Verizon Wireless
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Lewis Center, OH 43035

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GPD# 2025737.00.149814.01
September 17, 2025

STRUCTURAL ANALYSIS REPORT

VERIZON DESIGNATION:	**MDG Location ID:**	**5000305363**
	Site Name:	**TUTTLE CROSSING**
	PSLC Code:	**149814**
	FUZE Project ID:	**17080741**
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:		**5080 Tuttle Crossing Blvd, Dublin, OH 43016, Franklin County** **Latitude 40° 04' 38.30" N, Longitude 83° 07' 39.79" W** **Screen Wall with Mount Pipes on 65'-0" Building**

To whom it may concern:

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

Analysis Results

Screen Wall Stress Level with Proposed Equipment:	34.7%	Pass
Mount Stress Level with Proposed Equipment:	81.7%	Pass

We at GPD appreciate the opportunity of providing our continuing professional services to you and Verizon Wireless. 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

9/17/2025

SUMMARY & RESULTS

The purpose of this analysis was to verify whether the existing structure and proposed mounts are capable of carrying the proposed loading configuration as specified by Verizon Wireless.

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 Appendices A & B.

SUMMARY AND RESULTS

Notes	Components	Centerline	% Capacity	Results
-	Screen Wall Post	67.0	34.7	Pass
-	Pipe Mount	67.0	47.3	Pass
-	Corner Angle	67.0	51.4	Pass
-	Radio Pipe	67.0	17.8	Pass
-	Tieback	67.0	13.1	Pass
-	Standoff Vertical	67.0	11.9	Pass
-	Standoff Horizontal	67.0	81.7	Pass
-	Unistrut	67.0	62.3	Pass
-	Mount Connection	67.0	45.1	Pass

RECOMMENDATIONS

The screen wall and mounts have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

ANALYSIS METHOD

Commercially available analysis software packages and hand calculations were used to create a three-dimensional model of the structure and calculate member stresses for the proposed loading configuration. Selected calculations from this analysis are included in Appendix B. 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
Construction Drawings	GPD Project #: 2025737.00.149814.01 Rev 1, dated 9/16/2025	Verizon Wireless
Building Drawings	DG Comm #: 8938, dated: 5/15/1990	Verizon Wireless
Structure Mapping	GPD Project #: 2025737.00.149814.01, dated: 8/22/2025	GPD
Mount Modification Drawings	Terra Project #: A48713-0046, dated: 7/10/2013	Verizon Wireless

ASSUMPTIONS

This structural analysis is based on the theoretical capacity of the members and is not a condition assessment of the structure. 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 structure member sizes and shapes are considered accurate as supplied. Material grades not supplied have been assumed based on previous experience with similar structures.
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 structure 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. Screen wall material grade has been assumed based on standard grade for HSS shapes per AISC.

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 structure.

DISCLAIMER OF WARRANTIES

GPD has performed a site visit to the structure to verify the member sizes and antenna/coax loading. If the existing conditions are not as represented on the structure 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 structure. This report does not replace a full structure inspection. The structure 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 Structural Analysis are limited to a computer analysis of the structure and theoretical capacity of its main structural members. All structure 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 structure 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 structure. 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.

Structures are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the structure 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 structure collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the structure.

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

Structural Analysis Summary Form

Structural Analysis Summary Form

General Info

Site Name	TUTTLE CROSSING
PLSC Site Number	149814
Date of Analysis	9/17/2025
Company Performing Analysis	GPD

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

Structure Info	Description	Date
Structure Type	Rooftop	
Structure Height	165'-0"	
Building Drawings	DG Comm #: 8938	5/15/1990
Mount Model	n/a	
Structure Mapping	GPD Project #: 2025737.00.149814.01	8/22/2025
Previous Structural Analysis	n/a	
Mount Modification Design	Terra Project #: A48713-0046	7/10/2013
Construction Drawings	GPD Project #: 2025737.00.149814.01 Rev 1	9/16/2025

Design Parameters

Design Code Used	TIA-222-H & 2024 OBC
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	
Screen Wall (%)	34.7%
Mount Components (%)	81.7%
Mount Connection (%)	45.1%

Proposed Configuration

Antenna								Mount		
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type
Verizon Wireless	67	67	6	Panel	Quintel	QS4658-5	0/140/250	6		Pipe Mounts
Verizon Wireless	63	63	3	Panel	Samsung	MT6413-77A	0/140/250			on the same mounts
Verizon Wireless	63	63	3	RRH	Samsung	RF4461d-13A				on the same mounts
Verizon Wireless	63	63	3	RRH	Samsung	RF4439d-25A				on the same mounts
Verizon Wireless	63	63	3	Surge	Raycap	RC3DC-3315-PF-48				on the same mounts

APPENDIX B

Wind Calculations and RISA-3D Output File

ASCE 7-16 Rooftop Structures C&C Wind Pressures

Site ID / Name: **149814 / TUTTLE CROSSING**

GPD Project #: **2025737.00.149814.01**

Wind Loading Information

Code	ASCE 7-16		
G_h	0.85		*26.11.1*
V (Basic)	108	mph	
K_d	0.85		*Table 26.6-1*
Exposure Category	C		
Z_g	900	ft	*Table 26.11-1*
α	9.5		*Table 26.11-1*
$K_{z,min}$	0.85		*Table 26.10-1*
K_{zt}	1.00		
Ground Elevation	875.4	ft	
K_e	0.969		*Table 26.9-1*
Minimum Net Pressure	16	psf	*30.2.2*

Structure Information

Mean Roof Height, H	52	ft	
Building Width, B	78	ft	
Building Length, L	208	ft	
BH	4,056	sf	
LH	10,816	sf	
BL	16,224	sf	
Rooftop Structure	Screen Wall		
Screen Wall Height Above Grade	65	ft	
Screen Wall Height Above Roof	13	ft	
Screen Wall Width	7.875	ft	*Tributary Width*
Screen Wall Wall Area (Af)	102.375	sf	
Screen Wall Length	7.1	ft	*Tributary Length*
Screen Wall Wall Area (Af)	92.3	sf	
Screen Wall Flat Roof (Af)	55.9125	sf	

ASCE 7-16 Rooftop Structures C&C Wind Pressures — **30.10 / 29.4.1 Rooftop Structure**

Section Description	h (ft)	K_z	q_h (psf)	$0.1Af_{(BH \text{ or } LH \text{ or } BL)}$	(GC_r)	$P_{Pressure}$ (psf)
Screen Wall Width Wall Pressure:	65	1.156	28.422	405.6	1.900	**54.00**
Screen Wall Length Wall Pressure:	65	1.156	28.422	1081.6	1.900	**54.00**
Screen Wall Flat Roof Pressure:	65	1.156	28.422	1622.4	1.500	**42.63**
		Table 26.10-1	*26.10-1*			

TIA-222-H: Mount Analysis Wind Loading
149814 / TUTTLE CROSSING
GPD Project #: 2025737.00.149814.01

Structure Information		
Supporting Structure Type:	Building	
Structure Height:	52	ft
z (Mount Centerline) =	67	ft
G_h (Mount Gust Effect Factor) =	1.00	
Risk Category:	II	
Rooftop/Penthouse Mounted?	Yes	
Apply Wind Speed-Up Factor:	No	

Code Specifications		
IBC Edition:	2021	
TIA/EIA Code:	H	
Ultimate Wind Speed (No Ice) =	108	mph (3-s gust)
Ultimate Wind Speed (With Ice) =	40	mph (3-s gust)
Ice Thickness	1	in
Exposure Category	C	
Building Base Elevation (AMSL)	875.4	ft

Topographic Inputs	
Topographic Feature:	N/A

Section Sets										No Ice	Ice 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_a	User's Wind Multiplier	Normal Wind Force (lb/ft)*	Normal Ice Wind Force (lb/ft)*	Ice Weight (lb/ft)*
Screen Wall Post	Square/Rect.	156.000	5	5		7.07	Flat	0.90	0.00	0.00	0.00	10.68
Pipe Mount	Pipe	120.000	2.875	2.875		2.88	Round	0.90	1.00	8.27	1.94	5.18
Corner Angle	Angle	23.000	3	3		4.24	Flat	0.90	1.00	10.23	1.80	6.97
Radio Pipe	Pipe	60.000	2.375	2.375		2.38	Round	0.90	0.00	0.00	0.00	4.52
Tieback	Pipe	31.701	2.375	2.375		2.38	Round	0.90	1.00	5.36	1.19	4.52
Standoff Vertical	Pipe	36.000	1.9	1.9		1.90	Round	0.90	1.00	4.85	1.12	3.90
Standoff Horizontal	Square/Rect.	24.000	2	2		2.83	Flat	0.90	1.00	7.51	1.43	5.12
Unistrut	Square/Rect.	60.000	1.625	1.625		2.30	Flat	0.90	0.00	0.00	0.00	4.42

*All forces are unfactored.

Appurtenances								Shielding			No Ice		Ice 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_a and/or block shielding	Normal Wind Force (lbs)*	Wt (lbs) (no ice)*	Normal Wind Force (lbs) (w/ ice)*	Wt (lbs) (only ice)*
(6)	QS4658-5	67	52	12	9.6	69.4	Flat			0.90	159.78	69.40	24.37	97.47
(3)	MT6413-77A	63	28.9	15.75	5.51	57.32	Flat			0.90	107.73	57.32	16.67	56.20
(3)	RF4461d-13A	63	14.96	14.96	10.23	79.1	Flat	100%	100%	1.00	0.00	79.10	1.44	42.88
(3)	RF4439d-25A	63	14.96	14.96	10.04	74.7	Flat	100%	100%	1.00	0.00	74.70	1.44	42.46
(3)	RC3DC-3315-PF-48	63	28.93	15.73	10.3	32	Flat	100%	100%	1.00	0.00	32.00	2.10	71.69

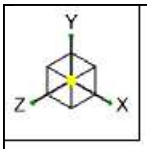
*All forces are unfactored.

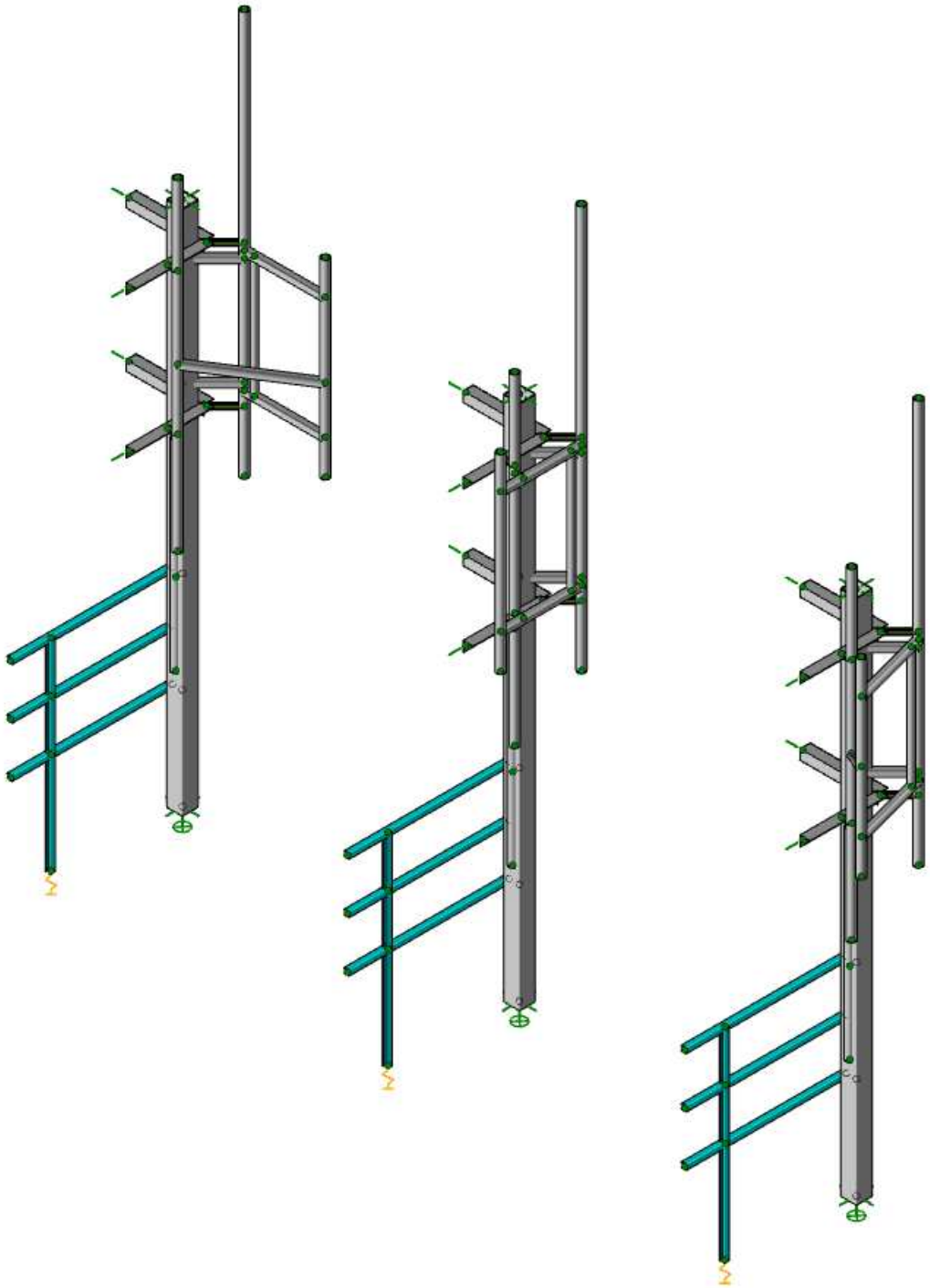
TIA-222-H: Mount Analysis Wind Loading
149814 / TUTTLE CROSSING
GPD Project #: 2025737.00.149814.01

Structure Information		
Supporting Structure Type:	Building	
Structure Height:	52	ft
z (Mount Centerline) =	67	ft
G_h (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
K_d =	0.95
K_e =	0.969
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)
(6)	QS4658-5	1.163	31.969	1.281	1.330	5.55	4.61	159.8	153.0	139.4	132.6	139.4	153.0	159.8	153.0	139.4	132.6	139.4	153.0	4.385	1.073	1.259	1.294	0.729	0.747	6.18	5.19
(3)	MT6413-77A	1.148	31.558	1.200	1.322	3.79	1.46	107.7	91.2	58.1	41.5	58.1	91.2	107.7	91.2	58.1	41.5	58.1	91.2	4.329	1.067	1.200	1.269	0.700	0.735	4.28	1.80
(3)	RF4461d-13A	1.148	31.558	1.200	1.200	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.329	1.067	1.200	1.200	0.700	0.700	0.33	0.28
(3)	RF4439d-25A	1.148	31.558	1.200	1.200	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.329	1.067	1.200	1.200	0.700	0.700	0.33	0.28
(3)	RC3DC-3315-PF-48	1.148	31.558	1.200	1.214	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.329	1.067	1.200	1.200	0.700	0.700	0.49	0.43





Envelope Only Solution

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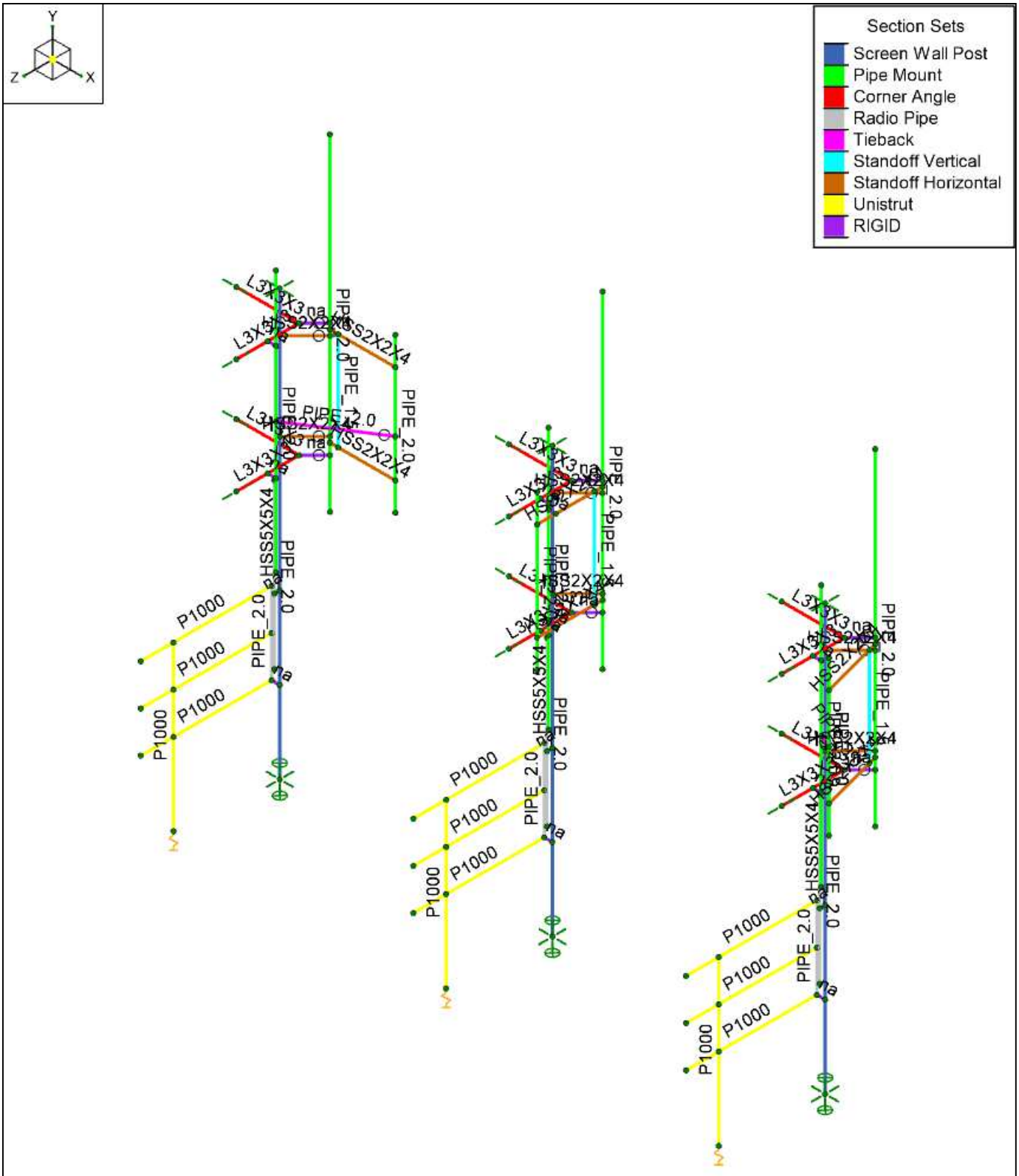

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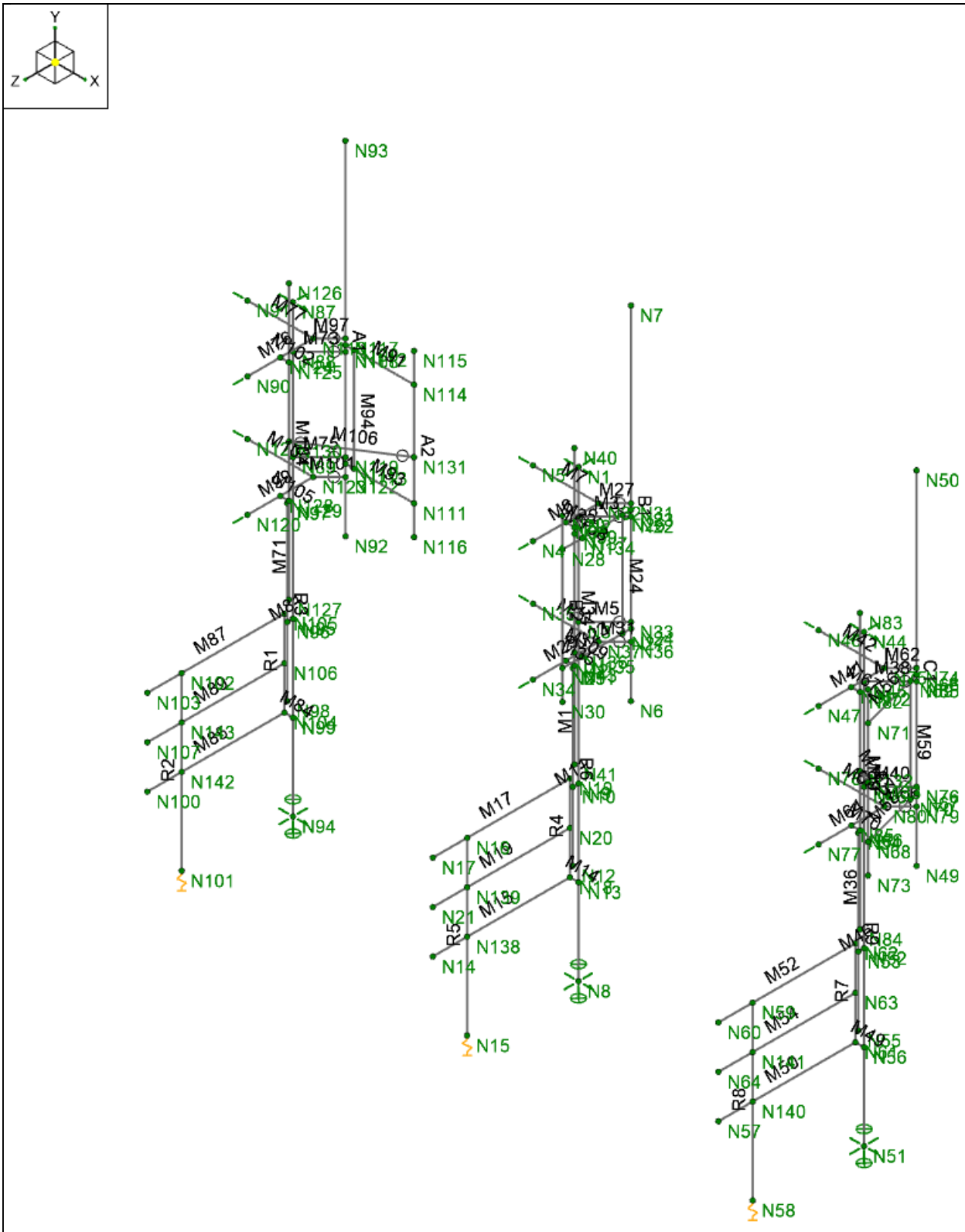

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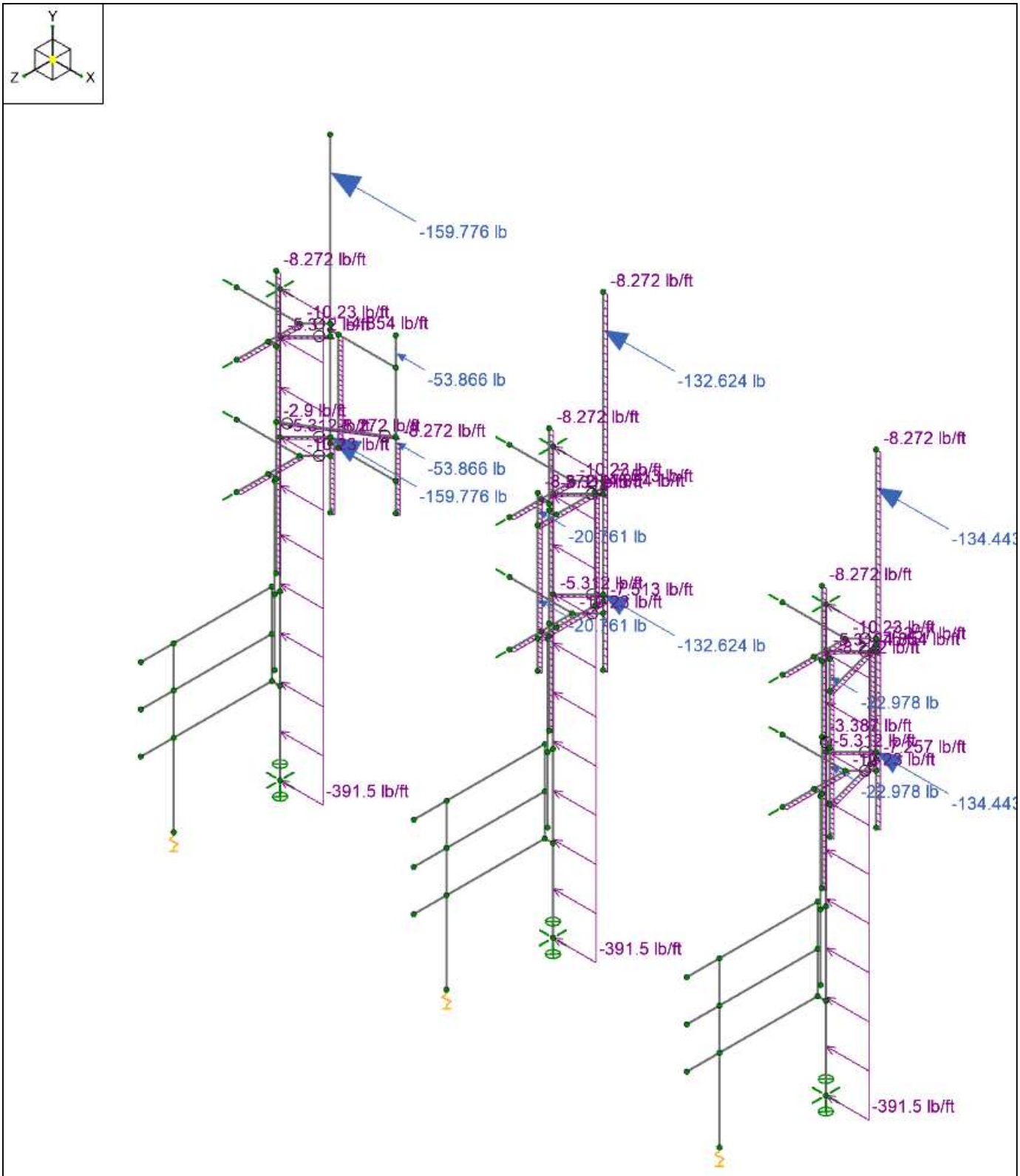

Loads: BLC 2, No Ice Wind 0 deg
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RISA A NEMETSCHEK COMPANY	GPD	149814 / TUTTLE CROSSING	SK-4
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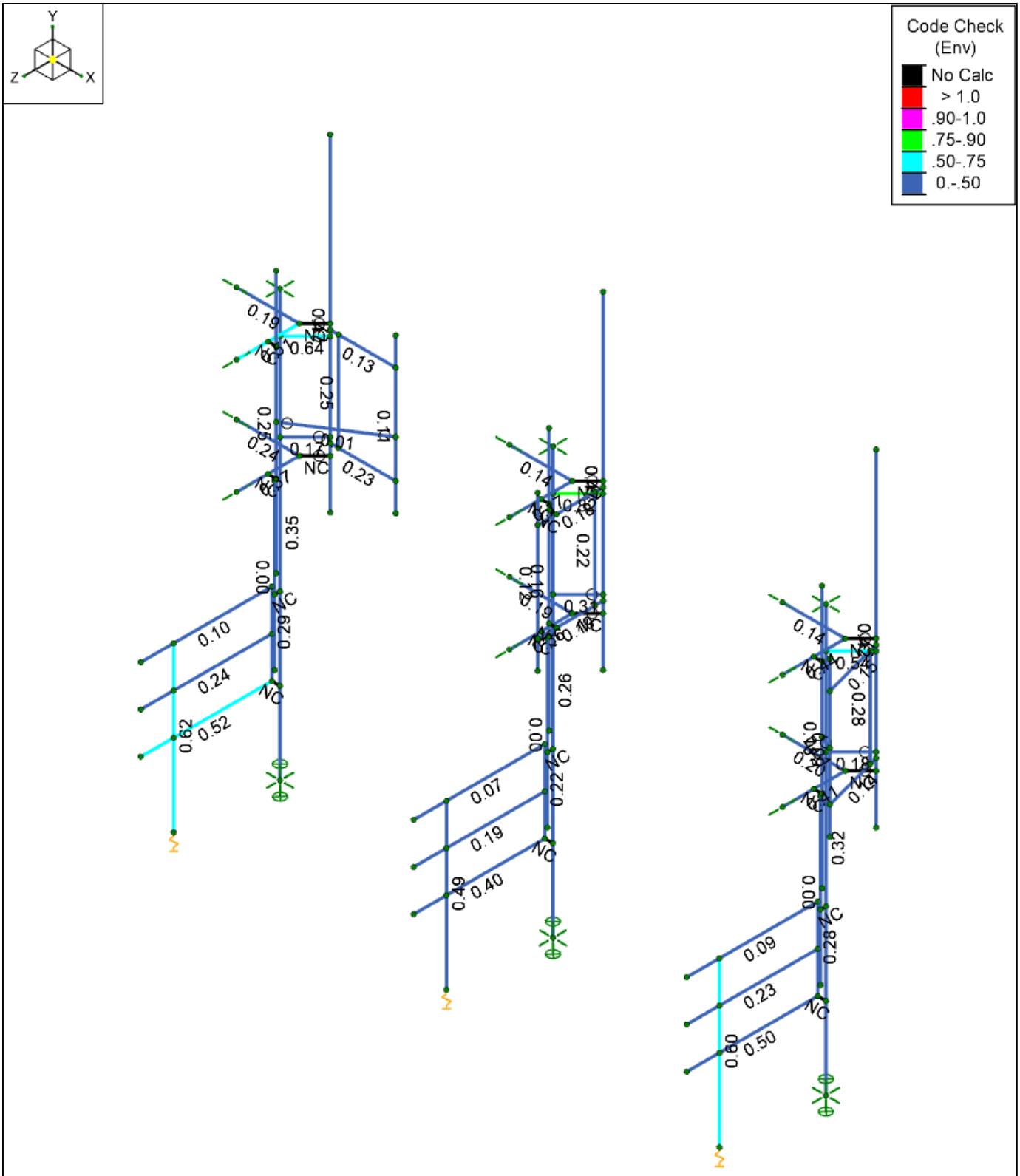

Member Code Checks Displayed (Enveloped)
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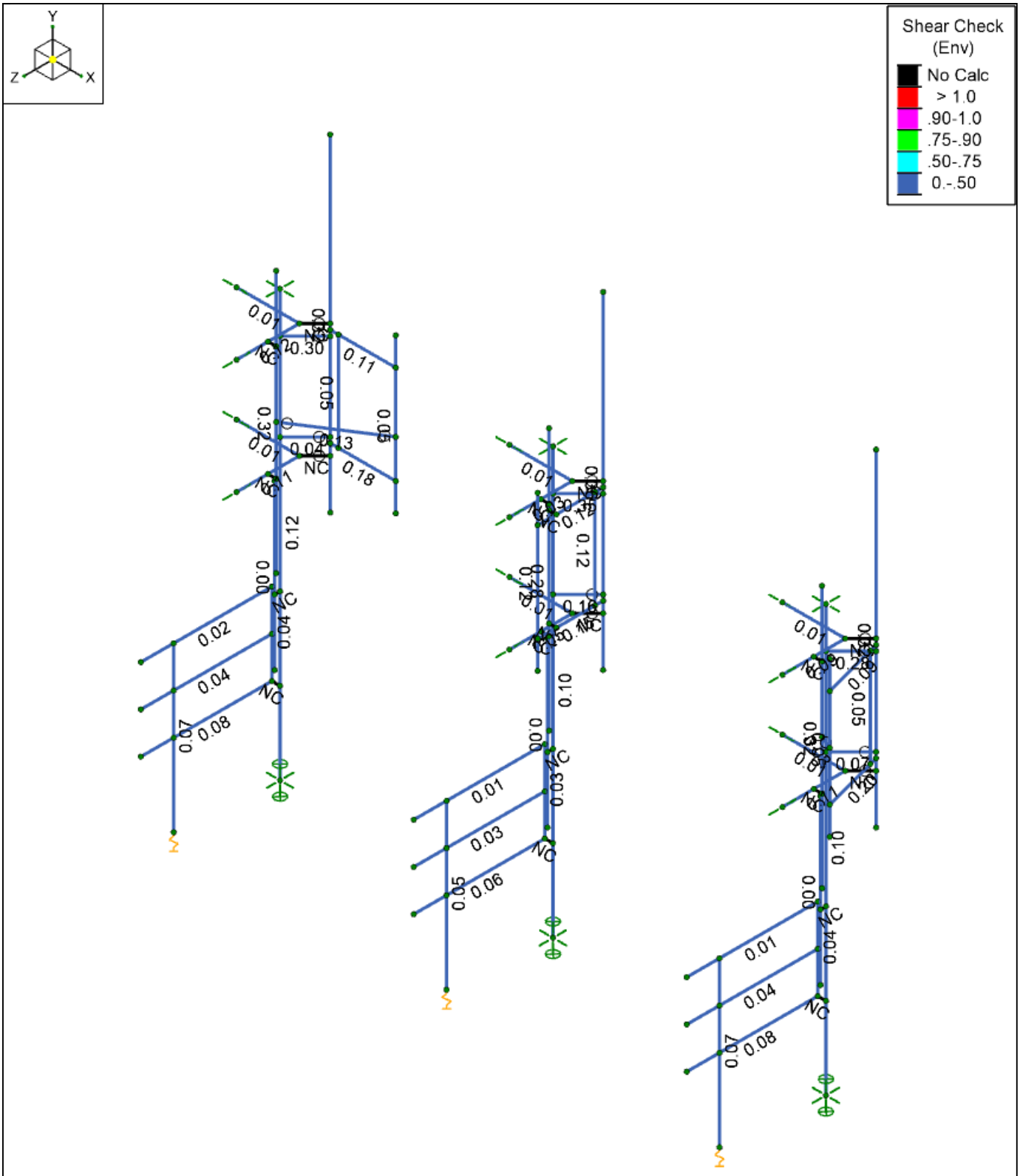

Member Shear Checks Displayed (Enveloped)
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Model Settings

Number of Reported Sections	5
Number of Internal Sections	100
Member Area Load Mesh Size (in^2)	144
Consider Shear Deformation	Yes
Consider Torsional Warping	Yes
Approximate Mesh Size (in)	24
Transfer Forces Between Intersecting Wood Walls	Yes
Increase Wood Wall Nailing Capacity for Wind Loads	Yes
Include P-Delta for Walls	Yes
Optimize Masonry and Wood Walls	Yes
Maximum Number of Iterations	3
Single	No
Multiple (Optimum)	Yes
Maximum	No

Global Axis corresponding to vertical direction	Y
Convert Existing Data	Yes
Default Global Plane for z-axis	XZ
Plate Local Axis Orientation	Global

Hot Rolled Steel	AISC 15th (360-16): LRFD
Stiffness Adjustment	Yes (Iterative)
Notional Annex	None
Connections	None
Cold Formed Steel	AISI S100-20: LRFD
Stiffness Adjustment	Yes (Iterative)
Wood	None
Temperature	< 100F
Concrete	None
Masonry	None
Aluminum	None
Structure Type	Building
Stiffness Adjustment	Yes (Iterative)
Stainless	None
Stiffness Adjustment	Yes (Iterative)

Compression Stress Block	Rectangular Stress Block
Analyze using Cracked Sections	Yes
Leave room for horizontal rebar splices (2*d bar spacing)	No
List forces which were ignored for design in the Detail Report	Yes

Column Min Steel	1
Column Max Steel	8
Rebar Material Spec	ASTM A615
Warn if beam-column framing arrangement is not understood	No
Number of Shear Regions	4
Region 2 & 3 Spacing Increase Increment (in)	4

Code	None
Base Elevation (ft)	
Include the weight of the structure in base shear calcs	Yes

Model Settings (Continued)

T Z (sec)	
T X (sec)	
C_tZ	0.02
C_tX	0.02
R Z	3
R X	3

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	Y Rot [k-ft/rad]
1	N121	Reaction			
2	N91	Reaction			
3	N5	Reaction			
4	N35	Reaction			
5	N48	Reaction			
6	N78	Reaction			
7	N47			Reaction	
8	N77			Reaction	
9	N4			Reaction	
10	N34			Reaction	
11	N90			Reaction	
12	N120			Reaction	
13	N58		CS14		
14	N15		CS14		
15	N101		CS14		
16	N8	Reaction	Reaction	Reaction	Reaction
17	N94	Reaction	Reaction	Reaction	Reaction
18	N51	Reaction	Reaction	Reaction	Reaction
19	N1	Reaction		Reaction	
20	N44	Reaction		Reaction	
21	N87	Reaction		Reaction	

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	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	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
3	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
4	A500 Gr.B RECT	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
5	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2

Cold Formed Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Fu [ksi]
1	A653 SS Gr33	29500	11346	0.3	0.65	0.49	33	45
2	A653 SS Gr50/1	29500	11346	0.3	0.65	0.49	50	65

General Materials Properties

	Label	E [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Plate Methodology
1	RIGID	1e+6	0.3	0	0	Isotropic

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Screen Wall Post	HSS5X5X4	None	None	A500 Gr.B RECT	Typical	4.3	16	16	25.8
2	Pipe Mount	PIPE 2.0	None	None	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
3	Corner Angle	L3X3X3	None	None	A36 Gr.36	Typical	1.09	0.948	0.948	0.014
4	Radio Pipe	PIPE 2.0	None	None	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
5	Tieback	PIPE 2.0	None	None	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
6	Standoff Vertical	PIPE 1.5	None	None	A53 Gr.B	Typical	0.749	0.293	0.293	0.586
7	Standoff Horizontal	HSS2X2X4	Column	Tube	A500 Gr.B RECT	Typical	1.51	0.747	0.747	1.31

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Unistrut	P1000	None	None	A653 SS Gr33	Typical	0.513	0.162	0.219	0.002

General Section Sets

	Label	Type	Material	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	RIGID	None	RIGID	1e+6	1e+6	1e+6	1e+6

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N8	N1		Screen Wall Post	None	None	A500 Gr.B RECT	Typical
2	M3	N2	N22		Standoff Horizontal	Column	Tube	A500 Gr.B RECT	Typical
3	M5	N3	N33		Standoff Horizontal	Column	Tube	A500 Gr.B RECT	Typical
4	M6	N32	N4	180	Corner Angle	None	None	A36 Gr.36	Typical
5	M7	N32	N5	90	Corner Angle	None	None	A36 Gr.36	Typical
6	B1	N7	N6		Pipe Mount	None	None	A53 Gr.B	Typical
7	M11	N9	N10		RIGID	None	None	RIGID	Typical
8	R6	N11	N12		Radio Pipe	None	None	A53 Gr.B	Typical
9	M14	N13	N18		RIGID	None	None	RIGID	Typical
10	M15	N18	N14		Unistrut	None	None	A653 SS Gr33	Typical
11	R5	N15	N16		Unistrut	None	None	A653 SS Gr33	Typical
12	M17	N19	N17		Unistrut	None	None	A653 SS Gr33	Typical
13	R4	N18	N19		Radio Pipe	None	None	A53 Gr.B	Typical
14	M19	N20	N21		Unistrut	None	None	A653 SS Gr33	Typical
15	M21	N23	N28		Standoff Horizontal	Column	Tube	A500 Gr.B RECT	Typical
16	M23	N24	N25		Standoff Horizontal	Column	Tube	A500 Gr.B RECT	Typical
17	M24	N26	N27		Standoff Vertical	None	None	A53 Gr.B	Typical
18	B2	N29	N30		Pipe Mount	None	None	A53 Gr.B	Typical
19	M27	N31	N32		RIGID	None	None	RIGID	Typical
20	M29	N37	N34	180	Corner Angle	None	None	A36 Gr.36	Typical
21	M30	N37	N35	90	Corner Angle	None	None	A36 Gr.36	Typical
22	M31	N36	N37		RIGID	None	None	RIGID	Typical
23	M32	N38	N39		RIGID	None	None	RIGID	Typical
24	M34	N40	N41		Pipe Mount	None	None	A53 Gr.B	Typical
25	M35	N42	N43		RIGID	None	None	RIGID	Typical
26	M36	N51	N44		Screen Wall Post	None	None	A500 Gr.B RECT	Typical
27	M38	N45	N65		Standoff Horizontal	Column	Tube	A500 Gr.B RECT	Typical
28	M40	N46	N76		Standoff Horizontal	Column	Tube	A500 Gr.B RECT	Typical
29	M41	N75	N47	180	Corner Angle	None	None	A36 Gr.36	Typical
30	M42	N75	N48	90	Corner Angle	None	None	A36 Gr.36	Typical
31	C1	N50	N49		Pipe Mount	None	None	A53 Gr.B	Typical
32	M46	N52	N53		RIGID	None	None	RIGID	Typical
33	R9	N54	N55		Radio Pipe	None	None	A53 Gr.B	Typical
34	M49	N56	N61		RIGID	None	None	RIGID	Typical
35	M50	N61	N57		Unistrut	None	None	A653 SS Gr33	Typical
36	R8	N58	N59		Unistrut	None	None	A653 SS Gr33	Typical
37	M52	N62	N60		Unistrut	None	None	A653 SS Gr33	Typical
38	R7	N61	N62		Radio Pipe	None	None	A53 Gr.B	Typical
39	M54	N63	N64		Unistrut	None	None	A653 SS Gr33	Typical
40	M56	N66	N71		Standoff Horizontal	Column	Tube	A500 Gr.B RECT	Typical
41	M58	N67	N68		Standoff Horizontal	Column	Tube	A500 Gr.B RECT	Typical
42	M59	N69	N70		Standoff Vertical	None	None	A53 Gr.B	Typical
43	C2	N72	N73		Pipe Mount	None	None	A53 Gr.B	Typical
44	M62	N74	N75		RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
45	M64	N80	N77	180	Corner Angle	None	None	A36 Gr.36	Typical
46	M65	N80	N78	90	Corner Angle	None	None	A36 Gr.36	Typical
47	M66	N79	N80		RIGID	None	None	RIGID	Typical
48	M67	N81	N82		RIGID	None	None	RIGID	Typical
49	M69	N83	N84		Pipe Mount	None	None	A53 Gr.B	Typical
50	M70	N85	N86		RIGID	None	None	RIGID	Typical
51	M71	N94	N87		Screen Wall Post	None	None	A500 Gr.B RECT	Typical
52	M73	N88	N108		Standoff Horizontal	Column	Tube	A500 Gr.B RECT	Typical
53	M75	N89	N119		Standoff Horizontal	Column	Tube	A500 Gr.B RECT	Typical
54	M76	N118	N90	180	Corner Angle	None	None	A36 Gr.36	Typical
55	M77	N118	N91	90	Corner Angle	None	None	A36 Gr.36	Typical
56	A1	N93	N92		Pipe Mount	None	None	A53 Gr.B	Typical
57	M81	N95	N96		RIGID	None	None	RIGID	Typical
58	R3	N97	N98		Radio Pipe	None	None	A53 Gr.B	Typical
59	M84	N99	N104		RIGID	None	None	RIGID	Typical
60	M85	N104	N100		Unistrut	None	None	A653 SS Gr33	Typical
61	R2	N101	N102		Unistrut	None	None	A653 SS Gr33	Typical
62	M87	N105	N103		Unistrut	None	None	A653 SS Gr33	Typical
63	R1	N104	N105		Radio Pipe	None	None	A53 Gr.B	Typical
64	M89	N106	N107		Unistrut	None	None	A653 SS Gr33	Typical
65	M91	N109	N114		Standoff Horizontal	Column	Tube	A500 Gr.B RECT	Typical
66	M93	N110	N111		Standoff Horizontal	Column	Tube	A500 Gr.B RECT	Typical
67	M94	N112	N113		Standoff Vertical	None	None	A53 Gr.B	Typical
68	A2	N115	N116		Pipe Mount	None	None	A53 Gr.B	Typical
69	M97	N117	N118		RIGID	None	None	RIGID	Typical
70	M99	N123	N120	180	Corner Angle	None	None	A36 Gr.36	Typical
71	M100	N123	N121	90	Corner Angle	None	None	A36 Gr.36	Typical
72	M101	N122	N123		RIGID	None	None	RIGID	Typical
73	M102	N124	N125		RIGID	None	None	RIGID	Typical
74	M104	N126	N127		Pipe Mount	None	None	A53 Gr.B	Typical
75	M105	N128	N129		RIGID	None	None	RIGID	Typical
76	M106	N130	N131		Tieback	None	None	A53 Gr.B	Typical
77	M107	N132	N133		Tieback	None	None	A53 Gr.B	Typical
78	M108	N137	N134		RIGID	None	None	RIGID	Typical
79	M109	N136	N135		RIGID	None	None	RIGID	Typical

Hot Rolled Steel Design Parameters

	Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	Lcomp top [in]	Lcomp bot [in]	L-Torque [in]	K y-y	K z-z	Channel Conn.	a [in]	Function
1	M1	Screen Wall Post	156			Lbyy					N/A	N/A	Lateral
2	M3	Standoff Horizontal	13			Lbyy					N/A	N/A	Lateral
3	M5	Standoff Horizontal	13			Lbyy					N/A	N/A	Lateral
4	M6	Corner Angle	23			Lbyy					N/A	N/A	Lateral
5	M7	Corner Angle	23			Lbyy					N/A	N/A	Lateral
6	B1	Pipe Mount	120	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
7	R6	Radio Pipe	60	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
8	R4	Radio Pipe	30	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
9	M21	Standoff Horizontal	24			Lbyy					N/A	N/A	Lateral
10	M23	Standoff Horizontal	24			Lbyy					N/A	N/A	Lateral
11	M24	Standoff Vertical	36			Lbyy					N/A	N/A	Lateral
12	B2	Pipe Mount	56.5	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
13	M29	Corner Angle	23			Lbyy					N/A	N/A	Lateral
14	M30	Corner Angle	23			Lbyy					N/A	N/A	Lateral
15	M34	Pipe Mount	96	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
16	M36	Screen Wall Post	156			Lbyy					N/A	N/A	Lateral
17	M38	Standoff Horizontal	13			Lbyy					N/A	N/A	Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	Lcomp top [in]	Lcomp bot [in]	L-Torque [in]	K y-y	K z-z	Channel Conn.	a [in]	Function
18	M40	Standoff Horizontal	13			Lbyy					N/A	N/A	Lateral
19	M41	Corner Angle	23			Lbyy					N/A	N/A	Lateral
20	M42	Corner Angle	23			Lbyy					N/A	N/A	Lateral
21	C1	Pipe Mount	120	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
22	R9	Radio Pipe	60	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
23	R7	Radio Pipe	30	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
24	M56	Standoff Horizontal	24			Lbyy					N/A	N/A	Lateral
25	M58	Standoff Horizontal	24			Lbyy					N/A	N/A	Lateral
26	M59	Standoff Vertical	36			Lbyy					N/A	N/A	Lateral
27	C2	Pipe Mount	56.5	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
28	M64	Corner Angle	23			Lbyy					N/A	N/A	Lateral
29	M65	Corner Angle	23			Lbyy					N/A	N/A	Lateral
30	M69	Pipe Mount	96	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
31	M71	Screen Wall Post	156			Lbyy					N/A	N/A	Lateral
32	M73	Standoff Horizontal	13			Lbyy					N/A	N/A	Lateral
33	M75	Standoff Horizontal	13			Lbyy					N/A	N/A	Lateral
34	M76	Corner Angle	23			Lbyy					N/A	N/A	Lateral
35	M77	Corner Angle	23			Lbyy					N/A	N/A	Lateral
36	A1	Pipe Mount	120	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
37	R3	Radio Pipe	60	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
38	R1	Radio Pipe	30	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
39	M91	Standoff Horizontal	24			Lbyy					N/A	N/A	Lateral
40	M93	Standoff Horizontal	24			Lbyy					N/A	N/A	Lateral
41	M94	Standoff Vertical	36			Lbyy					N/A	N/A	Lateral
42	A2	Pipe Mount	56.5			Lbyy					N/A	N/A	Lateral
43	M99	Corner Angle	23			Lbyy					N/A	N/A	Lateral
44	M100	Corner Angle	23			Lbyy					N/A	N/A	Lateral
45	M104	Pipe Mount	96	Segment	Segment	Segment	Segment	Segment	2.1	2.1	N/A	N/A	Lateral
46	M106	Tieback	31.701			Lbyy					N/A	N/A	Lateral
47	M107	Tieback	11.444			Lbyy					N/A	N/A	Lateral

Cold Formed Steel Design Parameters

	Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	Lcomp top [in]	Function
1	M15	Unistrut	48	36	36		Lateral
2	R5	Unistrut	60			Lbyy	Lateral
3	M17	Unistrut	48	36	36		Lateral
4	M19	Unistrut	48	36	36		Lateral
5	M50	Unistrut	48	36	36		Lateral
6	R8	Unistrut	60			Lbyy	Lateral
7	M52	Unistrut	48	36	36		Lateral
8	M54	Unistrut	48	36	36		Lateral
9	M85	Unistrut	48	36	36		Lateral
10	R2	Unistrut	60			Lbyy	Lateral
11	M87	Unistrut	48	36	36		Lateral
12	M89	Unistrut	48	36	36		Lateral

Basic Load Cases

	BLC Description	Category	Y Gravity	Point	Distributed
1	Dead	DL	-1	24	
2	No Ice Wind 0 deg	None		12	33
3	No Ice Wind 30 deg	None		24	79
4	No Ice Wind 60 deg	None		24	79
5	No Ice Wind 90 deg	None		12	30

Basic Load Cases (Continued)

	BLC Description	Category	Y Gravity	Point	Distributed
6	No Ice Wind 120 deg	None		24	76
7	No Ice Wind 150 deg	None		24	76
8	No Ice Wind 180 deg	None		12	30
9	No Ice Wind 210 deg	None		24	79
10	No Ice Wind 240 deg	None		24	79
11	No Ice Wind 270 deg	None		12	33
12	No Ice Wind 300 deg	None		24	82
13	No Ice Wind 330 deg	None		24	82
14	Ice Weight	None		24	59
15	Ice Wind 0 deg	None		24	30
16	Ice Wind 30 deg	None		48	76
17	Ice Wind 60 deg	None		48	76
18	Ice Wind 90 deg	None		24	30
19	Ice Wind 120 deg	None		48	76
20	Ice Wind 150 deg	None		48	76
21	Ice Wind 180 deg	None		24	30
22	Ice Wind 210 deg	None		48	76
23	Ice Wind 240 deg	None		48	76
24	Ice Wind 270 deg	None		24	30
25	Ice Wind 300 deg	None		48	76
26	Ice Wind 330 deg	None		48	76

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		
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

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
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

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	N121	max	2115.734	24	0	37	0	37	0	37	0	37	0	37
2		min	54.99	9	0	1	0	1	0	1	0	1	0	1
3	N91	max	1875.749	21	0	37	0	37	0	37	0	37	0	37
4		min	-1053.177	12	0	1	0	1	0	1	0	1	0	1
5	N5	max	1807.076	22	0	37	0	37	0	37	0	37	0	37
6		min	-936.918	13	0	1	0	1	0	1	0	1	0	1
7	N35	max	2195.39	24	0	37	0	37	0	37	0	37	0	37
8		min	-0.667	15	0	1	0	1	0	1	0	1	0	1
9	N48	max	1674.212	22	0	37	0	37	0	37	0	37	0	37
10		min	-973.231	13	0	1	0	1	0	1	0	1	0	1
11	N78	max	2127.177	24	0	37	0	37	0	37	0	37	0	37
12		min	-53.45	15	0	1	0	1	0	1	0	1	0	1
13	N47	max	0	37	0	37	721.934	11	0	37	0	37	0	37
14		min	0	1	0	1	-1427.295	2	0	1	0	1	0	1
15	N77	max	0	37	0	37	51.806	26	0	37	0	37	0	37
16		min	0	1	0	1	-1694.264	25	0	1	0	1	0	1
17	N4	max	0	37	0	37	630.792	11	0	37	0	37	0	37
18		min	0	1	0	1	-1949.196	2	0	1	0	1	0	1
19	N34	max	0	37	0	37	68.586	37	0	37	0	37	0	37
20		min	0	1	0	1	-2036.821	23	0	1	0	1	0	1
21	N90	max	0	37	0	37	775.159	10	0	37	0	37	0	37
22		min	0	1	0	1	-1464.005	2	0	1	0	1	0	1
23	N120	max	0	37	0	37	-66.94	1	0	37	0	37	0	37
24		min	0	1	0	1	-1831.908	24	0	1	0	1	0	1
25	N58	max	0	37	484.999	20	0	37	0	37	0	37	0	37
26		min	0	1	0	3	0	1	0	1	0	1	0	1
27	N15	max	0	37	431.453	20	0	37	0	37	0	37	0	37
28		min	0	1	21.296	3	0	1	0	1	0	1	0	1
29	N101	max	0	37	496.065	20	0	37	0	37	0	37	0	37
30		min	0	1	0	3	0	1	0	1	0	1	0	1
31	N8	max	1891.814	2	1498.321	30	417.334	2	0	37	1.014	20	0	37
32		min	-390.385	21	329.662	21	-1997.142	20	0	1	-0.568	4	0	1
33	N94	max	2049.849	2	1524.686	29	594.688	2	0	37	1.764	20	0	37
34		min	-555.804	20	273.779	21	-2212.385	20	0	1	-1.406	4	0	1
35	N51	max	1988.762	2	1508.517	30	522.368	2	0	37	1.327	20	0	37
36		min	-502.919	21	279.123	21	-2175.701	21	0	1	-0.693	4	0	1
37	N1	max	1292.847	3	0	37	2262.863	2	0	37	0	37	0	37
38		min	-2121.967	20	0	1	-1938.684	21	0	1	0	1	0	1
39	N44	max	1463.039	3	0	37	2034.317	2	0	37	0	37	0	37
40		min	-2256.828	20	0	1	-1930.63	21	0	1	0	1	0	1
41	N87	max	1948.442	5	0	37	2237.131	2	0	37	0	37	0	37
42		min	-2676.643	20	0	1	-1998.995	21	0	1	0	1	0	1
43	Totals:	max	17057.284	2	5490.603	26	1787.645	9						
44		min	-1788.709	15	2147.423	15	-17056.164	20						

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

	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
1	M1	HSS5X5X4	0.257	73.125	20	0.101	139.75	y	20	114656.847	178020	26.255	26.255	1.384	H1-1b
2	M3	HSS2X2X4	0.817	0	20	0.35	0	z	20	61093.806	62514	3.326	3.326	1.672	H3-6
3	M5	HSS2X2X4	0.312	0	20	0.158	13	z	3	61093.806	62514	3.326	3.326	1.685	H1-1b
4	M6	L3X3X3	0.171	11.5	2	0.031	11.5	z	20	27553.877	35316	1.32	2.905	1.5	H2-1
5	M7	L3X3X3	0.139	0	20	0.006	23	y	20	27553.877	35316	1.32	2.833	1.5	H2-1
6	B1	PIPE_2.0	0.466	63.75	20	0.361	97.5		24	32082.844	32130	1.872	1.872	1	H1-1b
7	R6	PIPE_2.0	0.001	35.625	37	0	35.625		20	19963.662	32130	1.872	1.872	1	H1-1b*
8	R4	PIPE_2.0	0.223	0	21	0.028	15		20	29582.197	32130	1.872	1.872	1	H1-1b
9	M21	HSS2X2X4	0.178	0	4	0.12	3	y	2	57804.58	62514	3.326	3.326	3	H1-1b
10	M23	HSS2X2X4	0.193	0	3	0.153	3	y	23	57804.58	62514	3.326	3.326	2.535	H1-1b
11	M24	PIPE_1.5	0.223	36	24	0.123	0		2	19913.659	23593.5	1.105	1.105	1	H1-1b
12	B2	PIPE_2.0	0.119	45.906	20	0.116	33.547		21	19963.662	32130	1.872	1.872	1	H1-1b
13	M29	L3X3X3	0.363	0	2	0.053	0	z	3	27553.877	35316	1.32	2.833	1.5	H2-1
14	M30	L3X3X3	0.19	0	2	0.007	23	y	2	27553.877	35316	1.32	2.905	1.5	H2-1
15	M34	PIPE_2.0	0.157	66	21	0.283	62		21	31941.789	32130	1.872	1.872	1	H1-1b
16	M36	HSS5X5X4	0.324	81.25	20	0.104	0	z	20	114656.847	178020	26.255	26.255	1.37	H1-1b
17	M38	HSS2X2X4	0.542	0	20	0.281	0	z	20	61093.806	62514	3.326	3.326	1.672	H1-1b
18	M40	HSS2X2X4	0.178	0	16	0.068	13	z	3	61093.806	62514	3.326	3.326	1.676	H1-1b
19	M41	L3X3X3	0.441	0	20	0.088	11.5	z	20	27553.877	35316	1.32	2.833	1.388	H2-1
20	M42	L3X3X3	0.137	0	20	0.006	23	y	20	27553.877	35316	1.32	2.833	1.5	H2-1
21	C1	PIPE_2.0	0.425	61.25	4	0.324	97.5		24	32082.844	32130	1.872	1.872	1	H1-1b
22	R9	PIPE_2.0	0.001	35.625	37	0	35.625		20	19963.662	32130	1.872	1.872	1	H1-1b*
23	R7	PIPE_2.0	0.276	0	21	0.036	15		20	29582.197	32130	1.872	1.872	1	H1-1b
24	M56	HSS2X2X4	0.153	0	4	0.088	0	y	4	57804.58	62514	3.326	3.326	3	H1-1b
25	M58	HSS2X2X4	0.137	0	25	0.198	3	y	24	57804.58	62514	3.326	3.326	2.918	H1-1b
26	M59	PIPE_1.5	0.282	36	24	0.046	0		2	19913.659	23593.5	1.105	1.105	1	H1-1b
27	C2	PIPE_2.0	0.092	45.906	22	0.054	28.25		2	28526.146	32130	1.872	1.872	1	H1-1b
28	M64	L3X3X3	0.411	0	2	0.114	11.5	z	20	27553.877	35316	1.32	2.833	1.494	H2-1
29	M65	L3X3X3	0.204	0	2	0.009	23	y	2	27553.877	35316	1.32	2.905	1.5	H2-1
30	M69	PIPE_2.0	0.178	66	20	0.322	48		21	28526.146	32130	1.872	1.872	1	H3-6
31	M71	HSS5X5X4	0.347	84.5	20	0.125	0	z	20	114656.847	178020	26.255	26.255	1.363	H1-1b
32	M73	HSS2X2X4	0.638	0	20	0.296	0	z	5	61093.806	62514	3.326	3.326	1.672	H1-1b
33	M75	HSS2X2X4	0.172	0	29	0.041	0	y	16	61093.806	62514	3.326	3.326	1.673	H1-1b
34	M76	L3X3X3	0.514	0	20	0.118	11.5	z	20	27553.877	35316	1.32	2.833	1.439	H2-1
35	M77	L3X3X3	0.194	0	20	0.008	23	y	20	27553.877	35316	1.32	2.833	1.5	H2-1
36	A1	PIPE_2.0	0.473	63.75	5	0.32	97.5		22	32082.844	32130	1.872	1.872	1	H1-1b
37	R3	PIPE_2.0	0.001	35.625	37	0	35.625		20	19963.662	32130	1.872	1.872	1	H1-1b*
38	R1	PIPE_2.0	0.287	0	21	0.038	15		20	29582.197	32130	1.872	1.872	1	H1-1b
39	M91	HSS2X2X4	0.134	0	19	0.107	3	y	19	57804.58	62514	3.326	3.326	2.923	H1-1b
40	M93	HSS2X2X4	0.23	0	22	0.176	0	y	22	57804.58	62514	3.326	3.326	2.635	H1-1b
41	M94	PIPE_1.5	0.245	36	25	0.048	0		21	19913.659	23593.5	1.105	1.105	1	H1-1b
42	A2	PIPE_2.0	0.114	32.37	4	0.054	32.37		21	24630.727	32130	1.872	1.872	1	H1-1b
43	M99	L3X3X3	0.366	11.5	2	0.111	11.5	z	20	27553.877	35316	1.32	2.833	1.279	H2-1
44	M100	L3X3X3	0.239	0	2	0.01	23	y	2	27553.877	35316	1.32	2.905	1.5	H2-1
45	M104	PIPE_2.0	0.251	48	20	0.324	24		20	26005.018	32130	1.872	1.872	1	H3-6
46	M106	PIPE_2.0	0.007	0	21	0.131	31.701		2	29550.943	32130	1.872	1.872	1	H1-1b*
47	M107	PIPE_2.0	0.005	0	15	0.082	11.444		20	31781.567	32130	1.872	1.872	1	H1-1b*

Envelope AISI S100-20: LRFD Member Cold Formed Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pn[lb]	phi*Tn[lb]	phi*Mnyy[k-ft]	phi*Mnzz[k-ft]	phi*Vny[lb]	phi*Vnz[lb]	Cb	Eqn
1	R2	P1000	0.623	30	20	0.068	45	z	21	5537.105	15236.1	0.383	0.666	2257.482	4514.964	1.305	H1.2-1
2	R8	P1000	0.6	30	20	0.066	45	z	21	5537.105	15236.1	0.383	0.666	2257.482	4514.964	1.301	H1.2-1
3	M85	P1000	0.523	0	21	0.081	36	y	21	7531.452	15236.1	0.593	0.667	2257.482	4514.964	2.039	H1.1-1
4	M50	P1000	0.503	0	21	0.078	36	y	21	7531.452	15236.1	0.593	0.667	2257.482	4514.964	2.039	H1.1-1

Envelope AISI S100-20: LRFD Member Cold Formed Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pn[lb]	phi*Tn[lb]	phi*Mnyy[k-ft]	phi*Mnzz[k-ft]	phi*Vny[lb]	phi*Vnz[lb]	Cb	Eqn
5	R5	P1000	0.489	30	20	0.053	45	z	21	5537.105	15236.1	0.383	0.666	2257.482	4514.964	1.299	H1.2-1
6	M15	P1000	0.403	0	21	0.063	36	y	21	7531.452	15236.1	0.593	0.667	2257.482	4514.964	2.037	H1.1-1
7	M89	P1000	0.24	36	21	0.04	36	y	20	7531.452	15236.1	0.401	0.666	2257.482	4514.964	1.616	H1.2-1
8	M54	P1000	0.231	36	21	0.038	36	y	20	7531.452	15236.1	0.401	0.666	2257.482	4514.964	1.616	H1.2-1
9	M19	P1000	0.187	36	21	0.031	36	y	20	7531.452	15236.1	0.401	0.666	2257.482	4514.964	1.617	H1.2-1
10	M87	P1000	0.098	0	20	0.016	36	y	20	7531.452	15236.1	0.413	0.666	2257.482	4514.964	1.802	H1.2-1
11	M52	P1000	0.092	0	20	0.015	36	y	20	7531.452	15236.1	0.413	0.666	2257.482	4514.964	1.799	H1.2-1
12	M17	P1000	0.071	0	20	0.012	36	y	20	7531.452	15236.1	0.413	0.666	2257.482	4514.964	1.785	H1.2-1

Manufactured Anchorage Analysis
149814 / TUTTLE CROSSING
GPD Project #: 2025737.00.149814.01
HSS to Screen Wall Connection

Bolt Reactions		
Label:	1/4" x 20 HWH TEK	
Max Tension (T_{ub}) =	1063	lbs
Max Shear ⊥ ($V_{ub,\perp}$) =	291	lbs
Max Shear ∥ ($V_{ub,\parallel}$) =	77	lbs

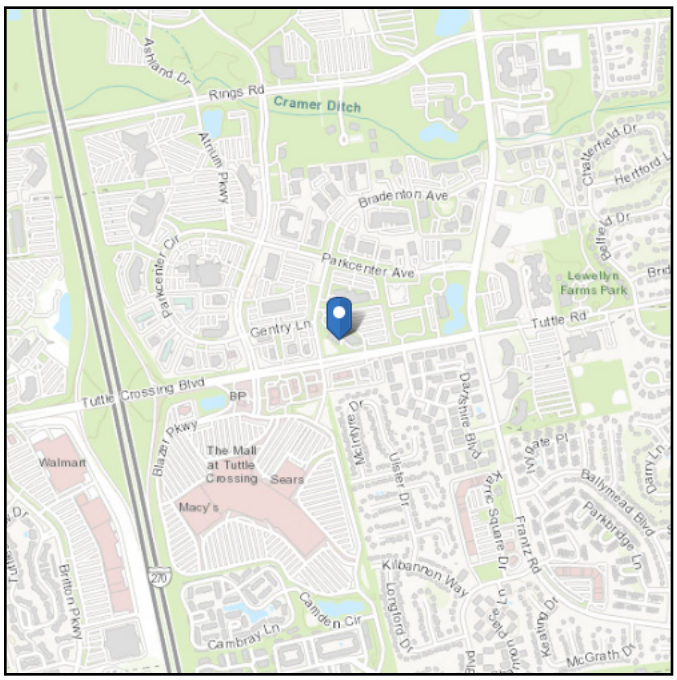
Steel Strength		
Allowable Pullout (phi = 0.5) =	2360	lbs
Allowable Shear (phi = 0.5) =	1441	lbs

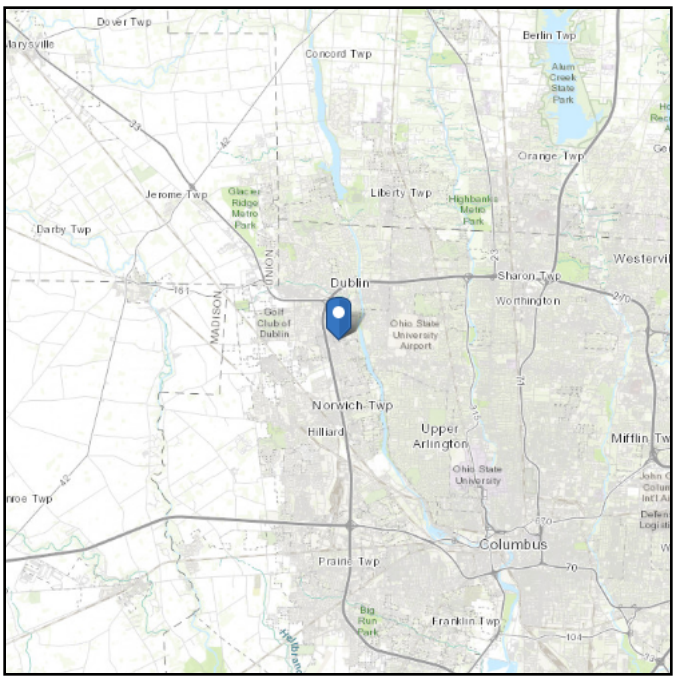
Controlling Capacity	
T_{ub}/Pullout =	0.45
$V_{ub,\perp}$/Shear =	0.20
$V_{ub,\parallel}$/Shear =	0.05
	45.1%

ASCE Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	40.0773
Risk Category:	II	**Longitude:**	-83.1277
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	875.3976576387083 ft (NAVD 88)





Wind

Results:

Wind Speed	108 Vmph
10-year MRI	74 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: Tue Sep 09 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.

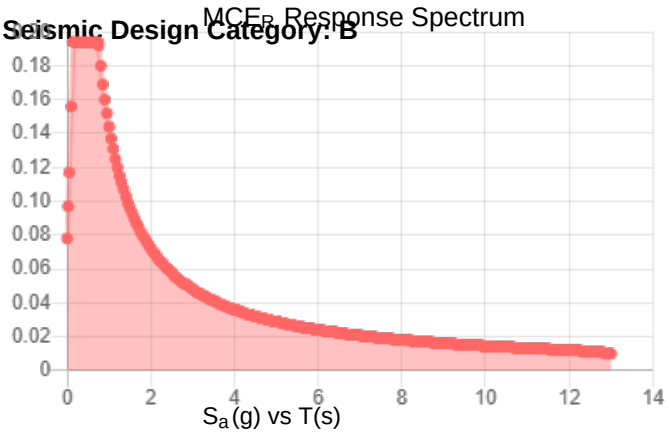
Seismic

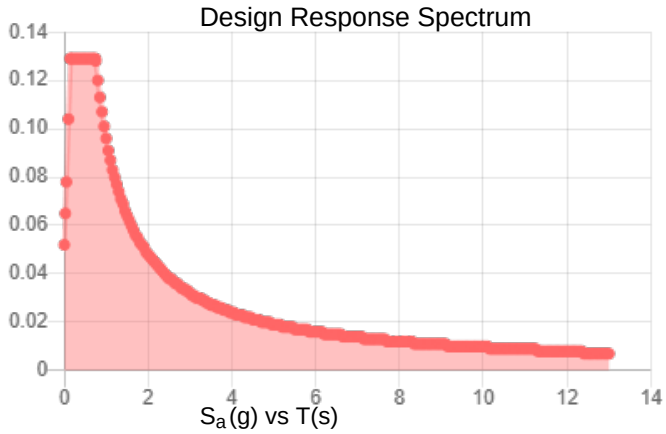
Site Soil Class: D - Default (see Section 11.4.3)

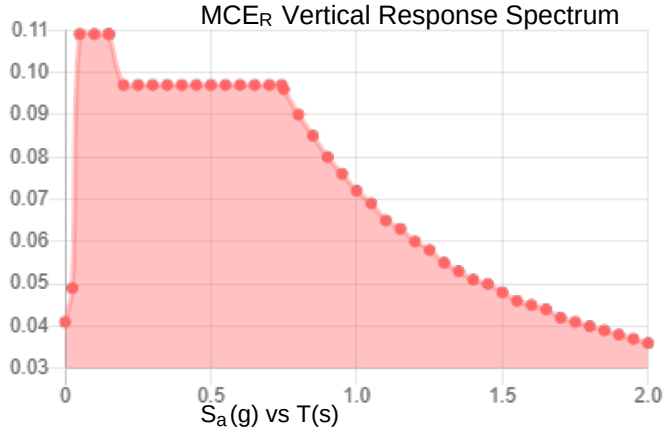
Results:

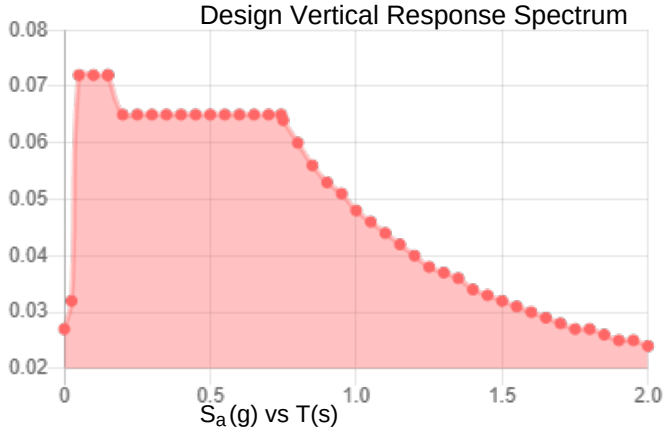
S_S :	0.121	S_{D1} :	0.096
S_1 :	0.06	T_L :	12
F_a :	1.6	PGA :	0.061
F_v :	2.4	PGA_M :	0.098
S_{MS} :	0.194	F_{PGA} :	1.6
S_{M1} :	0.144	I_e :	1
S_{DS} :	0.129	C_v :	0.7

Seismic Design Category: B









Data Accessed: **Tue Sep 09 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:	Tue Sep 09 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.

Snow

Results:

Ground Snow Load, p_g:	20 lb/ft^2
Mapped Elevation:	875.4 ft
Data Source:	ASCE/SEI 7-16, Table 7.2-8
Date Accessed:	Tue Sep 09 2025

Values provided are ground snow loads. In areas designated "case study required," extreme local variations in ground snow loads preclude mapping at this scale. Site-specific case studies are required to establish ground snow loads at elevations not covered.

Snow load values are mapped to a 0.5 mile resolution. This resolution can create a mismatch between the mapped elevation and the site-specific elevation in topographically complex areas. Engineers should consult the local authority having jurisdiction in locations where the reported ‘elevation’ and ‘mapped elevation’ differ significantly from each other.

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