1.5	6	0.077
91	1.2 Dead + 1.5 Live M - AP2 + 1.0 Wind @ 150°	Yes	Y	1	1.2	42	1.5	7	0.077
92	1.2 Dead + 1.5 Live M - AP2 + 1.0 Wind @ 180°	Yes	Y	1	1.2	42	1.5	8	0.077
93	1.2 Dead + 1.5 Live M - AP2 + 1.0 Wind @ 210°	Yes	Y	1	1.2	42	1.5	9	0.077
94	1.2 Dead + 1.5 Live M - AP2 + 1.0 Wind @ 240°	Yes	Y	1	1.2	42	1.5	10	0.077
95	1.2 Dead + 1.5 Live M - AP2 + 1.0 Wind @ 270°	Yes	Y	1	1.2	42	1.5	11	0.077
96	1.2 Dead + 1.5 Live M - AP2 + 1.0 Wind @ 300°	Yes	Y	1	1.2	42	1.5	12	0.077
97	1.2 Dead + 1.5 Live M - AP2 + 1.0 Wind @ 330°	Yes	Y	1	1.2	42	1.5	13	0.077
98	1.2 Dead + 1.5 Live M - AP3 + 1.0 Wind @ 0°	Yes	Y	1	1.2	43	1.5	2	0.077
99	1.2 Dead + 1.5 Live M - AP3 + 1.0 Wind @ 30°	Yes	Y	1	1.2	43	1.5	3	0.077
100	1.2 Dead + 1.5 Live M - AP3 + 1.0 Wind @ 60°	Yes	Y	1	1.2	43	1.5	4	0.077
101	1.2 Dead + 1.5 Live M - AP3 + 1.0 Wind @ 90°	Yes	Y	1	1.2	43	1.5	5	0.077
102	1.2 Dead + 1.5 Live M - AP3 + 1.0 Wind @ 120°	Yes	Y	1	1.2	43	1.5	6	0.077
103	1.2 Dead + 1.5 Live M - AP3 + 1.0 Wind @ 150°	Yes	Y	1	1.2	43	1.5	7	0.077
104	1.2 Dead + 1.5 Live M - AP3 + 1.0 Wind @ 180°	Yes	Y	1	1.2	43	1.5	8	0.077
105	1.2 Dead + 1.5 Live M - AP3 + 1.0 Wind @ 210°	Yes	Y	1	1.2	43	1.5	9	0.077
106	1.2 Dead + 1.5 Live M - AP3 + 1.0 Wind @ 240°	Yes	Y	1	1.2	43	1.5	10	0.077
107	1.2 Dead + 1.5 Live M - AP3 + 1.0 Wind @ 270°	Yes	Y	1	1.2	43	1.5	11	0.077
108	1.2 Dead + 1.5 Live M - AP3 + 1.0 Wind @ 300°	Yes	Y	1	1.2	43	1.5	12	0.077
109	1.2 Dead + 1.5 Live M - AP3 + 1.0 Wind @ 330°	Yes	Y	1	1.2	43	1.5	13	0.077
110	1.2 Dead + 1.5 Live M - AP4 + 1.0 Wind @ 0°	Yes	Y	1	1.2	44	1.5	2	0.077
111	1.2 Dead + 1.5 Live M - AP4 + 1.0 Wind @ 30°	Yes	Y	1	1.2	44	1.5	3	0.077
112	1.2 Dead + 1.5 Live M - AP4 + 1.0 Wind @ 60°	Yes	Y	1	1.2	44	1.5	4	0.077
113	1.2 Dead + 1.5 Live M - AP4 + 1.0 Wind @ 90°	Yes	Y	1	1.2	44	1.5	5	0.077
114	1.2 Dead + 1.5 Live M - AP4 + 1.0 Wind @ 120°	Yes	Y	1	1.2	44	1.5	6	0.077
115	1.2 Dead + 1.5 Live M - AP4 + 1.0 Wind @ 150°	Yes	Y	1	1.2	44	1.5	7	0.077
116	1.2 Dead + 1.5 Live M - AP4 + 1.0 Wind @ 180°	Yes	Y	1	1.2	44	1.5	8	0.077



Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
117	1.2 Dead + 1.5 Live M - AP4 + 1.0 Wind @ 210°	Yes	Y	1	1.2	44	1.5	9	0.077
118	1.2 Dead + 1.5 Live M - AP4 + 1.0 Wind @ 240°	Yes	Y	1	1.2	44	1.5	10	0.077
119	1.2 Dead + 1.5 Live M - AP4 + 1.0 Wind @ 270°	Yes	Y	1	1.2	44	1.5	11	0.077
120	1.2 Dead + 1.5 Live M - AP4 + 1.0 Wind @ 300°	Yes	Y	1	1.2	44	1.5	12	0.077
121	1.2 Dead + 1.5 Live M - AP4 + 1.0 Wind @ 330°	Yes	Y	1	1.2	44	1.5	13	0.077
122	1.2 Dead + 1.5 Live M - BP1 + 1.0 Wind @ 0°	Yes	Y	1	1.2	45	1.5	2	0.077
123	1.2 Dead + 1.5 Live M - BP1 + 1.0 Wind @ 30°	Yes	Y	1	1.2	45	1.5	3	0.077
124	1.2 Dead + 1.5 Live M - BP1 + 1.0 Wind @ 60°	Yes	Y	1	1.2	45	1.5	4	0.077
125	1.2 Dead + 1.5 Live M - BP1 + 1.0 Wind @ 90°	Yes	Y	1	1.2	45	1.5	5	0.077
126	1.2 Dead + 1.5 Live M - BP1 + 1.0 Wind @ 120°	Yes	Y	1	1.2	45	1.5	6	0.077
127	1.2 Dead + 1.5 Live M - BP1 + 1.0 Wind @ 150°	Yes	Y	1	1.2	45	1.5	7	0.077
128	1.2 Dead + 1.5 Live M - BP1 + 1.0 Wind @ 180°	Yes	Y	1	1.2	45	1.5	8	0.077
129	1.2 Dead + 1.5 Live M - BP1 + 1.0 Wind @ 210°	Yes	Y	1	1.2	45	1.5	9	0.077
130	1.2 Dead + 1.5 Live M - BP1 + 1.0 Wind @ 240°	Yes	Y	1	1.2	45	1.5	10	0.077
131	1.2 Dead + 1.5 Live M - BP1 + 1.0 Wind @ 270°	Yes	Y	1	1.2	45	1.5	11	0.077
132	1.2 Dead + 1.5 Live M - BP1 + 1.0 Wind @ 300°	Yes	Y	1	1.2	45	1.5	12	0.077
133	1.2 Dead + 1.5 Live M - BP1 + 1.0 Wind @ 330°	Yes	Y	1	1.2	45	1.5	13	0.077
134	1.2 Dead + 1.5 Live M - BP2 + 1.0 Wind @ 0°	Yes	Y	1	1.2	46	1.5	2	0.077
135	1.2 Dead + 1.5 Live M - BP2 + 1.0 Wind @ 30°	Yes	Y	1	1.2	46	1.5	3	0.077
136	1.2 Dead + 1.5 Live M - BP2 + 1.0 Wind @ 60°	Yes	Y	1	1.2	46	1.5	4	0.077
137	1.2 Dead + 1.5 Live M - BP2 + 1.0 Wind @ 90°	Yes	Y	1	1.2	46	1.5	5	0.077
138	1.2 Dead + 1.5 Live M - BP2 + 1.0 Wind @ 120°	Yes	Y	1	1.2	46	1.5	6	0.077
139	1.2 Dead + 1.5 Live M - BP2 + 1.0 Wind @ 150°	Yes	Y	1	1.2	46	1.5	7	0.077
140	1.2 Dead + 1.5 Live M - BP2 + 1.0 Wind @ 180°	Yes	Y	1	1.2	46	1.5	8	0.077
141	1.2 Dead + 1.5 Live M - BP2 + 1.0 Wind @ 210°	Yes	Y	1	1.2	46	1.5	9	0.077
142	1.2 Dead + 1.5 Live M - BP2 + 1.0 Wind @ 240°	Yes	Y	1	1.2	46	1.5	10	0.077
143	1.2 Dead + 1.5 Live M - BP2 + 1.0 Wind @ 270°	Yes	Y	1	1.2	46	1.5	11	0.077
144	1.2 Dead + 1.5 Live M - BP2 + 1.0 Wind @ 300°	Yes	Y	1	1.2	46	1.5	12	0.077
145	1.2 Dead + 1.5 Live M - BP2 + 1.0 Wind @ 330°	Yes	Y	1	1.2	46	1.5	13	0.077
146	1.2 Dead + 1.5 Live M - BP3 + 1.0 Wind @ 0°	Yes	Y	1	1.2	47	1.5	2	0.077
147	1.2 Dead + 1.5 Live M - BP3 + 1.0 Wind @ 30°	Yes	Y	1	1.2	47	1.5	3	0.077
148	1.2 Dead + 1.5 Live M - BP3 + 1.0 Wind @ 60°	Yes	Y	1	1.2	47	1.5	4	0.077
149	1.2 Dead + 1.5 Live M - BP3 + 1.0 Wind @ 90°	Yes	Y	1	1.2	47	1.5	5	0.077
150	1.2 Dead + 1.5 Live M - BP3 + 1.0 Wind @ 120°	Yes	Y	1	1.2	47	1.5	6	0.077
151	1.2 Dead + 1.5 Live M - BP3 + 1.0 Wind @ 150°	Yes	Y	1	1.2	47	1.5	7	0.077
152	1.2 Dead + 1.5 Live M - BP3 + 1.0 Wind @ 180°	Yes	Y	1	1.2	47	1.5	8	0.077
153	1.2 Dead + 1.5 Live M - BP3 + 1.0 Wind @ 210°	Yes	Y	1	1.2	47	1.5	9	0.077
154	1.2 Dead + 1.5 Live M - BP3 + 1.0 Wind @ 240°	Yes	Y	1	1.2	47	1.5	10	0.077
155	1.2 Dead + 1.5 Live M - BP3 + 1.0 Wind @ 270°	Yes	Y	1	1.2	47	1.5	11	0.077
156	1.2 Dead + 1.5 Live M - BP3 + 1.0 Wind @ 300°	Yes	Y	1	1.2	47	1.5	12	0.077
157	1.2 Dead + 1.5 Live M - BP3 + 1.0 Wind @ 330°	Yes	Y	1	1.2	47	1.5	13	0.077
158	1.2 Dead + 1.5 Live M - BP4 + 1.0 Wind @ 0°	Yes	Y	1	1.2	48	1.5	2	0.077
159	1.2 Dead + 1.5 Live M - BP4 + 1.0 Wind @ 30°	Yes	Y	1	1.2	48	1.5	3	0.077
160	1.2 Dead + 1.5 Live M - BP4 + 1.0 Wind @ 60°	Yes	Y	1	1.2	48	1.5	4	0.077
161	1.2 Dead + 1.5 Live M - BP4 + 1.0 Wind @ 90°	Yes	Y	1	1.2	48	1.5	5	0.077
162	1.2 Dead + 1.5 Live M - BP4 + 1.0 Wind @ 120°	Yes	Y	1	1.2	48	1.5	6	0.077
163	1.2 Dead + 1.5 Live M - BP4 + 1.0 Wind @ 150°	Yes	Y	1	1.2	48	1.5	7	0.077
164	1.2 Dead + 1.5 Live M - BP4 + 1.0 Wind @ 180°	Yes	Y	1	1.2	48	1.5	8	0.077
165	1.2 Dead + 1.5 Live M - BP4 + 1.0 Wind @ 210°	Yes	Y	1	1.2	48	1.5	9	0.077
166	1.2 Dead + 1.5 Live M - BP4 + 1.0 Wind @ 240°	Yes	Y	1	1.2	48	1.5	10	0.077
167	1.2 Dead + 1.5 Live M - BP4 + 1.0 Wind @ 270°	Yes	Y	1	1.2	48	1.5	11	0.077
168	1.2 Dead + 1.5 Live M - BP4 + 1.0 Wind @ 300°	Yes	Y	1	1.2	48	1.5	12	0.077
169	1.2 Dead + 1.5 Live M - BP4 + 1.0 Wind @ 330°	Yes	Y	1	1.2	48	1.5	13	0.077
170	1.2 Dead + 1.5 Live M - CP1 + 1.0 Wind @ 0°	Yes	Y	1	1.2	49	1.5	2	0.077
171	1.2 Dead + 1.5 Live M - CP1 + 1.0 Wind @ 30°	Yes	Y	1	1.2	49	1.5	3	0.077



Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
172	1.2 Dead + 1.5 Live M - CP1 + 1.0 Wind @ 60°	Yes	Y	1	1.2	49	1.5	4	0.077
173	1.2 Dead + 1.5 Live M - CP1 + 1.0 Wind @ 90°	Yes	Y	1	1.2	49	1.5	5	0.077
174	1.2 Dead + 1.5 Live M - CP1 + 1.0 Wind @ 120°	Yes	Y	1	1.2	49	1.5	6	0.077
175	1.2 Dead + 1.5 Live M - CP1 + 1.0 Wind @ 150°	Yes	Y	1	1.2	49	1.5	7	0.077
176	1.2 Dead + 1.5 Live M - CP1 + 1.0 Wind @ 180°	Yes	Y	1	1.2	49	1.5	8	0.077
177	1.2 Dead + 1.5 Live M - CP1 + 1.0 Wind @ 210°	Yes	Y	1	1.2	49	1.5	9	0.077
178	1.2 Dead + 1.5 Live M - CP1 + 1.0 Wind @ 240°	Yes	Y	1	1.2	49	1.5	10	0.077
179	1.2 Dead + 1.5 Live M - CP1 + 1.0 Wind @ 270°	Yes	Y	1	1.2	49	1.5	11	0.077
180	1.2 Dead + 1.5 Live M - CP1 + 1.0 Wind @ 300°	Yes	Y	1	1.2	49	1.5	12	0.077
181	1.2 Dead + 1.5 Live M - CP1 + 1.0 Wind @ 330°	Yes	Y	1	1.2	49	1.5	13	0.077
182	1.2 Dead + 1.5 Live M - CP2 + 1.0 Wind @ 0°	Yes	Y	1	1.2	50	1.5	2	0.077
183	1.2 Dead + 1.5 Live M - CP2 + 1.0 Wind @ 30°	Yes	Y	1	1.2	50	1.5	3	0.077
184	1.2 Dead + 1.5 Live M - CP2 + 1.0 Wind @ 60°	Yes	Y	1	1.2	50	1.5	4	0.077
185	1.2 Dead + 1.5 Live M - CP2 + 1.0 Wind @ 90°	Yes	Y	1	1.2	50	1.5	5	0.077
186	1.2 Dead + 1.5 Live M - CP2 + 1.0 Wind @ 120°	Yes	Y	1	1.2	50	1.5	6	0.077
187	1.2 Dead + 1.5 Live M - CP2 + 1.0 Wind @ 150°	Yes	Y	1	1.2	50	1.5	7	0.077
188	1.2 Dead + 1.5 Live M - CP2 + 1.0 Wind @ 180°	Yes	Y	1	1.2	50	1.5	8	0.077
189	1.2 Dead + 1.5 Live M - CP2 + 1.0 Wind @ 210°	Yes	Y	1	1.2	50	1.5	9	0.077
190	1.2 Dead + 1.5 Live M - CP2 + 1.0 Wind @ 240°	Yes	Y	1	1.2	50	1.5	10	0.077
191	1.2 Dead + 1.5 Live M - CP2 + 1.0 Wind @ 270°	Yes	Y	1	1.2	50	1.5	11	0.077
192	1.2 Dead + 1.5 Live M - CP2 + 1.0 Wind @ 300°	Yes	Y	1	1.2	50	1.5	12	0.077
193	1.2 Dead + 1.5 Live M - CP2 + 1.0 Wind @ 330°	Yes	Y	1	1.2	50	1.5	13	0.077
194	1.2 Dead + 1.5 Live M - CP3 + 1.0 Wind @ 0°	Yes	Y	1	1.2	51	1.5	2	0.077
195	1.2 Dead + 1.5 Live M - CP3 + 1.0 Wind @ 30°	Yes	Y	1	1.2	51	1.5	3	0.077
196	1.2 Dead + 1.5 Live M - CP3 + 1.0 Wind @ 60°	Yes	Y	1	1.2	51	1.5	4	0.077
197	1.2 Dead + 1.5 Live M - CP3 + 1.0 Wind @ 90°	Yes	Y	1	1.2	51	1.5	5	0.077
198	1.2 Dead + 1.5 Live M - CP3 + 1.0 Wind @ 120°	Yes	Y	1	1.2	51	1.5	6	0.077
199	1.2 Dead + 1.5 Live M - CP3 + 1.0 Wind @ 150°	Yes	Y	1	1.2	51	1.5	7	0.077
200	1.2 Dead + 1.5 Live M - CP3 + 1.0 Wind @ 180°	Yes	Y	1	1.2	51	1.5	8	0.077
201	1.2 Dead + 1.5 Live M - CP3 + 1.0 Wind @ 210°	Yes	Y	1	1.2	51	1.5	9	0.077
202	1.2 Dead + 1.5 Live M - CP3 + 1.0 Wind @ 240°	Yes	Y	1	1.2	51	1.5	10	0.077
203	1.2 Dead + 1.5 Live M - CP3 + 1.0 Wind @ 270°	Yes	Y	1	1.2	51	1.5	11	0.077
204	1.2 Dead + 1.5 Live M - CP3 + 1.0 Wind @ 300°	Yes	Y	1	1.2	51	1.5	12	0.077
205	1.2 Dead + 1.5 Live M - CP3 + 1.0 Wind @ 330°	Yes	Y	1	1.2	51	1.5	13	0.077
206	1.2 Dead + 1.5 Live M - CP4 + 1.0 Wind @ 0°	Yes	Y	1	1.2	52	1.5	2	0.077
207	1.2 Dead + 1.5 Live M - CP4 + 1.0 Wind @ 30°	Yes	Y	1	1.2	52	1.5	3	0.077
208	1.2 Dead + 1.5 Live M - CP4 + 1.0 Wind @ 60°	Yes	Y	1	1.2	52	1.5	4	0.077
209	1.2 Dead + 1.5 Live M - CP4 + 1.0 Wind @ 90°	Yes	Y	1	1.2	52	1.5	5	0.077
210	1.2 Dead + 1.5 Live M - CP4 + 1.0 Wind @ 120°	Yes	Y	1	1.2	52	1.5	6	0.077
211	1.2 Dead + 1.5 Live M - CP4 + 1.0 Wind @ 150°	Yes	Y	1	1.2	52	1.5	7	0.077
212	1.2 Dead + 1.5 Live M - CP4 + 1.0 Wind @ 180°	Yes	Y	1	1.2	52	1.5	8	0.077
213	1.2 Dead + 1.5 Live M - CP4 + 1.0 Wind @ 210°	Yes	Y	1	1.2	52	1.5	9	0.077
214	1.2 Dead + 1.5 Live M - CP4 + 1.0 Wind @ 240°	Yes	Y	1	1.2	52	1.5	10	0.077
215	1.2 Dead + 1.5 Live M - CP4 + 1.0 Wind @ 270°	Yes	Y	1	1.2	52	1.5	11	0.077
216	1.2 Dead + 1.5 Live M - CP4 + 1.0 Wind @ 300°	Yes	Y	1	1.2	52	1.5	12	0.077
217	1.2 Dead + 1.5 Live M - CP4 + 1.0 Wind @ 330°	Yes	Y	1	1.2	52	1.5	13	0.077
218	1.2 Dead + 1.5 Live M - M71 + 1.0 Wind @ 0°	Yes	Y	1	1.2	53	1.5	2	0.077
219	1.2 Dead + 1.5 Live M - M71 + 1.0 Wind @ 30°	Yes	Y	1	1.2	53	1.5	3	0.077
220	1.2 Dead + 1.5 Live M - M71 + 1.0 Wind @ 60°	Yes	Y	1	1.2	53	1.5	4	0.077
221	1.2 Dead + 1.5 Live M - M71 + 1.0 Wind @ 90°	Yes	Y	1	1.2	53	1.5	5	0.077
222	1.2 Dead + 1.5 Live M - M71 + 1.0 Wind @ 120°	Yes	Y	1	1.2	53	1.5	6	0.077
223	1.2 Dead + 1.5 Live M - M71 + 1.0 Wind @ 150°	Yes	Y	1	1.2	53	1.5	7	0.077
224	1.2 Dead + 1.5 Live M - M71 + 1.0 Wind @ 180°	Yes	Y	1	1.2	53	1.5	8	0.077
225	1.2 Dead + 1.5 Live M - M71 + 1.0 Wind @ 210°	Yes	Y	1	1.2	53	1.5	9	0.077
226	1.2 Dead + 1.5 Live M - M71 + 1.0 Wind @ 240°	Yes	Y	1	1.2	53	1.5	10	0.077



Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
227	1.2 Dead + 1.5 Live M - M71 + 1.0 Wind @ 270°	Yes	Y	1	1.2	53	1.5	11	0.077
228	1.2 Dead + 1.5 Live M - M71 + 1.0 Wind @ 300°	Yes	Y	1	1.2	53	1.5	12	0.077
229	1.2 Dead + 1.5 Live M - M71 + 1.0 Wind @ 330°	Yes	Y	1	1.2	53	1.5	13	0.077
230	1.2 Dead + 1.5 Live M - M130 + 1.0 Wind @ 0°	Yes	Y	1	1.2	54	1.5	2	0.077
231	1.2 Dead + 1.5 Live M - M130 + 1.0 Wind @ 30°	Yes	Y	1	1.2	54	1.5	3	0.077
232	1.2 Dead + 1.5 Live M - M130 + 1.0 Wind @ 60°	Yes	Y	1	1.2	54	1.5	4	0.077
233	1.2 Dead + 1.5 Live M - M130 + 1.0 Wind @ 90°	Yes	Y	1	1.2	54	1.5	5	0.077
234	1.2 Dead + 1.5 Live M - M130 + 1.0 Wind @ 120°	Yes	Y	1	1.2	54	1.5	6	0.077
235	1.2 Dead + 1.5 Live M - M130 + 1.0 Wind @ 150°	Yes	Y	1	1.2	54	1.5	7	0.077
236	1.2 Dead + 1.5 Live M - M130 + 1.0 Wind @ 180°	Yes	Y	1	1.2	54	1.5	8	0.077
237	1.2 Dead + 1.5 Live M - M130 + 1.0 Wind @ 210°	Yes	Y	1	1.2	54	1.5	9	0.077
238	1.2 Dead + 1.5 Live M - M130 + 1.0 Wind @ 240°	Yes	Y	1	1.2	54	1.5	10	0.077
239	1.2 Dead + 1.5 Live M - M130 + 1.0 Wind @ 270°	Yes	Y	1	1.2	54	1.5	11	0.077
240	1.2 Dead + 1.5 Live M - M130 + 1.0 Wind @ 300°	Yes	Y	1	1.2	54	1.5	12	0.077
241	1.2 Dead + 1.5 Live M - M130 + 1.0 Wind @ 330°	Yes	Y	1	1.2	54	1.5	13	0.077

Envelope Node Reactions

Node Label	X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC	
1 AN67	max	521.385	3	804.229	3	2530.228	6	0	241	0	241	0	241
2	min	-4043.592	32	-1734.052	14	-2360.788	19	0	1	0	1	0	1
3 AN68	max	3822.506	26	4546.496	33	622.856	114	0	241	0	241	0	241
4	min	979.996	13	312.768	3	-1080.216	82	0	1	0	1	0	1
5 AN88	max	1283.376	19	37.438	34	733.25	19	0	241	0	241	0	241
6	min	-1173.325	6	-9.02	7	-665.442	6	0	1	0	1	0	1
7 AN87	max	1231.999	7	233.963	6	785.576	18	0	241	0	241	0	241
8	min	-1416.073	18	-241.172	19	-684.012	7	0	1	0	1	0	1
9 N136	max	3027.373	2	525.228	21	3782.752	29	0	241	0	241	0	241
10	min	-1653.735	15	-1538.61	8	-831.812	21	0	1	0	1	0	1
11 N137	max	121.965	3	4478.165	29	-881.445	7	0	241	0	241	0	241
12	min	-1716.476	32	482.058	21	-3528.344	34	0	1	0	1	0	1
13 N212	max	3178.521	2	640.432	11	585.867	9	0	241	0	241	0	241
14	min	-2173.731	13	-1599.13	22	-3932.333	35	0	1	0	1	0	1
15 N213	max	-6.218	25	4542.866	37	3783.788	29	0	241	0	241	0	241
16	min	-1609.553	163	451.269	11	727.291	19	0	1	0	1	0	1
17 N232	max	370.488	11	36.136	10	1366.452	2	0	241	0	241	0	241
18	min	-346.397	22	-12.449	3	-1415.25	11	0	1	0	1	0	1
19 N233	max	107.733	13	260.324	12	1545.81	13	0	241	0	241	0	241
20	min	-107.345	24	-246.645	3	-1608.739	2	0	1	0	1	0	1
21 N234	max	1214.414	12	38.314	26	816.115	25	0	241	0	241	0	241
22	min	-1183.087	25	-9.963	13	-841.779	12	0	1	0	1	0	1
23 N237	max	1136.054	10	220.586	22	1117.495	10	0	241	0	241	0	241
24	min	-1022.651	23	-216.28	11	-1004.77	23	0	1	0	1	0	1
25 Totals:	max	5562.298	2	9238.269	26	5627.233	9						
26	min	-5131.229	15	3406.556	51	-5627.235	20						

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

Member	Shape	Code Check	Loc[in]	LC	Shear	CheckLoc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1 M154	PL5/8X5	0.144	2	37	0.024	2	z	36	139367.189	140625	1.831	14.648	1	H1-1b
2 M80	P2.5 XSTR	0.144	27.625	10	0.054	26	z	2	17862.766	93296.548	6.456	6.456	1	H1-1b
3 AM27	PL5/8X5	0.143	2	31	0.016	2	z	77	139367.189	140625	1.831	14.648	1.028	H1-1b
4 M95	PL5/8X5	0.143	2	33	0.025	2	y	8	139367.189	140625	1.831	14.648	1.011	H1-1b
5 M139	P2.5 XSTR	0.138	27.625	24	0.064	130	z	2	17862.766	93296.548	6.456	6.456	1	H1-1b
6 AM8	PIPE 3.0	0.133	50	16	0.038	50	10	42405.505	85698	7.555	7.555	1	H1-1b	



Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks (Continued)

Member	Shape	Code Check	Loc[in]	LC Shear	CheckLoc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn		
7	AM16	P2.5 XSTR	0.132	27.625	18	0.057	130	18	17862.766	93296.548	6.456	6.456	1	H1-1b	
8	M130	PIPE 3.0	0.129	50	18	0.04	50	18	42405.505	85698	7.555	7.555	1	H1-1b	
9	BP3	P2.5STD	0.128	47.25	12	0.022	47.25	12	21709.034	53677.575	3.812	3.812	1	H1-1b	
10	AP3	P2.5STD	0.127	47.25	4	0.021	47.25	4	21709.034	53677.575	3.812	3.812	1	H1-1b	
11	M71	PIPE 3.0	0.124	50	10	0.037	50	17	42405.505	85698	7.555	7.555	1	H1-1b	
12	CP3	P2.5STD	0.118	47.25	22	0.02	47.25	22	21709.034	53677.575	3.812	3.812	1	H1-1b	
13	AP1	P2.5STD	0.113	47.25	16	0.042	47.25	18	21709.034	53677.575	3.812	3.812	1	H1-1b	
14	BP1	P2.5STD	0.112	47.25	24	0.04	47.25	12	21709.034	53677.575	3.812	3.812	1	H1-1b	
15	CP1	P2.5STD	0.107	80.063	20	0.038	47.25	10	21709.034	53677.575	3.812	3.812	1	H1-1b	
16	M135	PL5/8X5	0.105	2	159	0.018	2	z	167	139367.189	140625	1.831	14.648	1.018	H1-1b
17	CP2	P2.5STD	0.105	78.75	10	0.026	47.25	10	21709.034	53677.575	3.812	3.812	1	H1-1b	
18	AM12	PL5/8X5	0.105	2	118	0.022	2	z	32	139367.189	140625	1.831	14.648	1.026	H1-1b
19	M76	PL5/8X5	0.104	2	211	0.018	2	z	33	139367.189	140625	1.831	14.648	1.021	H1-1b
20	AP2	P2.5STD	0.103	78.75	18	0.026	47.25	18	21709.034	53677.575	3.812	3.812	1	H1-1b	
21	BP2	P2.5STD	0.102	78.75	24	0.028	47.25	24	21709.034	53677.575	3.812	3.812	1	H1-1b	
22	M147	PL5/8X5	0.101	0	37	0.024	2.25	z	36	139034.979	140625	1.831	14.648	1	H1-1b
23	AM22	PL5/8X5	0.1	0	34	0.016	2.25	z	77	139034.979	140625	1.831	14.648	1.014	H1-1b
24	M88	PL5/8X5	0.099	0	30	0.025	2.25	y	8	139034.979	140625	1.831	14.648	1.001	H1-1b
25	M132	PL5/8X5	0.095	2	14	0.037	0.812	y	12	139367.189	140625	1.831	14.648	1.011	H1-1b
26	AM10	PL5/8X5	0.094	2	6	0.021	2	y	24	139367.189	140625	1.831	14.648	1.008	H1-1b
27	M73	PL5/8X5	0.093	2	22	0.029	2	y	10	139367.189	140625	1.831	14.648	1.013	H1-1b
28	M129	PL5/8X5	0.092	2.69	6	0.032	0.813	y	6	138358.104	140625	1.831	14.648	1.667	H1-1b
29	M167	PL5/8X5	0.091	2	6	0.029	0	y	2	139367.189	140625	1.831	14.648	1.013	H1-1b
30	AM41	PL5/8X5	0.084	2	18	0.017	0	y	4	139367.189	140625	1.831	14.648	1.001	H1-1b
31	M108	PL5/8X5	0.079	2	14	0.04	2	y	16	139367.189	140625	1.831	14.648	1.009	H1-1b
32	M83	P2.5 XSTR	0.079	53.625	4	0.045	130	20	17862.766	93296.548	6.456	6.456	1	H1-1b	
33	M70	PL5/8X5	0.078	0	32	0.053	2.69	y	16	138358.104	140625	1.831	14.648	1.665	H1-1b
34	M142	P2.5 XSTR	0.077	128.375	20	0.049	130	24	17862.766	93296.548	6.456	6.456	1	H1-1b	
35	M170	HSS2.875X0.203	0.075	0	2	0.033	61.687	12	49119.501	65826	4.727	4.727	1	H1-1b	
36	M112	HSS2.875X0.203	0.075	0	2	0.049	61.687	16	49119.304	65826	4.727	4.727	1	H1-1b	
37	AM50	HSS2.875X0.203	0.074	0	18	0.032	61.687	26	49119.501	65826	4.727	4.727	1	H1-1b	
38	M111	HSS2.875X0.203	0.073	0	10	0.026	61.687	30	49119.501	65826	4.727	4.727	1	H1-1b	
39	AM18	P2.5 XSTR	0.07	128.375	12	0.042	130	4	17862.766	93296.548	6.456	6.456	1	H1-1b	
40	AM54	HSS2.875X0.203	0.07	0	10	0.043	61.687	36	49119.304	65826	4.727	4.727	1	H1-1b	
41	M171	HSS2.875X0.203	0.07	0	18	0.044	61.687	6	49119.304	65826	4.727	4.727	1	H1-1b	
42	M72	PL5/8X5	0.07	0	28	0.036	2.69	y	10	138358.104	140625	1.831	14.648	1.665	H1-1b
43	AM30	PL5/8X5	0.069	0	117	0.022	2.25	z	32	139034.979	140625	1.831	14.648	1.027	H1-1b
44	M158	PL5/8X5	0.069	0	26	0.018	2.25	z	167	139034.979	140625	1.831	14.648	1.004	H1-1b
45	M99	PL5/8X5	0.069	0	210	0.018	2.25	z	33	139034.979	140625	1.831	14.648	1.022	H1-1b
46	AM5	PL5/8X5	0.067	0	18	0.036	0.42	y	97	138358.104	140625	1.831	14.648	1.666	H1-1b
47	M131	PL5/8X5	0.059	2.69	24	0.022	2.69	y	24	138358.104	140625	1.831	14.648	1.665	H1-1b
48	M181	HSS2.875X0.120	0.059	88.561	23	0.003	88.561	29	24683.601	42998.495	3.144	3.144	1	H1-1b*	
49	AP4	P2.5STD	0.058	78.75	118	0.039	47.25	18	21709.034	53677.575	3.812	3.812	1	H1-1b	
50	BP4	P2.5STD	0.058	78.75	12	0.036	47.25	12	21709.034	53677.575	3.812	3.812	1	H1-1b	
51	M183	HSS2.875X0.120	0.058	80.241	13	0.003	80.241	14	27262.7	42998.495	3.144	3.144	1	H1-1b*	
52	M141	PL5/8X5	0.056	0	2	0.029	0	y	2	139034.979	140625	1.831	14.648	1.001	H1-1b
53	M144	PL5/8X5	0.056	0	14	0.037	0.82	y	12	139034.979	140625	1.831	14.648	1.012	H1-1b
54	AM42	PL5/8X5	0.056	0	18	0.017	0	y	4	139034.979	140625	1.831	14.648	1.002	H1-1b
55	AM21	HSS2.875X0.120	0.056	0	19	0.003	81.412	35	26900.004	42998.495	3.144	3.144	1	H1-1b*	
56	AM51	PL5/8X5	0.055	0	6	0.021	2.25	y	24	139034.979	140625	1.831	14.648	1.01	H1-1b
57	M182	HSS2.875X0.120	0.055	0	3	0.003	83.547	34	26237.989	42998.495	3.144	3.144	1	H1-1b*	
58	CP4	P2.5STD	0.055	78.75	210	0.037	47.25	11	21709.034	53677.575	3.812	3.812	1	H1-1b	
59	AM24	HSS2.875X0.203	0.055	0	35	0.039	61.687	31	49119.304	65826	4.727	4.727	1	H1-1b	
60	M90	HSS2.875X0.203	0.055	0	32	0.034	61.687	29	49119.304	65826	4.727	4.727	1	H1-1b	
61	M149	HSS2.875X0.203	0.054	0	26	0.036	61.687	36	49119.304	65826	4.727	4.727	1	H1-1b	



Company : GPD
 Designer : Karumanchi, Ujwala
 Job Number : 2026705.51
 Model Name : 318661 - DUBLIN COFFMAN

5/18/2026
 3:30:54 PM
 Checked By : _____

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks (Continued)

Member	Shape	Code Check	Loc[in]	LC	Shear	Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
62	M85	PL5/8X5	0.054	0	22	0.029	2.25	y	10	139034.979	140625	1.831	14.648	1.015	H1-1b
63	AM58	HSS2.875X0.120	0.054	0	7	0.003	82.386		29	26597.964	42998.495	3.144	3.144	1	H1-1b*
64	AM4	PL5/8X5	0.054	0	79	0.036	0.42	y	96	138358.104	140625	1.831	14.648	1.666	H1-1b
65	M93	PL5/8X5	0.053	0	215	0.045	2.69	y	10	138358.104	140625	1.831	14.648	1.666	H1-1b
66	M110	PL5/8X5	0.052	0	207	0.027	2.69	y	16	138358.104	140625	1.831	14.648	1.666	H1-1b
67	M82	PL5/8X5	0.051	0	10	0.04	2.25	y	16	139034.979	140625	1.831	14.648	1.002	H1-1b
68	M180	HSS2.875X0.120	0.051	0	11	0.002	74.846		32	28925.759	42998.495	3.144	3.144	1	H1-1b*
69	M152	PL5/8X5	0.05	0	160	0.052	2.69	y	12	138358.104	140625	1.831	14.648	1.668	H1-1b
70	M169	PL5/8X5	0.049	0	34	0.024	2.69	y	8	138358.104	140625	1.831	14.648	1.663	H1-1b
71	M134	SR 0.75	0.049	45.14	37	0.006	45.14		2	3514.239	19880.391	0.249	0.249	1	H1-1b*
72	M91	SR 0.75	0.049	45.14	30	0.004	45.14		21	3514.239	19880.391	0.249	0.249	1	H1-1b*
73	AM48	SR 0.75	0.048	45.14	34	0.006	45.14		19	3514.239	19880.391	0.249	0.249	1	H1-1b*
74	AM46	SR 0.75	0.048	45.14	33	0.002	45.14		6	3514.239	19880.391	0.249	0.249	1	H1-1b*
75	M75	SR 0.75	0.048	45.14	30	0.006	45.14		10	3514.239	19880.391	0.249	0.249	1	H1-1b*
76	AM57	SR 1.0	0.048	0	18	0.008	0		18	18931.654	35342.91	0.589	0.589	1	H1-1b
77	M150	SR 0.75	0.047	45.14	37	0.003	45.14		24	3514.239	19880.391	0.249	0.249	1	H1-1b*
78	AM37	PL5/8X5	0.044	0	111	0.037	0.42	y	99	138358.104	140625	1.831	14.648	1.667	H1-1b
79	AM44	PL5/8X5	0.043	0	115	0.039	0.056	y	102	138358.104	140625	1.831	14.648	1.66	H1-1b
80	M160	HSS2.875X0.203	0.038	0	2	0.026	61.687		166	49119.501	65826	4.727	4.727	1	H1-1b
81	AM31	HSS2.875X0.203	0.037	0	112	0.033	61.687		30	49119.501	65826	4.727	4.727	1	H1-1b
82	M101	HSS2.875X0.203	0.037	0	215	0.026	61.687		36	49119.501	65826	4.727	4.727	1	H1-1b
83	AM56	SR 1.0	0.037	0	6	0.007	0		6	18931.654	35342.91	0.589	0.589	1	H1-1b
84	AM13	SR 0.75	0.035	45.14	31	0.005	45.14		6	3514.239	19880.391	0.249	0.249	1	H1-1b*
85	AM25	SR 1.0	0.035	33	30	0.005	0		78	18931.654	35342.91	0.589	0.589	1	H1-1b
86	M136	SR 0.75	0.035	45.14	35	0.006	45.14		18	3514.239	19880.391	0.249	0.249	1	H1-1b*
87	M77	SR 0.75	0.034	45.14	27	0.006	45.14		2	3514.239	19880.391	0.249	0.249	1	H1-1b*
88	M65	SR 0.75	0.034	45.14	207	0.003	45.14		20	3514.239	19880.391	0.249	0.249	1	H1-1b*
89	M124	SR 0.75	0.034	45.14	167	0.004	45.14		20	3514.239	19880.391	0.249	0.249	1	H1-1b*
90	AM49	SR 0.75	0.034	45.14	115	0.001	45.14		8	3514.239	19880.391	0.249	0.249	1	H1-1b*
91	M92	SR 1.0	0.032	33	36	0.005	0		170	18931.654	35342.91	0.589	0.589	1	H1-1b
92	M151	SR 1.0	0.031	33	33	0.005	0		130	18931.654	35342.91	0.589	0.589	1	H1-1b
93	M102	SR 1.0	0.029	0	10	0.005	33		180	18931.654	35342.91	0.589	0.589	1	H1-1b
94	M161	SR 1.0	0.028	0	24	0.005	0		130	18931.654	35342.91	0.589	0.589	1	H1-1b
95	AM33	SR 1.0	0.027	33	18	0.005	33		76	18931.654	35342.91	0.589	0.589	1	H1-1b*
96	M105	SR 1.0	0.026	33	32	0.006	0		2	18931.654	35342.91	0.589	0.589	1	H1-1b
97	M113	SR 1.0	0.022	0	4	0.004	33		2	18931.654	35342.91	0.589	0.589	1	H1-1b
98	AM45	SR 1.0	0.022	0	35	0.004	0		18	18931.654	35342.91	0.589	0.589	1	H1-1b
99	M164	SR 1.0	0.021	0	12	0.007	0		12	18931.654	35342.91	0.589	0.589	1	H1-1b
100	M69	SR 1.0	0.021	33	35	0.006	0		2	18931.654	35342.91	0.589	0.589	1	H1-1b
101	M138	SR 1.0	0.02	0	25	0.005	33		2	18931.654	35342.91	0.589	0.589	1	H1-1b
102	M79	SR 1.0	0.02	0	10	0.005	0		10	18931.654	35342.91	0.589	0.589	1	H1-1b
103	AM15	SR 1.0	0.018	0	101	0.005	33		18	18931.654	35342.91	0.589	0.589	1	H1-1b
104	M128	SR 1.0	0.018	33	164	0.006	0		2	18931.654	35342.91	0.589	0.589	1	H1-1b
105	M172	SR 1.0	0.013	0	19	0.004	33		14	18931.654	35342.91	0.589	0.589	1	H1-1b
106	AM47	SR 0.75	0.002	45.14	11	0.006	45.14		18	3514.239	19880.391	0.249	0.249	1	H1-1b*
107	M114	SR 0.75	0.002	0	3	0.006	45.14		20	3514.239	19880.391	0.249	0.249	1	H1-1b*
108	M173	SR 0.75	0.001	45.14	15	0.005	45.14		12	3514.239	19880.391	0.249	0.249	1	H1-1b*
109	AM14	SR 0.75	0	45.14	241	0.005	45.14		6	3514.239	19880.391	0.249	0.249	1	H1-1a
110	AM23	SR 0.75	0	45.14	241	0.006	45.14		18	3514.239	19880.391	0.249	0.249	1	H1-1a
111	AM32	SR 0.75	0	45.14	241	0.005	45.14		6	3514.239	19880.391	0.249	0.249	1	H1-1a
112	M78	SR 0.75	0	45.14	241	0.004	45.14		4	3514.239	19880.391	0.249	0.249	1	H1-1a
113	M86	SR 0.75	0	45.14	241	0.005	45.14		10	3514.239	19880.391	0.249	0.249	1	H1-1a
114	M98	SR 0.75	0	45.14	241	0.005	45.14		2	3514.239	19880.391	0.249	0.249	1	H1-1a
115	M137	SR 0.75	0	45.14	241	0.005	45.14		18	3514.239	19880.391	0.249	0.249	1	H1-1a
116	M145	SR 0.75	0	45.14	241	0.005	45.14		2	3514.239	19880.391	0.249	0.249	1	H1-1a



Company : GPD
Designer : Karumanchi, Ujwala
Job Number : 2026705.51
Model Name : 318661 - DUBLIN COFFMAN

5/18/2026
3:30:54 PM
Checked By : _____

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks (Continued)

Member	Shape	Code Check	Loc[in]	LC Shear Check	Loc[in]	Dir	LC	phi*Pnc	[lb]	phi*Pnt	[lb]	phi*Mn y-y	[k-ft]	phi*Mn z-z	[k-ft]	Cb	Eqn
117	M157	SR	0.75	0	45.14	241	0.005	45.14	18	3514.239	19880.391	0.249		0.249		1	H1-1a

APPENDIX C

Additional Calculations



TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Typ. All Sectors
GPD #: 2026705.51

Bolt Information	
Bolt Diameter (d)	0.625 in
Net Tensile Area (A _n)	0.226 in ²
# of Bolts Total (n)	4
Bolt Grade	A307
Bolt Tensile Strength (F _{ub})	60 ksi

RISA 3D Reactions	
Moment (M)	0.00 k-ft
Axial (T)	-3.74 kips
Shear (V)	4.60 kips

Apply TIA-222-H Section 15.5?	No
Maximum Capacity	105%

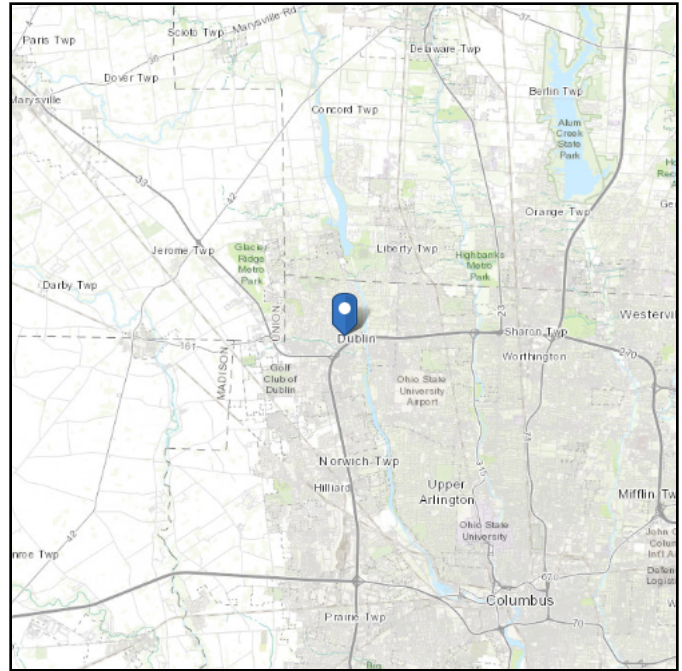
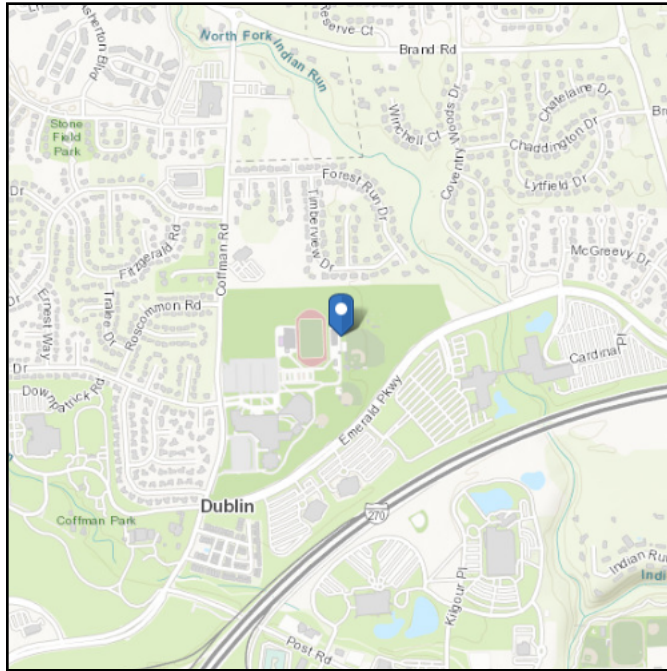
Bolt Capacity	
Nominal Tensile Strength (R _{nt})	13.560 kips
Nominal Shear Strength (R _{nv})	9.20 kips
Bolt Tensile Force (T _{ub})	-0.93 kips
Bolt Shear Force (V _{ub})	1.151 kips
$T_{ub}/\phi R_{nt}$	-0.09190
$V_{ub}/\phi R_{nv}$	0.16667
$(V_{ub}/\phi R_{nv})^2 + (T_{ub}/\phi R_{nt})^2$	0.03623
Bolt Capacity =	16.7% OK

ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Latitude: 40.109831
Longitude: -83.128067
Elevation: 886.870785555061 ft (NAVD 88)



Wind

Results:

Wind Speed	108 Vmph
10-year MRI	75 Vmph
25-year MRI	81 Vmph
50-year MRI	85 Vmph
100-year MRI	93 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Mon May 18 2026

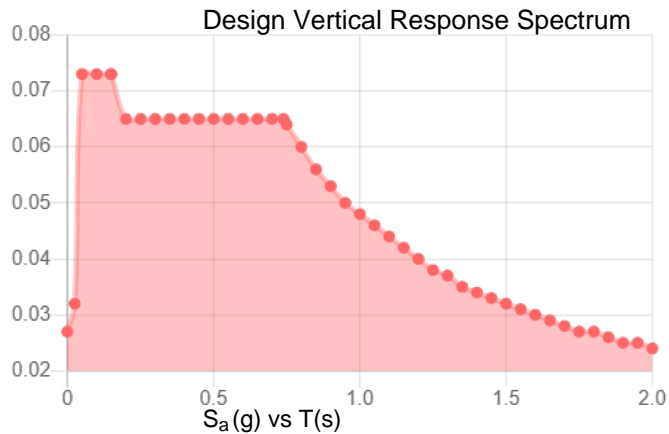
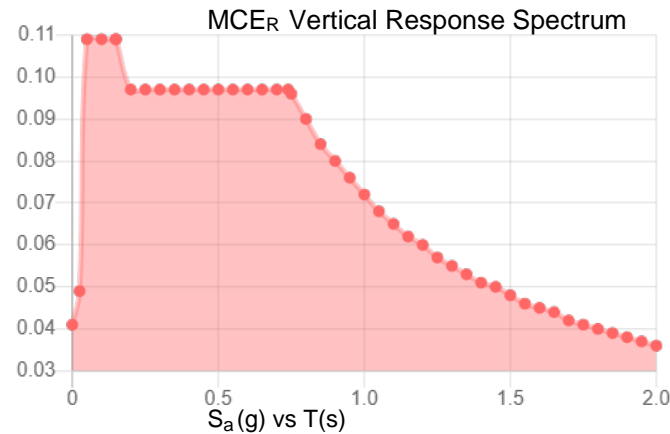
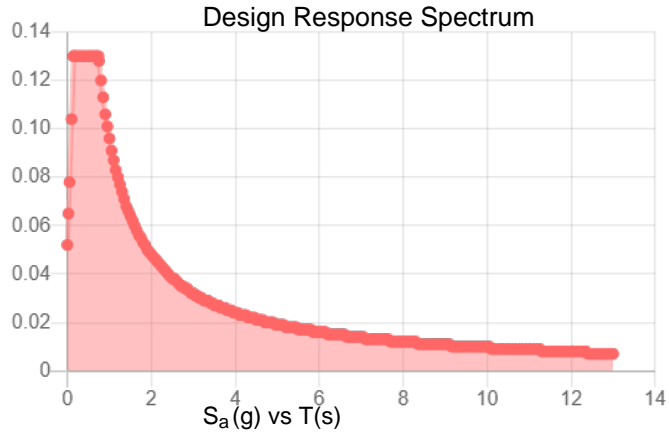
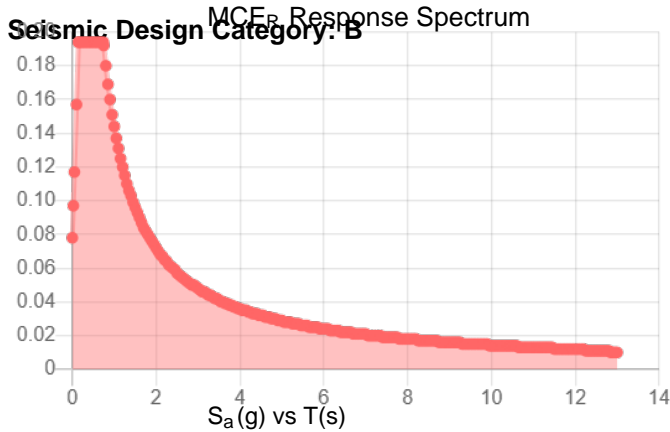
Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_s :	0.121	S_{D1} :	0.096
S_1 :	0.06	T_L :	12
F_a :	1.6	PGA :	0.062
F_v :	2.4	PGA _M :	0.098
S_{MS} :	0.194	F_{PGA} :	1.6
S_{M1} :	0.144	I_e :	1
S_{DS} :	0.13	C_v :	0.7



Data Accessed: Mon May 18 2026

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness: 1.00 in.
Concurrent Temperature: 5 F
Gust Speed 40 mph

Data Source: Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

Date Accessed: Mon May 18 2026

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

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