



March 6, 2021

MOUNT EVALUATION LETTER

Market Name:	TURF MOKAN	Site Number:	45545 (KS4130)
Project Name:	LTE 3C/5G NR	Site Name:	GREEN
FA Location:	10000343	Site Data:	202 East Third Street
B&V Work Order:	45545ATTMO9-P		Less Summit, MO 64063
		Latitude:	38.91389
		Longitude:	-94.37417

Black & Veatch Corporation is pleased to submit this "Mount Evaluation Letter" to determine the structural integrity of AT&T Mobility's antenna mounting system on the above-mentioned site. The purpose of this evaluation is to determine the capacity of the system in supporting the final loading in the attached "Loading Summary".

Based on our evaluation we have determined the antenna mounting system to be:

SUFFICIENT

Structure Rating (max from all components) =	67.5%
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The existing mounting system will be capable of supporting the existing and proposed equipment, under the assumptions described in Section 4 of the report and the following conditions:

- Contractor shall be responsible for the means and methods of construction.
- Contractor shall inspect the condition of all existing and proposed structural members, all relevant members and connections and report any deficiencies to the engineer prior to installation of any new antennas and other equipment.

The scope of this evaluation pertains only to the existing antenna mounting system and does not include examination of the loads imparted by the antenna mounting system to the existing tower and its structural components. This document was prepared based on information provided to Black & Veatch. If existing conditions do not reflect those represented, this analysis is no longer valid.

Please contact Gregg Van Loon in our Overland Park Office at 913-458-2898 if you have any questions or comments.

Sincerely,
Black & Veatch Corporation

Prepared By: Assada Wisanutun
Submitted By: Christopher Giannotti, P.E.



3/8/2021



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1. LOADING SUMMARY

Appurtenance								
Carrier	Position	Sector	Antenna RAD Center (ft)	Mount Centerline (ft)	Qty	Type	Manufacturer	Model
AT&T	1	A B	149	147	4	Panel	Quintel	QS86512-2
AT&T	1	C	149	147	2	Panel	Quintel	QS66512-2
AT&T	3	A B C	149	147	3	Panel	Nokia	AEQK
AT&T	5	A B	149	147	2	Panel	Andrew	SBNHH-1D65C
AT&T	5	C	149	147	1	Panel	Andrew	SBNHH-1D65B
AT&T	Corner	A B C	-	147	3	TMA	Powerwave	TT08-19DB111-001
AT&T	1	A B C	-	147	3	RRH	Nokia	Tri RRH 4T4R B12/14/29 370W AHLBBA
AT&T	1	A B C	-	147	3	RRH	Alcatel-Lucent	RRH4x25-WCS-4R
AT&T	2	A B C	-	147	3	RRH	Alcatel-Lucent	B25 RRH4x30-4R
AT&T	4	A B C	-	147	3	RRH	Alcatel-Lucent	B66A RRH4x45
AT&T	4	A B C	-	147	3	RRH	Airscale	RRH 4T4R B5 160W AHCA
AT&T	Tower	-	-	147	1	SS Box	Raycap	DC6-48-60-18-8F
AT&T	Tower	-	-	147	1	SS Box	Raycap	DC6-48-60-0-8C
AT&T	Tower	-	-	147	1	SS Box	Raycap	DC6-48-60-18-8C



2. ANALYSIS CRITERIA SUMMARY

ANALYSIS CRITERIA	
STANDARD	TIA-222-H
WIND SPEED	Ultimate of 109 mph
WIND SPEED WITH ICE	40 mph with 1.5" radial ice thickness
EXPOSURE CATEGORY	B
RISK CATEGORY	II
TOPO CATEGORY	Flat
CREST HEIGHT	N/A

3. REFERENCES

- American Institute of Steel Construction, AISC 15th Edition
- Telecommunications Industry Association Standard, TIA-222-H & International Building Code, IBC 2018
- Similar Antenna Mount Geometry Mapping Reference (USID: 1425-A) by FDH, dated 02/27/2014

4. ASSUMPTIONS

This analysis may be affected if any assumptions are not valid or have been made in error. Black & Veatch should be notified to determine the effect on the structural integrity of the antenna mounting system.

- The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
- The configuration of antennas, mounts, and other appurtenances are as specified in the Loading Summary and the referenced drawings.
- All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
- Sector frame center line: located equidistant between top & bottom boom; Platform center line: located at the base perimeter of platform, unless otherwise specified.
- Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR B-35)
Connection Bolts	ASTM A325



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GREEN

5. RESULTS SUMMARY

Name	Bending Stress Ratio		Shear Stress Ratio	
Perimeter: C5X9	55.6%	Pass	17.4%	Pass
Arm: C5X9	62.1%	Pass	26.4%	Pass
Support Rail: L3X3X3/8	27.1%	Pass	15.5%	Pass
Corner Extension: L3X3X3/8	8.9%	Pass	31.2%	Pass
Support Rail Bracing: L1.75x1.75x1/4	67.5%	Pass	10.2%	Pass
Mount Pipe1: Pipe 2.0 Std	29.4%	Pass	18.5%	Pass
Mount Pipe2: Pipe 3.0 Std	15.1%	Pass	7.5%	Pass
Kick Plate: PL6x1/4	0.0%	Pass	0.0%	Pass
<u>Von Mises SR*</u>				
Corner Plate (P19): 3/8" Thk.	11.3%	Pass		
Top Hat (P15): 1" Thk.	67.2%	Pass		

*Von Mises SR = (Max Von Mises Value From RISA-3D)/(0.9*Fy)

**Capacity rating per TIA-222-H Section 15.5.



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GREEN

**APPENDIX 1:
MOUNT ANALYSIS REPORT**



Client: AT&T

Computed By: Assada W.

Site Name: GREEN (KS4130)

Date: 3/4/2021

Work Order: 45545ATTMO9-P

Verified By: O. Yodkaew

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Title: MOUNT ANALYSIS REPORT

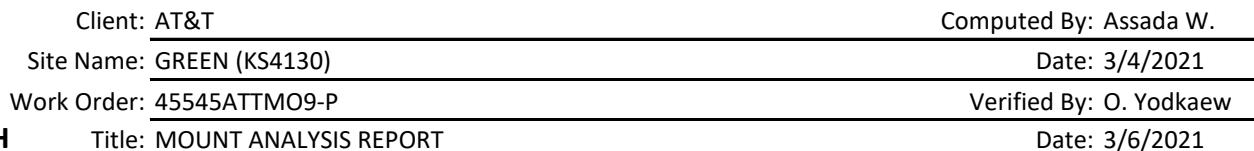
Date: 3/6/2021

Dead and Live Loads

Grating Dead Load: DL = 10 psf

Maintenance Live Load: L_v = 250 lbInstallation Live Load: L_M = 500 lb

Appurtenance Dead Loads	
Name	Weight (lb)
QS86512-2	167
QS66512-2	111
AEQK	99.2
SBNHH-1D65C	49.6
SBNHH-1D65B	40.6
TT08-19DB111-001	22
Tri RRH 4T4R B12/14/29 370W AHLBBA	101.4
RRH4x25-WCS-4R	70
B25 RRH4x30-4R	53
B66A RRH4x45	65.4
RRH 4T4R B5 160W AHCA	35.3

[illegible]



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Title: MOUNT ANALYSIS REPORT

Date: 3/6/2021

Member Wind Loading

Exposure Category = B

Risk Category = II

Topographic Category = 1

Basic Wind Speed, V = 109 mph

Height Above Ground, z = 149 ft

Crest Height, H = N/A ft

Velocity Pressure Coefficient, K_z = 1.11Topographic Factor, K_{zt} = 1.00Wind Directionality Factor, K_d = 0.95Shielding Factor, K_a = 0.90Ground Elevation Factor, K_e = 0.964Wind Velocity Pressure, q_z = 30.84 psfGust Effect Factor, G_h = 1.00**Equations**

$$K_z = 2.01 (z / z_g)^{2/\alpha}$$

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_e = e^{-0.000032 \cdot Z_s}$$

$$q_z = 0.00256 K_z K_{zt} K_e K_d V^2$$

$$F_A = q_z G_h (\text{EPA})$$

$$F_M = q_z G_h C_f D_p$$

TIA-222-H

2.6.5.2

2.6.6.2.1

2.6.6.2.1

2.6.8

2.6.11.6

2.6.11.2

2.6.11.2

Member Wind Loads

Name	Depth (ft)	Width (ft)	C_f	D_p (ft)	F_M (lb/ft)
Perimeter: C5X9	0.42	0.16	2	0.42	25.70
Arm: C5X9	0.42	0.16	2	0.42	25.70
Support Rail: L3X3X3/8	0.25	0.25	2	0.25	15.42
Corner Extension: L3X3X3/8	0.25	0.25	2	0.25	15.42
Support Rail Bracing: L1.75x1.75x1/4	0.15	0.15	2	0.15	8.99
Mount Pipe1: Pipe 2.0 Std	0.20		1.2	0.20	7.32
Mount Pipe2: Pipe 3.0 Std	0.29		1.2	0.29	10.79
Kick Plate: PL6x1/4	0.50	0.02	2	0.50	30.84



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Title: MOUNT ANALYSIS REPORT

Date: 3/6/2021

Appurtenance Ice Dead Loading**Equations**

TIA-222-H

Exposure Category = B
 Risk Category = II
 Topographic Category = 1
 Height Above Ground, z = 149 ft
 Crest Height, H = N/A ft
 Design Ice Thickness, T_i = 1.50 in
 Importance Factor, I = 1
 Topographic Factor, K_{zt} = 1.00
 Height Escalation Factor, K_{iz} = 1.16
 Factored Ice Thickness, T_{iz} = 1.74 in
 Grating Ice Dead Load, D_{Gice} = 8.14 psf

$$K_h = e^{(f \cdot z / H)}$$

2.6.6.2.1

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

2.6.6.2.1

$$K_{iz} = (z/33)^{0.10}$$

2.6.10

$$T_{iz} = T_i I K_{iz} (K_{zt})^{0.35}$$

2.6.10

$$DL_{ice} = [(H_{ice} * D_{ice} * W_{ice}) - (H * W * D)] * 56 \text{pcf}$$

Appurtenance Ice Dead Loads

Name	Height w/ ice (ft)	Width w/ice (ft)	Depth w/ ice (ft)	V_{ice} (ft ³)	DL_{ice} (lb)
QS86512-2	8.29	1.29	1.09	5.27	295.17
QS66512-2	6.29	1.29	1.09	4.06	227.10
AEQK	2.75	1.77	1.08	2.38	133.44
SBNHH-1D65C	8.32	1.28	0.88	4.70	263.47
SBNHH-1D65B	6.34	1.28	0.88	3.62	202.97
TT08-19DB111-001	1.47	0.85	0.74	0.63	35.26
Tri RRH 4T4R B12/14/29 370W AHLBBA	2.29	1.53	1.35	2.11	117.99
RRH4x25-WCS-4R	2.92	1.29	1.02	1.92	107.47
B25 RRH4x30-4R	2.06	1.29	0.89	1.31	73.08
B66A RRH4x45	2.44	1.27	0.89	1.50	84.06
RRH 4T4R B5 160W AHCA	1.40	1.26	0.83	0.88	49.49



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Title: MOUNT ANALYSIS REPORT

Date: 3/6/2021

Member Ice Dead Loading**Equations**

TIA-222-H

Exposure Category = B
 Risk Category = II
 Topographic Category = 1
 Height Above Ground, z = 149 ft
 Crest Height, H = N/A ft
 Design Ice Thickness, T_i = 1.50 in
 Importance Factor, I = 1
 Topographic Factor, K_{zt} = 1.00
 Height Escalation Factor, K_{iz} = 1.16
 Factored Ice Thickness, T_{iz} = 1.74 in
 Grating Ice Dead Load, D_{Gice} = 8.14 psf

$$K_h = e^{(f \cdot z / H)}$$

2.6.6.2.1

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

2.6.6.2.1

$$K_{iz} = (z/33)^{0.10}$$

2.6.10

$$T_{iz} = T_i I K_{iz} (K_{zt})^{0.35}$$

2.6.10

$$A_{iz} = \pi T_{iz} (D_c + T_{iz})$$

2.6.10

$$DL_{ice} = A_{iz} * 56 \text{pcf}$$

Member Ice Dead Loads

Name	Depth w/ ice (ft)	Width w/ ice (ft)	Dc (ft)	Aiz (ft ²)	DL _{ice} (lb/ft)
Perimeter: C5X9	0.71	0.45	0.45	0.27	15.11
Arm: C5X9	0.71	0.45	0.45	0.27	15.11
Support Rail: L3X3X3/8	0.54	0.54	0.35	0.23	12.76
Corner Extension: L3X3X3/8	0.54	0.54	0.35	0.23	12.76
Support Rail Bracing: L1.75x1.75x1/4	0.44	0.44	0.21	0.16	8.99
Mount Pipe1: Pipe 2.0 Std	0.49		0.20	0.16	8.78
Mount Pipe2: Pipe 3.0 Std	0.58		0.29	0.20	11.17
Kick Plate: PL6x1/4	0.79	0.31	0.50	0.29	16.51



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Date: 3/6/2021

Member Ice Wind Loading**Equations**

TIA-222-H

Exposure Category =	B	$K_z = 2.01 (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	II		
Topographic Category =	1	$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Ice Wind Speed, V_{ice} =	40 mph		
Height Above Ground, z =	149 ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	N/A ft		
Velocity Pressure Coefficient, K_z =	1.11 psf	$K_e = e^{-0.000032 \cdot Z_s}$	2.6.8
Topographic Factor, K_{zt} =	1.00		
Wind Directionality Factor, K_d =	0.95	$q_z = 0.00256 K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90		
Ground Elevation Factory, K_e =	0.964	$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$	2.6.11.2
Ice Wind Velocity Pressure, $q_{z(ice)}$ =	4.153		
Factored Ice Thickness, T_{iz} =	1.74 in	$F_{M(ice)} = q_{z(ice)} G_h C_f D_{p(ice)}$	2.6.11.2
Gust Effect Factor, G_h =	1		

Member Ice Wind Loads

Name	Depth w/ Ice (ft)	Width w/ Ice (ft)	C_f	$D_{p(ice)}$ (ft)	$F_{M(ice)}$ (lb/ft)
Perimeter: C5X9	0.71	0.45	2	0.71	5.88
Arm: C5X9	0.71	0.45	2	0.71	5.88
Support Rail: L3X3X3/8	0.54	0.54	2	0.54	4.49
Corner Extension: L3X3X3/8	0.54	0.54	2	0.54	4.49
Support Rail Bracing: L1.75x1.75x1/4	0.44	0.44	2	0.44	3.63
Mount Pipe1: Pipe 2.0 Std	0.49		1.2	0.49	2.44
Mount Pipe2: Pipe 3.0 Std	0.58		1.2	0.58	2.90
Kick Plate: PL6x1/4	0.79	0.31	2	0.79	6.57



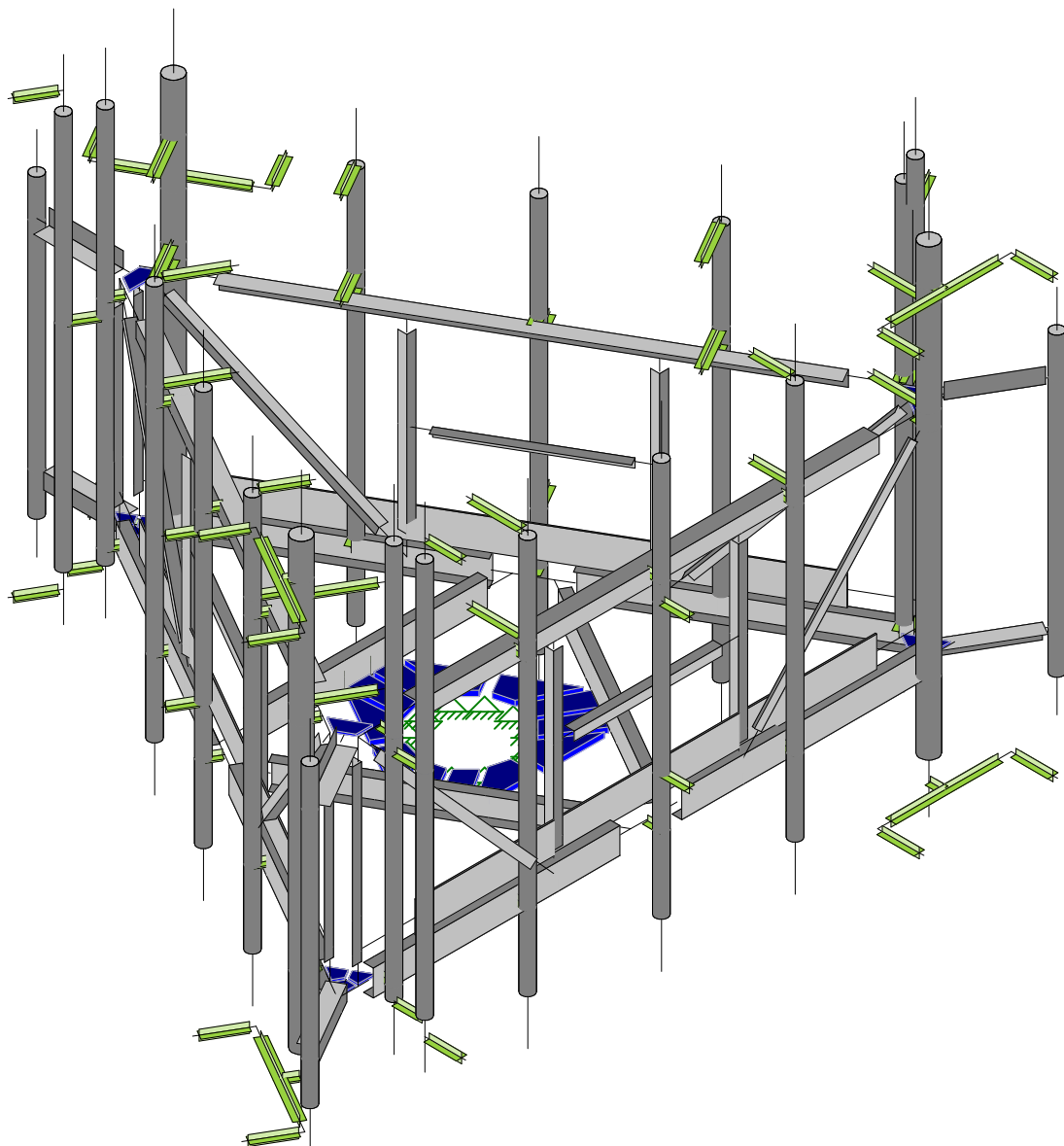
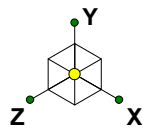
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45545ATTMO9-P

GREEN

**APPENDIX 2:
RISA PRINTOUTS**



Envelope Only Solution

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Assada W.

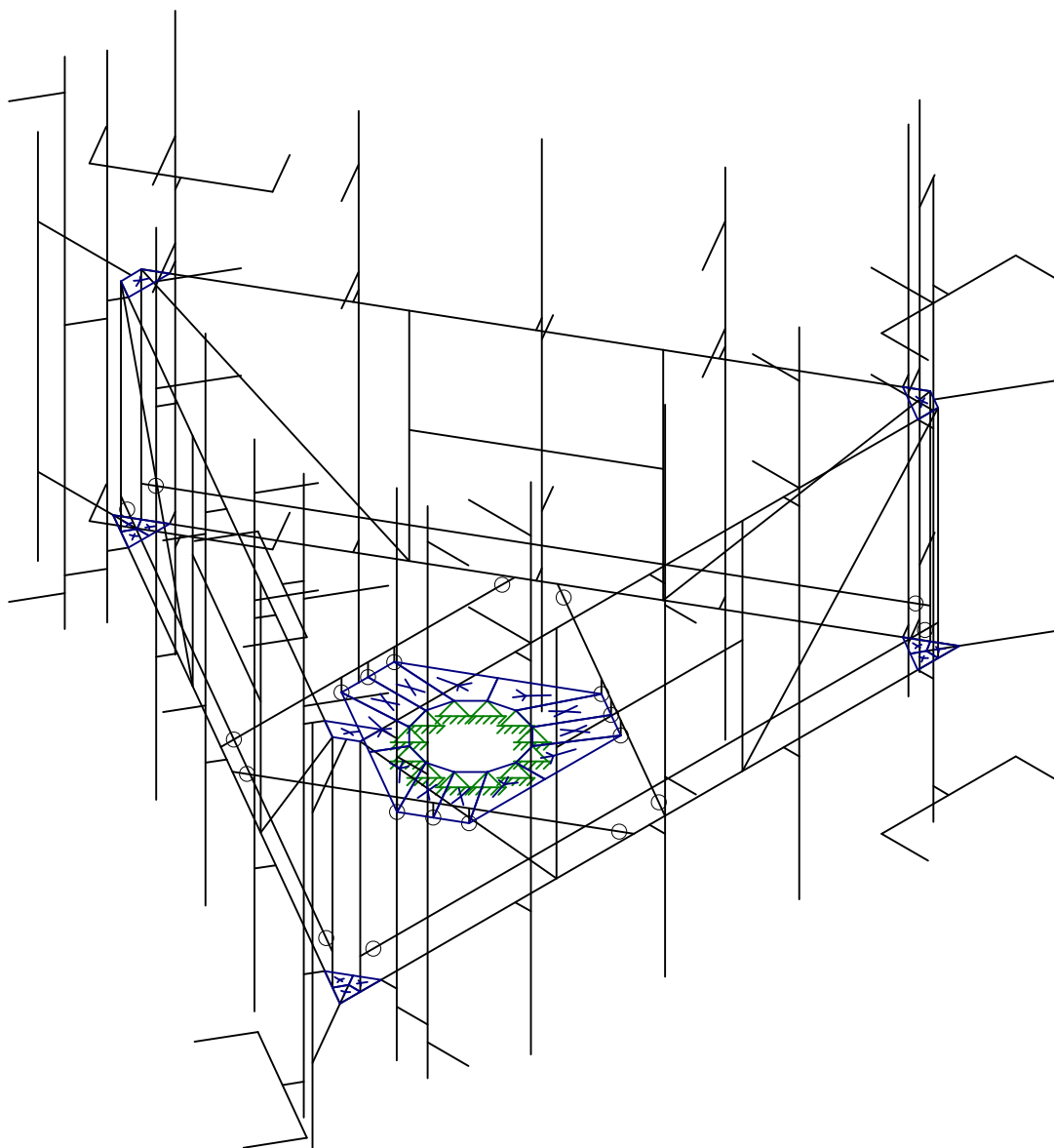
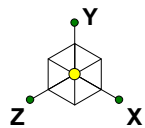
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45545ATTMO9-P

SK - 1

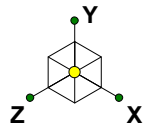
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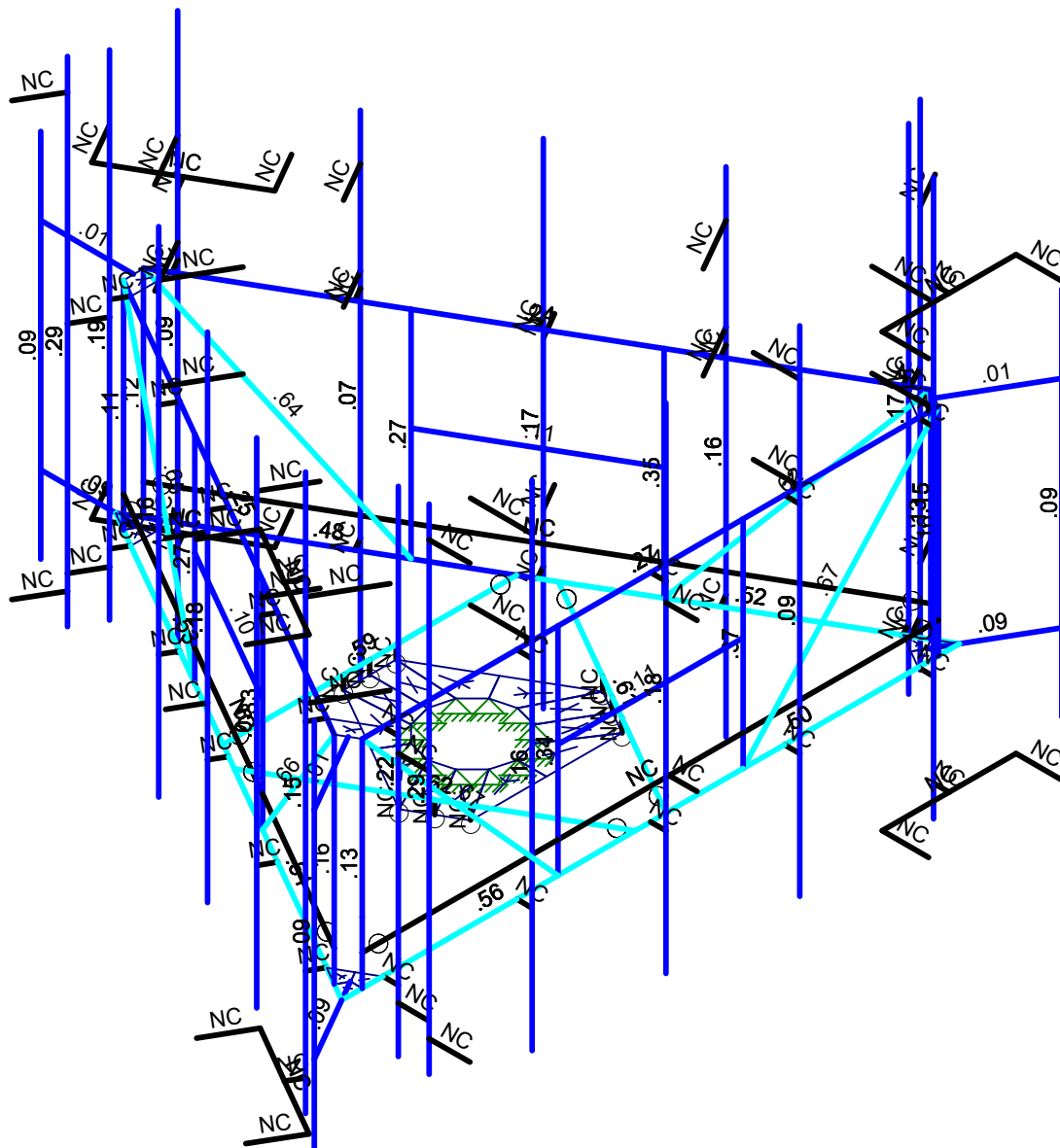


Envelope Only Solution

Black & Veatch Corp.	45545ATTMO9-P	SK - 2
Assada W.		Mar 6, 2021 at 11:37 PM
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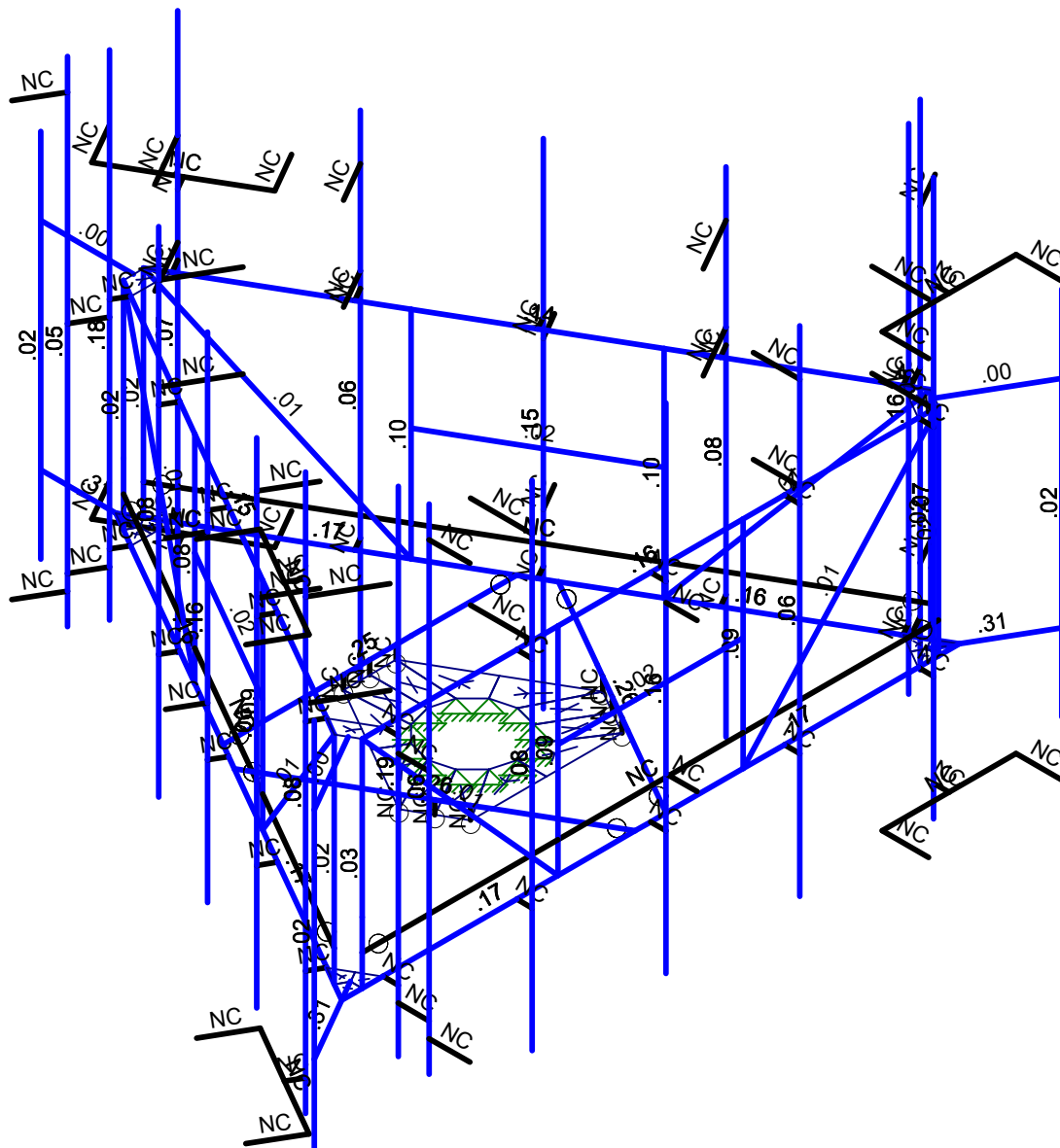
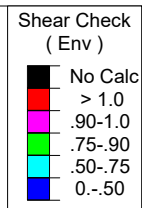
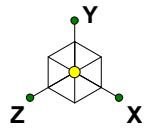


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 	.90-1.0
 	.75-.90
 	.50-.75
 	0-.50



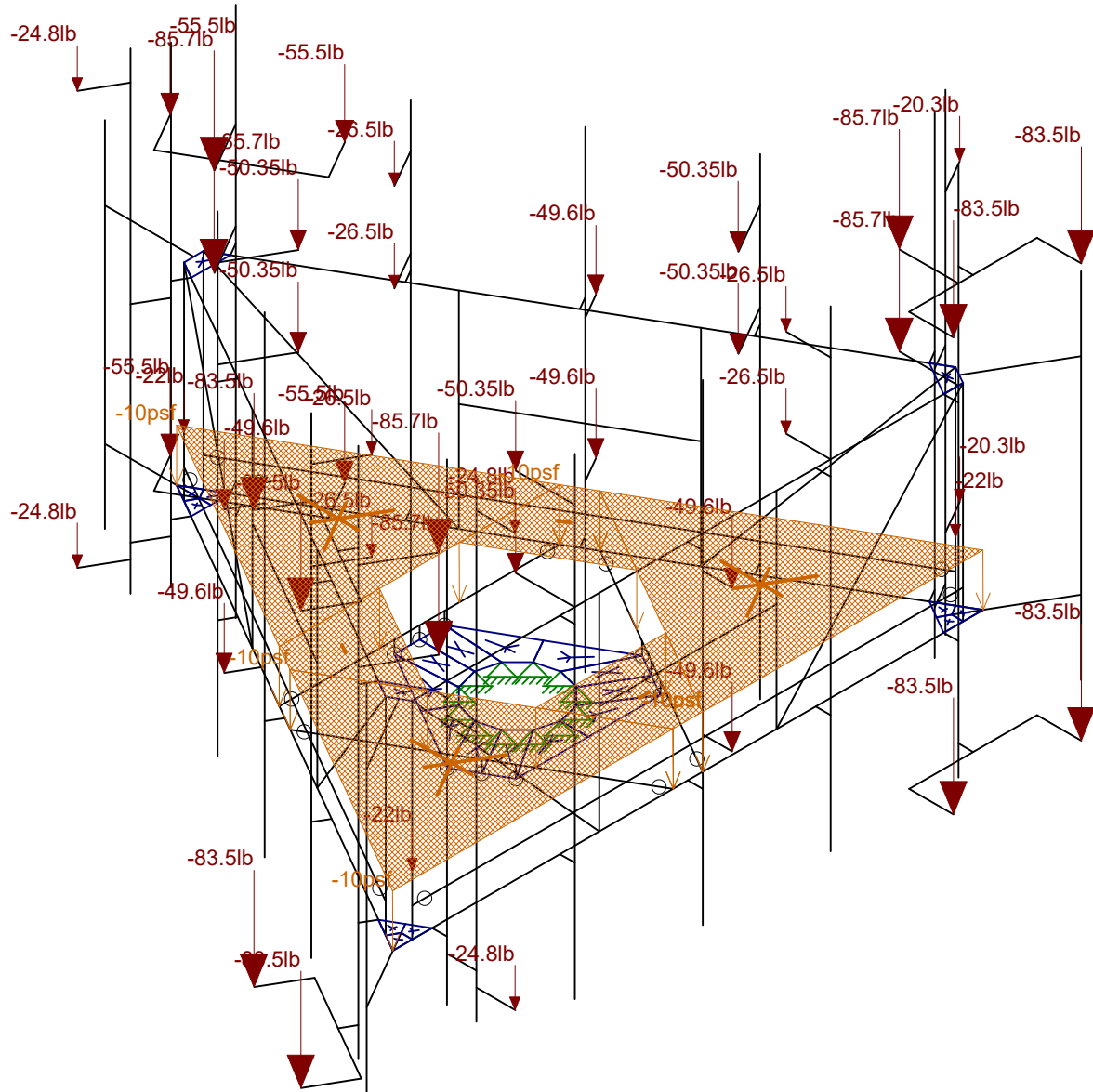
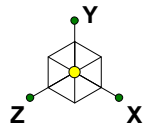
Member Code Checks Displayed (Enveloped)
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Black & Veatch Corp.	45545ATTMO9-P	SK - 3
Assada W.		Mar 6, 2021 at 11:37 PM
129331.1183		45545ATTMO9-P RISA Model.r3d



Member Shear Checks Displayed (Enveloped)
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Black & Veatch Corp.	45545ATTMO9-P	SK - 4
Assada W.		Mar 6, 2021 at 11:37 PM
129331.1183		45545ATTMO9-P RISA Model.r3d



Loads: BLC 1, DL
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Black & Veatch Corp.	45545ATTMO9-P	SK - 5
Assada W.		Mar 6, 2021 at 11:38 PM
129331.1183		45545ATTMO9-P RISA Model.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISACONNECTION CODE	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

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

(Global) Model Settings, Continued

Seismic Code	None
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2

General Material Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[k/ft^3]
1	gen Steel	29000	11154	.3	.65	.49
2	RIGID	1e+6		.3	0	0

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Perimeter	C5X9	Beam	Channel	A36 Gr.36	Typical	2.64	.624	8.89	.109
2	Arm	C5X9	Beam	Channel	A36 Gr.36	Typical	2.64	.624	8.89	.109
3	Support Rail	L3X3X6	Beam	Single Angle	A36 Gr.36	Typical	2.11	1.75	1.75	.101
4	Corner Extension	L3X3X6	Beam	Single Angle	A36 Gr.36	Typical	2.11	1.75	1.75	.101
5	Support Rail Bracing	L1.75x1.75x4	VBrace	Single Angle	A36 Gr.36	Typical	.813	.227	.227	.015
6	Mount Pipe1	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
7	Mount Pipe2	PIPE_3.0	Column	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
8	Kick Plate	PL6x1/4	Beam	RECT	A36 Gr.36	Typical	1.5	.008	4.5	.03

General Section Sets

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

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N186	Reaction	Reaction	Reaction			
2	N188	Reaction	Reaction	Reaction			
3	N187	Reaction	Reaction	Reaction			
4	N204	Reaction	Reaction	Reaction			
5	N205	Reaction	Reaction	Reaction			
6	N206	Reaction	Reaction	Reaction			
7	N210	Reaction	Reaction	Reaction			
8	N211	Reaction	Reaction	Reaction			
9	N212	Reaction	Reaction	Reaction			
10	N213	Reaction	Reaction	Reaction			
11	N214	Reaction	Reaction	Reaction			
12	N215	Reaction	Reaction	Reaction			

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N3	N1		180	Perimeter	Beam	Channel	A36 Gr.36	Typical
2	M2	N1	N2		180	Perimeter	Beam	Channel	A36 Gr.36	Typical
3	M3	N53	N47			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
4	M4	N47	N50		180	Support Rail	Beam	Single Angle	A36 Gr.36	Typical
5	M5	N8	N9			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
6	M6	N47	N9		180	Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
7	M7	N6	N7			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
8	M8	N50	N7			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
9	M9	N11	N10		180	Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
10	M10	N18	N19			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
11	M11	N20	N21		180	Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
12	M12	N3	N12			Perimeter	Beam	Channel	A36 Gr.36	Typical
13	M13	N12	N13			Perimeter	Beam	Channel	A36 Gr.36	Typical
14	M14	N48	N51		90	Support Rail	Beam	Single Angle	A36 Gr.36	Typical
15	M15	N48	N19			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
16	M16	N16	N17			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
17	M17	N51	N17		180	Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
18	M18	N57	N51			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
19	M19	N49	N52		90	Support Rail	Beam	Single Angle	A36 Gr.36	Typical
20	M20	N2	N22		180	Perimeter	Beam	Channel	A36 Gr.36	Typical
21	M21	N22	N13		180	Perimeter	Beam	Channel	A36 Gr.36	Typical
22	M22	N56	N50			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
23	M23	N29	N30			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
24	M24	N52	N30		180	Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
25	M25	N27	N28			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
26	M26	N49	N28			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
27	M27	N32	N31		180	Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
28	M28	N24	N15			Arm	Beam	Channel	A36 Gr.36	Typical
29	M29	N14	N4			Arm	Beam	Channel	A36 Gr.36	Typical
30	M30	N5	N23			Arm	Beam	Channel	A36 Gr.36	Typical
31	M31	N54	N48			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
32	M32	N58	N52			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
33	M33	N55	N49			Support Rail B...	VBrace	Single Angle	A36 Gr.36	Typical
34	M34	N61	N60			Mount Pipe2	Column	Pipe	A53 Gr.B	Typical
35	M35	N63	N62			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
36	M36	N65	N64			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
37	M37	N67	N66			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
38	M38	N78	N79		270	Corner Extensi...	Beam	Single Angle	A36 Gr.36	Typical
39	M39	N224	N81		90	Corner Extensi...	Beam	Single Angle	A36 Gr.36	Typical
40	M40	N82	N80			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
41	M41	N75	N36			RIGID	None	None	RIGID	Typical
42	M42	N76	N37			RIGID	None	None	RIGID	Typical
43	M43	N22	N68			RIGID	None	None	RIGID	Typical
44	M44	N69	N25			RIGID	None	None	RIGID	Typical
45	M45	N73	N34			RIGID	None	None	RIGID	Typical
46	M46	N74	N35			RIGID	None	None	RIGID	Typical
47	M47	N70	N26			RIGID	None	None	RIGID	Typical
48	M48	N72	N33			RIGID	None	None	RIGID	Typical
49	M49	N91	N90			Mount Pipe2	Column	Pipe	A53 Gr.B	Typical
50	M50	N93	N92			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
51	M51	N95	N94			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
52	M52	N97	N96			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
53	M53	N105	N88			RIGID	None	None	RIGID	Typical
54	M54	N106	N89			RIGID	None	None	RIGID	Typical
55	M55	N12	N98			RIGID	None	None	RIGID	Typical
56	M56	N99	N83			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
57	M57	N103	N86			RIGID	None	None	RIGID	Typical
58	M58	N104	N87			RIGID	None	None	RIGID	Typical
59	M59	N100	N84			RIGID	None	None	RIGID	Typical
60	M60	N102	N85			RIGID	None	None	RIGID	Typical
61	M61	N117	N116			Mount Pipe2	Column	Pipe	A53 Gr.B	Typical
62	M62	N121	N120			RIGID	None	None	RIGID	Typical
63	M63	N119	N118			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
64	M64	N123	N122			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
65	M65	N125	N124			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
66	M66	N129	N128			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
67	M67	N127	N126			RIGID	None	None	RIGID	Typical
68	M68	N133	N110			RIGID	None	None	RIGID	Typical
69	M69	N137	N114			RIGID	None	None	RIGID	Typical
70	M70	N138	N115			RIGID	None	None	RIGID	Typical
71	M71	N1	N130			RIGID	None	None	RIGID	Typical
72	M72	N131	N108			RIGID	None	None	RIGID	Typical
73	M73	N135	N112			RIGID	None	None	RIGID	Typical
74	M74	N136	N113			RIGID	None	None	RIGID	Typical
75	M75	N132	N109			RIGID	None	None	RIGID	Typical
76	M76	N134	N111			RIGID	None	None	RIGID	Typical
77	M77	N141	N140			RIGID	None	None	RIGID	Typical
78	M78	N143	N142			RIGID	None	None	RIGID	Typical
79	M79	N144	N145			RIGID	None	None	RIGID	Typical
80	M80	N146	N147			RIGID	None	None	RIGID	Typical
81	M81	N148	N149			RIGID	None	None	RIGID	Typical
82	M82	N150	N151			RIGID	None	None	RIGID	Typical
83	M83	N153	N152			RIGID	None	None	RIGID	Typical
84	M84	N155	N154			RIGID	None	None	RIGID	Typical
85	M85	N126	N152			RIGID	None	None	RIGID	Typical
86	M86	N140	N154			RIGID	None	None	RIGID	Typical
87	M87	N158	N159		270	Corner Extensi...	Beam	Single Angle	A36 Gr.36	Typical
88	M88	N226	N161		90	Corner Extensi...	Beam	Single Angle	A36 Gr.36	Typical
89	M89	N162	N160			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
90	M90	N163	N164		270	Corner Extensi...	Beam	Single Angle	A36 Gr.36	Typical
91	M91	N228	N166		90	Corner Extensi...	Beam	Single Angle	A36 Gr.36	Typical
92	M92	N167	N165			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
93	M93	N168	N169			RIGID	None	None	RIGID	Typical
94	M94	N170	N171			RIGID	None	None	RIGID	Typical
95	M95	N172	N173			Kick Plate	Beam	RECT	A36 Gr.36	Typical
96	M96	N174	N175			Kick Plate	Beam	RECT	A36 Gr.36	Typical
97	M97	N176	N177			Kick Plate	Beam	RECT	A36 Gr.36	Typical
98	M98	N156	N184			RIGID	None	None	RIGID	Typical
99	M99	N157	N185			RIGID	None	None	RIGID	Typical
100	M100	N201	N44			RIGID	None	None	RIGID	Typical
101	M101	N203	N46			RIGID	None	None	RIGID	Typical
102	M102	N197	N40			RIGID	None	None	RIGID	Typical
103	M103	N200	N43			RIGID	None	None	RIGID	Typical
104	M104	N195	N38			RIGID	None	None	RIGID	Typical
105	M105	N198	N41			RIGID	None	None	RIGID	Typical
106	M106	N202	N45			RIGID	None	None	RIGID	Typical
107	M107	N196	N39			RIGID	None	None	RIGID	Typical
108	M108	N199	N42			RIGID	None	None	RIGID	Typical
109	M109	N217	N216			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
110	M110	N218	N139			RIGID	None	None	RIGID	Typical
111	M111	N222	N219			RIGID	None	None	RIGID	Typical
112	M112	N220	N221			RIGID	None	None	RIGID	Typical
113	M113	N233	N232			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
114	M114	N231	N230			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
115	M115	N71	N229			RIGID	None	None	RIGID	Typical
116	M116	N236	N235			RIGID	None	None	RIGID	Typical
117	M117	N238	N237			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
118	M118	N77	N234			RIGID	None	None	RIGID	Typical
119	M119	N242	N239			RIGID	None	None	RIGID	Typical
120	M120	N240	N241			RIGID	None	None	RIGID	Typical
121	M121	N247	N246			RIGID	None	None	RIGID	Typical
122	M122	N245	N244			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
123	M123	N101	N243			RIGID	None	None	RIGID	Typical
124	M124	N250	N249			RIGID	None	None	RIGID	Typical
125	M125	N252	N251			Mount Pipe1	Column	Pipe	A53 Gr.B	Typical
126	M126	N107	N248			RIGID	None	None	RIGID	Typical
127	M127	N256	N253			RIGID	None	None	RIGID	Typical
128	M128	N254	N255			RIGID	None	None	RIGID	Typical
129	M129	N258	N257			RIGID	None	None	RIGID	Typical
130	M130	N260	N259			RIGID	None	None	RIGID	Typical
131	M131	N262	N261			RIGID	None	None	RIGID	Typical
132	M132	N264	N263			RIGID	None	None	RIGID	Typical
133	M133	N257	N261			RIGID	None	None	RIGID	Typical
134	M134	N259	N263			RIGID	None	None	RIGID	Typical
135	M135	N265	N267			RIGID	None	None	RIGID	Typical
136	M136	N266	N268			RIGID	None	None	RIGID	Typical
137	M137	N270	N269			RIGID	None	None	RIGID	Typical
138	M138	N272	N271			RIGID	None	None	RIGID	Typical
139	M139	N274	N273			RIGID	None	None	RIGID	Typical
140	M140	N276	N275			RIGID	None	None	RIGID	Typical
141	M141	N269	N273			RIGID	None	None	RIGID	Typical
142	M142	N271	N275			RIGID	None	None	RIGID	Typical
143	M143	N277	N279			RIGID	None	None	RIGID	Typical
144	M144	N278	N280			RIGID	None	None	RIGID	Typical
145	M145	N281	N282			RIGID	None	None	RIGID	Typical
146	M146	N283	N284			RIGID	None	None	RIGID	Typical
147	M147	N288	N289			RIGID	None	None	RIGID	Typical
148	M148	N290	N291			RIGID	None	None	RIGID	Typical
149	M149	N292	N293			RIGID	None	None	RIGID	Typical
150	M150	N294	N295			RIGID	None	None	RIGID	Typical
151	M151	N296	N297			RIGID	None	None	RIGID	Typical
152	M152	N298	N299			RIGID	None	None	RIGID	Typical
153	M153	N300	N301			RIGID	None	None	RIGID	Typical
154	M154	N302	N303			RIGID	None	None	RIGID	Typical
155	M155	N304	N305			RIGID	None	None	RIGID	Typical
156	M156	N306	N307			RIGID	None	None	RIGID	Typical
157	M157	N308	N309			RIGID	None	None	RIGID	Typical
158	M158	N310	N311			RIGID	None	None	RIGID	Typical
159	M159	N312	N313			RIGID	None	None	RIGID	Typical
160	M160	N314	N315			RIGID	None	None	RIGID	Typical
161	M161	N316	N317			RIGID	None	None	RIGID	Typical
162	M162	N318	N319			RIGID	None	None	RIGID	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes				None
2	M2						Yes				None
3	M3						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
4	M4						Yes				None
5	M5						Yes	** NA **			None
6	M6						Yes	** NA **			None
7	M7						Yes	** NA **			None
8	M8						Yes	** NA **			None
9	M9						Yes	** NA **			None
10	M10						Yes	** NA **			None
11	M11						Yes	** NA **			None
12	M12						Yes				None
13	M13						Yes				None
14	M14						Yes				None
15	M15						Yes	** NA **			None
16	M16						Yes	** NA **			None
17	M17						Yes	** NA **			None
18	M18						Yes	** NA **			None
19	M19						Yes				None
20	M20						Yes				None
21	M21						Yes				None
22	M22						Yes	** NA **			None
23	M23						Yes	** NA **			None
24	M24						Yes	** NA **			None
25	M25						Yes	** NA **			None
26	M26						Yes	** NA **			None
27	M27						Yes	** NA **			None
28	M28	BenPIN	BenPIN				Yes				None
29	M29	BenPIN	BenPIN				Yes				None
30	M30	BenPIN	BenPIN				Yes				None
31	M31						Yes	** NA **			None
32	M32						Yes	** NA **			None
33	M33						Yes	** NA **			None
34	M34						Yes	** NA **			None
35	M35						Yes	** NA **			None
36	M36						Yes	** NA **			None
37	M37						Yes	** NA **			None
38	M38						Yes				None
39	M39						Yes				None
40	M40						Yes	** NA **			None
41	M41						Yes	** NA **			None
42	M42						Yes	** NA **			None
43	M43						Yes	** NA **			None
44	M44						Yes	** NA **			None
45	M45						Yes	** NA **			None
46	M46						Yes	** NA **			None
47	M47						Yes	** NA **			None
48	M48						Yes	** NA **			None
49	M49						Yes	** NA **			None
50	M50						Yes	** NA **			None
51	M51						Yes	** NA **			None
52	M52						Yes	** NA **			None
53	M53						Yes	** NA **			None
54	M54						Yes	** NA **			None
55	M55						Yes	** NA **			None
56	M56						Yes	** NA **			None
57	M57						Yes	** NA **			None
58	M58						Yes	** NA **			None
59	M59						Yes	** NA **			None
60	M60						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
61	M61						Yes	** NA **			None
62	M62						Yes	** NA **			None
63	M63						Yes	** NA **			None
64	M64						Yes	** NA **			None
65	M65						Yes	** NA **			None
66	M66						Yes	** NA **			None
67	M67						Yes	** NA **			None
68	M68						Yes	** NA **			None
69	M69						Yes	** NA **			None
70	M70						Yes	** NA **			None
71	M71						Yes	** NA **			None
72	M72						Yes	** NA **			None
73	M73						Yes	** NA **			None
74	M74						Yes	** NA **			None
75	M75						Yes	** NA **			None
76	M76						Yes	** NA **			None
77	M77						Yes	** NA **			None
78	M78						Yes	** NA **			None
79	M79						Yes	** NA **			None
80	M80						Yes	** NA **			None
81	M81						Yes	** NA **			None
82	M82						Yes	** NA **			None
83	M83						Yes	** NA **			None
84	M84						Yes	** NA **			None
85	M85						Yes	** NA **			None
86	M86						Yes	** NA **			None
87	M87						Yes				None
88	M88						Yes				None
89	M89						Yes	** NA **			None
90	M90						Yes				None
91	M91						Yes				None
92	M92						Yes	** NA **			None
93	M93						Yes	** NA **			None
94	M94						Yes	** NA **			None
95	M95	BenPIN	BenPIN				Yes			Exclude	None
96	M96	BenPIN	BenPIN				Yes			Exclude	None
97	M97	BenPIN	BenPIN				Yes			Exclude	None
98	M98						Yes	** NA **			None
99	M99						Yes	** NA **			None
100	M100	BenPIN					Yes	** NA **			None
101	M101	BenPIN					Yes	** NA **			None
102	M102	BenPIN					Yes	** NA **			None
103	M103	BenPIN					Yes	** NA **			None
104	M104	BenPIN					Yes	** NA **			None
105	M105	BenPIN					Yes	** NA **			None
106	M106	BenPIN					Yes	** NA **			None
107	M107	BenPIN					Yes	** NA **			None
108	M108	BenPIN					Yes	** NA **			None
109	M109						Yes	** NA **			None
110	M110						Yes	** NA **			None
111	M111						Yes	** NA **			None
112	M112						Yes	** NA **			None
113	M113						Yes	** NA **			None
114	M114						Yes	** NA **			None
115	M115						Yes	** NA **			None
116	M116						Yes	** NA **			None
117	M117						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
118	M118						Yes	** NA **			None
119	M119						Yes	** NA **			None
120	M120						Yes	** NA **			None
121	M121						Yes	** NA **			None
122	M122						Yes	** NA **			None
123	M123						Yes	** NA **			None
124	M124						Yes	** NA **			None
125	M125						Yes	** NA **			None
126	M126						Yes	** NA **			None
127	M127						Yes	** NA **			None
128	M128						Yes	** NA **			None
129	M129						Yes	** NA **			None
130	M130						Yes	** NA **			None
131	M131						Yes	** NA **			None
132	M132						Yes	** NA **			None
133	M133						Yes	** NA **			None
134	M134						Yes	** NA **			None
135	M135						Yes	** NA **			None
136	M136						Yes	** NA **			None
137	M137						Yes	** NA **			None
138	M138						Yes	** NA **			None
139	M139						Yes	** NA **			None
140	M140						Yes	** NA **			None
141	M141						Yes	** NA **			None
142	M142						Yes	** NA **			None
143	M143						Yes	** NA **			None
144	M144						Yes	** NA **			None
145	M145						Yes	** NA **			None
146	M146						Yes	** NA **			None
147	M147						Yes	** NA **			None
148	M148						Yes	** NA **			None
149	M149						Yes	** NA **			None
150	M150						Yes	** NA **			None
151	M151						Yes	** NA **			None
152	M152						Yes	** NA **			None
153	M153						Yes	** NA **			None
154	M154						Yes	** NA **			None
155	M155						Yes	** NA **			None
156	M156						Yes	** NA **			None
157	M157						Yes	** NA **			None
158	M158						Yes	** NA **			None
159	M159						Yes	** NA **			None
160	M160						Yes	** NA **			None
161	M161						Yes	** NA **			None
162	M162						Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Funci...
1	M1	Perimeter	5									Lateral
2	M2	Perimeter	5									Lateral
3	M3	Support Rail Bracing	3.5									Lateral
4	M4	Support Rail	9.33		2.167							Lateral
5	M5	Support Rail Bracing	3.5									Lateral
6	M6	Support Rail Bracing	4.722									Lateral
7	M7	Support Rail Bracing	3.5									Lateral

Hot Rolled Steel Design Parameters (Continued)

Label	Shape	Length[ft]	Lbvy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Funci...
8	M8	Support Rail Bracing	4.715								Lateral
9	M9	Support Rail Bracing	3								Lateral
10	M10	Support Rail Bracing	3.5								Lateral
11	M11	Support Rail Bracing	3								Lateral
12	M12	Perimeter	5								Lateral
13	M13	Perimeter	5								Lateral
14	M14	Support Rail	9.33	2.167							Lateral
15	M15	Support Rail Bracing	4.722								Lateral
16	M16	Support Rail Bracing	3.5								Lateral
17	M17	Support Rail Bracing	4.715								Lateral
18	M18	Support Rail Bracing	3.5								Lateral
19	M19	Support Rail	9.33	2.167							Lateral
20	M20	Perimeter	5								Lateral
21	M21	Perimeter	5								Lateral
22	M22	Support Rail Bracing	3.5								Lateral
23	M23	Support Rail Bracing	3.5								Lateral
24	M24	Support Rail Bracing	4.715								Lateral
25	M25	Support Rail Bracing	3.5								Lateral
26	M26	Support Rail Bracing	4.722								Lateral
27	M27	Support Rail Bracing	3								Lateral
28	M28	Arm	4.75								Lateral
29	M29	Arm	4.75								Lateral
30	M30	Arm	4.75								Lateral
31	M31	Support Rail Bracing	3.5								Lateral
32	M32	Support Rail Bracing	3.5								Lateral
33	M33	Support Rail Bracing	3.5								Lateral
34	M34	Mount Pipe2	9								Lateral
35	M35	Mount Pipe1	8								Lateral
36	M36	Mount Pipe1	8								Lateral
37	M37	Mount Pipe1	8								Lateral
38	M38	Corner Extension	1.5								Lateral
39	M39	Corner Extension	1.599								Lateral
40	M40	Mount Pipe1	6								Lateral
41	M49	Mount Pipe2	9								Lateral
42	M50	Mount Pipe1	8								Lateral
43	M51	Mount Pipe1	8								Lateral
44	M52	Mount Pipe1	8								Lateral
45	M61	Mount Pipe2	9								Lateral
46	M63	Mount Pipe1	8								Lateral
47	M64	Mount Pipe1	8								Lateral
48	M65	Mount Pipe1	8								Lateral
49	M66	Mount Pipe1	8								Lateral
50	M87	Corner Extension	1.5								Lateral
51	M88	Corner Extension	1.599								Lateral
52	M89	Mount Pipe1	6								Lateral
53	M90	Corner Extension	1.504								Lateral
54	M91	Corner Extension	1.599								Lateral
55	M92	Mount Pipe1	6								Lateral
56	M95	Kick Plate	9.33		3.17						Lateral
57	M96	Kick Plate	9.33		3.17						Lateral
58	M97	Kick Plate	9.33		3.17						Lateral
59	M109	Mount Pipe1	8								Lateral
60	M114	Mount Pipe1	8								Lateral
61	M117	Mount Pipe1	8								Lateral
62	M122	Mount Pipe1	8								Lateral
63	M125	Mount Pipe1	8								Lateral

Member Area Loads (BLC 1 : DL)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N3	N14	N4		Y	Two Way	-10
2	N5	N2	N23		Y	Two Way	-10
3	N13	N15	N24		Y	Two Way	-10
4	N24	N23	N194	N189	Y	A-B	-10
5	N14	N15	N190	N191	Y	A-B	-10
6	N5	N4	N192	N193	Y	A-B	-10

Member Area Loads (BLC 28 : Ice DL)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N3	N14	N4		Y	A-B	-8.139
2	N5	N2	N23		Y	A-B	-8.139
3	N13	N15	N24		Y	A-B	-8.139
4	N24	N23	N194	N189	Y	A-B	-8.139
5	N14	N15	N190	N191	Y	Two Way	-8.139
6	N5	N4	N192	N193	Y	Two Way	-8.139

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Me...	Surface(...
1	DL	DL		-1		57		6	
2	Maintenance LL - LV	LL				1			
3	Installation LL - LM	LL				1			
4	Wind - 0 Deg (X)	WL				57		60	
5	Wind - 30 Deg (X)	WL				57		60	
6	Wind - 60 Deg (X)	WL				57		60	
7	Wind - 90 Deg (X)	WL				57		60	
8	Wind - 120 Deg (X)	WL				57		60	
9	Wind - 150 Deg (X)	WL				57		60	
10	Wind - 180 Deg (X)	WL				57		60	
11	Wind - 210 Deg (X)	WL				57		60	
12	Wind - 240 Deg (X)	WL				57		60	
13	Wind - 270 Deg (X)	WL				57		60	
14	Wind - 300 Deg (X)	WL				57		60	
15	Wind - 330 Deg (X)	WL				57		60	
16	Wind - 0 Deg (Z)	WL				57		60	
17	Wind - 30 Deg (Z)	WL				57		60	
18	Wind - 60 Deg (Z)	WL				57		60	
19	Wind - 90 Deg (Z)	WL				57		60	
20	Wind - 120 Deg (Z)	WL				57		60	
21	Wind - 150 Deg (Z)	WL				57		60	
22	Wind - 180 Deg (Z)	WL				57		60	
23	Wind - 210 Deg (Z)	WL				57		60	
24	Wind - 240 Deg (Z)	WL				57		60	
25	Wind - 270 Deg (Z)	WL				57		60	
26	Wind - 300 Deg (Z)	WL				57		60	
27	Wind - 330 Deg (Z)	WL				57		60	
28	Ice DL	DL				57		60	6
29	Ice Wind - 0 Deg (X)	WL				57		60	
30	Ice Wind - 30 Deg (X)	WL				57		60	
31	Ice Wind - 60 Deg (X)	WL				57		60	
32	Ice Wind - 90 Deg (X)	WL				57		60	
33	Ice Wind - 120 Deg (X)	WL				57		60	
34	Ice Wind - 150 Deg (X)	WL				57		60	
35	Ice Wind - 180 Deg (X)	WL				57		60	
36	Ice Wind - 210 Deg (X)	WL				57		60	

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area (Me...	Surface (...
37	Ice Wind - 240 Deg (X)	WL				57		60	
38	Ice Wind - 270 Deg (X)	WL				57		60	
39	Ice Wind - 300 Deg (X)	WL				57		60	
40	Ice Wind - 330 Deg (X)	WL				57		60	
41	Ice Wind - 0 Deg (Z)	WL				57		60	
42	Ice Wind - 30 Deg (Z)	WL				57		60	
43	Ice Wind - 60 Deg (Z)	WL				57		60	
44	Ice Wind - 90 Deg (Z)	WL				57		60	
45	Ice Wind - 120 Deg (Z)	WL				57		60	
46	Ice Wind - 150 Deg (Z)	WL				57		60	
47	Ice Wind - 180 Deg (Z)	WL				57		60	
48	Ice Wind - 210 Deg (Z)	WL				57		60	
49	Ice Wind - 240 Deg (Z)	WL				57		60	
50	Ice Wind - 270 Deg (Z)	WL				57		60	
51	Ice Wind - 300 Deg (Z)	WL				57		60	
52	Ice Wind - 330 Deg (Z)	WL				57		60	
53	BLC 1 Transient Area Loads	None						74	
54	BLC 28 Transient Area Loads	None						74	

Load Combinations

	Description	So...	P...	...	BLC Factor	BLC Factor	BLC Factor	BLC Factor	...	...	...	...	...	...	...	...	...	...	...	...
1	WIND LOAD COMBOS (109 MPH)																			
2	1.2DL + WL (0 DEG)	Yes	Y		1	1.2	4	1	16	1										
3	1.2DL + WL (30 DEG)	Yes	Y		1	1.2	5	1	17	1										
4	1.2DL + WL (60 DEG)	Yes	Y		1	1.2	6	1	18	1										
5	1.2DL + WL (90 DEG)	Yes	Y		1	1.2	7	1	19	1										
6	1.2DL + WL (120 DEG)	Yes	Y		1	1.2	8	1	20	1										
7	1.2DL + WL (150 DEG)	Yes	Y		1	1.2	9	1	21	1										
8	1.2DL + WL (180 DEG)	Yes	Y		1	1.2	10	1	22	1										
9	1.2DL + WL (210 DEG)	Yes	Y		1	1.2	11	1	23	1										
10	1.2DL + WL (240 DEG)	Yes	Y		1	1.2	12	1	24	1										
11	1.2DL + WL (270 DEG)	Yes	Y		1	1.2	13	1	25	1										
12	1.2DL + WL (300 DEG)	Yes	Y		1	1.2	14	1	26	1										
13	1.2DL + WL (330 DEG)	Yes	Y		1	1.2	15	1	27	1										
14																				
15	MOUNT LOAD COMBOS (30 MPH)																			
16	1.4DL	Yes	Y		1	1.4														
17	1.2DL + 1.5LV	Yes	Y		1	1.2	2	1.5												
18	1.2DL + 1.5LM + WL (0 DEG)	Yes	Y		1	1.2	3	1.5	4	.076	16	.076								
19	1.2DL + 1.5LM + WL (30 DEG)	Yes	Y		1	1.2	3	1.5	5	.076	17	.076								
20	1.2DL + 1.5LM + WL (60 DEG)	Yes	Y		1	1.2	3	1.5	6	.076	18	.076								
21	1.2DL + 1.5LM + WL (90 DEG)	Yes	Y		1	1.2	3	1.5	7	.076	19	.076								
22	1.2DL + 1.5LM + WL (120 DEG)	Yes	Y		1	1.2	3	1.5	8	.076	20	.076								
23	1.2DL + 1.5LM + WL (150 DEG)	Yes	Y		1	1.2	3	1.5	9	.076	21	.076								
24	1.2DL + 1.5LM + WL (180 DEG)	Yes	Y		1	1.2	3	1.5	10	.076	22	.076								
25	1.2DL + 1.5LM + WL (210 DEG)	Yes	Y		1	1.2	3	1.5	11	.076	23	.076								
26	1.2DL + 1.5LM + WL (240 DEG)	Yes	Y		1	1.2	3	1.5	12	.076	24	.076								
27	1.2DL + 1.5LM + WL (270 DEG)	Yes	Y		1	1.2	3	1.5	13	.076	25	.076								
28	1.2DL + 1.5LM + WL (300 DEG)	Yes	Y		1	1.2	3	1.5	14	.076	26	.076								
29	1.2DL + 1.5LM + WL (330 DEG)	Yes	Y		1	1.2	3	1.5	15	.076	27	.076								
30																				
31	ICE LOAD COMBOS (1.5", 40 MPH)																			
32	1.2DL + Ice DL + Ice WL (0 DEG)	Yes	Y		1	1.2	28	1	29	1	41	1								
33	1.2DL + Ice DL + Ice WL (30 DEG)	Yes	Y		1	1.2	28	1	30	1	42	1								
34	1.2DL + Ice DL + Ice WL (60 DEG)	Yes	Y		1	1.2	28	1	31	1	43	1								

Load Combinations (Continued)

	Description	So...	P...	...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	...	...	...	...	...	...	...	...
35	1.2DL + Ice DL + Ice WL (90 DEG)	Yes	Y		1	1.2	28	1	32	1	44	1								
36	1.2DL + Ice DL + Ice WL (120 DEG)	Yes	Y		1	1.2	28	1	33	1	45	1								
37	1.2DL + Ice DL + Ice WL (150 DEG)	Yes	Y		1	1.2	28	1	34	1	46	1								
38	1.2DL + Ice DL + Ice WL (180 DEG)	Yes	Y		1	1.2	28	1	35	1	47	1								
39	1.2DL + Ice DL + Ice WL (210 DEG)	Yes	Y		1	1.2	28	1	36	1	48	1								
40	1.2DL + Ice DL + Ice WL (240 DEG)	Yes	Y		1	1.2	28	1	37	1	49	1								
41	1.2DL + Ice DL + Ice WL (270 DEG)	Yes	Y		1	1.2	28	1	38	1	50	1								
42	1.2DL + Ice DL + Ice WL (300 DEG)	Yes	Y		1	1.2	28	1	39	1	51	1								
43	1.2DL + Ice DL + Ice WL (330 DEG)	Yes	Y		1	1.2	28	1	40	1	52	1								
44																				

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N186	max	62.218	8	16249.577	2	5376.937	5	0	43	0	43	0	43
2		min	-778.888	32	-8344.068	8	-5482.401	11	0	2	0	2	0	2
3	N188	max	4786.927	3	16899.022	6	2415.136	3	0	43	0	43	0	43
4		min	-4745.236	9	-7710.88	12	-3081.298	9	0	2	0	2	0	2
5	N187	max	4949.425	13	17126.65	10	3149.661	7	0	43	0	43	0	43
6		min	-4821.601	7	-7335.702	4	-2504.869	13	0	2	0	2	0	2
7	N204	max	1370.42	4	27796.929	12	1601.688	13	0	43	0	43	0	43
8		min	-1290.62	10	-23071.559	6	-1741	7	0	2	0	2	0	2
9	N205	max	1651.173	8	29110.672	8	1240.923	5	0	43	0	43	0	43
10		min	-1789.431	2	-21776.696	2	-1254.881	11	0	2	0	2	0	2
11	N206	max	1307.874	12	26998.867	4	1698.104	9	0	43	0	43	0	43
12		min	-1234.184	6	-23536.881	10	-1542.862	3	0	2	0	2	0	2
13	N210	max	825.703	4	8087.126	5	-11.858	3	0	43	0	43	0	43
14		min	-610.28	10	-13473.003	11	-124.68	39	0	2	0	2	0	2
15	N211	max	454.84	7	7854.591	13	826.049	6	0	43	0	43	0	43
16		min	-507.431	13	-13902.556	7	-787.211	13	0	2	0	2	0	2
17	N212	max	367.813	3	8596.141	9	796.631	9	0	43	0	43	0	43
18		min	-409.226	9	-12954.921	3	-553.925	3	0	2	0	2	0	2
19	N213	max	452.145	13	8451.696	7	751.107	13	0	43	0	43	0	43
20		min	-448.933	7	-13240.773	13	-910.396	7	0	2	0	2	0	2
21	N214	max	370.244	10	7644.627	3	704.614	4	0	43	0	43	0	43
22		min	-446.492	4	-13902.441	9	-729.49	10	0	2	0	2	0	2
23	N215	max	850.392	11	8354.216	11	145.658	37	0	43	0	43	0	43
24		min	-542.028	5	-13140.128	5	9.462	13	0	2	0	2	0	2
25	Totals:	max	7931.047	2	13637.738	32	7902.657	5						
26		min	-7931.042	8	5561.352	8	-7902.657	11						

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

Member	Shape	Code C...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-...	phi*Mn z-...	Cb	Eqn
1	M1	C5X9	.556	4.74	6	.168	5	z	11	38364.006	85536	1909.122	11853	2.... H1-1b
2	M2	C5X9	.504	.26	10	.174	0	z	5	38364.193	85536	1909.122	11853	2.... H1-1b
3	M3	L1.75x1.75x4	.132	0	12	.029	.474	z	12	11864.666	26325	512.686	1177.265	2.... H2-1
4	M4	L3X3X6	.271	.292	3	.155	9.33	z	10	12836.564	68364	2307.398	4883.051	1.... H2-1
5	M5	L1.75x1.75x4	.336	3.5	6	.091	3.026	z	8	11864.666	26325	512.686	1177.265	3.... H2-1
6	M6	L1.75x1.75x4	.675	2.066	7	.007	0	z	8	6660.931	26325	512.686	1043.26	1.... H2-1
7	M7	L1.75x1.75x4	.373	3.5	9	.093	3.5	z	9	11864.666	26325	512.686	1177.265	2.... H2-1
8	M8	L1.75x1.75x4	.668	1.474	9	.008	0	z	12	6679.893	26325	512.686	1103.123	1.... H2-1
9	M9	L1.75x1.75x4	.110	0	11	.017	0	y	11	14658.225	26325	512.686	1177.265	2.... H2-1
10	M10	L1.75x1.75x4	.333	3.5	13	.089	3.5	y	12	11864.666	26325	512.686	1177.265	1.... H2-1
11	M11	L1.75x1.75x4	.096	0	3	.016	0	y	3	14658.225	26325	512.686	1177.265	2.... H2-1
12	M12	C5X9	.507	4.74	2	.171	5	z	9	38364.053	85536	1909.122	11853	1.... H1-1b

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

	Member	Shape	Code C...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y...	phi*Mn z...	Cb	Eqn
13	M13	C5X9	.525	.26	10	.165	0	z	3	38364.099	85536	1909.122	11853	1...	H1-1b
14	M14	L3X3X6	.250	.292	9	.145	0	y	2	41486.938	68364	2307.398	5176.577	2...	H2-1
15	M15	L1.75x1.75x4	.664	1.722	13	.007	4.722	y	9	6660.924	26325	512.686	1087.135	1...	H2-1
16	M16	L1.75x1.75x4	.272	3.5	10	.075	3.5	y	8	11864.666	26325	512.686	1156.573	1...	H2-1
17	M17	L1.75x1.75x4	.650	1.572	11	.006	4.715	z	11	6679.893	26325	512.686	1058.288	1...	H2-1
18	M18	L1.75x1.75x4	.112	0	12	.022	.474	y	4	11864.666	26325	512.686	1177.265	2...	H2-1
19	M19	L3X3X6	.242	9.038	6	.137	9.038	y	6	41486.938	68364	2307.398	5322.329	2...	H2-1
20	M20	C5X9	.522	4.74	2	.157	5	z	7	38364.146	85536	1909.122	11853	1...	H1-1b
21	M21	C5X9	.479	.26	6	.167	0	z	13	38364.099	85536	1909.122	11853	1...	H1-1b
22	M22	L1.75x1.75x4	.160	0	3	.016	.474	z	10	11864.666	26325	512.686	1177.265	1...	H2-1
23	M23	L1.75x1.75x4	.353	3.5	3	.102	3.5	y	4	11864.666	26325	512.686	1177.265	3...	H2-1
24	M24	L1.75x1.75x4	.622	1.867	3	.006	0	z	5	6679.899	26325	512.686	1050.578	1...	H2-1
25	M25	L1.75x1.75x4	.267	3.5	6	.096	3.026	y	5	11864.666	26325	512.686	1177.265	3...	H2-1
26	M26	L1.75x1.75x4	.637	2.312	5	.005	4.722	y	13	6660.931	26325	512.686	1053.007	1...	H2-1
27	M27	L1.75x1.75x4	.115	0	7	.016	0	y	7	14658.225	26325	512.686	1177.265	2...	H2-1
28	M28	C5X9	.587	2.82	13	.249	2.771	y	13	41483.638	85536	1909.122	11853	1...	H1-1b
29	M29	C5X9	.621	2.82	9	.261	2.771	y	9	41483.634	85536	1909.122	11853	1...	H1-1b
30	M30	C5X9	.610	1.93	7	.264	1.979	y	7	41483.643	85536	1909.122	11853	1...	H1-1b
31	M31	L1.75x1.75x4	.161	0	7	.022	0	z	13	11864.666	26325	512.686	1177.265	3...	H2-1
32	M32	L1.75x1.75x4	.131	0	6	.020	0	z	9	11864.666	26325	512.686	1177.265	1...	H2-1
33	M33	L1.75x1.75x4	.124	0	6	.021	0	y	5	11864.666	26325	512.686	1177.265	1...	H2-1
34	M34	PIPE 3.0	.090	3.469	10	.069	3.563		5	42263.948	65205	5748.75	5748.75	2...	H1-1b
35	M35	PIPE 2.0	.157	2.5	40	.077	2.5		7	14916.096	32130	1871.625	1871.625	1...	H1-1b
36	M36	PIPE 2.0	.072	2.5	10	.061	2.5		4	14916.096	32130	1871.625	1871.625	2...	H1-1b
37	M37	PIPE 2.0	.168	6	7	.151	6		7	14916.096	32130	1871.625	1871.625	2...	H1-1b
38	M38	L3X3X6	.011	1.5	43	.001	1.5	z	43	64995.423	68364	2307.398	5322.329	2...	H2-1
39	M39	L3X3X6	.089	.4	10	.312	.4	y	7	64548.576	68364	2307.398	5322.329	1...	H2-1
40	M40	PIPE 2.0	.094	1.25	4	.017	1.25		7	20866.733	32130	1871.625	1871.625	1...	H1-1b
41	M49	PIPE 3.0	.151	3.469	6	.075	3.563		13	42263.948	65205	5748.75	5748.75	2...	H1-1b
42	M50	PIPE 2.0	.157	2.5	36	.077	2.5		9	14916.096	32130	1871.625	1871.625	2...	H1-1b
43	M51	PIPE 2.0	.086	2.5	35	.064	2.5		13	14916.096	32130	1871.625	1871.625	1...	H1-1b
44	M52	PIPE 2.0	.176	6	3	.158	6		3	14916.096	32130	1871.625	1871.625	1...	H1-1b
45	M61	PIPE 3.0	.151	3.469	2	.071	3.563		9	42263.948	65205	5748.75	5748.75	2...	H1-1b
46	M63	PIPE 2.0	.294	3.75	8	.056	3.75		13	14916.096	32130	1871.625	1871.625	2...	H1-1b
47	M64	PIPE 2.0	.163	2.5	32	.077	2.5		7	14916.096	32130	1871.625	1871.625	2...	H1-1b
48	M65	PIPE 2.0	.089	2.5	43	.064	2.5		8	14916.096	32130	1871.625	1871.625	2...	H1-1b
49	M66	PIPE 2.0	.178	6	11	.160	6		11	14916.096	32130	1871.625	1871.625	1...	H1-1b
50	M87	L3X3X6	.011	1.5	39	.001	1.5	z	39	64995.423	68364	2307.398	5322.329	2...	H2-1
51	M88	L3X3X6	.089	.4	6	.312	.4	y	9	64548.576	68364	2307.398	5322.329	1...	H2-1
52	M89	PIPE 2.0	.094	1.25	12	.017	1.25		9	20866.733	32130	1871.625	1871.625	1...	H1-1b
53	M90	L3X3X6	.012	1.504	35	.001	1.504	z	41	64976.427	68364	2307.398	5322.329	2...	H2-1
54	M91	L3X3X6	.089	.4	2	.312	.4	y	11	64548.576	68364	2307.398	5322.329	1...	H2-1
55	M92	PIPE 2.0	.094	1.25	8	.017	1.25		11	20866.733	32130	1871.625	1871.625	1...	H1-1b
56	M109	PIPE 2.0	.221	3.75	7	.185	3.5		12	14916.096	32130	1871.625	1871.625	4...	H1-1b
57	M114	PIPE 2.0	.146	3.75	4	.053	6.5		9	14916.096	32130	1871.625	1871.625	2...	H1-1b
58	M117	PIPE 2.0	.175	3.75	3	.157	3.5		8	14916.096	32130	1871.625	1871.625	2...	H1-1b
59	M122	PIPE 2.0	.293	3.75	12	.054	3.75		5	14916.096	32130	1871.625	1871.625	2...	H1-1b
60	M125	PIPE 2.0	.191	3.75	12	.178	3.5		4	14916.096	32130	1871.625	1871.625	4...	H1-1b



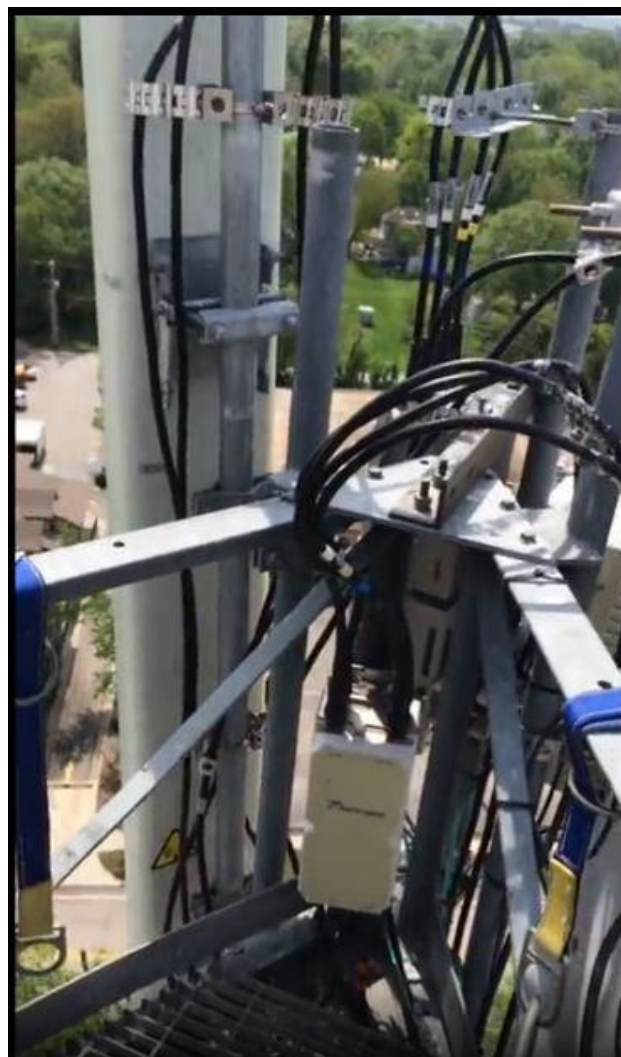
BLACK & VEATCH

March 6, 2021

45545ATTMO9-P

GREEN

**APPENDIX 3:
ATTACHMENTS**

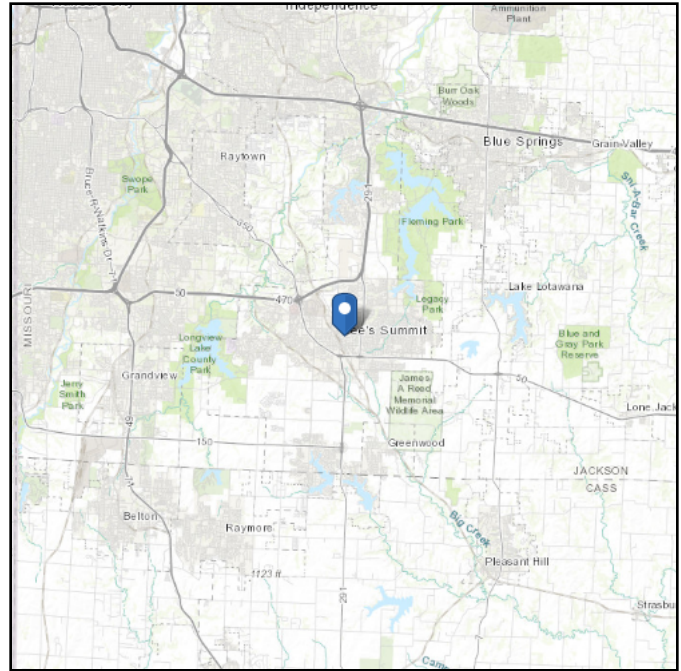
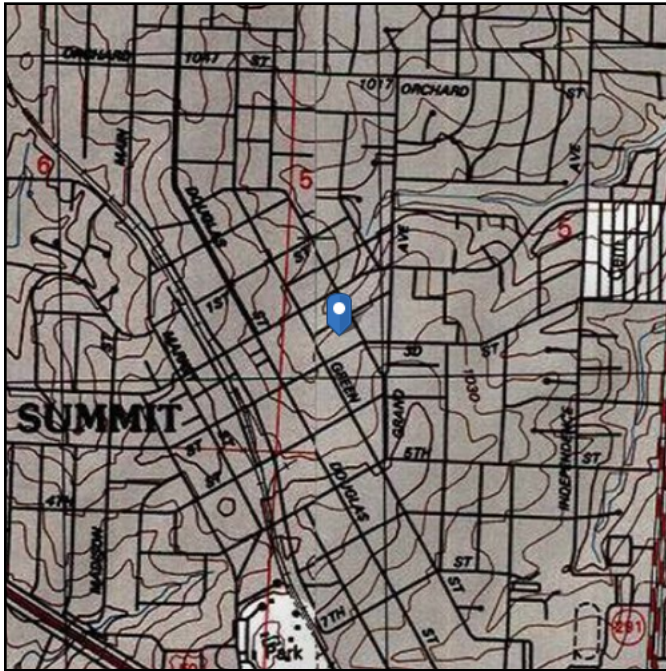


ASCE 7 Hazards Report

Address:
No Address at This
Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 1020.55 ft (NAVD 88)
Latitude: 38.91389
Longitude: -94.37417



Wind

Results:

Wind Speed:	109 Vmph
10-year MRI	76 Vmph
25-year MRI	83 Vmph
50-year MRI	88 Vmph
100-year MRI	94 Vmph

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

Date Accessed: Thu May 02 2019

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 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.

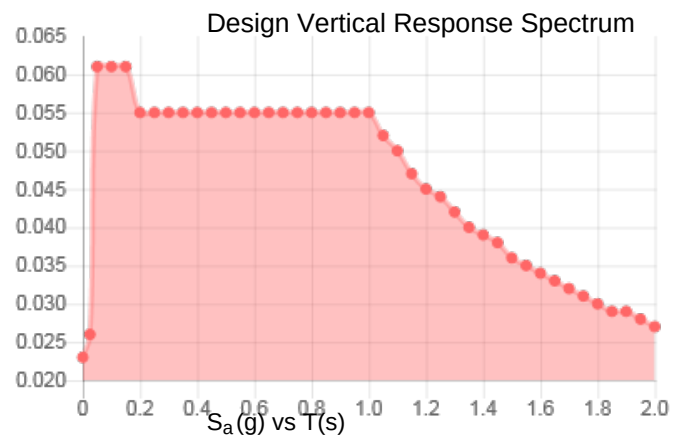
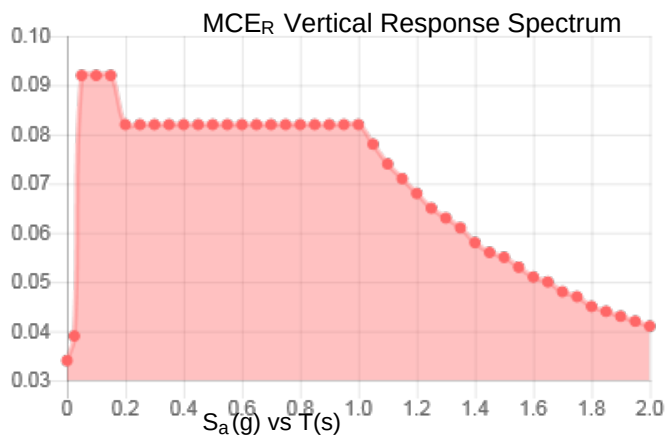
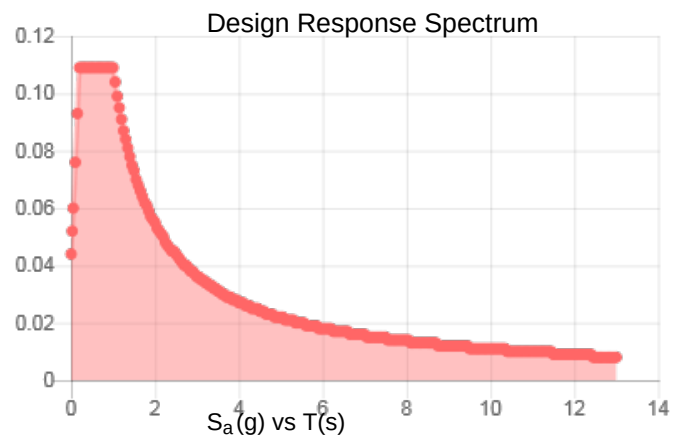
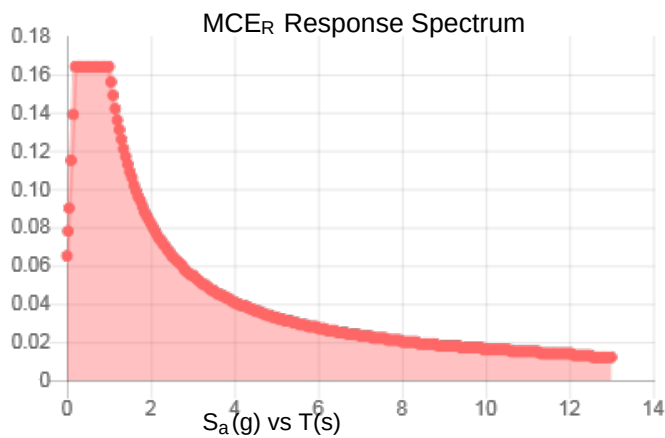
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

Site Soil Class: D - Stiff Soil

Results:

S_S :	0.1	S_{D1} :	0.109
S_1 :	0.068	T_L :	12
F_a :	1.6	PGA :	0.047
F_v :	2.4	PGA _M :	0.076
S_{MS} :	0.16	F_{PGA} :	1.6
S_{M1} :	0.164	I_e :	1
S_{DS} :	0.107	C_v :	0.7

Seismic Design Category B



Data Accessed:

Thu May 02 2019

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: 1.50 in.

Concurrent Temperature: 5 F

Gust Speed: 40 mph

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

Date Accessed: Thu May 02 2019

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

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 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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