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BLACK & VEATCH CORPORATION
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February 9, 2018

ANTENNA MOUNT EVALUATION LETTER

Site Number: 58357 (KS4070)
Site Name: WOODS CHAPEL
Site Address: 1204 Northeast Woods Chapel Road, Lees Summit, MO 64064

Market Name: TURF MOKAN
Project Number: 129039
Project Name: LTE 3C 2018
B&V Work Order: 58357ATTMO2-P

Black & Veatch Corporation is pleased to submit this "Antenna Mount Evaluation Letter" to determine the structural integrity of the above-mentioned antenna mounting system. The purpose of this evaluation is to determine the capacity of the system in supporting the loading in the attached "Antenna Mounting System Loading Summary".

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

Black & Veatch recommends *reinforcing the existing mounting system* or *removing and replacing the mounting system with one of the following systems* (or engineer approved equivalent):

- Valmont / Site Pro 1 RMQP-4096-HK Low Profile Platform w/ 2.5" STD pipes (Heavy 10)

Reinforcements may include – but are not limited to – the following:

- Additional kicker kit and additional Unistrut bracing (see assumptions)
- Additional mount pipe connections to platform channel perimeter
- Additional handrail kit/additional handrail bracings/additional V-Stabilizer kit/additional support bracings

Reinforcements may provide an estimated structural stress ratio between 90% and 100%. Further engineering and detailing is required to design the necessary modifications. *The above reinforcement recommendations should not be considered sufficient without a full analysis.*

After the installation of the reinforcement or proposed replacement, the mounting system will be capable of supporting the existing and proposed equipment, under the following assumptions:

- **The existing antenna mounting system has NOT been reinforced in accordance with Fullerton Engineering Drawing "Antenna Mount Reinforcement" dated 8/12/2014. This reinforcement was not considered in this analysis and may still be required.**
- **All existing/proposed loading shall be centered with the recommended replacement mount centerline (Sector frame center line: located in center between top & bottom boom; Platform center line: located at the base of platform).**
- All existing and proposed structural members are in good condition.
- Contractor shall be responsible for the means and methods of construction.
- Contractor shall inspect the condition of all relevant members and connections and report any deficiencies to the engineer prior to installation of any new antennas and other equipment.

This document was prepared based on information provided to Black & Veatch. 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. If existing conditions do not reflect those represented, this analysis is no longer valid.

Please contact Scott Keffer in our Overland Park Office at 913-458-2483 if you have any questions or comments.

Sincerely,
Black & Veatch Corporation

Prepared By: Jeerawadee Jirapo
Submitted By: Martin Li, P.E.

STRUCTURAL ANALYSIS OF EXISTING ANTENNA MOUNT

58357ATTMO2-P
WOODS CHAPEL (KS4070)
1204 Northeast Woods Chapel Road
Lees Summit, MO 64064

B&V PROJECT NO. 129039
PROJECT NAME: LTE 3C 2018

PREPARED FOR

AT&T
7801 Farley
Overland Park, KS 66204

BLACK & VEATCH CORPORATION
6800 W. 115TH ST., SUITE 2292
OVERLAND PARK, KS 66211

Martin Li, P.E.

February 9, 2018

Antenna Mounting System Loading Summary

General Info

Site Name	WOODS CHAPEL
Site Number	KS4070
FA Number	10000448
Date of Analysis	2/9/2018
Work Order	58357ATTMO2-P
Company Performing Analysis	Black & Veatch Corp.

Final Loading Configuration

Antenna								
Carrier	Position	Sector	Antenna RAD (ft)*	Mount Centerline (ft)*	Quantity	Type	Manufacturer	Model
AT&T	1	A	152	150	1	Panel	Powerwave	P65-16-XLH-RR
AT&T	1	B, C	152	150	2	Panel	Powerwave	P65-17-XLH-RR
AT&T	2, 5	A, B, C	152	150	6	Panel	CSS	XDUO06-80-R
AT&T	3	A, B, C	152	150	3	Panel	Commscope	JAH4-65C-R4
AT&T	2, 5	A, B, C	152	150	6	TMA	Andrew	ETD819G-12UB
AT&T	4	A, B, C	152	150	3	TMA	Powerwave	TT08-19DB111-001
AT&T	1	A, B, C	152	150	3	RRH	Alcatel-Lucent	RRH2x60-1900A-4R
AT&T	3	A, B, C	152	150	3	RRH	Alcatel-Lucent	RRH2x40W-07L
AT&T	4	A, B, C	152	150	3	RRH	Alcatel-Lucent	RRH4x25-WCS-4R
AT&T	Tower	-	-	-	1	Box	Raycap	DC6-48-60-18-8F
AT&T	Tower	-	-	-	1	Box	Raycap	DC6-48-60-0-8C

Definition:

Antenna RAD (ft): Vertical center of the antenna with respect to the ground level.

T-Frame and Truss Platform Mount Centerline (ft): The half distance between the top and bottom face members.

Low Profile Platform Mount Centerline (ft): Located at the base of the platform.

TABLE OF CONTENTS

1. PURPOSE

The purpose of this calculation is to evaluate the existing antenna mount under the existing and proposed loading.

2. REFERENCES

A. American Institute of Steel Construction, AISC 14th Ed.

B. International Building Code, IBC 2012

C. American Society of Civil Engineers, ASCE 7-10

D. Telecommunications Industry Association, TIA-222-G

E. Site Photos

F. Similar Antenna Mount Geometry Mapping Reference (USID: 1013) by HighTower Solutions Inc., dated 12/04/2015

3. ASSUMPTIONS

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.

Member sizes and strengths are accurate as supplied or are assumed as stated in the calculations
In the absence of sufficient design information, all welds and connections are assumed to develop at least the capacity of the connected member, unless otherwise stated in this analysis.

Project Risk Category - II

Other than the statements made above and those mentioned in the following calculations, no major assumptions have been made.

4. FINAL LOADING CONFIGURATION

Antenna / Equipment								
Equipment Owner	Position	Sector	Mount Height (ft)	Antenna RAD (ft)	Type	Quantity	Manufacturer	Model
AT&T	1	A	150	152	Panel	1	Powerwave	P65-16-XLH-RR
AT&T	1	B, C	150	152	Panel	2	Powerwave	P65-17-XLH-RR
AT&T	2, 5	A, B, C	150	152	Panel	6	CSS	XDUO06-80-R
AT&T	3	A, B, C	150	152	Panel	3	Commscope	JAH4-65C-R4
AT&T	2, 5	A, B, C	150	152	TMA	6	Andrew	ETD819G-12UB
AT&T	4	A, B, C	150	152	TMA	3	Powerwave	TT08-19DB111-001
AT&T	1	A, B, C	150	152	RRH	3	Alcatel-Lucent	RRH2x60-1900A-4R
AT&T	3	A, B, C	150	152	RRH	3	Alcatel-Lucent	RRH2x40W-07L
AT&T	4	A, B, C	150	152	RRH	3	Alcatel-Lucent	RRH4x25-WCS-4R
AT&T	Tower	-	-	-	Box	1	Raycap	DC6-48-60-18-8F
AT&T	Tower	-	-	-	Box	1	Raycap	DC6-48-60-0-8C

5. CONCLUSION

Based on our structural evaluation we have determined the existing antenna mounting system to be: INSUFFICIENT.

6. ANALYSIS & DESIGN

6.1 Summary of Analysis Results

Design Criteria

Wind Exposure = C	RAD Elevation = 152 ft.	Topographic Category 1
Ice Thickness = 1 in.	ASCE 7-10 Wind Speed = 115 mph	Qz = 44.94 psf
	ASCE 7-10 Ice Wind Speed = 40 mph	Qz ice = 5.44 psf

Analysis Results (Considering Existing + Proposed Loading)	***Bending Stress Ratio***		***Shear Stress Ratio***	
Perimeter: C5x6.7	69.1%	**Pass**	61.9%	**Pass**
Perimeter Corner Plate: PL9x3/8"	132.2%	**Fail**	66.9%	**Pass**
Arm: HSS4x4x1/4"	138.2%	**Fail**	18.7%	**Pass**
Grating Support: L4x4x1/4"	129.3%	**Fail**	6.3%	**Pass**
Existing Mount Pipe: Pipe 2.0" Std	297.1%	**Fail**	126.5%	**Fail**
Handrail: L3x3x1/4"	195.5%	**Fail**	11.6%	**Pass**
	Weld Stress Ratio		*Base Metal Stress Ratio*	
Weld Checks on node N20 in LC 56:	288.0%	**Fail**	110.4%	**Fail**
	Bolt Tension Stress Ratio		*Bolt Shear Stress Ratio*	
Bolt Checks on node N20 in LC 56:	114.2%	**Fail**	12.2%	**Pass**

6.2 Dead / Live Load

Grating Dead Load:

Grating Dead Load = 10 psf

Equipment Dead Loads:

P65-16-XLH-RR	53	lbs
	26.5	lbs/pt
P65-17-XLH-RR	70	lbs
	35	lbs/pt
XDUO06-80-R	46	lbs
	23	lbs/pt
JAH4-65C-R4	113.9	lbs
	56.95	lbs/pt
ETD819G-12UB	33	lbs
TT08-19DB111-001	22	lbs
RRH2x40W-07L	61	lbs
	30.5	lbs/pt
RRH2x60-1900A-4R	46	lbs
	23	lbs/pt
RRH4x25-WCS-4R	70	lbs
	35	lbs/pt

6.3 Wind Pressure per TIA-222-G

TIA-222-G Section #

a. Velocity Pressure, q_z

Basic Wind Speed, V_{ult} = **115** mph

q_z = 0.00256 Kz Kzt Kd Ka V^2 — 2.6.9.6

= 0.00256 x 1.40 x 1.00 x 0.95 x 1.00 x 115^2

= 44.94 psf

b. Velocity Pressure Coefficient, Kz — 2.6.5.2

K_z = 2.01 $(z/z_g)^{2/\alpha}$ — Exposure Category = **C** — 2.6.5.1

= 2.01 (160 / 900)^(2/9.5)

= 1.40 — Antenna Tip Height above Ground Level, z = **160** ft

$K_{zmin} \le K_z \le 2.01$ — α = 9.50 — Table 2-4

z_g = 900 ft

K_z = 1.40 — K_{zmin} = 0.85

c. Topographic Factor, Kzt — 2.6.6.4

Topographic Category: **(1) Flat or Rolling**

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

= $[1 + 1.0 \times 0.0 / 1.00]^2$ — Height of Crest Above Surrounding Terrain, H = **15** ft

= 1.00

K_h = $e^{(f*z/H)}$ — f = 0 — Table 2-5

= e ^(0.00 x 160/15) — K_t = 0

= 1.00 — K_e = 1.0 — Table 2-4

d. Wind Directionality Factor, Kd

Tubular pole structures, latticed structures with other cross sections, and appurtenances. — Table 2-2

K_d = 0.95

e. Shielding Factor, Ka — 2.6.9.2

K_a = 1

6.3.1 Wind Load

Wind Velocity Pressure @ z = 160 ft $Q_z = 44.94$ psf (based on 115 mph wind)
Gust Effect factor: $G_h = 1.0$

Wind Load on Members

Perimeter: C5x6.7 + 1" of thickness for grating

Depth: $D_p = 6$in
Force Coefficient: $C_a = 2$
Wind Load: $W_a = Q_z G_h C_a D_p = 44.94$ plf

Perimeter Corner Plate: PL9x3/8"

Depth: $D_p = 0.375$ in.
Force Coefficient: $C_a = 2$
Wind Load: $W_a = Q_z G_h C_a D_p = 2.81$ plf

Arm: HSS4x4x1/4"

Depth: $D_p = 4$ in.
Force Coefficient: $C_a = 2$
Wind Load: $W_a = Q_z G_h C_a D_p = 29.96$ plf

Grating Support: L4x4x1/4"

Depth: $D_p = 4$ in.
Force Coefficient: $C_a = 2$
Wind Load: $W_a = Q_z G_h C_a D_p = 29.96$ plf

Existing Mount Pipe: Pipe 2.0" Std

Depth: $D_p = 2.38$ in.
Force Coefficient: $C_a = 1.2$
Wind Load: $W_a = Q_z G_h C_a D_p = 10.70$ plf

Handrail: L3x3x1/4"

Depth: $D_p = 3$ in.
Force Coefficient: $C_a = 2$
Wind Load: $W_a = Q_z G_h C_a D_p = 22.47$ plf

6.3.1 Wind Load (Continued)

Wind Load on Equipment:

P65-16-XLH-RR

Dimensions: B = 1.00 ft.
H = 6.00 ft.
Force Coefficient: C_a = 1.36
Wind Load: $P_a = Q_z G_h C_a BH$ = 365.51 lbs.
182.76 lbs/pt

P65-17-XLH-RR

Dimensions: B = 1.00 ft.
H = 8.00 ft.
Force Coefficient: C_a = 1.43
Wind Load: $P_a = Q_z G_h C_a BH$ = 515.31 lbs.
257.66 lbs/pt

XDUO06-80-R

Dimensions: B = 1.04 ft.
H = 6.21 ft.
Force Coefficient: C_a = 1.35
Wind Load: $P_a = Q_z G_h C_a BH$ = 393.45 lbs.
196.72 lbs/pt

JAH4-65C-R4

Dimensions: B = 1.15 ft.
H = 8.00 ft.
Force Coefficient: C_a = 1.40
Wind Load: $P_a = Q_z G_h C_a BH$ = 578.03 lbs.
289.02 lbs/pt

ETD819G-12UB

Dimensions: B = 1.17 ft.
H = 1.32 ft.
Force Coefficient: C_a = 1.20
Wind Load: $P_a = Q_z G_h C_a BH$ = 82.84 lbs.

TT08-19DB111-001

Dimensions: B = 0.56 ft.
H = 1.18 ft.
Force Coefficient: C_a = 1.20
Wind Load: $P_a = Q_z G_h C_a BH$ = 35.63 lbs.

RRH2x40W-07L

Dimensions: B = 1.02 ft.
H = 2.10 ft.
Force Coefficient: C_a = 1.20
Wind Load: $P_a = Q_z G_h C_a BH$ = 115.14 lbs.
57.57 lbs/pt

6.3.1 Wind Load (Continued)

Wind Load on Equipment:

RRH2x60-1900A-4R

Dimensions: B = 0.94 ft.
H = 1.67 ft.

Force Coefficient: $C_a = 1.20$

Wind Load: $P_a = Q_z G_h C_a BH = 84.33$ lbs.
42.17 lbs/pt

RRH4x25-WCS-4R

Dimensions: B = 1.00 ft.
H = 2.63 ft.

Force Coefficient: $C_a = 1.21$

Wind Load: $P_a = Q_z G_h C_a BH = 142.22$ lbs.
71.11 lbs/pt

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Owner:	AT&T TURF	Computed By:	J. Jirapo
Site:	WOODS CHAPEL (KS4070)	Date:	2/6/2018
Project No.	129039 Work Order: 58357ATTMO2-P	Verified By:	C. Garcia Godos
Title:	STRUCTURAL ANALYSIS OF EXISTING ANTENNA MOUNT	Date:	2/9/2018

BV Template V4.7.1 10/12/2017

TIA-222-G Section #

6.4 Ice Dead Load per TIA-222-G

Design Ice Thickness @ z = 33 ft T_i = **1.00** **in.** — Annex B

Note: The design ice thickness shall be escalated with height when calculating the ice weight and wind force on the ice.

Platform and antennas height elevation, z: 160 ft

Factored Ice Thickness, Tiz at Z for Ice Weight Calculations: — 2.6.8

$T_{iz} = 2.0\ T_i\ I\ K_{iz}\ (K_{zt})^{0.35}$ → T_{iz} = **2.34** **in**

where,

Importance Factor for Ice Thickness, I — Table 2-3

I = 1.00 Structure Classification: **II** — Table 2-1

Height Escalation Factor, K_{iz} — 2.6.8

$K_{iz} = (z/33)^{0.10}$ z = **160** ft

$= (160/33)\ ^\wedge\ 0.10$

$= 1.17$

Topographic Factor, K_{zt} — 2.6.6.4

$K_{zt} = [\ 1 + K_e\ K_t / K_h\ ]^2$ K_e = 1.00

$= [\ 1 + 1.0 \times 0.0 / 1.00\ ]^2$ K_t = 0

$= 1.00$ K_h = 1.00

The weight of ice shall be based on a unit weight of 56 pcf.

Therefore

W_{ice} = 56pcf * T_{iz} /12= **10.93** **psf**

6.4.1 Ice Dead Load (Continued)

Design Ice Thickness @ z = 33 ft T_i = 1.00 in.

Factored Ice Thickness @ z = 160 ft T_{iz} = 2.34 in.

Ice Dead Load on Members:

Perimeter: C5x6.7

Dimensions: B = 1.89 in. W = 5 in. D_c = 5.35 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 56.56 in^2

$DL_{ice} = A_{iz}$*56pcf ($ft^2/144in^2$) = 22.00 plf

Perimeter Corner Plate: PL9x3/8"

Dimensions: B = 9 in. W = 0.375 in. D_c = 9.01 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 83.51 in^2

$DL_{ice} = A_{iz}$*56pcf ($ft^2/144in^2$) = 32.48 plf

Arm: HSS4x4x1/4"

Dimensions: B = 4 in. W = 4 in. D_c = 5.66 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 58.85 in^2

$DL_{ice} = A_{iz}$*56pcf ($ft^2/144in^2$) = 22.89 plf

Grating Support: L4x4x1/4"

Dimensions: B = 4 in. W = 4 in. D_c = 5.66 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 58.85 in^2

$DL_{ice} = A_{iz}$*56pcf ($ft^2/144in^2$) = 22.89 plf

Existing Mount Pipe: Pipe 2.0" Std

Dimensions: B = in. W = 2.38 in. D_c = 2.38 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 34.74 in^2

$DL_{ice} = A_{iz}$*56pcf ($ft^2/144in^2$) = 13.51 plf

Handrail: L3x3x1/4"

Dimensions: B = 3 in. W = 3 in. D_c = 4.24 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 48.45 in^2

$DL_{ice} = A_{iz}$*56pcf ($ft^2/144in^2$) = 18.84 plf

6.4.1 Ice Dead Load (Continued)

Ice Dead Load on Equipment:

P65-16-XLH-RR

Dimensions w/out ice: B = 12 in. W = 6 in.
H = 72 in. D_c = 13.42 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 115.95 i^n2

$DL_{ice} = [A_{iz}(H+2T_{iz})+2T_{iz}BW]56pcf(ft^3/1728in^3)$ = 299.07 lbs

149.53 lbs/pt

P65-17-XLH-RR

Dimensions w/out ice: B = 12 in. W = 6 in.
H = 96 in. D_c = 13.42 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 115.95 i^n2

$DL_{ice} = [A_{iz}(H+2T_{iz})+2T_{iz}BW]56pcf(ft^3/1728in^3)$ = 389.25 lbs

194.62 lbs/pt

XDUO06-80-R

Dimensions w/out ice: B = 12.5 in. W = 7.1 in.
H = 74.5 in. D_c = 14.38 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 123.00 i^n2

$DL_{ice} = [A_{iz}(H+2T_{iz})+2T_{iz}BW]56pcf(ft^3/1728in^3)$ = 329.12 lbs

164.56 lbs/pt

JAH4-65C-R4

Dimensions w/out ice: B = 13.8 in. W = 8.2 in.
H = 96 in. D_c = 16.05 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 135.34 i^n2

$DL_{ice} = [A_{iz}(H+2T_{iz})+2T_{iz}BW]56pcf(ft^3/1728in^3)$ = 458.78 lbs

229.39 lbs/pt

ETD819G-12UB

Dimensions w/out ice: B = 14 in. W = 3.1 in.
H = 15.8 in. D_c = 14.34 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 122.73 i^n2

$DL_{ice} = [A_{iz}(H+2T_{iz})+2T_{iz}BW]56pcf(ft^3/1728in^3)$ = 88.06 lbs

TT08-19DB111-001

Dimensions w/out ice: B = 6.7 in. W = 5.4 in.
H = 14.2 in. D_c = 8.61 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 80.55 in^2

$DL_{ice} = [A_{iz}(H+2T_{iz})+2T_{iz}BW]56pcf(ft^3/1728in^3)$ = 54.78 lbs

RRH2x40W-07L

Dimensions w/out ice: B = 12.2 in. W = 6.6 in.
H = 25.2 in. D_c = 13.87 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 119.29 i^n2

$DL_{ice} = [A_{iz}(H+2T_{iz})+2T_{iz}BW]56pcf(ft^3/1728in^3)$ = 127.75 lbs

63.87 lbs/pt

6.4.1 Ice Dead Load (Continued)

Ice Dead Load on Equipment:

RRH2x60-1900A-4R

Dimensions w/out ice: B = 11.22 in. W = 7.6 in.
H = 20.07 in. D_c = 13.55 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 116.94 i^n2

$DL_{ice} = [A_{iz}(H+2T_{iz})+2T_{iz}BW]56pcf(ft^3/1728in^3)$ = 106.76 lbs

53.38 lbs/pt

RRH4x25-WCS-4R

Dimensions w/out ice: B = 12 in. W = 8.7 in.
H = 31.5 in. D_c = 14.82 in.

Ice cross sectional area: $A_{iz} = \pi T_{iz}(D_c + T_{iz})$ = 126.29 i^n2

$DL_{ice} = [A_{iz}(H+2T_{iz})+2T_{iz}BW]56pcf(ft^3/1728in^3)$ = 163.94 lbs

81.97 lbs/pt

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Owner:	AT&T TURF	Computed By:	J. Jirapo
Site:	WOODS CHAPEL (KS4070)	Date:	2/6/2018
Project No.	129039 Work Order: 58357ATTMO2-P	Verified By:	C. Garcia Godos
Title:	STRUCTURAL ANALYSIS OF EXISTING ANTENNA MOUNT	Date:	2/9/2018

BV Template V4.7.1 10/12/2017

6.5 Ice Wind Pressure per TIA-222-G

TIA-222-G Section #

a. Velocity Pressure, q_z

Basic Wind Speed, V_{ult} = **40** mph

q_z = 0.00256 Kz Kzt Kd Ka V^2 — 2.6.9.6

= 0.00256 x 1.40 x 1.00 x 0.95 x 1.00 x 40^2

= 5.44 psf

b. Velocity Pressure Coefficient, K_z — 2.6.5.2

K_z = 2.01 $(z/z_g)^{2/\alpha}$ — Exposure Category = **C** — 2.6.5.1

= 2.01 (160 / 900)^(2/9.5)

= 1.40 — Antenna Tip Height above Ground Level, z = **160** ft

$K_{zmin} \le K_z \le 2.01$ — α = 9.50 — Table 2-4

z_g = 900 ft

K_z = 1.40 — K_{zmin} = 0.85

c. Topographic Factor, Kzt — 2.6.6.4

Topographic Category: **(1) Flat or Rolling**

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

= [1 + 1.0 x 0.0 / 1.00] ^{2} — Height of Crest Above Surrounding Terrain, H = **15** ft

= 1.00

K_h = $e^{(f*z/H)}$ — f = 0 — Table 2-5

= e ^(0.00 x 160/15) — K_t = 0

= 1.00 — K_e = 1.0 — Table 2-4

d. Wind Directionality Factor, Kd

Tubular pole structures, latticed structures with other cross sections, and appurtenances. — Table 2-2

K_d = 0.95

e. Shielding Factor, Ka — 2.6.9.2

K_a = 1

6.5.1 Ice Wind Load

Wind Velocity Pressure @ z = 160 ft. Q_{zice} = 5.44 psf (based on 40 mph wind)
Gust factor: G_h = 1.0

Wind Load on Members

Perimeter: C5x6.7 + 1" of thickness for grating

Member Depth: D_p = 5.00 in. + $2T_{iz}$ + 1 in. of grating thickness= 10.68 in.
Force Coefficient: C_a = 2
Ice Wind Load: $P_p = Q_{zice}G_hC_aD_p$ = 9.68 plf

Perimeter Corner Plate: PL9x3/8"

Member Depth: D_p = 0.38 in. + $2T_{iz}$ = 5.06 in.
Force Coefficient: C_a = 2
Ice Wind Load: $P_p = Q_{zice}G_hC_aD_p$ = 4.58 plf

Arm: HSS4x4x1/4"

Member Depth: D_p = 4.00 in. + $2T_{iz}$ = 8.68 in.
Force Coefficient: C_a = 2
Ice Wind Load: $P_p = Q_{zice}G_hC_aD_p$ = 7.87 plf

Grating Support: L4x4x1/4"

Member Depth: D_p = 4.00 in. + $2T_{iz}$ = 8.68 in.
Force Coefficient: C_a = 2
Ice Wind Load: $P_p = Q_{zice}G_hC_aD_p$ = 7.87 plf

Existing Mount Pipe: Pipe 2.0" Std

Member Depth: D_p = 2.38 in. + $2T_{iz}$ = 7.06 in.
Force Coefficient: C_a = 1.2
Ice Wind Load: $P_p = Q_{zice}G_hC_aD_p$ = 3.84 plf

Handrail: L3x3x1/4"

Member Depth: D_p = 3.00 in. + $2T_{iz}$ = 7.68 in.
Force Coefficient: C_a = 2
Ice Wind Load: $P_p = Q_{zice}G_hC_aD_p$ = 6.96 plf

6.5.1 Ice Wind Load (Continued)

Ice Wind Load on Equipment:

P65-16-XLH-RR

Dimensions: $B = 1.00 \text{ ft} + (2T_{iz})/12\text{in} = 1.39 \text{ ft.}$
$H = 6.00 \text{ ft} + (2T_{iz})/12\text{in} = 6.39 \text{ ft.}$
Force Coefficient: $C_a = 1.36$
Wind Load: $P_a = Q_{zice}G_hC_aBH = 65.48 \text{ lbs.}$
32.74 lbs/pt

P65-17-XLH-RR

Dimensions: $B = 1.00 \text{ ft} + (2T_{iz})/12\text{in} = 1.39 \text{ ft.}$
$H = 8.00 \text{ ft} + (2T_{iz})/12\text{in} = 8.39 \text{ ft.}$
Force Coefficient: $C_a = 1.43$
Wind Load: $P_a = Q_{zice}G_hC_aBH = 90.91 \text{ lbs.}$
45.45 lbs/pt

XDUO06-80-R

Dimensions: $B = 1.04 \text{ ft} + (2T_{iz})/12\text{in} = 1.43 \text{ ft.}$
$H = 6.21 \text{ ft} + (2T_{iz})/12\text{in} = 6.60 \text{ ft.}$
Force Coefficient: $C_a = 1.35$
Wind Load: $P_a = Q_{zice}G_hC_aBH = 69.55 \text{ lbs.}$
34.78 lbs/pt

JAH4-65C-R4

Dimensions: $B = 1.15 \text{ ft} + (2T_{iz})/12\text{in} = 1.54 \text{ ft.}$
$H = 8.00 \text{ ft} + (2T_{iz})/12\text{in} = 8.39 \text{ ft.}$
Force Coefficient: $C_a = 1.40$
Wind Load: $P_a = Q_{zice}G_hC_aBH = 98.24 \text{ lbs.}$
49.12 lbs/pt

ETD819G-12UB

Dimensions: $B = 1.17 \text{ ft} + (2T_{iz})/12\text{in} = 1.56 \text{ ft.}$
$H = 1.32 \text{ ft} + (2T_{iz})/12\text{in} = 1.71 \text{ ft.}$
Force Coefficient: $C_a = 1.20$
Wind Load: $P_a = Q_{zice}G_hC_aBH = 17.34 \text{ lbs.}$

TT08-19DB111-001

Dimensions: $B = 0.56 \text{ ft} + (2T_{iz})/12\text{in} = 0.95 \text{ ft.}$
$H = 1.18 \text{ ft} + (2T_{iz})/12\text{in} = 1.57 \text{ ft.}$
Force Coefficient: $C_a = 1.20$
Wind Load: $P_a = Q_{zice}G_hC_aBH = 9.74 \text{ lbs.}$

RRH2x40W-07L

Dimensions: $B = 1.02 \text{ ft} + (2T_{iz})/12\text{in} = 1.41 \text{ ft.}$
$H = 2.10 \text{ ft} + (2T_{iz})/12\text{in} = 2.49 \text{ ft.}$
Force Coefficient: $C_a = 1.20$
Wind Load: $P_a = Q_{zice}G_hC_aBH = 22.86 \text{ lbs.}$
11.43 lbs/pt

6.5.1 Ice Wind Load (Continued)

Ice Wind Load on Equipment:

RRH2x60-1900A-4R

Dimensions: $B = 0.94 \text{ ft} + (2T_{iz})/12\text{in} = 1.33 \text{ ft.}$

$H = 1.67 \text{ ft} + (2T_{iz})/12\text{in} = 2.06 \text{ ft.}$

Force Coefficient: $C_a = 1.20$

Wind Load: $P_a = Q_{zice}G_hC_aBH = 17.84$ lbs.

8.92 lbs/pt

RRH4x25-WCS-4R

Dimensions: $B = 1.00 \text{ ft} + (2T_{iz})/12\text{in} = 1.39 \text{ ft.}$

$H = 2.63 \text{ ft} + (2T_{iz})/12\text{in} = 3.02 \text{ ft.}$

Force Coefficient: $C_a = 1.21$

Wind Load: $P_a = Q_{zice}G_hC_aBH = 27.48$ lbs.

13.74 lbs/pt

BLACK & VEATCH

Owner:	AT&T TURF	Computed By:	J. Jirapo
Site:	WOODS CHAPEL (KS4070)	Date:	2/6/2018
Project No.	129039 Work Order: 58357ATTMO2-P	Verified By:	C. Garcia Godos
Title:	STRUCTURAL ANALYSIS OF EXISTING ANTENNA MOUNT	Date:	2/9/2018

BV Template V4.7.1 10/12/2017

6.6 Rectangular Weld Analysis for Antenna Mount to Tower Connection

The point of connection is node N20 from RISA-3D Load Combination 56 Design Method: LRFD

Applied Loads:

P_x =	0.01	kip
P_y =	6.066	kip
P_z =	16.697	kip
M_x =	233.384	kip-in
M_y =	0.436	kip-in
M_z =	0.11	kip-in

Base Metal Properties:

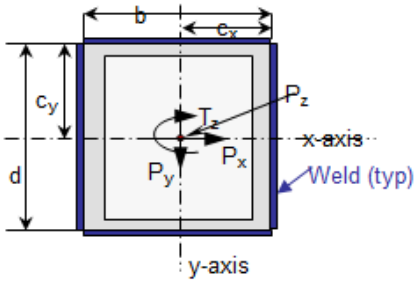
d (arm)=	4	in	t (arm)=	0.25	in
b (arm)=	4	in	t (plate)=	0.5	in
F_y (arm)=	42	ksi	F_y (plate)=	36	ksi
F_u (arm)=	58	ksi	F_u (plate)=	58	ksi

Weld Strength:

ϕF_w = 1.392 (kip/in)/(1/16" weld) (AISC Eq. 8-2a)

CALCULATIONS

Distance from y-axis to Edge of Weld, c_x =	2	in
Distance from x-axis to Edge of Weld, c_y =	2	in
Total Length of Weld in x-direction, L_x =	8	in
Total Length of Weld in y-direction, L_y =	8	in
Total Length of Weld, L_w =	16	in
Section Modulus of Weld About x-axis, S_x =	21.333	in^2
Section Modulus of Weld About y-axis, S_y =	21.333	in^2
Polar Moment of Inertia About z-axis, I_z =	85.333	in^3
Shear Stress on x-axis of Weld, f_{vx} =	0.001	kip/in
Shear Stress on y-axis of Weld, f_{vy} =	0.758	kip/in
Torsional Stress on x-axis of Weld, f_{tx} =	0.003	kip/in
Torsional Stress on y-axis of Weld, f_{ty} =	0.003	kip/in
Axial Stress on Weld, f_a =	1.044	kip/in
Bending Stress about x-axis of Weld, f_{bx} =	10.94	kip/in
Bending Stress about y-axis of Weld, f_{by} =	0.02	kip/in
Total Force Acting in x-direction, f_1 =	0.004	kip/in
Total Force Acting in y-direction, f_2 =	0.761	kip/in
Total Force Acting in z-direction, f_3 =	12.004	kip/in
Resultant Force on Weld, f_r =	12.028	kip/in



Weld Strength Check

Existing Weld Size, t_w =	0.1875	in
Weld Stress Ratio, SR_w =	288.03%	

Base Metal Check

Arm Tensile Rupture Strength, ϕT_{arm} =	174	kip
Arm Shear Rupture Strength, ϕV_{arm} =	37.8	kip
Plate Tensile Rupture Strength, ϕT_{plate} =	348	kip
Plate Shear Rupture Strength, ϕV_{plate} =	64.8	kip
Base Metal Stress Ratio, SR_b =	110.38%	

Legend:

P_x = Major axis load (x-axis)	M_x = Moment about x-axis	d = Depth	ϕ = Design Factor, 0.75
P_y = Minor axis load (y-axis)	M_y = Moment about y-axis	b = Width	F_{EXX} = 70 ksi Assumed
P_z = Axial Load (z-axis)	T_z = Torque about z-axis	t = Thickness	

Equations:

$c_x = b/2$	$S_x = d/3(3b + d)$	$f_{tx} = T_z(c_y/I_z)$	$f_1 = f_{vx} + f_{tx}$	$\phi T = 0.75(F_u t L_w)$
$c_y = d/2$	$S_y = b/3(3d + b)$	$f_{ty} = T_z(c_x/I_z)$	$f_2 = f_{vy} + f_{ty}$	$\phi V = 0.75(0.6F_y t L_x)$
$L_x = 2b$	$I_z = [(b + d)^3]/6$	$f_a = P_z/L_w$	$f_3 = f_a + f_{bx} + f_{by}$	$SR_T = f_3 L_w/\phi T_{plate}$
$L_y = 2d$	$f_{vx} = P_x/L_x$	$f_{bx} = M_x/S_x$	$f_r = (f_1^2 + f_2^2 + f_3^2)^{1/2}$	$SR_V = f_2 L_x/\phi V_{plate}$
$L_w = L_x + L_y$	$f_{vy} = P_y/L_y$	$f_{by} = M_y/S_y$	$SR_w = f_r/(\phi F_w t_w 16)$	$SR_b = SR_T \le SR_V$

BLACK & VEATCH

Owner:	AT&T TURF	Computed By:	J. Jirapo
Site:	WOODS CHAPEL (KS4070)	Date:	2/6/2018
Project No.	129039 Work Order: 58357ATTMO2-P	Verified By:	C. Garcia Godos
Title:	STRUCTURAL ANALYSIS OF EXISTING ANTENNA MOUNT	Date:	2/9/2018

BV Template V4.7.1 10/12/2017

6.7 Bolt Analysis of Antenna Mount Arm to Tower Connection

The point of connection is node N20 from RISA-3D Load Combination 56 Design Method: LRFD

Applied Loads:

P_x =	0.01	kip
P_y =	6.066	kip
P_z =	16.697	kip
M_x =	233.384	kip-in
M_y =	0.436	kip-in
M_z =	0.11	kip-in

Bolt Properties:

d_b =	0.625	in
A_b =	0.307	in^2
N_b =	4	

Load Location Coordinates:

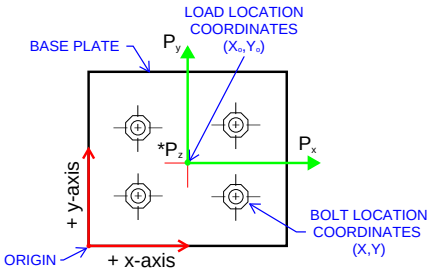
X_o =	4	in
Y_o =	4	in

Bolt Location Coordinates (in):

Bolt #	X_b	Y_b
#1	1	1
#2	1	7
#3	7	1
#4	7	7

Bolt Strength: A325 (AISC Table J3.2)

F_{nt} =	90	ksi
F_{nv} =	54	ksi



*Pz points out of the page

CALCULATIONS

Bolt Group Centroid y-coordinate, Y_c =	4	in
Bolt Group Centroid x-coordinate, X_c =	4	in
Load Eccentricity in x-direction, e_x =	0	in
Load Eccentricity in y-direction, e_y =	0	in
Total Moment Including Load Eccentricity, ΣM_x =	233.38	kip-in
Total Moment Including Load Eccentricity, ΣM_y =	0.44	kip-in
Total Moment Including Load Eccentricity, ΣM_z =	0.11	kip-in

Bolt #	Centroid Dist. (in)		Polar Moments of Inertia (in^4/in^2)			Force per Bolt (kip)	
	d_x	d_y	I_x	I_y	I_{xy}	Tension	Shear
#1	-3	-3	9	9	9	15.237	1.512
#2	-3	3	9	9	-9	23.659	1.512
#3	3	-3	9	9	-9	15.311	1.521
#4	3	3	9	9	9	23.586	1.521

Bolt Shear Strength Check

Available Shear Strength per Bolt, ϕV_n =	12.43	kip	AISC Eq. (J3-1)
Bolt Shear Stress Ratio, SR_V =	12.24%		

Bolt Tensile Strength Check

Nom. Tensile Stress (Including Effects of Shear), F'_{nt} =	90	ksi	AISC Eq. (J3-3a)
Available Tensile Strength per Bolt, ϕT_n =	20.72	kip	AISC Eq. (J3-2)
Bolt Tension Stress Ratio, SR_T =	114.18%		

Legend:

P_x = Major Axis Load (X-Axis)	M_x = Moment About X-Axis	d_b = Diameter of Bolt
P_y = Minor Axis Load (Y-Axis)	M_y = Moment About Y-Axis	A_b = Cross-Sectional Area of Bolt
P_z = Axial Load (Z-Axis)	M_z = Torque About Z-Axis	N_b = Number of Bolts

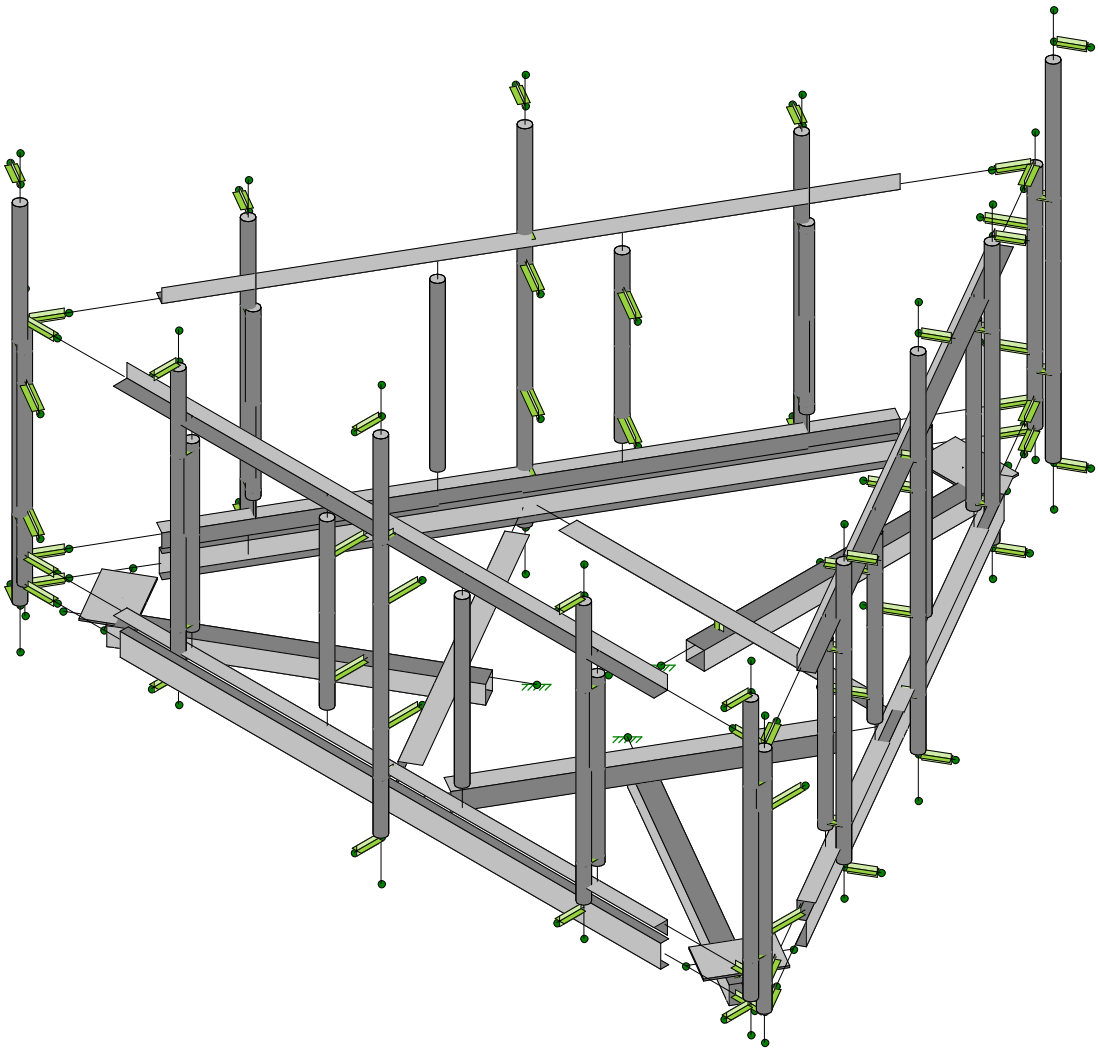
Equations:

$d_x = Y_b - Y_c$ $\quad I_{xy} = d_x d_y$ $\quad SR_V = V_u/\phi V_n$ $\quad F'_{nt} = 1.3F_{nt} - (F_{nt}/\phi F_{nv})(V_u/A_b) \le F_{nt}$

$d_y = X_b - X_c$ $\quad \Sigma M_x = M_x + P_z(e_y)$ $\quad SR_T = T_u/\phi T_n$ $\quad T_{ui} = \Sigma P_z/N_b - [(\Sigma M_x \Sigma I_y + \Sigma M_y \Sigma I_{xy})/(\Sigma I_x \Sigma I_y - \Sigma I_{xy}^2)]d_x$

$I_x = d_y^2$ $\quad \Sigma M_y = M_y + P_z(e_x)$ $\quad \phi V_n = 0.75F_{nv}A_b$ $\quad + [(\Sigma M_y \Sigma I_x + \Sigma M_x \Sigma I_{xy})/(\Sigma I_x \Sigma I_y - \Sigma I_{xy}^2)]d_y$

$I_y = d_x^2$ $\quad \Sigma M_z = M_z + P_x(e_y) + P_y(e_x)$ $\quad \phi T_n = 0.75F'_{nt}A_b$ $\quad V_{ui} = [(\Sigma P_x/N_b - \Sigma M_z d_y/(\Sigma I_x + \Sigma I_y))^2 + (\Sigma P_y/N_b - \Sigma M_z d_x/(\Sigma I_x + \Sigma I_y))^2]^{1/2}$



Envelope Only Solution

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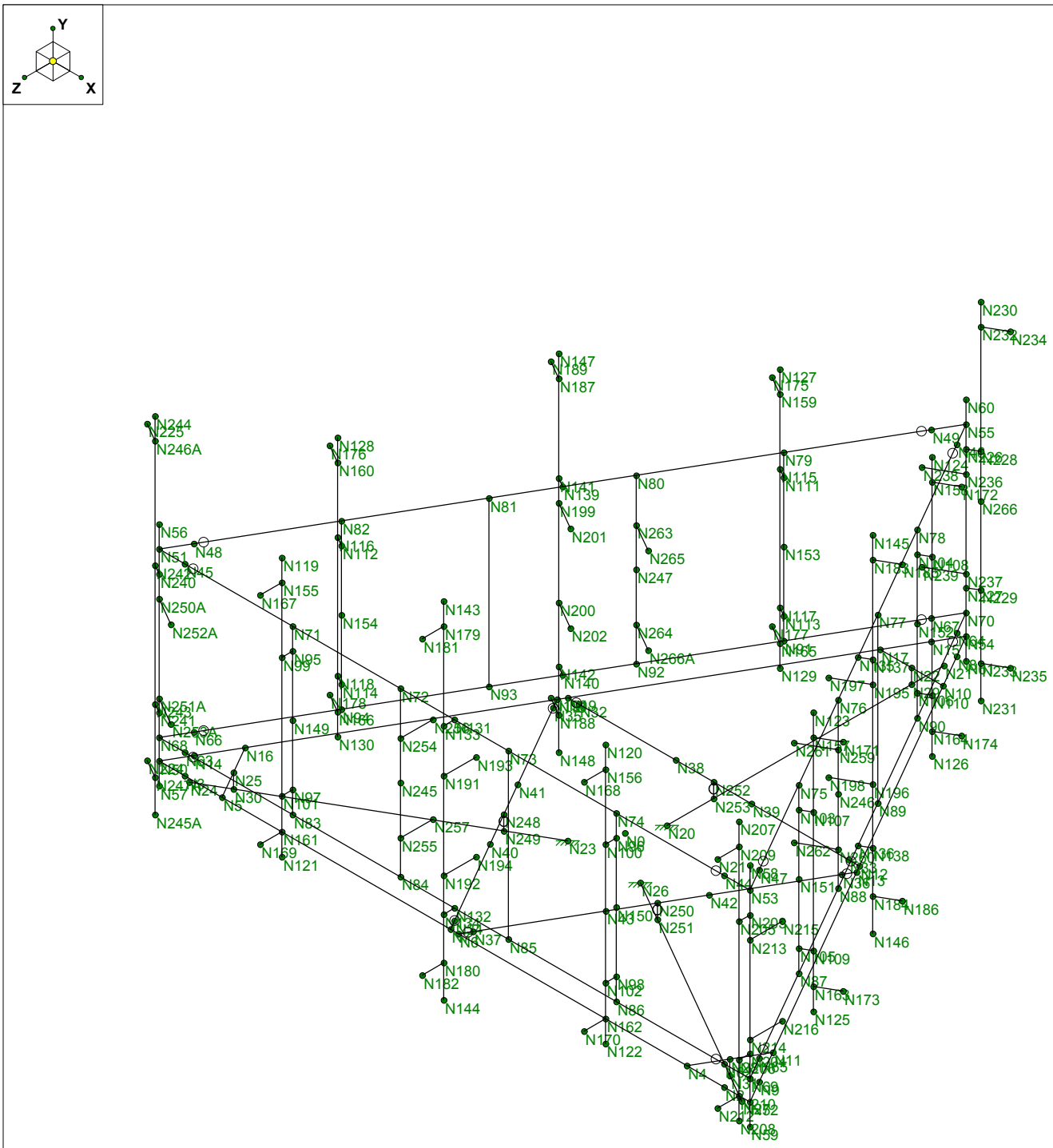

Envelope Only Solution

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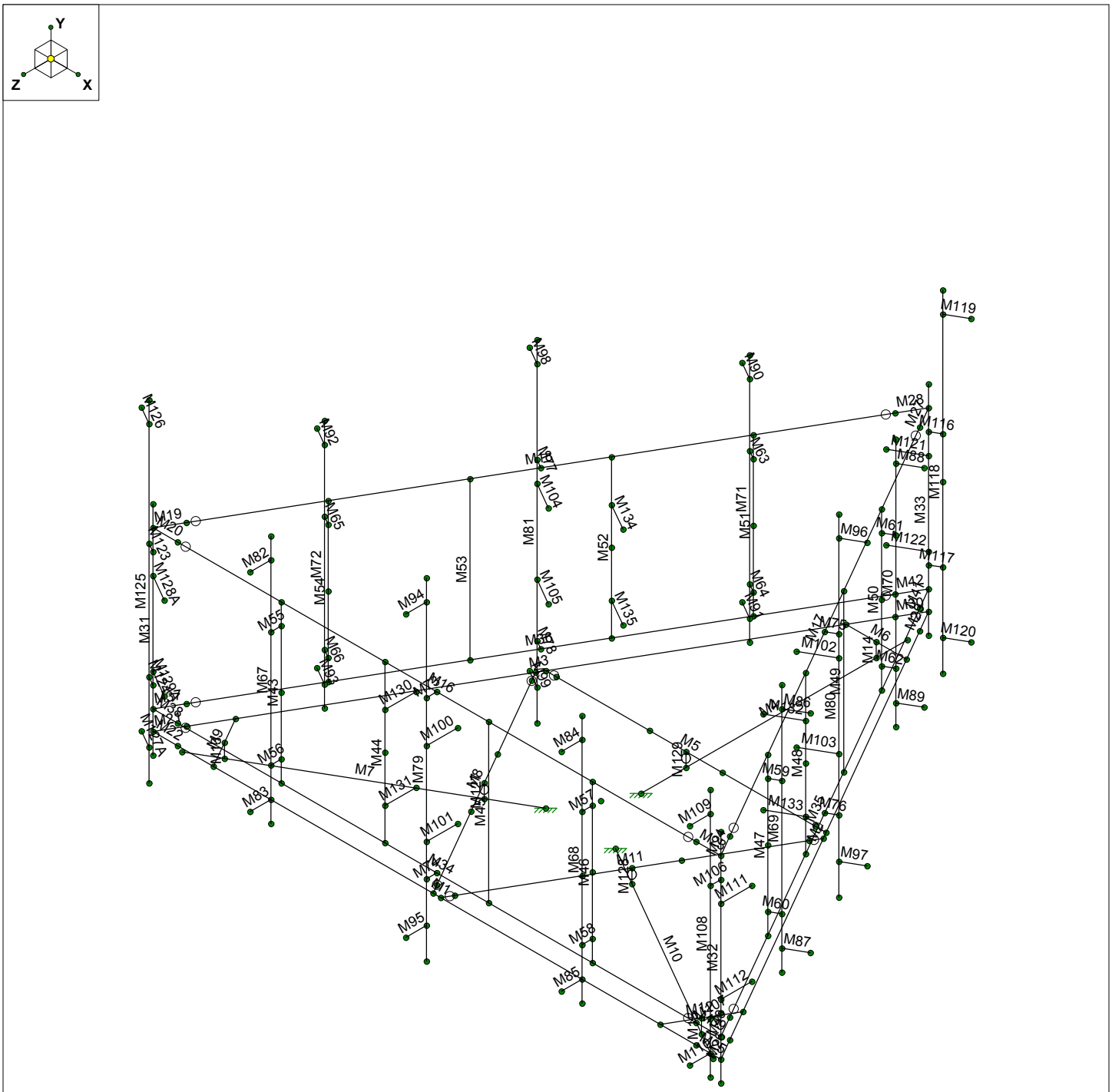

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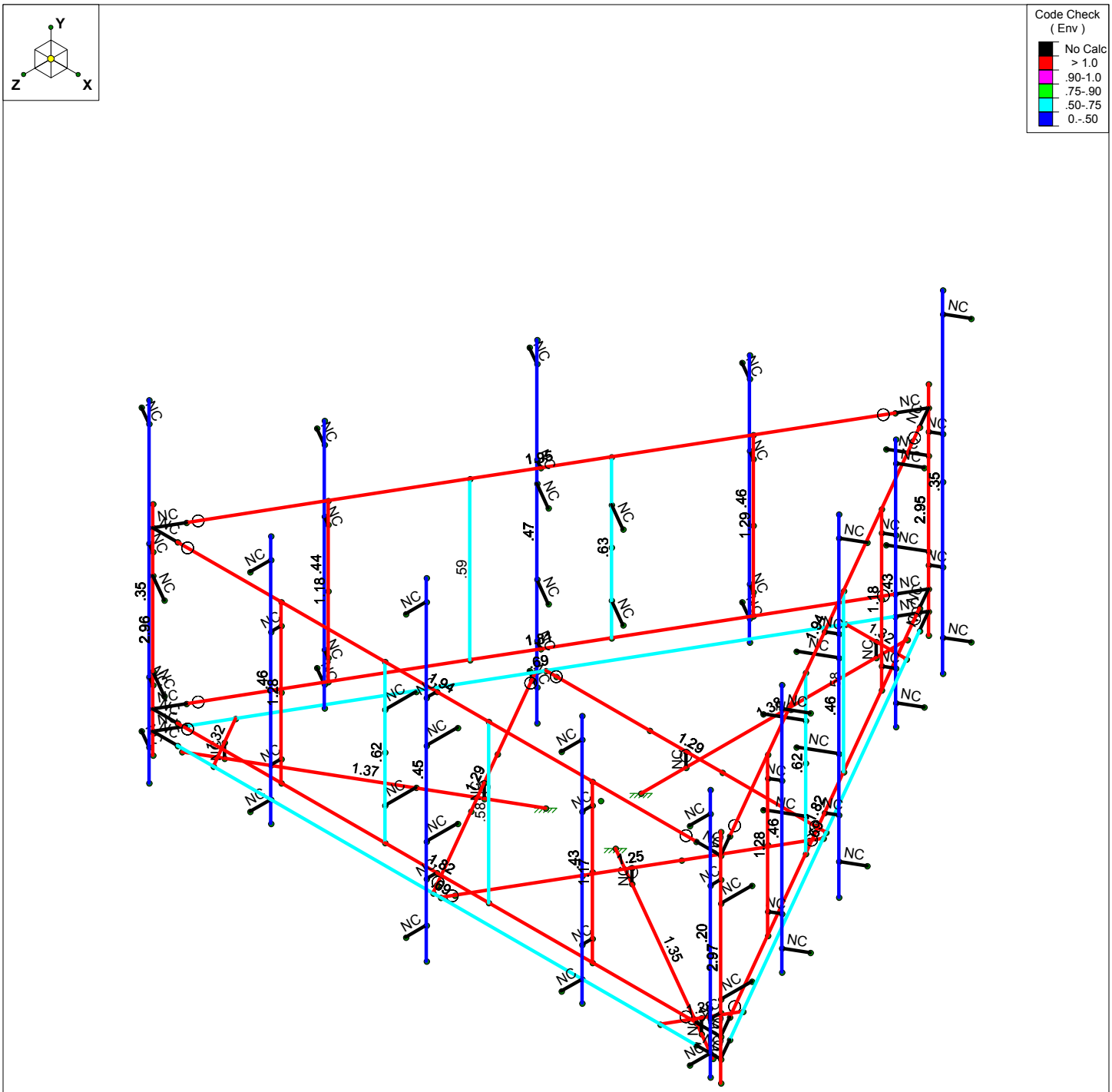

Member Code Checks Displayed (Enveloped)
Envelope Only Solution

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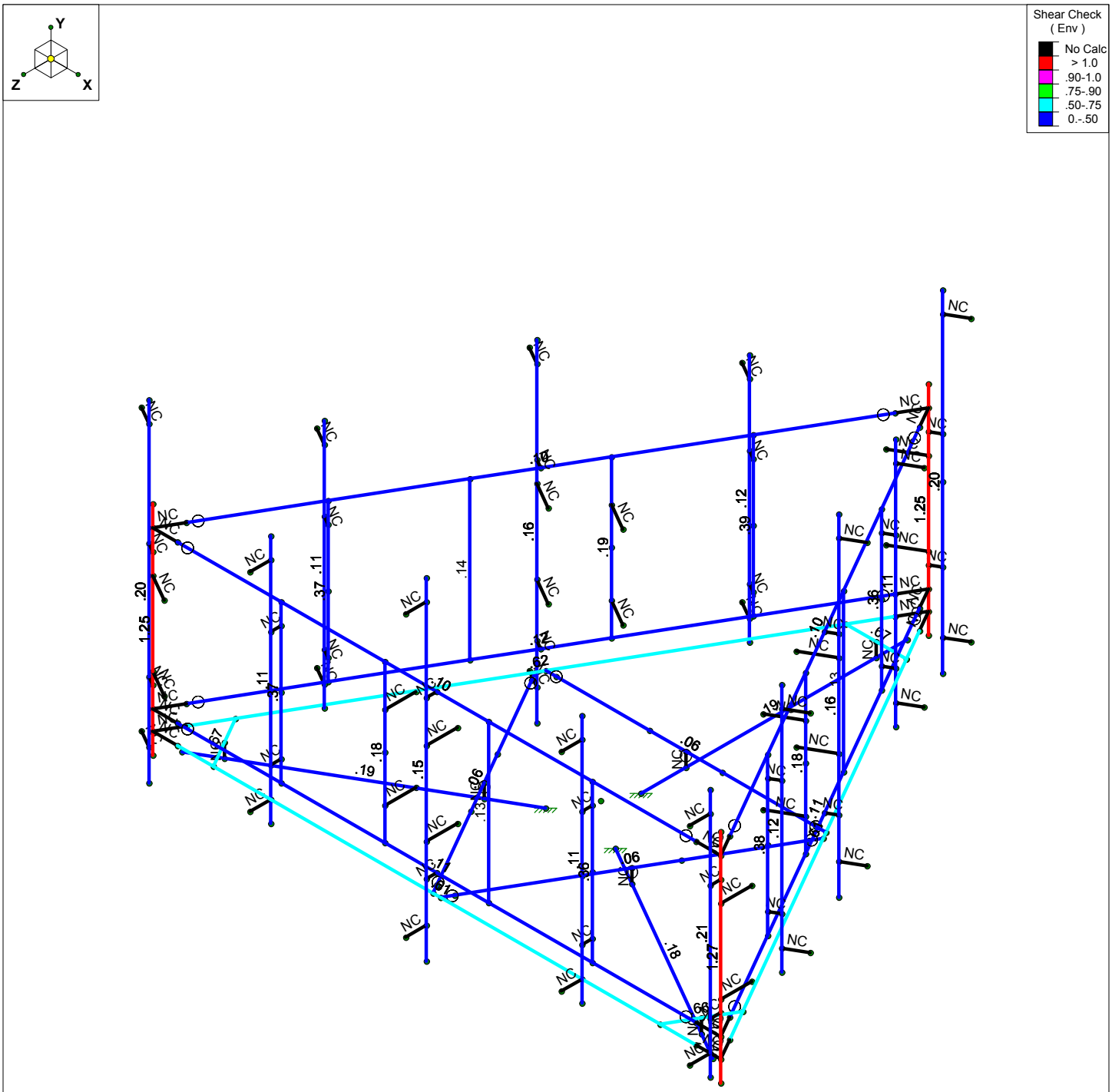

Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

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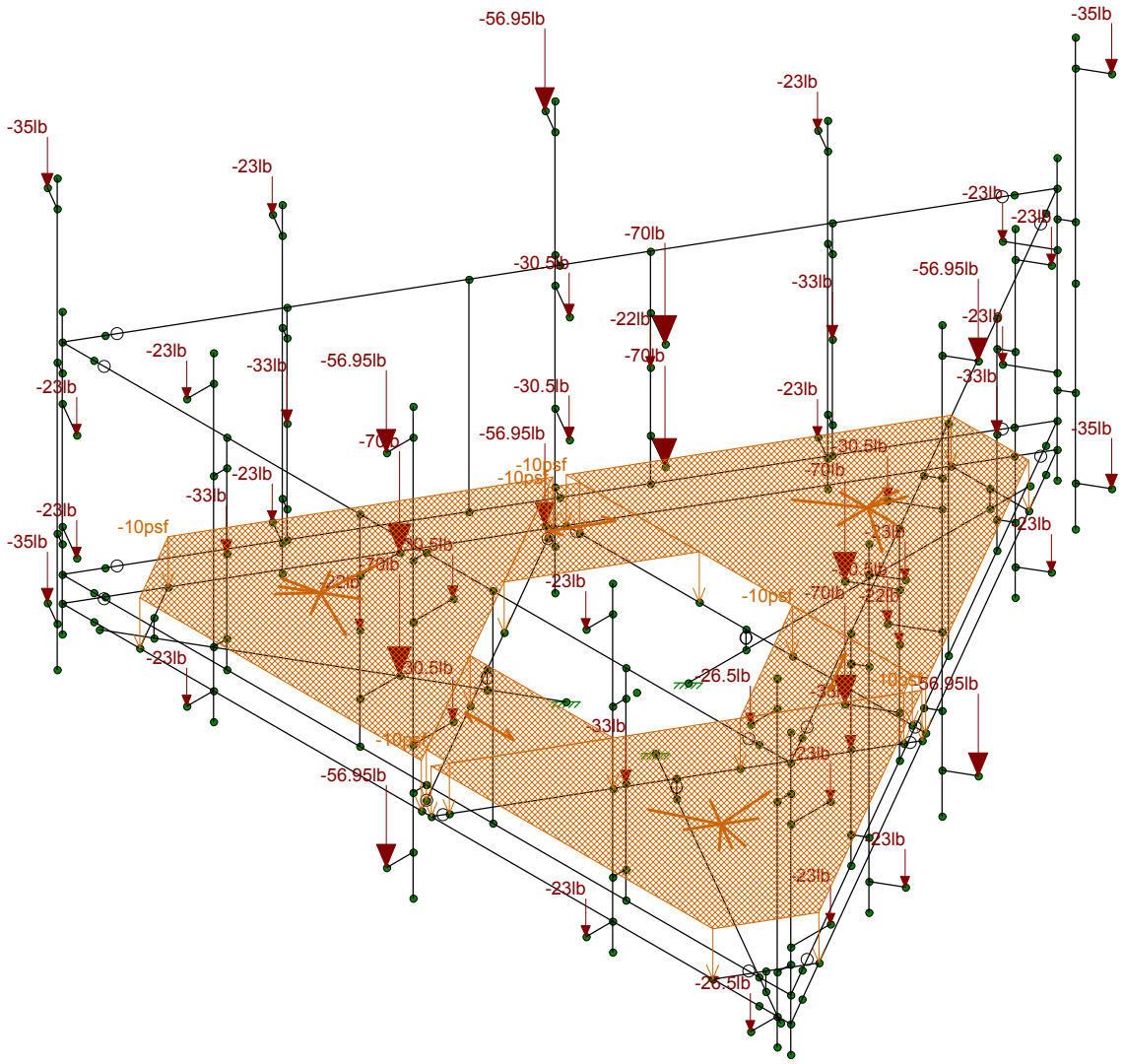

Loads: BLC 1, DL
Envelope Only Solution

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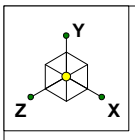

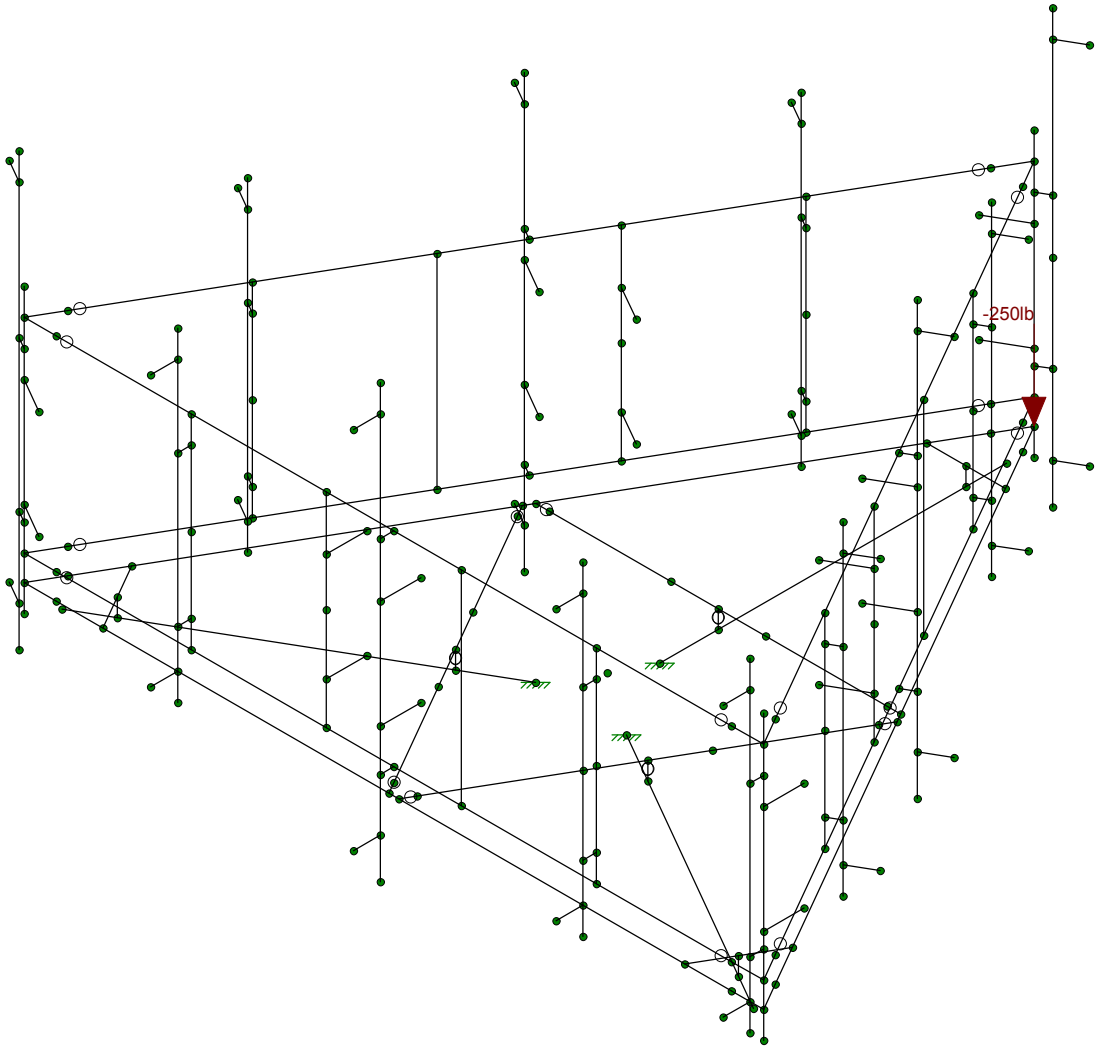

Loads: BLC 2, Maintenance LL - LV
Envelope Only Solution

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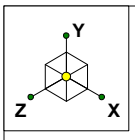

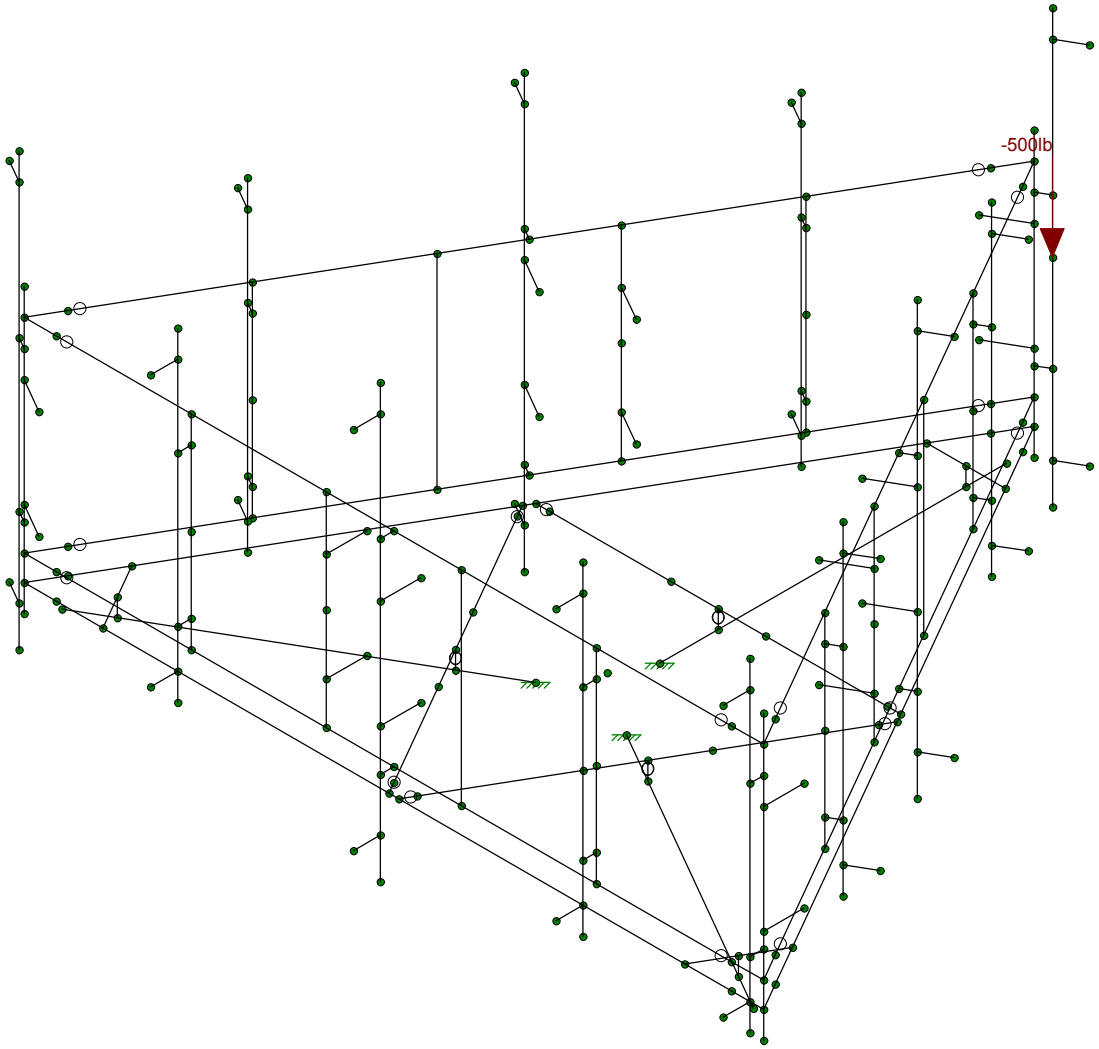

Loads: BLC 3, Installation LL - LM
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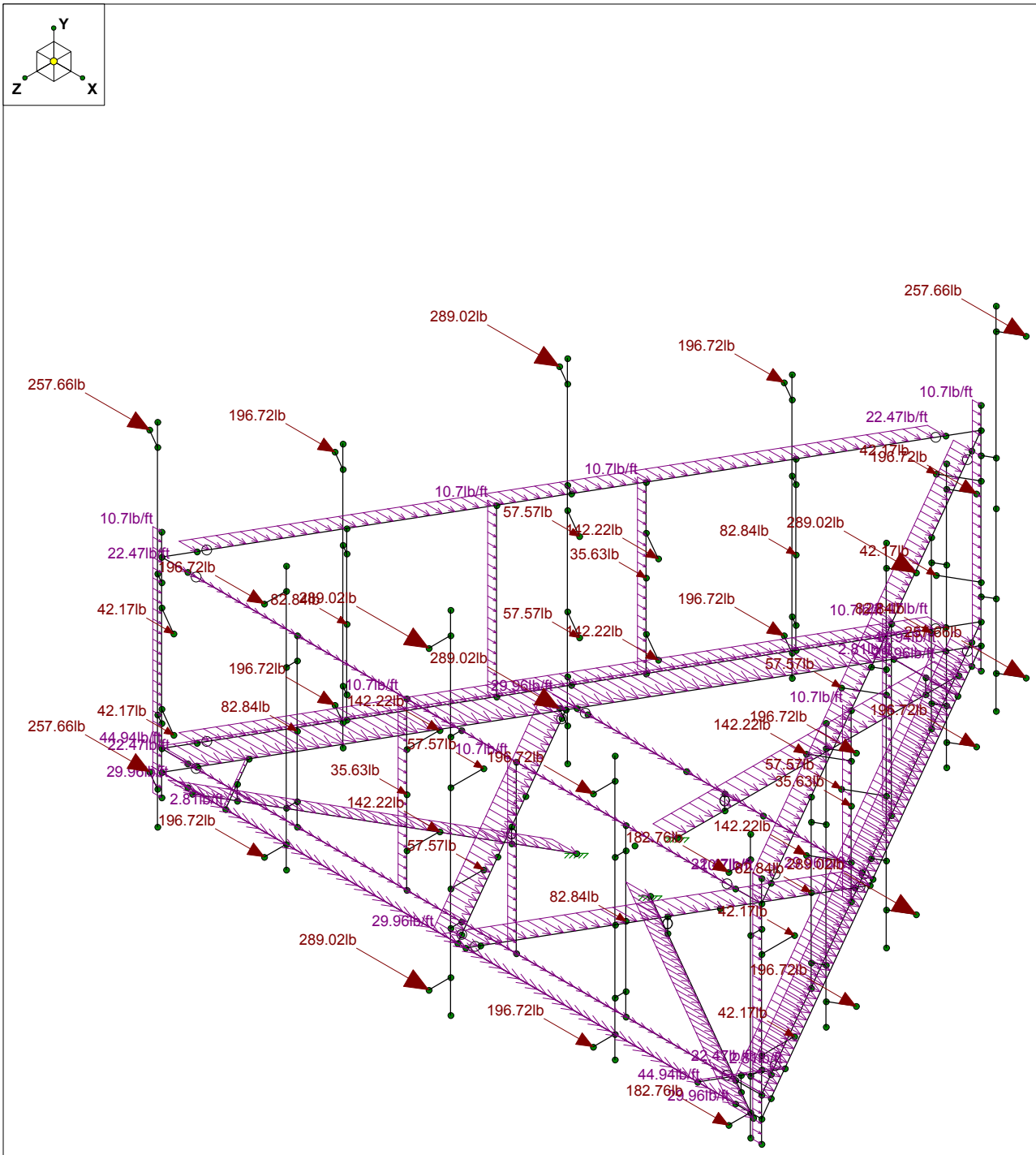

Loads: BLC 4, Wind - 0 Deg (+X)
Envelope Only Solution

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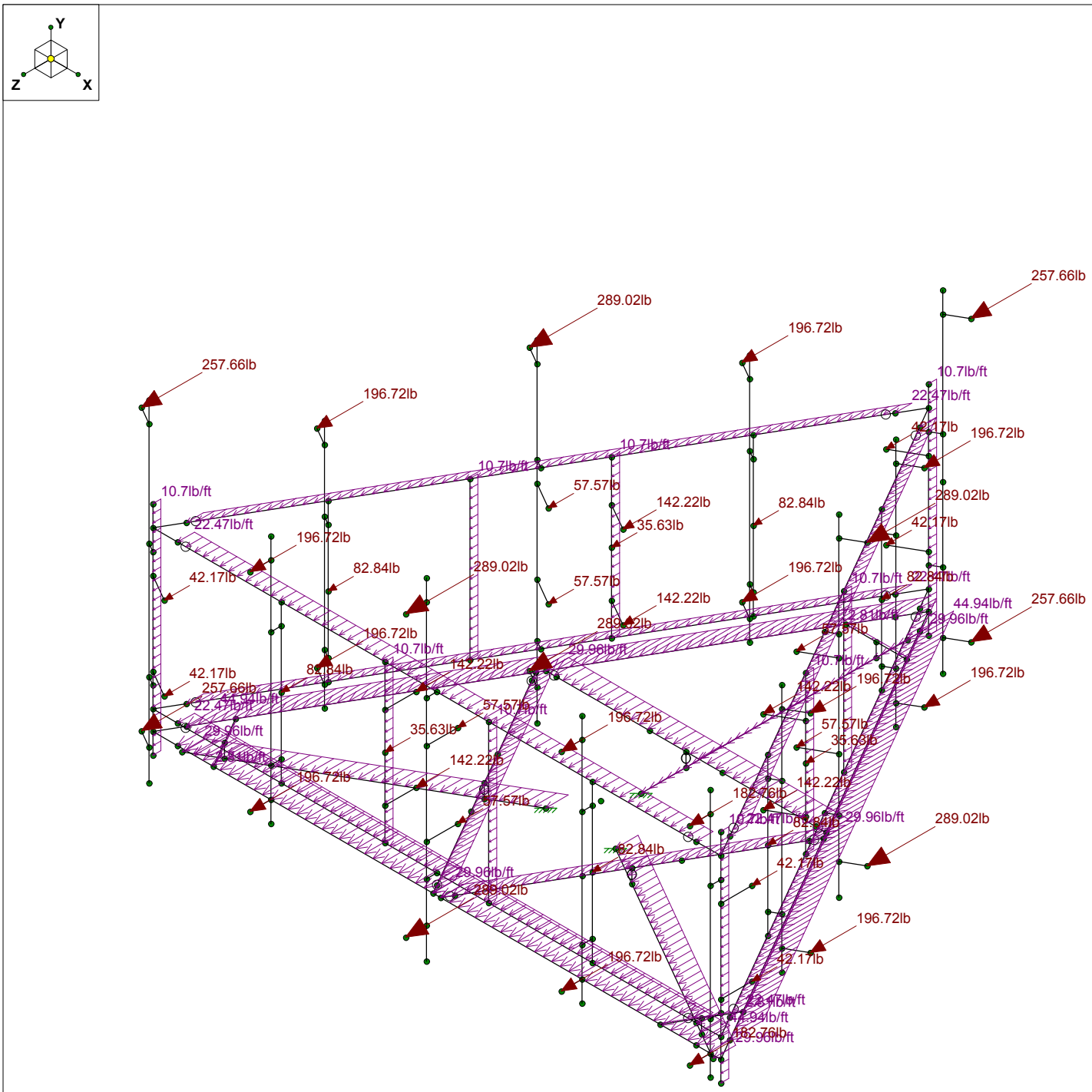

Loads: BLC 5, Wind - 90 Deg (+Z)
Envelope Only Solution

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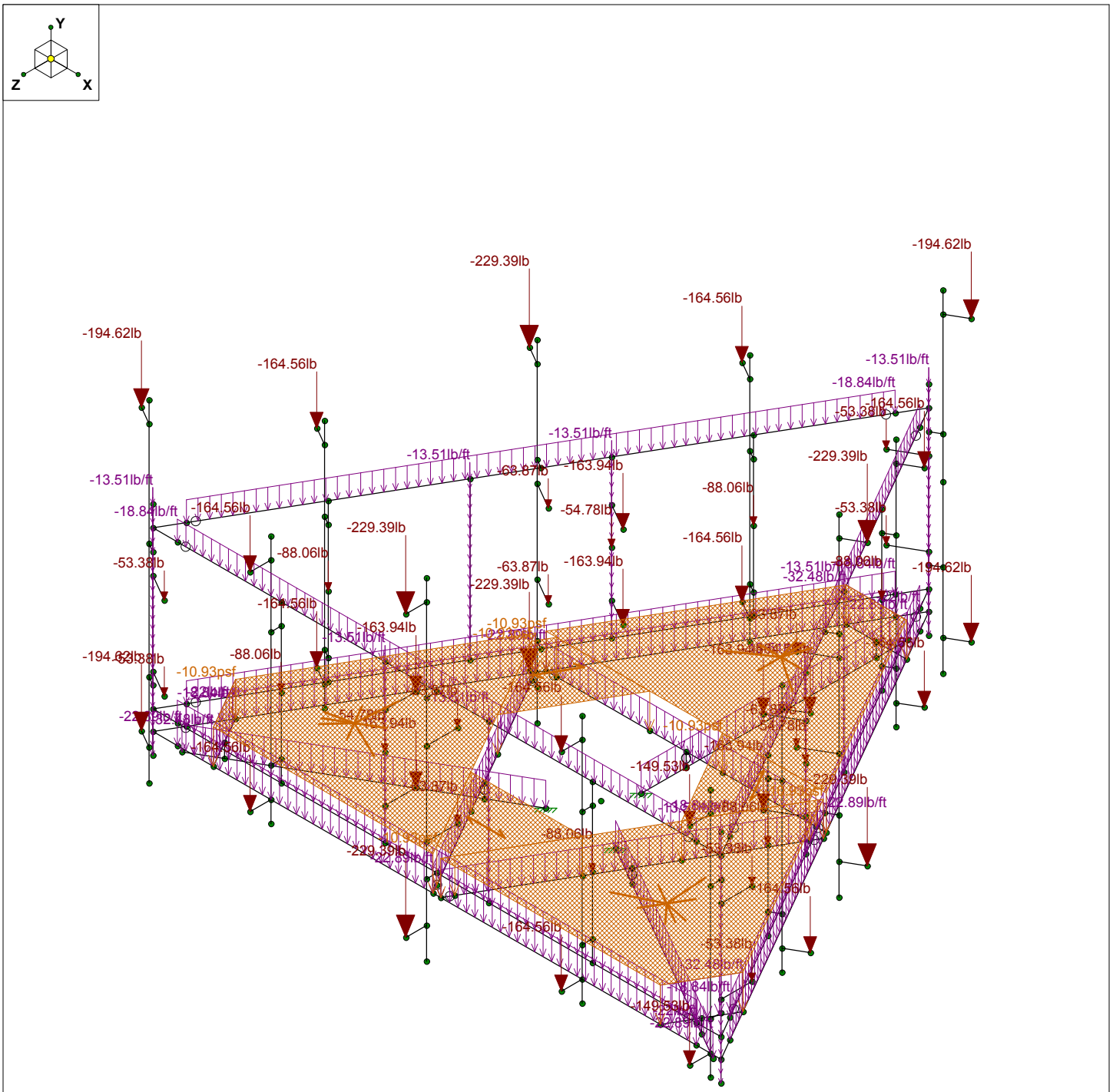

Loads: BLC 6, Ice DL
Envelope Only Solution

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J. Jirapo		Feb 9, 2018 at 2:09 PM
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(Global) Model Settings

Display Sections for Member Calcs	3
Max Internal Sections for Member Calcs	99
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (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	Standard Solver

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

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

(Global) Model Settings, Continued

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

General Material Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]
1	gen_Conc3NW	3155	1372	.15	.6	.145
2	gen_Conc4NW	3644	1584	.15	.6	.145
3	gen_Conc3LW	2085	906	.15	.6	.11
4	gen_Conc4LW	2408	1047	.15	.6	.11
5	gen_Alum	10600	4077	.3	1.29	.173
6	gen_Steel	29000	11154	.3	.65	.49
7	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	C5x6.7	Beam	Channel	A36 Gr.36	Typical	1.97	.47	7.48	.055
2	Perimeter Corner Plate	PL9x3/8	Beam	RECT	A36 Gr.36	Typical	3.375	.04	22.781	.154
3	Arm	HSS4x4x4	Beam	Tube	A500 Gr.42	Typical	3.37	7.8	7.8	12.8
4	Grating Support	L4x4x4	Beam	Single Angle	A36 Gr.36	Typical	1.93	3	3	.044
5	Existing Mount Pipe	PIPE_2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
6	Handrail	L3x3x4	Beam	Single Angle	A36 Gr.36	Typical	1.44	1.23	1.23	.031
7	Handrail Corner Plate	PL 6X1/2	Beam	RECT	A36 Gr.36	Typical	3	.063	9	.237

General Section Sets

	Label	Shape	Type	Material	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	GEN1A	RE4X4	Beam	gen_Conc3NW	16	21.333	21.333	31.573
2	RIGID		None	RIGID	1e+6	1e+6	1e+6	1e+6

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N0	0	0	0	0	
2	N2	6.25	0	3.950408	0	
3	N3	-6.25	0	3.950408	0	
4	N4	5.383975	0	3.950408	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
5	N5	-5.383975	0	3.950408	0	
6	N6	0.0916	0	3.950408	0	
7	N7	-0.0916	0	3.950408	0	
8	N8	0.296154	0	-7.387863	0	
9	N9	6.546154	0	3.437455	0	
10	N10	0.729166	0	-6.637863	0	
11	N11	6.113141	0	2.687455	0	
12	N12	3.375354	0	-2.054532	0	
13	N13	3.466954	0	-1.895876	0	
14	N14	-6.546154	0	3.437455	0	
15	N15	-0.296154	0	-7.387863	0	
16	N16	-6.113141	0	2.687455	0	
17	N17	-0.729166	0	-6.637863	0	
18	N18	-3.466954	0	-1.895876	0	
19	N19	-3.375354	0	-2.054532	0	
20	N20	0	-0.333333	-0.9712	0	
21	N21	0	-0.333333	-7.387867	0	
22	N22	0	0	-6.637863	0	
23	N23	-0.841084	-0.333333	0.4856	0	
24	N24	-6.39808	-0.333333	3.693933	0	
25	N25	-5.748558	0	3.318932	0	
26	N26	0.841084	-0.333333	0.4856	0	
27	N27	6.39808	-0.333333	3.693933	0	
28	N28	5.748558	0	3.318932	0	
29	N29	0	-0.333333	-6.637863	0	
30	N30	-5.748558	-0.333333	3.318932	0	
31	N31	5.748558	-0.333333	3.318932	0	
32	N32	-3.125354	0	-2.054532	0	
33	N33	3.125354	0	-2.054532	0	
34	N34	-0.2166	0	3.733902	0	
35	N35	-3.341954	0	-1.67937	0	
36	N36	3.341954	0	-1.67937	0	
37	N37	0.2166	0	3.733902	0	
38	N38	-0.875354	0	-2.054532	0	
39	N39	0.875354	0	-2.054532	0	
40	N40	-1.3416	0	1.785345	0	
41	N41	-2.216954	0	0.269187	0	
42	N42	2.216954	0	0.269187	0	
43	N43	1.3416	0	1.785345	0	
44	N44	6.25	4.25	3.950408	0	
45	N45	-6.25	4.25	3.950408	0	
46	N46	0.296154	4.25	-7.387863	0	
47	N47	6.546154	4.25	3.437455	0	
48	N48	-6.546154	4.25	3.437455	0	
49	N49	-0.296154	4.25	-7.387863	0	
50	N50	-6.842308	0	3.950408	0	
51	N51	-6.842308	4.25	3.950408	0	
52	N52	6.842308	0	3.950409	0	
53	N53	6.842308	4.25	3.950409	0	
54	N54	0.	0	-7.900817	0	
55	N55	0.	4.25	-7.900817	0	
56	N56	-6.842308	4.75	3.950408	0	
57	N57	-6.842308	-.5	3.950408	0	
58	N58	6.842308	4.75	3.950409	0	
59	N59	6.842308	-.5	3.950409	0	
60	N60	0.	4.75	-7.900817	0	
61	N61	0.	-.5	-7.900817	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
62	N62	6.25	.47	3.950408	0	
63	N63	-6.25	.47	3.950408	0	
64	N64	0.296154	.47	-7.387863	0	
65	N65	6.546154	.47	3.437455	0	
66	N66	-6.546154	.47	3.437455	0	
67	N67	-0.296154	.47	-7.387863	0	
68	N68	-6.842308	.47	3.950408	0	
69	N69	6.842308	.47	3.950409	0	
70	N70	0.	.47	-7.900817	0	
71	N71	-3.75	4.25	3.950408	0	
72	N72	-1.25	4.25	3.950408	0	
73	N73	1.25	4.25	3.950408	0	
74	N74	3.75	4.25	3.950408	0	
75	N75	5.296154	4.25	1.272391	0	
76	N76	4.046154	4.25	-0.892672	0	
77	N77	2.796154	4.25	-3.057736	0	
78	N78	1.546154	4.25	-5.222799	0	
79	N79	-1.546154	4.25	-5.222799	0	
80	N80	-2.796154	4.25	-3.057736	0	
81	N81	-4.046154	4.25	-0.892672	0	
82	N82	-5.296154	4.25	1.272391	0	
83	N83	-3.75	.47	3.950408	0	
84	N84	-1.25	.47	3.950408	0	
85	N85	1.25	.47	3.950408	0	
86	N86	3.75	.47	3.950408	0	
87	N87	5.296154	.47	1.272391	0	
88	N88	4.046154	.47	-0.892672	0	
89	N89	2.796154	.47	-3.057736	0	
90	N90	1.546154	.47	-5.222799	0	
91	N91	-1.546154	.47	-5.222799	0	
92	N92	-2.796154	.47	-3.057736	0	
93	N93	-4.046154	.47	-0.892672	0	
94	N94	-5.296154	.47	1.272391	0	
95	N95	-3.75	3.75	3.950408	0	
96	N96	3.75	3.75	3.950408	0	
97	N97	-3.75	.97	3.950408	0	
98	N98	3.75	.97	3.950408	0	
99	N99	-3.75	3.75	4.200408	0	
100	N100	3.75	3.75	4.200408	0	
101	N101	-3.75	.97	4.200408	0	
102	N102	3.75	.97	4.200408	0	
103	N103	5.296154	3.75	1.272391	0	
104	N104	1.546154	3.75	-5.222799	0	
105	N105	5.296154	.97	1.272391	0	
106	N106	1.546154	.97	-5.222799	0	
107	N107	5.51266	3.75	1.147391	0	
108	N108	1.76266	3.75	-5.347799	0	
109	N109	5.51266	.97	1.147391	0	
110	N110	1.76266	.97	-5.347799	0	
111	N111	-1.546154	3.75	-5.222799	0	
112	N112	-5.296154	3.75	1.272391	0	
113	N113	-1.546154	.97	-5.222799	0	
114	N114	-5.296154	.97	1.272391	0	
115	N115	-1.76266	3.75	-5.347799	0	
116	N116	-5.51266	3.75	1.147391	0	
117	N117	-1.76266	.97	-5.347799	0	
118	N118	-5.51266	.97	1.147391	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
119	N119	-3.75	5.75	4.200408	0	
120	N120	3.75	5.75	4.200408	0	
121	N121	-3.75	-.25	4.200408	0	
122	N122	3.75	-.25	4.200408	0	
123	N123	5.51266	5.75	1.147391	0	
124	N124	1.76266	5.75	-5.347799	0	
125	N125	5.51266	-.25	1.147391	0	
126	N126	1.76266	-.25	-5.347799	0	
127	N127	-1.76266	5.75	-5.347799	0	
128	N128	-5.51266	5.75	1.147391	0	
129	N129	-1.76266	-.25	-5.347799	0	
130	N130	-5.51266	-.25	1.147391	0	
131	N131	0	4.25	3.950408	0	
132	N132	0	.47	3.950408	0	
133	N133	0	4.25	4.200408	0	
134	N134	0	.47	4.200408	0	
135	N135	3.421154	4.25	-1.975204	0	
136	N136	3.421154	.47	-1.975204	0	
137	N137	3.63766	4.25	-2.100204	0	
138	N138	3.63766	.47	-2.100204	0	
139	N139	-3.421154	4.25	-1.975204	0	
140	N140	-3.421154	.47	-1.975204	0	
141	N141	-3.63766	4.25	-2.100204	0	
142	N142	-3.63766	.47	-2.100204	0	
143	N143	0	6.75	4.200408	0	
144	N144	0	-1.25	4.200408	0	
145	N145	3.63766	6.75	-2.100204	0	
146	N146	3.63766	-1.25	-2.100204	0	
147	N147	-3.63766	6.75	-2.100204	0	
148	N148	-3.63766	-1.25	-2.100204	0	
149	N149	-3.75	2.36	3.950408	0	
150	N150	3.75	2.36	3.950408	0	
151	N151	5.296154	2.36	1.272391	0	
152	N152	1.546154	2.36	-5.222799	0	
153	N153	-1.546154	2.36	-5.222799	0	
154	N154	-5.296154	2.36	1.272391	0	
155	N155	-3.75	5.25	4.200408	0	
156	N156	3.75	5.25	4.200408	0	
157	N157	5.51266	5.25	1.147391	0	
158	N158	1.76266	5.25	-5.347799	0	
159	N159	-1.76266	5.25	-5.347799	0	
160	N160	-5.51266	5.25	1.147391	0	
161	N161	-3.75	.25	4.200408	0	
162	N162	3.75	.25	4.200408	0	
163	N163	5.51266	.25	1.147391	0	
164	N164	1.76266	.25	-5.347799	0	
165	N165	-1.76266	.25	-5.347799	0	
166	N166	-5.51266	.25	1.147391	0	
167	N167	-3.75	5.25	4.700408	0	
168	N168	3.75	5.25	4.700408	0	
169	N169	-3.75	.25	4.700408	0	
170	N170	3.75	.25	4.700408	0	
171	N171	5.945673	5.25	0.897391	0	
172	N172	2.195673	5.25	-5.597799	0	
173	N173	5.945673	.25	0.897391	0	
174	N174	2.195673	.25	-5.597799	0	
175	N175	-2.195673	5.25	-5.597799	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
176	N176	-5.945673	5.25	0.897391	0	
177	N177	-2.195673	.25	-5.597799	0	
178	N178	-5.945673	.25	0.897391	0	
179	N179	0	6.25	4.200408	0	
180	N180	0	-.5	4.200408	0	
181	N181	0	6.25	4.700408	0	
182	N182	0	-.5	4.700408	0	
183	N183	3.63766	6.25	-2.100204	0	
184	N184	3.63766	-.5	-2.100204	0	
185	N185	4.070673	6.25	-2.350204	0	
186	N186	4.070673	-.5	-2.350204	0	
187	N187	-3.63766	6.25	-2.100204	0	
188	N188	-3.63766	-.5	-2.100204	0	
189	N189	-4.070673	6.25	-2.350204	0	
190	N190	-4.070673	-.5	-2.350204	0	
191	N191	0	3.25	4.200408	0	
192	N192	0	1.25	4.200408	0	
193	N193	0	3.25	3.450408	0	
194	N194	0	1.25	3.450408	0	
195	N195	3.63766	3.75	-2.100204	0	
196	N196	3.63766	1.75	-2.100204	0	
197	N197	2.988141	3.75	-1.725204	0	
198	N198	2.988141	1.75	-1.725204	0	
199	N199	-3.63766	3.75	-2.100204	0	
200	N200	-3.63766	1.75	-2.100204	0	
201	N201	-2.988141	3.75	-1.725204	0	
202	N202	-2.988141	1.75	-1.725204	0	
203	N203	6.842308	3.75	3.950408	0	
204	N204	6.842308	.97	3.950408	0	
205	N205	6.842308	3.75	4.200408	0	
206	N206	6.842308	.97	4.200408	0	
207	N207	6.842308	5.75	4.200408	0	
208	N208	6.842308	-.25	4.200408	0	
209	N209	6.842308	5.25	4.200408	0	
210	N210	6.842308	.25	4.200408	0	
211	N211	6.842308	5.25	4.700408	0	
212	N212	6.842308	.25	4.700408	0	
213	N213	6.842308	3.25	3.950408	0	
214	N214	6.842308	1.25	3.950408	0	
215	N215	6.842308	3.25	3.200408	0	
216	N216	6.842308	1.25	3.200408	0	
217	N245	-1.25	2.36	3.950408	0	
218	N246	4.046154	2.36	-0.892672	0	
219	N247	-2.796154	2.36	-3.057736	0	
220	N248	-1.779277	0	1.027266	0	
221	N249	-1.779277	-0.333333	1.027266	0	
222	N250	1.779277	0	1.027266	0	
223	N251	1.779277	-0.333333	1.027266	0	
224	N252	0.	0	-2.054532	0	
225	N253	0	-0.333333	-2.054532	0	
226	N226	-0.	3.75	-7.900817	0	
227	N227	-0.	.97	-7.900817	0	
228	N228	0.216506	3.75	-8.025817	0	
229	N229	0.216506	.97	-8.025817	0	
230	N230	0.216506	6.75	-8.025817	0	
231	N231	0.216506	-1.25	-8.025817	0	
232	N232	0.216506	6.25	-8.025817	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
233	N233	0.216506	-.5	-8.025817	0	
234	N234	0.649519	6.25	-8.275817	0	
235	N235	0.649519	-.5	-8.275817	0	
236	N236	-0.	3.25	-7.900817	0	
237	N237	-0.	1.25	-7.900817	0	
238	N238	-0.649519	3.25	-7.525817	0	
239	N239	-0.649519	1.25	-7.525817	0	
240	N240	-6.842308	3.75	3.950408	0	
241	N241	-6.842308	.97	3.950408	0	
242	N242	-7.058814	3.75	3.825408	0	
243	N243	-7.058814	.97	3.825408	0	
244	N244	-7.058814	6.75	3.825408	0	
245	N245A	-7.058814	-1.25	3.825408	0	
246	N246A	-7.058814	6.25	3.825408	0	
247	N247A	-7.058814	-.5	3.825408	0	
248	N225	-7.491827	6.25	3.575408	0	
249	N224	-7.491827	-.5	3.575408	0	
250	N250A	-6.842308	3.25	3.950408	0	
251	N251A	-6.842308	1.25	3.950408	0	
252	N252A	-6.192789	3.25	4.325408	0	
253	N253A	-6.192789	1.25	4.325408	0	
254	N254	-1.25	3.25	3.950408	0	
255	N255	-1.25	1.25	3.950408	0	
256	N256	-1.25	3.25	3.200408	0	
257	N257	-1.25	1.25	3.200408	0	
258	N266	0.216506	2.75	-8.025817	0	
259	N259	4.046154	3.25	-0.892672	0	
260	N260	4.046154	1.25	-0.892672	0	
261	N261	3.396635	3.25	-0.517672	0	
262	N262	3.396635	1.25	-0.517672	0	
263	N263	-2.796154	3.25	-3.057736	0	
264	N264	-2.796154	1.25	-3.057736	0	
265	N265	-2.146635	3.25	-2.682736	0	
266	N266A	-2.146635	1.25	-2.682736	0	

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	N20	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N23	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N26	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N2	N3			Perimeter	Beam	Channel	A36 Gr.36	Typical
2	M2	N8	N9			Perimeter	Beam	Channel	A36 Gr.36	Typical
3	M3	N14	N15			Perimeter	Beam	Channel	A36 Gr.36	Typical
4	M4	N21	N20			Arm	Beam	Tube	A500 Gr...	Typical
5	M5	N19	N12		90	Grating Support	Beam	Single Angle	A36 Gr.36	Typical
6	M6	N17	N10		90	Perimeter Corner Plate	Beam	RECT	A36 Gr.36	Typical
7	M7	N24	N23			Arm	Beam	Tube	A500 Gr...	Typical
8	M8	N7	N18		90	Grating Support	Beam	Single Angle	A36 Gr.36	Typical
9	M9	N5	N16		90	Perimeter Corner Plate	Beam	RECT	A36 Gr.36	Typical
10	M10	N27	N26			Arm	Beam	Tube	A500 Gr...	Typical
11	M11	N13	N6		90	Grating Support	Beam	Single Angle	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
12	M12	N11	N4		90	Perimeter Corner Plate	Beam	RECT	A36 Gr.36	Typical
13	M13	N25	N30			RIGID	None	None	RIGID	Typical
14	M14	N22	N29			RIGID	None	None	RIGID	Typical
15	M15	N28	N31			RIGID	None	None	RIGID	Typical
16	M16	N45	N44			Handrail	Beam	Single Angle	A36 Gr.36	Typical
17	M17	N47	N46			Handrail	Beam	Single Angle	A36 Gr.36	Typical
18	M18	N49	N48			Handrail	Beam	Single Angle	A36 Gr.36	Typical
19	M19	N48	N51			RIGID	None	None	RIGID	Typical
20	M20	N45	N51			RIGID	None	None	RIGID	Typical
21	M21	N14	N50			RIGID	None	None	RIGID	Typical
22	M22	N3	N50			RIGID	None	None	RIGID	Typical
23	M23	N44	N53			RIGID	None	None	RIGID	Typical
24	M24	N47	N53			RIGID	None	None	RIGID	Typical
25	M25	N2	N52			RIGID	None	None	RIGID	Typical
26	M26	N9	N52			RIGID	None	None	RIGID	Typical
27	M27	N46	N55			RIGID	None	None	RIGID	Typical
28	M28	N49	N55			RIGID	None	None	RIGID	Typical
29	M29	N8	N54			RIGID	None	None	RIGID	Typical
30	M30	N15	N54			RIGID	None	None	RIGID	Typical
31	M31	N56	N57			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
32	M32	N58	N59			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
33	M33	N60	N61			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
34	M34	N63	N62		90	Handrail	Beam	Single Angle	A36 Gr.36	Typical
35	M35	N65	N64		90	Handrail	Beam	Single Angle	A36 Gr.36	Typical
36	M36	N67	N66		90	Handrail	Beam	Single Angle	A36 Gr.36	Typical
37	M37	N66	N68			RIGID	None	None	RIGID	Typical
38	M38	N63	N68			RIGID	None	None	RIGID	Typical
39	M39	N62	N69			RIGID	None	None	RIGID	Typical
40	M40	N65	N69			RIGID	None	None	RIGID	Typical
41	M41	N64	N70			RIGID	None	None	RIGID	Typical
42	M42	N67	N70			RIGID	None	None	RIGID	Typical
43	M43	N71	N83			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
44	M44	N72	N84			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
45	M45	N73	N85			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
46	M46	N74	N86			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
47	M47	N75	N87			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
48	M48	N76	N88			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
49	M49	N77	N89			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
50	M50	N78	N90			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
51	M51	N79	N91			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
52	M52	N80	N92			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
53	M53	N81	N93			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
54	M54	N82	N94			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
55	M55	N99	N95			RIGID	None	None	RIGID	Typical
56	M56	N101	N97			RIGID	None	None	RIGID	Typical
57	M57	N100	N96			RIGID	None	None	RIGID	Typical
58	M58	N102	N98			RIGID	None	None	RIGID	Typical
59	M59	N107	N103			RIGID	None	None	RIGID	Typical
60	M60	N109	N105			RIGID	None	None	RIGID	Typical
61	M61	N108	N104			RIGID	None	None	RIGID	Typical
62	M62	N110	N106			RIGID	None	None	RIGID	Typical
63	M63	N115	N111			RIGID	None	None	RIGID	Typical
64	M64	N117	N113			RIGID	None	None	RIGID	Typical
65	M65	N116	N112			RIGID	None	None	RIGID	Typical
66	M66	N118	N114			RIGID	None	None	RIGID	Typical
67	M67	N119	N121			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
68	M68	N120	N122			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
69	M69	N123	N125			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
70	M70	N124	N126			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
71	M71	N127	N129			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
72	M72	N128	N130			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
73	M73	N133	N131			RIGID	None	None	RIGID	Typical
74	M74	N134	N132			RIGID	None	None	RIGID	Typical
75	M75	N137	N135			RIGID	None	None	RIGID	Typical
76	M76	N138	N136			RIGID	None	None	RIGID	Typical
77	M77	N141	N139			RIGID	None	None	RIGID	Typical
78	M78	N142	N140			RIGID	None	None	RIGID	Typical
79	M79	N143	N144			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
80	M80	N145	N146			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
81	M81	N147	N148			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
82	M82	N167	N155			RIGID	None	None	RIGID	Typical
83	M83	N169	N161			RIGID	None	None	RIGID	Typical
84	M84	N168	N156			RIGID	None	None	RIGID	Typical
85	M85	N170	N162			RIGID	None	None	RIGID	Typical
86	M86	N171	N157			RIGID	None	None	RIGID	Typical
87	M87	N173	N163			RIGID	None	None	RIGID	Typical
88	M88	N172	N158			RIGID	None	None	RIGID	Typical
89	M89	N174	N164			RIGID	None	None	RIGID	Typical
90	M90	N175	N159			RIGID	None	None	RIGID	Typical
91	M91	N177	N165			RIGID	None	None	RIGID	Typical
92	M92	N176	N160			RIGID	None	None	RIGID	Typical
93	M93	N178	N166			RIGID	None	None	RIGID	Typical
94	M94	N181	N179			RIGID	None	None	RIGID	Typical
95	M95	N182	N180			RIGID	None	None	RIGID	Typical
96	M96	N185	N183			RIGID	None	None	RIGID	Typical
97	M97	N186	N184			RIGID	None	None	RIGID	Typical
98	M98	N189	N187			RIGID	None	None	RIGID	Typical
99	M99	N190	N188			RIGID	None	None	RIGID	Typical
100	M100	N191	N193			RIGID	None	None	RIGID	Typical
101	M101	N192	N194			RIGID	None	None	RIGID	Typical
102	M102	N195	N197			RIGID	None	None	RIGID	Typical
103	M103	N196	N198			RIGID	None	None	RIGID	Typical
104	M104	N199	N201			RIGID	None	None	RIGID	Typical
105	M105	N200	N202			RIGID	None	None	RIGID	Typical
106	M106	N205	N203			RIGID	None	None	RIGID	Typical
107	M107	N206	N204			RIGID	None	None	RIGID	Typical
108	M108	N207	N208			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
109	M109	N211	N209			RIGID	None	None	RIGID	Typical
110	M110	N212	N210			RIGID	None	None	RIGID	Typical
111	M111	N213	N215			RIGID	None	None	RIGID	Typical
112	M112	N214	N216			RIGID	None	None	RIGID	Typical
113	M127	N249	N248			RIGID	None	None	RIGID	Typical
114	M128	N251	N250			RIGID	None	None	RIGID	Typical
115	M129	N253	N252			RIGID	None	None	RIGID	Typical
116	M116	N228	N226			RIGID	None	None	RIGID	Typical
117	M117	N229	N227			RIGID	None	None	RIGID	Typical
118	M118	N230	N231			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical
119	M119	N234	N232			RIGID	None	None	RIGID	Typical
120	M120	N235	N233			RIGID	None	None	RIGID	Typical
121	M121	N236	N238			RIGID	None	None	RIGID	Typical
122	M122	N237	N239			RIGID	None	None	RIGID	Typical
123	M123	N242	N240			RIGID	None	None	RIGID	Typical
124	M124	N243	N241			RIGID	None	None	RIGID	Typical
125	M125	N244	N245A			Existing Mount Pipe	Beam	Pipe	A53 Gr. B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
126	M126	N225	N246A			RIGID	None	None	RIGID	Typical
127	M127A	N224	N247A			RIGID	None	None	RIGID	Typical
128	M128A	N250A	N252A			RIGID	None	None	RIGID	Typical
129	M129A	N251A	N253A			RIGID	None	None	RIGID	Typical
130	M130	N254	N256			RIGID	None	None	RIGID	Typical
131	M131	N255	N257			RIGID	None	None	RIGID	Typical
132	M132	N259	N261			RIGID	None	None	RIGID	Typical
133	M133	N260	N262			RIGID	None	None	RIGID	Typical
134	M134	N263	N265			RIGID	None	None	RIGID	Typical
135	M135	N264	N266A			RIGID	None	None	RIGID	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
1	M1						Yes			None
2	M2						Yes			None
3	M3						Yes			None
4	M4						Yes	-y		None
5	M5	BenPIN	BenPIN				Yes			None
6	M6						Yes			None
7	M7						Yes	-y		None
8	M8	BenPIN	BenPIN				Yes			None
9	M9						Yes			None
10	M10						Yes	-y		None
11	M11	BenPIN	BenPIN				Yes			None
12	M12						Yes			None
13	M13						Yes			None
14	M14						Yes			None
15	M15						Yes			None
16	M16	BenPIN	BenPIN				Yes			None
17	M17	BenPIN	BenPIN				Yes			None
18	M18	BenPIN	BenPIN				Yes			None
19	M19						Yes			None
20	M20						Yes			None
21	M21						Yes			None
22	M22						Yes			None
23	M23						Yes			None
24	M24						Yes			None
25	M25						Yes			None
26	M26						Yes			None
27	M27						Yes			None
28	M28						Yes			None
29	M29						Yes			None
30	M30						Yes			None
31	M31						Yes			None
32	M32						Yes			None
33	M33						Yes			None
34	M34	BenPIN	BenPIN				Yes			None
35	M35	BenPIN	BenPIN				Yes			None
36	M36	BenPIN	BenPIN				Yes			None
37	M37						Yes			None
38	M38						Yes			None
39	M39						Yes			None
40	M40						Yes			None
41	M41						Yes			None
42	M42						Yes			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
43	M43						Yes			None
44	M44						Yes			None
45	M45						Yes			None
46	M46						Yes			None
47	M47						Yes			None
48	M48						Yes			None
49	M49						Yes			None
50	M50						Yes			None
51	M51						Yes			None
52	M52						Yes			None
53	M53						Yes			None
54	M54						Yes			None
55	M55						Yes			None
56	M56						Yes			None
57	M57						Yes			None
58	M58						Yes			None
59	M59						Yes			None
60	M60						Yes			None
61	M61						Yes			None
62	M62						Yes			None
63	M63						Yes			None
64	M64						Yes			None
65	M65						Yes			None
66	M66						Yes			None
67	M67						Yes			None
68	M68						Yes			None
69	M69						Yes			None
70	M70						Yes			None
71	M71						Yes			None
72	M72						Yes			None
73	M73						Yes			None
74	M74						Yes			None
75	M75						Yes			None
76	M76						Yes			None
77	M77						Yes			None
78	M78						Yes			None
79	M79						Yes			None
80	M80						Yes			None
81	M81						Yes			None
82	M82						Yes			None
83	M83						Yes			None
84	M84						Yes			None
85	M85						Yes			None
86	M86						Yes			None
87	M87						Yes			None
88	M88						Yes			None
89	M89						Yes			None
90	M90						Yes			None
91	M91						Yes			None
92	M92						Yes			None
93	M93						Yes			None
94	M94						Yes			None
95	M95						Yes			None
96	M96						Yes			None
97	M97						Yes			None
98	M98						Yes			None
99	M99						Yes			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
100	M100						Yes			None
101	M101						Yes			None
102	M102						Yes			None
103	M103						Yes			None
104	M104						Yes			None
105	M105						Yes			None
106	M106						Yes			None
107	M107						Yes			None
108	M108						Yes			None
109	M109						Yes			None
110	M110						Yes			None
111	M111						Yes			None
112	M112						Yes			None
113	M127	OXXXXX					Yes			None
114	M128	OXXXXX					Yes			None
115	M129	OXXXXX					Yes			None
116	M116						Yes			None
117	M117						Yes			None
118	M118						Yes			None
119	M119						Yes			None
120	M120						Yes			None
121	M121						Yes			None
122	M122						Yes			None
123	M123						Yes			None
124	M124						Yes			None
125	M125						Yes			None
126	M126						Yes			None
127	M127A						Yes			None
128	M128A						Yes			None
129	M129A						Yes			None
130	M130						Yes			None
131	M131						Yes			None
132	M132						Yes			None
133	M133						Yes			None
134	M134						Yes			None
135	M135						Yes			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[...	Lbyy[ft]	Lbzz[ft]	Lcomp top...	Lcomp bot...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	Perimeter	12.5	5.3								Lateral
2	M2	Perimeter	12.5	5.3								Lateral
3	M3	Perimeter	12.5	5.3								Lateral
4	M4	Arm	6.417									Lateral
5	M5	Grating Support	6.751									Lateral
6	M6	Perimeter Corner Plate	1.458									Lateral
7	M7	Arm	6.417									Lateral
8	M8	Grating Support	6.751									Lateral
9	M9	Perimeter Corner Plate	1.458									Lateral
10	M10	Arm	6.417									Lateral
11	M11	Grating Support	6.751									Lateral
12	M12	Perimeter Corner Plate	1.458									Lateral
13	M16	Handrail	12.5		2.5							Lateral
14	M17	Handrail	12.5		2.5							Lateral
15	M18	Handrail	12.5		2.5							Lateral
16	M31	Existing Mount Pipe	5.25									Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[...	Lbyy[ft]	Lbzz[ft]	Lcomp top...	Lcomp bot...	L-torq...	Kyy	Kzz	Cb	Functi...
17	M32	Existing Mount Pipe	5.25									Lateral
18	M33	Existing Mount Pipe	5.25									Lateral
19	M34	Handrail	12.5		2.5							Lateral
20	M35	Handrail	12.5		2.5							Lateral
21	M36	Handrail	12.5		2.5							Lateral
22	M43	Existing Mount Pipe	3.78									Lateral
23	M44	Existing Mount Pipe	3.78									Lateral
24	M45	Existing Mount Pipe	3.78									Lateral
25	M46	Existing Mount Pipe	3.78									Lateral
26	M47	Existing Mount Pipe	3.78									Lateral
27	M48	Existing Mount Pipe	3.78									Lateral
28	M49	Existing Mount Pipe	3.78									Lateral
29	M50	Existing Mount Pipe	3.78									Lateral
30	M51	Existing Mount Pipe	3.78									Lateral
31	M52	Existing Mount Pipe	3.78									Lateral
32	M53	Existing Mount Pipe	3.78									Lateral
33	M54	Existing Mount Pipe	3.78									Lateral
34	M67	Existing Mount Pipe	6									Lateral
35	M68	Existing Mount Pipe	6									Lateral
36	M69	Existing Mount Pipe	6									Lateral
37	M70	Existing Mount Pipe	6									Lateral
38	M71	Existing Mount Pipe	6									Lateral
39	M72	Existing Mount Pipe	6									Lateral
40	M79	Existing Mount Pipe	8									Lateral
41	M80	Existing Mount Pipe	8									Lateral
42	M81	Existing Mount Pipe	8									Lateral
43	M108	Existing Mount Pipe	6									Lateral
44	M118	Existing Mount Pipe	8									Lateral
45	M125	Existing Mount Pipe	8									Lateral

Joint Loads and Enforced Displacements (BLC 1 : DL)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-in), (in,rad), (k*s^2/f...
1	N211	L	Y	-.026
2	N212	L	Y	-.026
3	N224	L	Y	-.035
4	N225	L	Y	-.035
5	N234	L	Y	-.035
6	N235	L	Y	-.035
7	N168	L	Y	-.023
8	N170	L	Y	-.023
9	N167	L	Y	-.023
10	N169	L	Y	-.023
11	N176	L	Y	-.023
12	N178	L	Y	-.023
13	N175	L	Y	-.023
14	N177	L	Y	-.023
15	N172	L	Y	-.023
16	N174	L	Y	-.023
17	N171	L	Y	-.023
18	N173	L	Y	-.023
19	N181	L	Y	-.057
20	N182	L	Y	-.057
21	N189	L	Y	-.057
22	N190	L	Y	-.057
23	N185	L	Y	-.057

Joint Loads and Enforced Displacements (BLC 1 : DL) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-in), (in,rad), (k*s^2/f...
24	N186	L	Y	-.057
25	N150	L	Y	-.033
26	N149	L	Y	-.033
27	N154	L	Y	-.033
28	N153	L	Y	-.033
29	N152	L	Y	-.033
30	N151	L	Y	-.033
31	N245	L	Y	-.022
32	N247	L	Y	-.022
33	N246	L	Y	-.022
34	N193	L	Y	-.03
35	N194	L	Y	-.03
36	N201	L	Y	-.03
37	N202	L	Y	-.03
38	N197	L	Y	-.03
39	N198	L	Y	-.03
40	N215	L	Y	-.023
41	N216	L	Y	-.023
42	N252A	L	Y	-.023
43	N253A	L	Y	-.023
44	N238	L	Y	-.023
45	N239	L	Y	-.023
46	N256	L	Y	-.035
47	N257	L	Y	-.035
48	N256	L	Y	-.035
49	N257	L	Y	-.035
50	N261	L	Y	-.035
51	N261	L	Y	-.035
52	N262	L	Y	-.035
53	N262	L	Y	-.035
54	N265	L	Y	-.035
55	N265	L	Y	-.035
56	N266A	L	Y	-.035
57	N266A	L	Y	-.035

Joint Loads and Enforced Displacements (BLC 2 : Maintenance LL - LV)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-in), (in,rad), (k*s^2/f...
1	N54	L	Y	-.25

Joint Loads and Enforced Displacements (BLC 3 : Installation LL - LM)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-in), (in,rad), (k*s^2/f...
1	N266	L	Y	-.5

Joint Loads and Enforced Displacements (BLC 4 : Wind - 0 Deg (+X))

	Joint Label	L,D,M	Direction	Magnitude[(k,k-in), (in,rad), (k*s^2/f...
1	N211	L	X	.183
2	N212	L	X	.183
3	N224	L	X	.258
4	N225	L	X	.258
5	N234	L	X	.258
6	N235	L	X	.258
7	N168	L	X	.197
8	N170	L	X	.197
9	N167	L	X	.197
10	N169	L	X	.197

Joint Loads and Enforced Displacements (BLC 4 : Wind - 0 Deg (+X)) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-in), (in,rad), (k*s^2/f...
11	N176	L	X	.197
12	N178	L	X	.197
13	N175	L	X	.197
14	N177	L	X	.197
15	N172	L	X	.197
16	N174	L	X	.197
17	N171	L	X	.197
18	N173	L	X	.197
19	N181	L	X	.289
20	N182	L	X	.289
21	N189	L	X	.289
22	N190	L	X	.289
23	N185	L	X	.289
24	N186	L	X	.289
25	N150	L	X	.083
26	N149	L	X	.083
27	N154	L	X	.083
28	N153	L	X	.083
29	N152	L	X	.083
30	N151	L	X	.083
31	N245	L	X	.036
32	N247	L	X	.036
33	N246	L	X	.036
34	N193	L	X	.058
35	N194	L	X	.058
36	N201	L	X	.058
37	N202	L	X	.058
38	N197	L	X	.058
39	N198	L	X	.058
40	N215	L	X	.042
41	N216	L	X	.042
42	N252A	L	X	.042
43	N253A	L	X	.042
44	N238	L	X	.042
45	N239	L	X	.042
46	N256	L	X	.071
47	N257	L	X	.071
48	N256	L	X	.071
49	N257	L	X	.071
50	N261	L	X	.071
51	N261	L	X	.071
52	N262	L	X	.071
53	N262	L	X	.071
54	N265	L	X	.071
55	N265	L	X	.071
56	N266A	L	X	.071
57	N266A	L	X	.071

Joint Loads and Enforced Displacements (BLC 5 : Wind - 90 Deg (+Z))

	Joint Label	L,D,M	Direction	Magnitude[(k,k-in), (in,rad), (k*s^2/f...
1	N211	L	Z	.183
2	N212	L	Z	.183
3	N224	L	Z	.258
4	N225	L	Z	.258
5	N234	L	Z	.258
6	N235	L	Z	.258

Joint Loads and Enforced Displacements (BLC 5 : Wind - 90 Deg (+Z)) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-in), (in,rad), (k*s^2/f...
7	N168	L	Z	.197
8	N170	L	Z	.197
9	N167	L	Z	.197
10	N169	L	Z	.197
11	N176	L	Z	.197
12	N178	L	Z	.197
13	N175	L	Z	.197
14	N177	L	Z	.197
15	N172	L	Z	.197
16	N174	L	Z	.197
17	N171	L	Z	.197
18	N173	L	Z	.197
19	N181	L	Z	.289
20	N182	L	Z	.289
21	N189	L	Z	.289
22	N190	L	Z	.289
23	N185	L	Z	.289
24	N186	L	Z	.289
25	N150	L	Z	.083
26	N149	L	Z	.083
27	N154	L	Z	.083
28	N153	L	Z	.083
29	N152	L	Z	.083
30	N151	L	Z	.083
31	N245	L	Z	.036
32	N247	L	Z	.036
33	N246	L	Z	.036
34	N193	L	Z	.058
35	N194	L	Z	.058
36	N201	L	Z	.058
37	N202	L	Z	.058
38	N197	L	Z	.058
39	N198	L	Z	.058
40	N215	L	Z	.042
41	N216	L	Z	.042
42	N252A	L	Z	.042
43	N253A	L	Z	.042
44	N238	L	Z	.042
45	N239	L	Z	.042
46	N256	L	Z	.071
47	N257	L	Z	.071
48	N256	L	Z	.071
49	N257	L	Z	.071
50	N261	L	Z	.071
51	N261	L	Z	.071
52	N262	L	Z	.071
53	N262	L	Z	.071
54	N265	L	Z	.071
55	N265	L	Z	.071
56	N266A	L	Z	.071
57	N266A	L	Z	.071

Joint Loads and Enforced Displacements (BLC 6 : Ice DL)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-in), (in,rad), (k*s^2/f...
1	N211	L	Y	-.15
2	N212	L	Y	-.15

Joint Loads and Enforced Displacements (BLC 6 : Ice DL) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-in), (in,rad), (k*s^2/f...
3	N224	L	Y	-.195
4	N225	L	Y	-.195
5	N234	L	Y	-.195
6	N235	L	Y	-.195
7	N168	L	Y	-.165
8	N170	L	Y	-.165
9	N167	L	Y	-.165
10	N169	L	Y	-.165
11	N176	L	Y	-.165
12	N178	L	Y	-.165
13	N175	L	Y	-.165
14	N177	L	Y	-.165
15	N172	L	Y	-.165
16	N174	L	Y	-.165
17	N171	L	Y	-.165
18	N173	L	Y	-.165
19	N181	L	Y	-.229
20	N182	L	Y	-.229
21	N189	L	Y	-.229
22	N190	L	Y	-.229
23	N185	L	Y	-.229
24	N186	L	Y	-.229
25	N150	L	Y	-.088
26	N149	L	Y	-.088
27	N154	L	Y	-.088
28	N153	L	Y	-.088
29	N152	L	Y	-.088
30	N151	L	Y	-.088
31	N245	L	Y	-.055
32	N247	L	Y	-.055
33	N246	L	Y	-.055
34	N193	L	Y	-.064
35	N194	L	Y	-.064
36	N201	L	Y	-.064
37	N202	L	Y	-.064
38	N197	L	Y	-.064
39	N198	L	Y	-.064
40	N215	L	Y	-.053
41	N216	L	Y	-.053
42	N252A	L	Y	-.053
43	N253A	L	Y	-.053
44	N238	L	Y	-.053
45	N239	L	Y	-.053
46	N256	L	Y	-.082
47	N257	L	Y	-.082
48	N256	L	Y	-.082
49	N257	L	Y	-.082
50	N261	L	Y	-.082
51	N261	L	Y	-.082
52	N262	L	Y	-.082
53	N262	L	Y	-.082
54	N265	L	Y	-.082
55	N265	L	Y	-.082
56	N266A	L	Y	-.082
57	N266A	L	Y	-.082

Joint Loads and Enforced Displacements (BLC 7 : Ice Wind - 0 Deg (+X))

	Joint Label	L,D,M	Direction	Magnitude[(k,k-in), (in,rad), (k*s^2/f...
1	N211	L	X	.033
2	N212	L	X	.033
3	N224	L	X	.045
4	N225	L	X	.045
5	N234	L	X	.045
6	N235	L	X	.045
7	N168	L	X	.035
8	N170	L	X	.035
9	N167	L	X	.035
10	N169	L	X	.035
11	N176	L	X	.035
12	N178	L	X	.035
13	N175	L	X	.035
14	N177	L	X	.035
15	N172	L	X	.035
16	N174	L	X	.035
17	N171	L	X	.035
18	N173	L	X	.035
19	N181	L	X	.049
20	N182	L	X	.049
21	N189	L	X	.049
22	N190	L	X	.049
23	N185	L	X	.049
24	N186	L	X	.049
25	N150	L	X	.017
26	N149	L	X	.017
27	N154	L	X	.017
28	N153	L	X	.017
29	N152	L	X	.017
30	N151	L	X	.017
31	N245	L	X	.01
32	N247	L	X	.01
33	N246	L	X	.01
34	N193	L	X	.011
35	N194	L	X	.011
36	N201	L	X	.011
37	N202	L	X	.011
38	N197	L	X	.011
39	N198	L	X	.011
40	N215	L	X	.009
41	N216	L	X	.009
42	N252A	L	X	.009
43	N253A	L	X	.009
44	N238	L	X	.009
45	N239	L	X	.009
46	N256	L	X	.014
47	N257	L	X	.014
48	N256	L	X	.014
49	N257	L	X	.014
50	N261	L	X	.014
51	N261	L	X	.014
52	N262	L	X	.014
53	N262	L	X	.014
54	N265	L	X	.014
55	N265	L	X	.014
56	N266A	L	X	.014
57	N266A	L	X	.014

Joint Loads and Enforced Displacements (BLC 8 : Ice Wind - 90 Deg (+Z))

	Joint Label	L,D,M	Direction	Magnitude[(k,k-in), (in,rad), (k*s^2/f...
1	N211	L	Z	.033
2	N212	L	Z	.033
3	N224	L	Z	.045
4	N225	L	Z	.045
5	N234	L	Z	.045
6	N235	L	Z	.045
7	N168	L	Z	.035
8	N170	L	Z	.035
9	N167	L	Z	.035
10	N169	L	Z	.035
11	N176	L	Z	.035
12	N178	L	Z	.035
13	N175	L	Z	.035
14	N177	L	Z	.035
15	N172	L	Z	.035
16	N174	L	Z	.035
17	N171	L	Z	.035
18	N173	L	Z	.035
19	N181	L	Z	.049
20	N182	L	Z	.049
21	N189	L	Z	.049
22	N190	L	Z	.049
23	N185	L	Z	.049
24	N186	L	Z	.049
25	N150	L	Z	.017
26	N149	L	Z	.017
27	N154	L	Z	.017
28	N153	L	Z	.017
29	N152	L	Z	.017
30	N151	L	Z	.017
31	N245	L	Z	.01
32	N247	L	Z	.01
33	N246	L	Z	.01
34	N193	L	Z	.011
35	N194	L	Z	.011
36	N201	L	Z	.011
37	N202	L	Z	.011
38	N197	L	Z	.011
39	N198	L	Z	.011
40	N215	L	Z	.009
41	N216	L	Z	.009
42	N252A	L	Z	.009
43	N253A	L	Z	.009
44	N238	L	Z	.009
45	N239	L	Z	.009
46	N256	L	Z	.014
47	N257	L	Z	.014
48	N256	L	Z	.014
49	N257	L	Z	.014
50	N261	L	Z	.014
51	N261	L	Z	.014
52	N262	L	Z	.014
53	N262	L	Z	.014
54	N265	L	Z	.014
55	N265	L	Z	.014
56	N266A	L	Z	.014
57	N266A	L	Z	.014

Member Distributed Loads (BLC 4 : Wind - 0 Deg (+X))

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	44.94	44.94	0	0
2	M2	X	44.94	44.94	0	0
3	M3	X	44.94	44.94	0	0
4	M6	X	2.81	2.81	0	0
5	M9	X	2.81	2.81	0	0
6	M12	X	2.81	2.81	0	0
7	M4	X	29.96	29.96	0	0
8	M7	X	29.96	29.96	0	0
9	M10	X	29.96	29.96	0	0
10	M5	X	29.96	29.96	0	0
11	M8	X	29.96	29.96	0	0
12	M11	X	29.96	29.96	0	0
13	M32	X	10.7	10.7	0	0
14	M45	X	10.7	10.7	0	0
15	M44	X	10.7	10.7	0	0
16	M31	X	10.7	10.7	0	0
17	M53	X	10.7	10.7	0	0
18	M52	X	10.7	10.7	0	0
19	M33	X	10.7	10.7	0	0
20	M49	X	10.7	10.7	0	0
21	M48	X	10.7	10.7	0	0
22	M16	X	22.47	22.47	0	0
23	M17	X	22.47	22.47	0	0
24	M18	X	22.47	22.47	0	0
25	M34	X	22.47	22.47	0	0
26	M35	X	22.47	22.47	0	0
27	M36	X	22.47	22.47	0	0

Member Distributed Loads (BLC 5 : Wind - 90 Deg (+Z))

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	44.94	44.94	0	0
2	M2	Z	44.94	44.94	0	0
3	M3	Z	44.94	44.94	0	0
4	M6	Z	2.81	2.81	0	0
5	M9	Z	2.81	2.81	0	0
6	M12	Z	2.81	2.81	0	0
7	M4	Z	29.96	29.96	0	0
8	M7	Z	29.96	29.96	0	0
9	M10	Z	29.96	29.96	0	0
10	M5	Z	29.96	29.96	0	0
11	M8	Z	29.96	29.96	0	0
12	M11	Z	29.96	29.96	0	0
13	M32	Z	10.7	10.7	0	0
14	M45	Z	10.7	10.7	0	0
15	M44	Z	10.7	10.7	0	0
16	M31	Z	10.7	10.7	0	0
17	M53	Z	10.7	10.7	0	0
18	M52	Z	10.7	10.7	0	0
19	M33	Z	10.7	10.7	0	0
20	M49	Z	10.7	10.7	0	0
21	M48	Z	10.7	10.7	0	0
22	M16	Z	22.47	22.47	0	0
23	M17	Z	22.47	22.47	0	0
24	M18	Z	22.47	22.47	0	0
25	M34	Z	22.47	22.47	0	0

Member Distributed Loads (BLC 5 : Wind - 90 Deg (+Z)) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
26	M35	Z	22.47	22.47	0	0
27	M36	Z	22.47	22.47	0	0

Member Distributed Loads (BLC 6 : Ice DL)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-22	-22	0	0
2	M2	Y	-22	-22	0	0
3	M3	Y	-22	-22	0	0
4	M6	Y	-32.48	-32.48	0	0
5	M9	Y	-32.48	-32.48	0	0
6	M12	Y	-32.48	-32.48	0	0
7	M4	Y	-22.89	-22.89	0	0
8	M7	Y	-22.89	-22.89	0	0
9	M10	Y	-22.89	-22.89	0	0
10	M5	Y	-22.89	-22.89	0	0
11	M8	Y	-22.89	-22.89	0	0
12	M11	Y	-22.89	-22.89	0	0
13	M32	Y	-13.51	-13.51	0	0
14	M45	Y	-13.51	-13.51	0	0
15	M44	Y	-13.51	-13.51	0	0
16	M31	Y	-13.51	-13.51	0	0
17	M53	Y	-13.51	-13.51	0	0
18	M52	Y	-13.51	-13.51	0	0
19	M33	Y	-13.51	-13.51	0	0
20	M49	Y	-13.51	-13.51	0	0
21	M48	Y	-13.51	-13.51	0	0
22	M16	Y	-18.84	-18.84	0	0
23	M17	Y	-18.84	-18.84	0	0
24	M18	Y	-18.84	-18.84	0	0
25	M34	Y	-18.84	-18.84	0	0
26	M35	Y	-18.84	-18.84	0	0
27	M36	Y	-18.84	-18.84	0	0

Member Distributed Loads (BLC 7 : Ice Wind - 0 Deg (+X))

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	9.68	9.68	0	0
2	M2	X	9.68	9.68	0	0
3	M3	X	9.68	9.68	0	0
4	M6	X	4.58	4.58	0	0
5	M9	X	4.58	4.58	0	0
6	M12	X	4.58	4.58	0	0
7	M4	X	7.87	7.87	0	0
8	M7	X	7.87	7.87	0	0
9	M10	X	7.87	7.87	0	0
10	M5	X	7.87	7.87	0	0
11	M8	X	7.87	7.87	0	0
12	M11	X	7.87	7.87	0	0
13	M32	X	3.84	3.84	0	0
14	M45	X	3.84	3.84	0	0
15	M44	X	3.84	3.84	0	0
16	M31	X	3.84	3.84	0	0
17	M53	X	3.84	3.84	0	0
18	M52	X	3.84	3.84	0	0
19	M33	X	3.84	3.84	0	0
20	M49	X	3.84	3.84	0	0
21	M48	X	3.84	3.84	0	0

Member Distributed Loads (BLC 7 : Ice Wind - 0 Deg (+X)) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
22	M16	X	6.96	6.96	0	0
23	M17	X	6.96	6.96	0	0
24	M18	X	6.96	6.96	0	0
25	M34	X	6.96	6.96	0	0
26	M35	X	6.96	6.96	0	0
27	M36	X	6.96	6.96	0	0

Member Distributed Loads (BLC 8 : Ice Wind - 90 Deg (+Z))

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	9.68	9.68	0	0
2	M2	Z	9.68	9.68	0	0
3	M3	Z	9.68	9.68	0	0
4	M6	Z	4.58	4.58	0	0
5	M9	Z	4.58	4.58	0	0
6	M12	Z	4.58	4.58	0	0
7	M4	Z	7.87	7.87	0	0
8	M7	Z	7.87	7.87	0	0
9	M10	Z	7.87	7.87	0	0
10	M5	Z	7.87	7.87	0	0
11	M8	Z	7.87	7.87	0	0
12	M11	Z	7.87	7.87	0	0
13	M32	Z	3.84	3.84	0	0
14	M45	Z	3.84	3.84	0	0
15	M44	Z	3.84	3.84	0	0
16	M31	Z	3.84	3.84	0	0
17	M53	Z	3.84	3.84	0	0
18	M52	Z	3.84	3.84	0	0
19	M33	Z	3.84	3.84	0	0
20	M49	Z	3.84	3.84	0	0
21	M48	Z	3.84	3.84	0	0
22	M16	Z	6.96	6.96	0	0
23	M17	Z	6.96	6.96	0	0
24	M18	Z	6.96	6.96	0	0
25	M34	Z	6.96	6.96	0	0
26	M35	Z	6.96	6.96	0	0
27	M36	Z	6.96	6.96	0	0

Member Distributed Loads (BLC 9 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.41	-8.026	6.25	7.813
2	M1	Y	-8.026	-15.922	7.813	9.375
3	M1	Y	-15.922	-9.946	9.375	10.938
4	M1	Y	-9.946	-.41	10.938	12.5
5	M3	Y	-.468	-11.218	0	1.562
6	M3	Y	-11.218	-13.554	1.562	3.125
7	M3	Y	-13.554	-6.454	3.125	4.687
8	M3	Y	-6.454	-4.02	4.687	6.25
9	M8	Y	-1.343	-11.73	0	1.688
10	M8	Y	-11.73	-17.865	1.688	3.375
11	M8	Y	-17.865	-13.534	3.375	5.063
12	M8	Y	-13.534	-2.99	5.063	6.751
13	M9	Y	-5.782	-5.782	.391	1.391
14	M2	Y	-.906	-11.595	0	2.083
15	M2	Y	-11.595	-11.935	2.083	4.167
16	M2	Y	-11.935	-.906	4.167	6.25
17	M3	Y	-2.271	-9.255	6.25	8.75

Member Distributed Loads (BLC 9 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
18	M3	Y	-9.255	-16.24	8.75	11.25
19	M5	Y	-.993	-10.866	0	1.35
20	M5	Y	-10.866	-15.523	1.35	2.7
21	M5	Y	-15.523	-16.145	2.7	4.05
22	M5	Y	-16.145	-12.052	4.05	5.401
23	M5	Y	-12.052	-1.271	5.401	6.751
24	M6	Y	-10.685	-10.866	0	1.458
25	M1	Y	-.409	-9.929	0	1.563
26	M1	Y	-9.929	-15.899	1.563	3.125
27	M1	Y	-15.899	-8.017	3.125	4.688
28	M1	Y	-8.017	-.409	4.688	6.25
29	M2	Y	-4.021	-6.459	6.25	7.812
30	M2	Y	-6.459	-13.576	7.812	9.375
31	M2	Y	-13.576	-11.243	9.375	10.937
32	M2	Y	-11.243	-.47	10.937	12.5
33	M11	Y	-2.989	-13.543	0	1.688
34	M11	Y	-13.543	-17.867	1.688	3.375
35	M11	Y	-17.867	-11.722	3.375	5.063
36	M11	Y	-11.722	-1.339	5.063	6.751
37	M12	Y	-5.776	-5.776	.069	1.069
38	M5	Y	-.15	-3.633	0	.675
39	M5	Y	-3.633	-6.612	.675	1.35
40	M5	Y	-6.612	-7.739	1.35	2.025
41	M5	Y	-7.739	-4.011	2.025	2.7
42	M5	Y	-4.011	-.15	2.7	3.375
43	M8	Y	-.18	-4.057	3.375	4.05
44	M8	Y	-4.057	-7.867	4.05	4.725
45	M8	Y	-7.867	-6.819	4.725	5.401
46	M8	Y	-6.819	-3.91	5.401	6.076
47	M8	Y	-3.91	-.18	6.076	6.751
48	M8	Y	-1.945	-3.449	0	.675
49	M8	Y	-3.449	-6.179	.675	1.35
50	M8	Y	-6.179	-7.891	1.35	2.025
51	M8	Y	-7.891	-3.85	2.025	2.7
52	M8	Y	-3.85	-.075	2.7	3.375
53	M11	Y	-.218	-5.699	3.375	4.219
54	M11	Y	-5.699	-8.35	4.219	5.063
55	M11	Y	-8.35	-3.775	5.063	5.907
56	M11	Y	-3.775	-.287	5.907	6.751
57	M5	Y	-.15	-4.008	3.375	4.05
58	M5	Y	-4.008	-7.739	4.05	4.725
59	M5	Y	-7.739	-6.616	4.725	5.401
60	M5	Y	-6.616	-3.635	5.401	6.076
61	M5	Y	-3.635	-.15	6.076	6.751
62	M11	Y	-.18	-3.908	0	.675
63	M11	Y	-3.908	-6.815	.675	1.35
64	M11	Y	-6.815	-7.866	1.35	2.025
65	M11	Y	-7.866	-4.06	2.025	2.7
66	M11	Y	-4.06	-.18	2.7	3.375

Member Distributed Loads (BLC 10 : BLC 6 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.448	-8.773	6.25	7.813
2	M1	Y	-8.773	-17.403	7.813	9.375
3	M1	Y	-17.403	-10.871	9.375	10.938
4	M1	Y	-10.871	-.448	10.938	12.5

Member Distributed Loads (BLC 10 : BLC 6 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
5	M3	Y	-.512	-12.262	0	1.562
6	M3	Y	-12.262	-14.814	1.562	3.125
7	M3	Y	-14.814	-7.054	3.125	4.687
8	M3	Y	-7.054	-4.394	4.687	6.25
9	M8	Y	-1.468	-12.821	0	1.688
10	M8	Y	-12.821	-19.526	1.688	3.375
11	M8	Y	-19.526	-14.793	3.375	5.063
12	M8	Y	-14.793	-3.268	5.063	6.751
13	M9	Y	-6.32	-6.32	.391	1.391
14	M2	Y	-.99	-12.673	0	2.083
15	M2	Y	-12.673	-13.045	2.083	4.167
16	M2	Y	-13.045	-.99	4.167	6.25
17	M3	Y	-2.482	-10.116	6.25	8.75
18	M3	Y	-10.116	-17.75	8.75	11.25
19	M5	Y	-1.086	-11.876	0	1.35
20	M5	Y	-11.876	-16.966	1.35	2.7
21	M5	Y	-16.966	-17.647	2.7	4.05
22	M5	Y	-17.647	-13.173	4.05	5.401
23	M5	Y	-13.173	-1.389	5.401	6.751
24	M6	Y	-11.679	-11.876	0	1.458
25	M1	Y	-.447	-10.852	0	1.563
26	M1	Y	-10.852	-17.378	1.563	3.125
27	M1	Y	-17.378	-8.762	3.125	4.688
28	M1	Y	-8.762	-.447	4.688	6.25
29	M2	Y	-4.395	-7.06	6.25	7.812
30	M2	Y	-7.06	-14.839	7.812	9.375
31	M2	Y	-14.839	-12.288	9.375	10.937
32	M2	Y	-12.288	-.514	10.937	12.5
33	M11	Y	-3.267	-14.803	0	1.688
34	M11	Y	-14.803	-19.528	1.688	3.375
35	M11	Y	-19.528	-12.812	3.375	5.063
36	M11	Y	-12.812	-1.463	5.063	6.751
37	M12	Y	-6.313	-6.313	.069	1.069
38	M5	Y	-.164	-3.971	0	.675
39	M5	Y	-3.971	-7.227	.675	1.35
40	M5	Y	-7.227	-8.458	1.35	2.025
41	M5	Y	-8.458	-4.384	2.025	2.7
42	M5	Y	-4.384	-.164	2.7	3.375
43	M8	Y	-.197	-4.434	3.375	4.05
44	M8	Y	-4.434	-8.598	4.05	4.725
45	M8	Y	-8.598	-7.453	4.725	5.401
46	M8	Y	-7.453	-4.273	5.401	6.076
47	M8	Y	-4.273	-.197	6.076	6.751
48	M8	Y	-2.126	-3.77	0	.675
49	M8	Y	-3.77	-6.754	.675	1.35
50	M8	Y	-6.754	-8.625	1.35	2.025
51	M8	Y	-8.625	-4.208	2.025	2.7
52	M8	Y	-4.208	-.082	2.7	3.375
53	M11	Y	-.238	-6.229	3.375	4.219
54	M11	Y	-6.229	-9.127	4.219	5.063
55	M11	Y	-9.127	-4.127	5.063	5.907
56	M11	Y	-4.127	-.314	5.907	6.751
57	M5	Y	-.164	-4.381	3.375	4.05
58	M5	Y	-4.381	-8.458	4.05	4.725
59	M5	Y	-8.458	-7.231	4.725	5.401
60	M5	Y	-7.231	-3.973	5.401	6.076
61	M5	Y	-3.973	-.164	6.076	6.751

Member Distributed Loads (BLC 10 : BLC 6 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
62	M11	Y	-.197	-4.271	0	.675
63	M11	Y	-4.271	-7.449	.675	1.35
64	M11	Y	-7.449	-8.598	1.35	2.025
65	M11	Y	-8.598	-4.437	2.025	2.7
66	M11	Y	-4.437	-.197	2.7	3.375

Basic Load Cases

	BLC Description	Category	X Grav..	Y Grav..	Z Grav...	Joint	Point	Distributed	Area(Member)	Surfac...
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		27		
5	Wind - 90 Deg (+Z)	WL				57		27		
6	Ice DL	DL				57		27	6	
7	Ice Wind - 0 Deg (+X)	WL				57		27		
8	Ice Wind - 90 Deg (+Z)	WL				57		27		
9	BLC 1 Transient Area...	None						66		
10	BLC 6 Transient Area...	None						66		

Load Combinations

	Description	S...	P...	S...	BLC	Fac...	B...	Factor	B...	Fact...	B...	Factor...	F.....	F.....	F.....	F.....	F.....	F...
1	WIND LOAD COMBOS																	
2	(Basic Wind Speed, V = 115 MPH)																	
3	1.2DL + WL (0 DEG, +X)	Yes	Y		1	1.2	4	1										
4	1.2DL + WL (0 DEG, -X)	Yes	Y		1	1.2	4	-1										
5	1.2DL + WL (30 DEG, +X, +Z)	Yes	Y		1	1.2	4	.866	5	.5								
6	1.2DL + WL (30 DEG, -X, -Z)	Yes	Y		1	1.2	4	-.866	5	-.5								
7	1.2DL + WL (30 DEG, +X, -Z)	Yes	Y		1	1.2	4	.866	5	-.5								
8	1.2DL + WL (30 DEG, -X, +Z)	Yes	Y		1	1.2	4	-.866	5	.5								
9	1.2DL + WL (60 DEG, +X, +Z)	Yes	Y		1	1.2	5	.866	4	.5								
10	1.2DL + WL (60 DEG, -X, -Z)	Yes	Y		1	1.2	5	-.866	4	-.5								
11	1.2DL + WL (60 DEG, +X, -Z)	Yes	Y		1	1.2	5	.866	4	-.5								
12	1.2DL + WL (60 DEG, -X, +Z)	Yes	Y		1	1.2	5	-.866	4	.5								
13	1.2DL + WL (90 DEG, +Z)	Yes	Y		1	1.2	5	1										
14	1.2DL + WL (90 DEG, -Z)	Yes	Y		1	1.2	5	-1										
15	0.9DL + WL (0 DEG, +X)	Yes	Y		1	.9	4	1										
16	0.9DL + WL (0 DEG, -X)	Yes	Y		1	.9	4	-1										
17	0.9DL + WL (30 DEG, +X, +Z)	Yes	Y		1	.9	4	.866	5	.5								
18	0.9DL + WL (30 DEG, -X, -Z)	Yes	Y		1	.9	4	-.866	5	-.5								
19	0.9DL + WL (30 DEG, +X, -Z)	Yes	Y		1	.9	4	.866	5	-.5								
20	0.9DL + WL (30 DEG, -X, +Z)	Yes	Y		1	.9	4	-.866	5	.5								
21	0.9DL + WL (60 DEG, +X, +Z)	Yes	Y		1	.9	5	.866	4	.5								
22	0.9DL + WL (60 DEG, -X, -Z)	Yes	Y		1	.9	5	-.866	4	-.5								
23	0.9DL + WL (60 DEG, +X, -Z)	Yes	Y		1	.9	5	.866	4	-.5								
24	0.9DL + WL (60 DEG, -X, +Z)	Yes	Y		1	.9	5	-.866	4	.5								
25	0.9DL + WL (90 DEG, +Z)	Yes	Y		1	.9	5	1										
26	0.9DL + WL (90 DEG, -Z)	Yes	Y		1	.9	5	-1										
27																		
28	MOUNT LOAD COMBOS (30 MPH)																	
29	1.4DL	Yes	Y		1	1.4												
30	1.2DL + 1.5LV	Yes	Y		1	1.2	2	1.5										
31	1.2DL + 1.5LM + WL (0 DEG, +X)	Yes	Y		1	1.2	3	1.5	4	.068								
32	1.2DL + 1.5LM + WL (0 DEG, -X)	Yes	Y		1	1.2	3	1.5	4	-.068								
33	1.2DL + 1.5LM + WL (30 DEG, +X, +Z)	Yes	Y		1	1.2	3	1.5	4	.059	5	.034						

Load Combinations (Continued)

	Description	S...	P...	S...	BLC	Fac...	B...	Factor	B...	Fact...	B...	Factor...	F.....	F.....	F.....	F.....	F.....	F.....	F...
34	1.2DL + 1.5LM + WL (30 DEG, -X, -Z)	Yes	Y		1	1.2	3	1.5	4	-.059	5	-.034							
35	1.2DL + 1.5LM + WL (30 DEG, +X, -Z)	Yes	Y		1	1.2	3	1.5	4	.059	5	-.034							
36	1.2DL + 1.5LM + WL (30 DEG, -X, +Z)	Yes	Y		1	1.2	3	1.5	4	-.059	5	.034							
37	1.2DL + 1.5LM + WL (60 DEG, +X, +Z)	Yes	Y		1	1.2	3	1.5	5	.059	4	.034							
38	1.2DL + 1.5LM + WL (60 DEG, -X, -Z)	Yes	Y		1	1.2	3	1.5	5	-.059	4	-.034							
39	1.2DL + 1.5LM + WL (60 DEG, +X, -Z)	Yes	Y		1	1.2	3	1.5	5	.059	4	-.034							
40	1.2DL + 1.5LM + WL (60 DEG, -X, +Z)	Yes	Y		1	1.2	3	1.5	5	-.059	4	.034							
41	1.2DL + 1.5LM + WL (90 DEG, +Z)	Yes	Y		1	1.2	3	1.5	5	.068									
42	1.2DL + 1.5LM + WL (90 DEG, -Z)	Yes	Y		1	1.2	3	1.5	5	-.068									
43																			
44	LOAD COMBOS WITH ICE																		
45	1.2DL + Ice DL + Ice WL (0 DEG, +X)	Yes	Y		1	1.2	6	1	7	1									
46	1.2DL + Ice DL + Ice WL (0 DEG, -X)	Yes	Y		1	1.2	6	1	7	-1									
47	1.2DL + Ice DL + Ice WL (30 DEG, +X, +Z)	Yes	Y		1	1.2	6	1	7	.866	8	.5							
48	1.2DL + Ice DL + Ice WL (30 DEG, -X, -Z)	Yes	Y		1	1.2	6	1	7	-.866	8	-.5							
49	1.2DL + Ice DL + Ice WL (30 DEG, +X, -Z)	Yes	Y		1	1.2	6	1	7	.866	8	-.5							
50	1.2DL + Ice DL + Ice WL (30 DEG, -X, +Z)	Yes	Y		1	1.2	6	1	7	-.866	8	.5							
51	1.2DL + Ice DL + Ice WL (60 DEG, +X, +Z)	Yes	Y		1	1.2	6	1	8	.866	7	.5							
52	1.2DL + Ice DL + Ice WL (60 DEG, -X, -Z)	Yes	Y		1	1.2	6	1	8	-.866	7	-.5							
53	1.2DL + Ice DL + Ice WL (60 DEG, +X, -Z)	Yes	Y		1	1.2	6	1	8	.866	7	-.5							
54	1.2DL + Ice DL + Ice WL (60 DEG, -X, +Z)	Yes	Y		1	1.2	6	1	8	-.866	7	.5							
55	1.2DL + Ice DL + Ice WL (90 DEG, +Z)	Yes	Y		1	1.2	6	1	8	1									
56	1.2DL + Ice DL + Ice WL (90 DEG, -Z)	Yes	Y		1	1.2	6	1	8	-1									
57																			

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-in]	LC	MY [k-in]	LC	MZ [k-in]	LC
1	N20	max	.835	16	6.066	56	3.987	26	233.384	56	35.882	15	12.395	3
2		min	-.833	15	-2.072	25	-20.046	55	-143.827	25	-36.021	4	-12.457	4
3	N23	max	3.448	20	6.037	50	10.028	49	72.167	19	35.146	10	124.797	19
4		min	-17.356	49	-2.081	19	-1.997	20	-116.228	8	-34.947	21	-201.394	8
5	N26	max	17.349	48	5.888	47	10.022	48	72.774	18	29.075	23	199.942	5
6		min	-3.428	17	-2.102	18	-2.02	17	-115.517	5	-29.063	24	-125.925	18
7	Totals:	max	12.524	16	16.117	53	12.524	14						
8		min	-12.524	3	3.592	24	-12.524	25						

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear...	Loc[ft]	Dir	LC	phi*P...	phi*P...	phi*M...	phi*M.....		Eqn
1	M1	C5x6.7	.689	12.5	9	.614	11.735	y	11	26.144	63.828	19.245	78.998	...	H1-1b
2	M2	C5x6.7	.686	12.5	12	.614	.765	y	54	26.144	63.828	19.245	78.974	...	H1-1b
3	M3	C5x6.7	.691	12.5	4	.619	.765	y	46	26.144	63.828	19.245	78.919	...	H1-1b
4	M4	HSS4x4...	1.382	6.417	14	.186	6.417	y	48	108.8...	127.3...	177.2...	177.2...	....	H1-1b
5	M5	L4x4x4	1.293	3.375	56	.063	3.375	z	52	34.104	62.532	37.651	71.992	...	H2-1
6	M6	PL9x3/8	1.316	.729	48	.666	.729	y	53	29.176	109.35	10.252	246.0...	....	H1-1b
7	M7	HSS4x4...	1.369	6.417	8	.187	6.417	y	48	108.8...	127.3...	177.2...	177.2...	....	H1-1b
8	M8	L4x4x4	1.285	3.375	50	.063	3.375	z	46	34.104	62.532	37.651	71.993	...	H2-1
9	M9	PL9x3/8	1.322	.729	48	.669	.729	y	54	29.176	109.35	10.252	246.0...	....	H1-1b
10	M10	HSS4x4...	1.351	6.417	5	.180	6.417	y	55	108.8...	127.3...	177.2...	177.2...	....	H1-1b
11	M11	L4x4x4	1.253	3.375	47	.061	3.375	z	51	34.104	62.532	37.651	72.001	...	H2-1
12	M12	PL9x3/8	1.278	.729	55	.663	.729	y	46	29.176	109.35	10.252	246.0...	....	H1-1b
13	M16	L3x3x4	1.938	6.25	13	.098	6.25	y	12	4.948	46.656	20.258	31.73	...	H2-1
14	M17	L3x3x4	1.944	6.25	7	.101	6.25	y	4	4.948	46.656	20.258	31.801	...	H2-1
15	M18	L3x3x4	1.955	6.25	6	.101	6.25	y	9	4.948	46.656	20.258	31.767	...	H2-1
16	M31	PIPE_2.0	2.956	4.714	10	1.249	4.714		10	23.088	32.13	22.459	22.459	...	H3-6

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear...	Loc[ft]	Dir	LC	phi*P...	phi*P...	phi*M...	phi*M.....		Eqn
17	M32	PIPE_2.0	2.971	4.714	11	1.265	4.714		11	23.088	32.13	22.459	22.459	...	H3-6
18	M33	PIPE_2.0	2.949	4.714	4	1.248	4.714		3	23.088	32.13	22.459	22.459	...	H3-6
19	M34	L3x3x4	1.818	6.25	26	.114	0	z	10	4.948	46.656	20.258	31.632	...	H2-1
20	M35	L3x3x4	1.824	6.25	20	.115	0	z	11	4.948	46.656	20.258	31.545	...	H2-1
21	M36	L3x3x4	1.805	6.25	17	.116	0	z	3	4.948	46.656	20.258	31.598	...	H2-1
22	M43	PIPE_2.0	1.282	3.78	46	.366	3.317		8	27.071	32.13	22.459	22.459	...	H1-1b
23	M44	PIPE_2.0	.615	3.78	4	.177	.964		8	27.071	32.13	22.459	22.459	...	H1-1b
24	M45	PIPE_2.0	.578	3.78	3	.132	3.78		5	27.071	32.13	22.459	22.459	...	H1-1b
25	M46	PIPE_2.0	1.172	3.78	45	.363	3.317		5	27.071	32.13	22.459	22.459	...	H1-1b
26	M47	PIPE_2.0	1.280	3.78	51	.380	3.317		5	27.071	32.13	22.459	22.459	...	H1-1b
27	M48	PIPE_2.0	.618	3.78	9	.183	.964		5	27.071	32.13	22.459	22.459	...	H1-1b
28	M49	PIPE_2.0	.582	3.78	10	.132	3.78		9	27.071	32.13	22.459	22.459	...	H1-1b
29	M50	PIPE_2.0	1.176	3.78	52	.360	3.317		14	27.071	32.13	22.459	22.459	...	H1-1b
30	M51	PIPE_2.0	1.288	3.78	54	.386	3.317		14	27.071	32.13	22.459	22.459	...	H1-1b
31	M52	PIPE_2.0	.632	3.78	12	.187	.964		14	27.071	32.13	22.459	22.459	...	H1-1b
32	M53	PIPE_2.0	.595	3.78	11	.139	3.78		12	27.071	32.13	22.459	22.459	...	H1-1b
33	M54	PIPE_2.0	1.178	3.78	11	.373	3.317		8	27.071	32.13	22.459	22.459	...	H1-1b
34	M67	PIPE_2.0	.462	4.776	46	.114	2.02		56	20.867	32.13	22.459	22.459	...	H1-1b
35	M68	PIPE_2.0	.430	4.776	3	.112	2.02		56	20.867	32.13	22.459	22.459	...	H1-1b
36	M69	PIPE_2.0	.462	4.776	51	.117	2.02		3	20.867	32.13	22.459	22.459	...	H1-1b
37	M70	PIPE_2.0	.430	4.776	10	.113	2.02		50	20.867	32.13	22.459	22.459	...	H1-1b
38	M71	PIPE_2.0	.465	4.776	54	.117	2.02		10	20.867	32.13	22.459	22.459	...	H1-1b
39	M72	PIPE_2.0	.439	4.776	11	.113	2.02		47	20.867	32.13	22.459	22.459	...	H1-1b
40	M79	PIPE_2.0	.454	6.204	3	.152	2.531		4	14.916	32.13	22.459	22.459	...	H1-1b
41	M80	PIPE_2.0	.457	6.204	10	.157	2.531		9	14.916	32.13	22.459	22.459	...	H1-1b
42	M81	PIPE_2.0	.468	6.204	11	.163	2.531		12	14.916	32.13	22.459	22.459	...	H1-1b
43	M108	PIPE_2.0	.197	2.02	13	.209	2.02		12	20.867	32.13	22.459	22.459	...	H1-1b
44	M118	PIPE_2.0	.348	2.939	7	.200	4		4	14.916	32.13	22.459	22.459	...	H1-1b
45	M125	PIPE_2.0	.348	2.939	6	.199	3.02		9	14.916	32.13	22.459	22.459	...	H1-1b

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
1	N0	max	0	3	0	3	0	3	0	3	0	3	0	3
2		min	0	3	0	3	0	3	0	3	0	3	0	3
3	N2	max	.255	3	1.993	18	.234	13	2.55e-02	13	1.25e-03	12	2.756e-02	16
4		min	-.254	4	-2.445	5	-.233	14	-2.382e-02	26	-1.261e-03	11	-3.065e-02	3
5	N3	max	.251	3	1.98	19	.298	13	2.547e-02	13	2.834e-03	13	3.103e-02	4
6		min	-.258	4	-2.461	8	-.298	14	-2.38e-02	26	-2.838e-03	14	-2.74e-02	15
7	N4	max	.255	3	1.732	18	.215	13	5.551e-02	9	1.484e-03	24	2.605e-02	16
8		min	-.254	4	-2.149	5	-.215	14	-3.859e-02	22	-1.779e-03	11	-2.92e-02	3
9	N5	max	.25	3	1.722	19	.263	13	5.572e-02	11	3.089e-03	13	2.955e-02	4
10		min	-.257	4	-2.163	8	-.263	14	-3.86e-02	24	-2.816e-03	22	-2.591e-02	15
11	N6	max	.253	3	.829	26	.27	13	4.654e-02	13	7.642e-04	8	2.262e-02	4
12		min	-.256	4	-1.075	13	-.271	14	-3.151e-02	26	-7.32e-04	15	-2.255e-02	3
13	N7	max	.253	3	.829	26	.27	13	4.654e-02	13	7.546e-04	20	2.276e-02	4
14		min	-.256	4	-1.075	13	-.271	14	-3.151e-02	26	-7.203e-04	15	-2.241e-02	3
15	N8	max	.298	3	1.977	25	.261	13	2.925e-02	25	2.796e-03	4	2.248e-02	4
16		min	-.299	4	-2.468	14	-.268	14	-3.35e-02	14	-2.784e-03	3	-2.238e-02	3
17	N9	max	.251	3	1.993	18	.238	13	2.55e-02	13	1.25e-03	12	2.756e-02	16
18		min	-.25	4	-2.445	5	-.237	14	-2.382e-02	26	-1.261e-03	11	-3.065e-02	3
19	N10	max	.267	3	1.719	25	.257	13	3.608e-02	25	2.988e-03	16	2.88e-02	20
20		min	-.268	4	-2.17	14	-.265	14	-4.884e-02	14	-3.272e-03	3	-3.998e-02	7
21	N11	max	.242	3	1.733	18	.228	13	1.96e-02	23	1.774e-03	12	4.146e-02	16
22		min	-.241	4	-2.149	5	-.227	14	-2.377e-02	12	-1.499e-03	23	-5.775e-02	3
23	N12	max	.277	3	.827	20	.251	13	2.282e-02	23	7.435e-04	25	2.808e-02	16

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
24		min	-.279	4	-1.078	7	-.253	14	-3.178e-02	14	-8.51e-04	26	-4.161e-02	3
25	N13	max	.278	3	.827	20	.251	13	2.252e-02	23	7.231e-04	25	2.846e-02	16
26		min	-.279	4	-1.078	7	-.252	14	-3.119e-02	14	-8.369e-04	14	-4.216e-02	3
27	N14	max	.249	3	1.979	19	.308	13	2.547e-02	13	2.834e-03	13	3.103e-02	4
28		min	-.255	4	-2.462	8	-.308	14	-2.38e-02	26	-2.838e-03	14	-2.74e-02	15
29	N15	max	.298	3	1.976	25	.265	13	2.925e-02	25	2.796e-03	4	2.248e-02	4
30		min	-.299	4	-2.467	14	-.271	14	-3.35e-02	14	-2.784e-03	3	-2.238e-02	3
31	N16	max	.242	3	1.719	19	.29	13	1.945e-02	21	3.064e-03	25	5.831e-02	4
32		min	-.247	4	-2.165	8	-.29	14	-2.376e-02	10	-3.358e-03	14	-4.103e-02	15
33	N17	max	.266	3	1.718	25	.267	13	3.611e-02	25	3.287e-03	4	4.007e-02	6
34		min	-.268	4	-2.168	14	-.274	14	-4.888e-02	14	-3.02e-03	19	-2.87e-02	17
35	N18	max	.277	3	.823	17	.288	13	2.248e-02	21	3.36e-04	24	4.247e-02	4
36		min	-.28	4	-1.084	6	-.291	14	-3.116e-02	14	-3.634e-04	20	-2.816e-02	15
37	N19	max	.277	3	.823	17	.288	13	2.278e-02	21	3.163e-04	24	4.191e-02	4
38		min	-.279	4	-1.084	6	-.291	14	-3.176e-02	14	-3.497e-04	20	-2.778e-02	15
39	N20	max	0	15	0	25	0	55	0	25	0	4	0	4
40		min	0	16	0	56	0	26	0	56	0	15	0	3
41	N21	max	.268	3	1.998	25	.093	13	4.146e-02	25	3.21e-03	4	6.765e-03	4
42		min	-.269	4	-2.354	14	-.091	14	-4.427e-02	14	-3.197e-03	3	-6.732e-03	3
43	N22	max	.266	3	1.625	25	.258	25	4.146e-02	25	3.209e-03	4	6.765e-03	4
44		min	-.268	4	-1.955	14	-.268	14	-4.427e-02	14	-3.195e-03	3	-6.732e-03	3
45	N23	max	0	49	0	19	0	20	0	8	0	21	0	8
46		min	0	20	0	50	0	49	0	19	0	10	0	19
47	N24	max	.142	5	2.001	19	.236	13	2.209e-02	11	3.13e-03	13	3.826e-02	8
48		min	-.141	6	-2.348	8	-.239	14	-2.085e-02	24	-3.142e-03	14	-3.592e-02	19
49	N25	max	.243	15	1.627	19	.277	13	2.209e-02	11	3.128e-03	13	3.825e-02	8
50		min	-.252	4	-1.95	8	-.275	14	-2.085e-02	24	-3.141e-03	14	-3.592e-02	19
51	N26	max	0	17	0	18	0	17	0	5	0	24	0	18
52		min	0	48	0	47	0	48	0	18	0	23	0	5
53	N27	max	.12	7	2.013	18	.169	13	2.199e-02	5	1.696e-03	12	3.611e-02	18
54		min	-.123	8	-2.332	5	-.171	14	-2.093e-02	22	-1.706e-03	11	-3.796e-02	5
55	N28	max	.248	3	1.638	18	.222	13	2.199e-02	5	1.694e-03	12	3.611e-02	18
56		min	-.244	4	-1.937	5	-.22	14	-2.093e-02	22	-1.704e-03	11	-3.796e-02	5
57	N29	max	.24	3	1.625	25	.093	13	4.146e-02	25	3.209e-03	4	6.765e-03	4
58		min	-.241	4	-1.955	14	-.091	14	-4.427e-02	14	-3.195e-03	3	-6.732e-03	3
59	N30	max	.132	5	1.627	19	.211	13	2.209e-02	11	3.128e-03	13	3.825e-02	8
60		min	-.131	6	-1.95	8	-.215	14	-2.085e-02	24	-3.141e-03	14	-3.592e-02	19
61	N31	max	.113	7	1.638	18	.157	13	2.199e-02	5	1.694e-03	12	3.611e-02	18
62		min	-.117	8	-1.937	5	-.159	14	-2.093e-02	22	-1.704e-03	11	-3.796e-02	5
63	N32	max	.277	3	.76	17	.306	25	2.267e-02	25	1.414e-02	14	2.917e-02	6
64		min	-.279	4	-.996	6	-.333	14	-3.176e-02	14	-6.241e-03	25	-2.081e-02	17
65	N33	max	.277	3	.764	20	.272	25	2.27e-02	25	7.16e-03	25	2.091e-02	20
66		min	-.279	4	-.991	7	-.298	14	-3.178e-02	14	-1.507e-02	14	-2.902e-02	7
67	N34	max	.268	15	.766	26	.283	13	3.906e-02	11	1.512e-02	8	1.778e-02	4
68		min	-.291	4	-.988	13	-.275	14	-2.776e-02	24	-7.269e-03	19	-1.431e-02	15
69	N35	max	.29	15	.76	17	.3	13	1.253e-02	21	6.182e-03	19	4.055e-02	4
70		min	-.313	4	-.996	6	-.293	14	-1.579e-02	10	-1.404e-02	8	-2.891e-02	15
71	N36	max	.31	3	.764	20	.264	13	1.258e-02	23	1.441e-02	5	2.916e-02	16
72		min	-.292	4	-.99	7	-.256	14	-1.585e-02	12	-6.678e-03	18	-4.022e-02	3
73	N37	max	.288	3	.766	26	.281	13	3.896e-02	9	6.804e-03	18	1.439e-02	16
74		min	-.27	16	-.988	13	-.273	14	-2.776e-02	22	-1.456e-02	5	-1.759e-02	3
75	N38	max	.277	3	.219	17	.437	25	2.268e-02	25	6.459e-03	56	2.255e-02	6
76		min	-.279	4	-.271	6	-.637	14	-3.177e-02	14	-2.457e-03	25	-1.869e-02	17
77	N39	max	.277	3	.22	20	.427	25	2.269e-02	25	3.372e-03	25	1.88e-02	20
78		min	-.279	4	-.27	7	-.627	14	-3.177e-02	14	-7.066e-03	14	-2.241e-02	7
79	N40	max	.381	15	.221	26	.402	11	2.967e-02	11	7.12e-03	8	2.442e-02	4
80		min	-.54	4	-.269	13	-.313	24	-2.222e-02	24	-3.473e-03	19	-1.884e-02	15

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
81	N41	max	.387	15	.219	17	.408	11	1.797e-02	13	2.378e-03	19	3.392e-02	4
82		min	-.546	4	-.271	6	-.319	24	-1.76e-02	14	-6.436e-03	50	-2.437e-02	15
83	N42	max	.543	5	.22	20	.385	9	1.801e-02	13	6.473e-03	5	2.457e-02	16
84		min	-.389	16	-.27	7	-.297	22	-1.767e-02	14	-2.866e-03	18	-3.362e-02	3
85	N43	max	.542	5	.221	26	.388	9	2.963e-02	9	2.999e-03	18	1.897e-02	16
86		min	-.383	16	-.269	13	-.3	22	-2.225e-02	22	-6.611e-03	5	-2.419e-02	3
87	N44	max	2.019	3	1.975	18	2.139	13	3.423e-02	25	2.113e-02	23	3.46e-02	4
88		min	-2.044	4	-2.468	5	-2.151	14	-3.566e-02	14	-2.153e-02	12	-3.185e-02	15
89	N45	max	2.02	3	1.959	19	2.183	13	3.605e-02	25	1.869e-02	18	3.221e-02	16
90		min	-2.043	4	-2.479	8	-2.221	14	-3.828e-02	14	-1.943e-02	5	-3.413e-02	3
91	N46	max	2.213	3	1.95	25	2.055	13	3.401e-02	13	1.852e-02	15	3.733e-02	4
92		min	-2.212	4	-2.482	14	-2.076	14	-3.176e-02	26	-1.901e-02	4	-3.759e-02	3
93	N47	max	2.071	3	1.976	18	2.071	13	3.423e-02	25	2.113e-02	23	3.46e-02	4
94		min	-2.096	4	-2.467	5	-2.08	14	-3.566e-02	14	-2.153e-02	12	-3.185e-02	15
95	N48	max	2.109	3	1.95	19	2.134	13	3.605e-02	25	1.869e-02	18	3.221e-02	16
96		min	-2.128	4	-2.475	8	-2.173	14	-3.828e-02	14	-1.943e-02	5	-3.413e-02	3
97	N49	max	2.213	3	1.953	25	2.028	13	3.401e-02	13	1.852e-02	15	3.733e-02	4
98		min	-2.212	4	-2.483	14	-2.05	14	-3.176e-02	26	-1.901e-02	4	-3.759e-02	3
99	N50	max	.251	3	2.16	19	.318	13	2.547e-02	13	2.834e-03	13	3.103e-02	4
100		min	-.258	4	-2.668	8	-.318	14	-2.38e-02	26	-2.838e-03	14	-2.74e-02	15
101	N51	max	2.02	3	2.161	19	2.085	13	3.605e-02	25	1.869e-02	18	3.221e-02	16
102		min	-2.043	4	-2.671	8	-2.125	14	-3.828e-02	14	-1.943e-02	5	-3.413e-02	3
103	N52	max	.255	3	2.175	18	.242	13	2.55e-02	13	1.25e-03	12	2.756e-02	16
104		min	-.254	4	-2.65	5	-.241	14	-2.382e-02	26	-1.261e-03	11	-3.065e-02	3
105	N53	max	2.019	3	2.176	18	2.002	13	3.423e-02	25	2.113e-02	23	3.46e-02	4
106		min	-2.044	4	-2.653	5	-2.009	14	-3.566e-02	14	-2.153e-02	12	-3.185e-02	15
107	N54	max	.315	3	2.157	25	.263	13	2.925e-02	25	2.796e-03	4	2.248e-02	4
108		min	-.317	4	-2.674	14	-.269	14	-3.35e-02	14	-2.784e-03	3	-2.238e-02	3
109	N55	max	2.099	3	2.158	25	2.041	13	3.401e-02	13	1.852e-02	15	3.733e-02	4
110		min	-2.095	4	-2.677	14	-2.063	14	-3.176e-02	26	-1.901e-02	4	-3.759e-02	3
111	N56	max	2.225	3	2.161	19	2.301	13	3.605e-02	25	1.869e-02	18	3.222e-02	16
112		min	-2.235	4	-2.671	8	-2.355	14	-3.828e-02	14	-1.943e-02	5	-3.414e-02	3
113	N57	max	.105	5	2.16	19	.166	25	2.547e-02	13	2.834e-03	13	3.103e-02	4
114		min	-.088	18	-2.668	8	-.177	14	-2.379e-02	26	-2.838e-03	14	-2.74e-02	15
115	N58	max	2.208	3	2.176	18	2.207	13	3.424e-02	25	2.113e-02	23	3.46e-02	4
116		min	-2.251	4	-2.653	5	-2.223	14	-3.566e-02	14	-2.153e-02	12	-3.185e-02	15
117	N59	max	.074	15	2.175	18	.09	25	2.55e-02	13	1.25e-03	12	2.755e-02	16
118		min	-.091	4	-2.65	5	-.099	14	-2.381e-02	26	-1.261e-03	11	-3.065e-02	3
119	N60	max	2.325	3	2.158	25	2.245	13	3.402e-02	13	1.852e-02	15	3.733e-02	4
120		min	-2.319	4	-2.677	14	-2.252	14	-3.176e-02	26	-1.901e-02	4	-3.759e-02	3
121	N61	max	.181	3	2.157	25	.091	13	2.925e-02	25	2.796e-03	4	2.248e-02	4
122		min	-.182	4	-2.674	14	-.071	26	-3.35e-02	14	-2.784e-03	3	-2.238e-02	3
123	N62	max	.434	3	1.965	18	.438	13	3.076e-02	13	4.881e-03	23	3.315e-02	4
124		min	-.433	4	-2.445	5	-.438	14	-3.134e-02	14	-4.908e-03	24	-3.219e-02	15
125	N63	max	.429	3	1.954	19	.492	13	3.01e-02	13	3.922e-03	18	3.276e-02	4
126		min	-.439	4	-2.463	8	-.494	14	-3.096e-02	14	-4.126e-03	17	-3.309e-02	3
127	N64	max	.491	3	1.952	25	.45	13	3.368e-02	13	3.091e-03	15	3.e-02	4
128		min	-.493	4	-2.471	14	-.46	14	-3.327e-02	14	-3.16e-03	20	-2.995e-02	3
129	N65	max	.444	3	1.965	18	.422	13	3.076e-02	13	4.881e-03	23	3.315e-02	4
130		min	-.443	4	-2.445	5	-.422	14	-3.134e-02	14	-4.908e-03	24	-3.219e-02	15
131	N66	max	.452	3	1.953	19	.486	13	3.01e-02	13	3.922e-03	18	3.276e-02	4
132		min	-.461	4	-2.465	8	-.488	14	-3.096e-02	14	-4.126e-03	17	-3.309e-02	3
133	N67	max	.491	3	1.95	25	.444	13	3.368e-02	13	3.091e-03	15	3.e-02	4
134		min	-.493	4	-2.468	14	-.455	14	-3.327e-02	14	-3.16e-03	20	-2.995e-02	3
135	N68	max	.429	3	2.16	19	.481	13	3.01e-02	13	3.922e-03	18	3.276e-02	4
136		min	-.439	4	-2.668	8	-.482	14	-3.096e-02	14	-4.126e-03	17	-3.309e-02	3
137	N69	max	.434	3	2.175	18	.406	13	3.076e-02	13	4.881e-03	23	3.315e-02	4

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
138		min	-.433	4	-2.65	5	-.405	14	-3.134e-02	14	-4.908e-03	24	-3.219e-02	15
139	N70	max	.472	3	2.157	25	.447	13	3.368e-02	13	3.091e-03	15	3.e-02	4
140		min	-.474	4	-2.674	14	-.458	14	-3.327e-02	14	-3.16e-03	20	-2.995e-02	3
141	N71	max	2.019	3	1.289	19	3.627	25	4.209e-02	25	4.297e-02	26	2.534e-02	16
142		min	-2.042	4	-2.117	8	-3.807	14	-4.444e-02	14	-4.077e-02	25	-3.004e-02	3
143	N72	max	2.018	3	.817	24	4.496	25	4.315e-02	25	1.61e-02	26	2.816e-02	16
144		min	-2.042	4	-2.219	53	-4.729	14	-4.477e-02	14	-1.565e-02	25	-2.957e-02	3
145	N73	max	2.018	3	.826	22	4.473	25	4.537e-02	25	1.701e-02	25	3.056e-02	4
146		min	-2.042	4	-2.173	51	-4.688	14	-4.657e-02	14	-1.819e-02	14	-2.813e-02	15
147	N74	max	2.018	3	1.305	18	3.583	25	4.243e-02	25	4.099e-02	25	3.012e-02	4
148		min	-2.043	4	-2.099	5	-3.733	14	-4.388e-02	14	-4.331e-02	26	-2.513e-02	15
149	N75	max	3.158	15	1.3	18	2.516	13	3.169e-02	13	4.442e-02	20	4.113e-02	4
150		min	-3.308	4	-2.11	5	-2.455	26	-3.396e-02	14	-4.223e-02	19	-3.577e-02	19
151	N76	max	3.914	19	.819	16	2.923	11	3.407e-02	13	1.742e-02	20	4.212e-02	4
152		min	-4.116	8	-2.207	45	-2.829	24	-3.243e-02	26	-1.699e-02	19	-3.868e-02	15
153	N77	max	3.926	19	.813	23	2.902	11	3.621e-02	13	1.59e-02	19	4.301e-02	4
154		min	-4.112	8	-2.2	54	-2.812	24	-3.181e-02	24	-1.712e-02	8	-4.227e-02	15
155	N78	max	3.291	15	1.289	25	2.487	11	3.397e-02	13	4.003e-02	19	4.032e-02	4
156		min	-3.398	4	-2.108	14	-2.425	24	-2.803e-02	24	-4.234e-02	20	-4.123e-02	3
157	N79	max	3.431	3	1.286	25	2.489	9	3.372e-02	13	4.361e-02	17	4.112e-02	16
158		min	-3.318	16	-2.128	14	-2.427	22	-2.744e-02	22	-4.159e-02	18	-4.091e-02	3
159	N80	max	4.11	3	.809	21	2.913	9	3.469e-02	13	1.669e-02	17	4.047e-02	16
160		min	-3.954	16	-2.267	52	-2.831	22	-3.082e-02	22	-1.631e-02	18	-4.212e-02	3
161	N81	max	4.068	5	.81	15	2.928	9	3.414e-02	13	1.664e-02	18	4.062e-02	16
162		min	-3.909	18	-2.236	46	-2.86	22	-3.358e-02	14	-1.777e-02	5	-4.424e-02	3
163	N82	max	3.299	3	1.29	19	2.543	13	3.118e-02	25	4.079e-02	18	3.671e-02	18
164		min	-3.193	16	-2.113	8	-2.514	26	-3.398e-02	14	-4.292e-02	17	-4.109e-02	3
165	N83	max	.432	3	1.29	19	1.712	13	4.244e-02	25	3.985e-02	26	2.454e-02	16
166		min	-.44	4	-2.117	8	-1.836	26	-4.477e-02	14	-3.48e-02	25	-2.94e-02	3
167	N84	max	.434	3	.818	24	2.446	25	4.73e-02	25	1.511e-02	26	2.946e-02	16
168		min	-.44	4	-2.219	53	-2.673	26	-4.921e-02	14	-1.312e-02	21	-3.083e-02	3
169	N85	max	.435	3	.827	22	2.411	25	4.554e-02	25	1.471e-02	25	3.099e-02	4
170		min	-.438	4	-2.173	51	-2.646	26	-4.673e-02	14	-1.663e-02	26	-2.861e-02	15
171	N86	max	.435	3	1.306	18	1.651	25	4.278e-02	25	3.493e-02	25	2.966e-02	4
172		min	-.436	4	-2.099	5	-1.785	26	-4.422e-02	14	-4.009e-02	26	-2.449e-02	15
173	N87	max	1.455	19	1.301	18	.919	23	3.112e-02	25	4.053e-02	20	4.121e-02	4
174		min	-1.561	20	-2.11	5	-.889	12	-3.354e-02	14	-3.547e-02	19	-3.603e-02	19
175	N88	max	2.108	19	.82	16	1.301	20	3.684e-02	13	1.589e-02	20	4.517e-02	4
176		min	-2.304	20	-2.207	45	-1.235	24	-3.499e-02	26	-1.376e-02	24	-4.153e-02	15
177	N89	max	2.098	19	.814	23	1.305	23	3.591e-02	13	1.372e-02	19	4.387e-02	4
178		min	-2.304	20	-2.2	54	-1.252	24	-3.106e-02	26	-1.564e-02	20	-4.31e-02	15
179	N90	max	1.468	19	1.289	25	.958	23	3.378e-02	13	3.381e-02	19	4.047e-02	4
180		min	-1.586	20	-2.109	14	-.943	12	-2.786e-02	24	-3.899e-02	20	-4.149e-02	3
181	N91	max	1.563	17	1.286	25	.972	21	3.333e-02	13	3.988e-02	17	4.124e-02	4
182		min	-1.462	6	-2.128	14	-.955	10	-2.723e-02	22	-3.494e-02	18	-4.094e-02	3
183	N92	max	2.291	17	.81	21	1.328	21	3.615e-02	13	1.533e-02	17	4.448e-02	16
184		min	-2.103	18	-2.268	52	-1.267	22	-3.215e-02	22	-1.312e-02	18	-4.642e-02	3
185	N93	max	2.278	17	.811	15	1.316	21	3.515e-02	13	1.424e-02	18	4.025e-02	16
186		min	-2.084	18	-2.236	46	-1.24	22	-3.451e-02	14	-1.611e-02	17	-4.381e-02	3
187	N94	max	1.55	17	1.29	19	.956	21	3.094e-02	25	3.434e-02	18	3.691e-02	18
188		min	-1.442	18	-2.113	8	-.912	10	-3.391e-02	14	-3.939e-02	17	-4.124e-02	3
189	N95	max	1.823	3	1.289	19	3.374	25	4.247e-02	25	4.244e-02	26	3.44e-02	4
190		min	-1.863	4	-2.117	8	-3.54	14	-4.48e-02	14	-3.941e-02	25	-3.494e-02	3
191	N96	max	1.841	3	1.305	18	3.328	25	4.281e-02	25	3.961e-02	25	3.528e-02	4
192		min	-1.846	4	-2.099	5	-3.469	14	-4.424e-02	14	-4.274e-02	26	-3.404e-02	15
193	N97	max	.623	3	1.29	19	1.966	25	4.223e-02	25	4.045e-02	26	3.317e-02	4
194		min	-.614	4	-2.117	8	-2.094	26	-4.455e-02	14	-3.611e-02	25	-3.381e-02	3

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
195	N98	max	.609	15	1.306	18	1.908	25	4.258e-02	25	3.625e-02	25	3.426e-02	4
196		min	-.629	4	-2.099	5	-2.041	26	-4.4e-02	14	-4.072e-02	26	-3.291e-02	15
197	N99	max	1.831	3	1.376	24	3.374	25	4.247e-02	25	4.244e-02	26	3.44e-02	4
198		min	-1.867	4	-2.18	11	-3.54	14	-4.48e-02	14	-3.941e-02	25	-3.494e-02	3
199	N100	max	1.847	3	1.394	22	3.328	25	4.281e-02	25	3.961e-02	25	3.528e-02	4
200		min	-1.855	4	-2.167	9	-3.469	14	-4.424e-02	14	-4.274e-02	26	-3.404e-02	15
201	N101	max	.622	3	1.375	24	1.966	25	4.223e-02	25	4.045e-02	26	3.317e-02	4
202		min	-.617	4	-2.18	11	-2.094	26	-4.455e-02	14	-3.611e-02	25	-3.381e-02	3
203	N102	max	.613	15	1.394	22	1.908	25	4.258e-02	25	3.625e-02	25	3.426e-02	4
204		min	-.631	4	-2.167	9	-2.041	26	-4.4e-02	14	-4.072e-02	26	-3.291e-02	15
205	N103	max	2.936	15	1.3	18	2.318	11	3.94e-02	13	4.372e-02	20	4.194e-02	4
206		min	-3.06	4	-2.11	5	-2.246	24	-3.77e-02	26	-4.069e-02	19	-3.846e-02	15
207	N104	max	3.039	15	1.289	25	2.283	11	3.748e-02	13	3.863e-02	19	4.373e-02	4
208		min	-3.145	4	-2.108	14	-2.243	24	-3.431e-02	26	-4.175e-02	20	-4.275e-02	15
209	N105	max	1.674	19	1.3	18	1.109	23	3.84e-02	13	4.13e-02	20	4.146e-02	4
210		min	-1.791	20	-2.11	5	-1.089	12	-3.678e-02	26	-3.696e-02	19	-3.795e-02	15
211	N106	max	1.697	19	1.289	25	1.154	23	3.67e-02	13	3.516e-02	19	4.331e-02	4
212		min	-1.808	20	-2.109	14	-1.122	24	-3.345e-02	26	-3.964e-02	20	-4.238e-02	15
213	N107	max	2.99	15	1.386	16	2.249	13	3.94e-02	13	4.372e-02	20	4.194e-02	4
214		min	-3.117	4	-2.173	3	-2.193	26	-3.77e-02	26	-4.069e-02	19	-3.846e-02	15
215	N108	max	2.991	15	1.378	23	2.38	11	3.748e-02	13	3.863e-02	19	4.373e-02	4
216		min	-3.093	4	-2.178	12	-2.333	24	-3.431e-02	26	-4.175e-02	20	-4.275e-02	15
217	N109	max	1.729	19	1.385	16	1.018	23	3.84e-02	13	4.13e-02	20	4.146e-02	4
218		min	-1.853	20	-2.173	3	-1.006	12	-3.678e-02	26	-3.696e-02	19	-3.795e-02	15
219	N110	max	1.645	19	1.377	23	1.243	23	3.67e-02	13	3.516e-02	19	4.331e-02	4
220		min	-1.749	20	-2.177	12	-1.203	24	-3.345e-02	26	-3.964e-02	20	-4.238e-02	15
221	N111	max	3.175	3	1.286	25	2.287	9	3.722e-02	13	4.294e-02	17	4.25e-02	16
222		min	-3.068	16	-2.128	14	-2.247	22	-3.402e-02	26	-4.008e-02	18	-4.438e-02	3
223	N112	max	3.05	3	1.29	19	2.346	9	3.894e-02	13	3.933e-02	18	3.915e-02	16
224		min	-2.966	16	-2.113	8	-2.3	22	-3.812e-02	26	-4.229e-02	17	-4.198e-02	3
225	N113	max	1.784	17	1.286	25	1.166	21	3.631e-02	13	4.061e-02	17	4.206e-02	16
226		min	-1.688	18	-2.128	14	-1.13	22	-3.304e-02	26	-3.64e-02	18	-4.389e-02	3
227	N114	max	1.778	17	1.29	19	1.146	21	3.812e-02	13	3.574e-02	18	3.868e-02	16
228		min	-1.666	18	-2.113	8	-1.117	10	-3.74e-02	26	-4.008e-02	17	-4.155e-02	3
229	N115	max	3.122	3	1.371	21	2.386	9	3.722e-02	13	4.294e-02	17	4.25e-02	16
230		min	-3.018	16	-2.19	10	-2.341	22	-3.402e-02	26	-4.008e-02	18	-4.438e-02	3
231	N116	max	3.107	3	1.378	15	2.285	13	3.894e-02	13	3.933e-02	18	3.915e-02	16
232		min	-3.02	16	-2.181	4	-2.255	26	-3.812e-02	26	-4.229e-02	17	-4.198e-02	3
233	N117	max	1.723	17	1.371	21	1.258	21	3.631e-02	13	4.061e-02	17	4.206e-02	16
234		min	-1.633	18	-2.19	10	-1.214	22	-3.304e-02	26	-3.64e-02	18	-4.389e-02	3
235	N118	max	1.838	17	1.378	15	1.059	21	3.812e-02	13	3.574e-02	18	3.868e-02	16
236		min	-1.72	18	-2.181	4	-1.039	10	-3.74e-02	26	-4.008e-02	17	-4.155e-02	3
237	N119	max	2.709	3	1.376	24	4.435	25	4.476e-02	25	4.251e-02	26	3.66e-02	4
238		min	-2.733	4	-2.18	11	-4.653	14	-4.687e-02	14	-3.935e-02	25	-3.714e-02	3
239	N120	max	2.702	3	1.394	22	4.396	25	4.51e-02	25	3.954e-02	25	3.749e-02	4
240		min	-2.742	4	-2.167	9	-4.569	14	-4.631e-02	14	-4.281e-02	26	-3.624e-02	15
241	N121	max	.164	19	1.375	24	1.358	13	4.177e-02	25	4.048e-02	26	3.266e-02	4
242		min	-.163	8	-2.18	11	-1.473	26	-4.398e-02	14	-3.608e-02	25	-3.331e-02	3
243	N122	max	.187	5	1.394	22	1.291	13	4.211e-02	25	3.623e-02	25	3.375e-02	4
244		min	-.195	22	-2.167	9	-1.426	26	-4.343e-02	14	-4.075e-02	26	-3.241e-02	15
245	N123	max	3.955	15	1.386	16	3.234	13	4.151e-02	13	4.379e-02	20	4.402e-02	4
246		min	-4.162	4	-2.173	3	-3.138	26	-3.996e-02	26	-4.063e-02	19	-4.075e-02	15
247	N124	max	4.059	15	1.378	23	3.242	11	3.959e-02	13	3.857e-02	19	4.581e-02	4
248		min	-4.181	4	-2.178	12	-3.148	24	-3.658e-02	26	-4.182e-02	20	-4.504e-02	15
249	N125	max	1.199	7	1.385	16	.581	20	3.784e-02	13	4.133e-02	20	4.089e-02	4
250		min	-1.308	20	-2.173	3	-.538	7	-3.63e-02	26	-3.693e-02	19	-3.749e-02	15
251	N126	max	1.096	7	1.377	23	.812	20	3.614e-02	13	3.513e-02	19	4.274e-02	4

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
252		min	-1.207	20	-2.177	12	-.743	12	-3.298e-02	26	-3.967e-02	20	-4.192e-02	15
253	N127	max	4.225	3	1.371	21	3.244	9	3.933e-02	13	4.301e-02	17	4.479e-02	16
254		min	-4.079	16	-2.19	10	-3.151	22	-3.629e-02	26	-4.001e-02	18	-4.646e-02	3
255	N128	max	4.153	3	1.378	15	3.259	13	4.105e-02	13	3.927e-02	18	4.144e-02	16
256		min	-4.002	16	-2.181	4	-3.211	26	-4.039e-02	26	-4.235e-02	17	-4.405e-02	3
257	N129	max	1.186	17	1.371	21	.823	17	3.576e-02	13	4.064e-02	17	4.159e-02	16
258		min	-1.098	6	-2.19	10	-.759	10	-3.257e-02	26	-3.637e-02	18	-4.331e-02	3
259	N130	max	1.297	17	1.378	15	.599	17	3.757e-02	13	3.572e-02	18	3.822e-02	16
260		min	-1.177	6	-2.181	4	-.546	6	-3.693e-02	26	-4.011e-02	17	-4.097e-02	3
261	N131	max	2.018	3	.74	26	4.614	25	5.123e-02	25	3.712e-03	17	3.185e-02	4
262		min	-2.042	4	-2.209	55	-4.844	14	-5.207e-02	14	-4.117e-03	4	-3.103e-02	15
263	N132	max	.435	3	.765	26	2.537	25	4.264e-02	25	2.485e-03	8	3.018e-02	4
264		min	-.439	4	-2.213	55	-2.784	26	-4.338e-02	14	-1.59e-03	19	-2.937e-02	15
265	N133	max	2.028	3	.89	26	4.614	25	5.123e-02	25	3.712e-03	17	3.185e-02	4
266		min	-2.055	4	-2.213	55	-4.844	14	-5.207e-02	14	-4.117e-03	4	-3.103e-02	15
267	N134	max	.43	3	.889	26	2.537	25	4.264e-02	25	2.485e-03	8	3.018e-02	4
268		min	-.433	4	-2.213	55	-2.784	26	-4.338e-02	14	-1.59e-03	19	-2.937e-02	15
269	N135	max	4.033	19	.733	20	2.972	11	3.879e-02	13	3.534e-03	22	4.786e-02	4
270		min	-4.232	8	-2.217	49	-2.877	24	-3.573e-02	24	-4.132e-03	9	-4.625e-02	15
271	N136	max	2.196	19	.758	20	1.363	20	3.499e-02	13	1.956e-03	5	4.104e-02	4
272		min	-2.411	20	-2.22	49	-1.292	24	-3.184e-02	26	-1.449e-03	22	-3.973e-02	15
273	N137	max	4.034	19	.885	20	2.977	11	3.879e-02	13	3.534e-03	22	4.786e-02	4
274		min	-4.231	8	-2.222	49	-2.882	24	-3.573e-02	24	-4.132e-03	9	-4.625e-02	15
275	N138	max	2.195	19	.884	20	1.363	20	3.499e-02	13	1.956e-03	5	4.104e-02	4
276		min	-2.411	20	-2.222	49	-1.29	24	-3.184e-02	26	-1.449e-03	22	-3.973e-02	15
277	N139	max	4.197	5	.726	17	2.979	9	3.76e-02	13	4.636e-03	23	4.647e-02	16
278		min	-4.025	18	-2.265	48	-2.901	22	-3.604e-02	22	-5.235e-03	12	-4.888e-02	3
279	N140	max	2.391	17	.752	17	1.374	21	3.435e-02	13	1.545e-03	14	3.939e-02	16
280		min	-2.187	18	-2.267	48	-1.3	22	-3.245e-02	26	-6.682e-04	23	-4.151e-02	3
281	N141	max	4.198	5	.878	17	2.982	9	3.76e-02	13	4.636e-03	23	4.647e-02	16
282		min	-4.027	16	-2.273	48	-2.907	22	-3.604e-02	22	-5.235e-03	12	-4.888e-02	3
283	N142	max	2.392	17	.877	17	1.372	21	3.435e-02	13	1.545e-03	14	3.939e-02	16
284		min	-2.188	18	-2.273	48	-1.296	22	-3.245e-02	26	-6.682e-04	23	-4.151e-02	3
285	N143	max	3.087	3	.89	26	6.285	25	5.736e-02	25	6.525e-03	15	3.762e-02	4
286		min	-3.138	4	-2.214	55	-6.525	14	-5.736e-02	14	-7.102e-03	4	-3.679e-02	15
287	N144	max	.166	4	.889	26	1.677	25	4.148e-02	25	1.529e-03	11	2.883e-02	4
288		min	-.154	15	-2.213	55	-1.959	26	-4.175e-02	14	-9.566e-04	22	-2.801e-02	15
289	N145	max	5.506	19	.885	20	4.204	11	4.426e-02	13	6.519e-03	22	5.319e-02	4
290		min	-5.717	4	-2.222	49	-4.068	24	-4.146e-02	26	-7.117e-03	9	-5.236e-02	15
291	N146	max	1.432	19	.884	20	.942	20	3.348e-02	13	7.596e-04	47	3.944e-02	4
292		min	-1.684	20	-2.222	49	-.807	19	-3.061e-02	26	-2.293e-04	23	-3.855e-02	15
293	N147	max	5.771	3	.878	17	4.179	9	4.307e-02	13	7.621e-03	23	5.258e-02	16
294		min	-5.555	16	-2.274	48	-4.103	22	-4.152e-02	26	-8.221e-03	12	-5.421e-02	3
295	N148	max	1.666	17	.877	17	.959	17	3.284e-02	13	9.519e-04	6	3.821e-02	16
296		min	-1.427	18	-2.273	48	-.809	18	-3.122e-02	26	-1.077e-03	15	-3.99e-02	3
297	N149	max	1.22	3	1.289	19	2.671	25	4.214e-02	25	4.145e-02	26	3.91e-02	4
298		min	-1.235	4	-2.117	8	-2.81	26	-4.454e-02	14	-3.776e-02	25	-3.692e-02	15
299	N150	max	1.221	3	1.305	18	2.618	25	4.249e-02	25	3.793e-02	25	3.73e-02	16
300		min	-1.235	4	-2.099	5	-2.75	26	-4.399e-02	14	-4.173e-02	26	-3.859e-02	3
301	N151	max	2.29	19	1.3	18	1.707	23	4.318e-02	13	4.251e-02	20	4.172e-02	4
302		min	-2.411	20	-2.11	5	-1.665	24	-3.926e-02	26	-3.882e-02	19	-3.94e-02	15
303	N152	max	2.326	19	1.289	25	1.715	23	3.858e-02	13	3.689e-02	19	4.524e-02	4
304		min	-2.44	20	-2.109	14	-1.681	24	-3.741e-02	14	-4.07e-02	20	-4.31e-02	15
305	N153	max	2.428	15	1.286	25	1.723	21	3.826e-02	13	4.178e-02	17	4.274e-02	16
306		min	-2.357	16	-2.128	14	-1.687	22	-3.723e-02	14	-3.824e-02	18	-4.591e-02	3
307	N154	max	2.394	17	1.29	19	1.742	21	4.28e-02	13	3.754e-02	18	4.005e-02	16
308		min	-2.304	16	-2.113	8	-1.706	22	-4.e-02	26	-4.118e-02	17	-4.182e-02	3

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
309	N155	max	2.487	3	1.376	24	4.167	25	4.476e-02	25	4.251e-02	26	3.66e-02	4
310		min	-2.514	4	-2.18	11	-4.372	14	-4.687e-02	14	-3.935e-02	25	-3.714e-02	3
311	N156	max	2.485	3	1.394	22	4.126	25	4.51e-02	25	3.954e-02	25	3.749e-02	4
312		min	-2.517	4	-2.167	9	-4.291	14	-4.631e-02	14	-4.281e-02	26	-3.624e-02	15
313	N157	max	3.71	15	1.386	16	2.985	13	4.151e-02	13	4.379e-02	20	4.402e-02	4
314		min	-3.898	4	-2.173	3	-2.899	26	-3.996e-02	26	-4.063e-02	19	-4.075e-02	15
315	N158	max	3.788	15	1.378	23	3.024	11	3.959e-02	13	3.857e-02	19	4.581e-02	4
316		min	-3.907	4	-2.178	12	-2.941	24	-3.658e-02	26	-4.182e-02	20	-4.504e-02	15
317	N159	max	3.946	3	1.371	21	3.027	9	3.933e-02	13	4.301e-02	17	4.479e-02	16
318		min	-3.81	16	-2.19	10	-2.945	22	-3.629e-02	26	-4.001e-02	18	-4.645e-02	3
319	N160	max	3.888	3	1.378	15	3.012	13	4.105e-02	13	3.927e-02	18	4.144e-02	16
320		min	-3.753	16	-2.181	4	-2.969	26	-4.039e-02	26	-4.235e-02	17	-4.405e-02	3
321	N161	max	.336	7	1.375	24	1.606	13	4.177e-02	25	4.048e-02	26	3.266e-02	4
322		min	-.334	4	-2.18	11	-1.727	26	-4.398e-02	14	-3.608e-02	25	-3.331e-02	3
323	N162	max	.356	17	1.394	22	1.543	25	4.211e-02	25	3.623e-02	25	3.375e-02	4
324		min	-.365	6	-2.167	9	-1.677	26	-4.343e-02	14	-4.075e-02	26	-3.241e-02	15
325	N163	max	1.415	19	1.385	16	.73	23	3.784e-02	13	4.133e-02	20	4.089e-02	4
326		min	-1.531	20	-2.173	3	-.717	12	-3.63e-02	26	-3.693e-02	19	-3.749e-02	15
327	N164	max	1.32	19	1.377	23	.96	23	3.614e-02	13	3.513e-02	19	4.274e-02	4
328		min	-1.429	20	-2.177	12	-.931	24	-3.298e-02	26	-3.967e-02	20	-4.192e-02	15
329	N165	max	1.406	17	1.371	21	.977	21	3.576e-02	13	4.064e-02	17	4.159e-02	16
330		min	-1.317	6	-2.19	10	-.945	10	-3.257e-02	26	-3.637e-02	18	-4.331e-02	3
331	N166	max	1.518	17	1.378	15	.771	21	3.757e-02	13	3.572e-02	18	3.822e-02	16
332		min	-1.399	18	-2.181	4	-.743	10	-3.693e-02	26	-4.011e-02	17	-4.097e-02	3
333	N167	max	2.51	3	1.605	24	4.167	25	4.476e-02	25	4.251e-02	26	3.66e-02	4
334		min	-2.532	4	-2.394	11	-4.372	14	-4.687e-02	14	-3.935e-02	25	-3.714e-02	3
335	N168	max	2.506	3	1.623	22	4.126	25	4.51e-02	25	3.954e-02	25	3.749e-02	4
336		min	-2.545	4	-2.386	9	-4.291	14	-4.631e-02	14	-4.281e-02	26	-3.624e-02	15
337	N169	max	.463	24	1.59	24	1.606	13	4.177e-02	25	4.048e-02	26	3.266e-02	4
338		min	-.451	20	-2.378	11	-1.727	26	-4.398e-02	14	-3.608e-02	25	-3.331e-02	3
339	N170	max	.479	17	1.608	22	1.543	25	4.211e-02	25	3.623e-02	25	3.375e-02	4
340		min	-.511	22	-2.37	9	-1.677	26	-4.343e-02	14	-4.075e-02	26	-3.241e-02	15
341	N171	max	3.821	15	1.615	16	2.888	13	4.151e-02	13	4.379e-02	20	4.402e-02	4
342		min	-4.016	4	-2.39	3	-2.808	26	-3.996e-02	26	-4.063e-02	19	-4.075e-02	15
343	N172	max	3.694	15	1.612	23	3.22	11	3.959e-02	13	3.857e-02	19	4.581e-02	4
344		min	-3.805	4	-2.401	12	-3.126	24	-3.658e-02	26	-4.182e-02	20	-4.504e-02	15
345	N173	max	1.525	19	1.6	16	.549	23	3.784e-02	13	4.133e-02	20	4.089e-02	4
346		min	-1.655	20	-2.373	3	-.554	12	-3.63e-02	26	-3.693e-02	19	-3.749e-02	15
347	N174	max	1.216	7	1.597	23	1.147	20	3.614e-02	13	3.513e-02	19	4.274e-02	4
348		min	-1.31	20	-2.385	12	-1.095	24	-3.298e-02	26	-3.967e-02	20	-4.192e-02	15
349	N175	max	3.843	3	1.6	21	3.23	9	3.933e-02	13	4.301e-02	17	4.479e-02	16
350		min	-3.713	16	-2.407	10	-3.137	22	-3.629e-02	26	-4.001e-02	18	-4.645e-02	3
351	N176	max	4.005	3	1.61	15	2.926	13	4.105e-02	13	3.927e-02	18	4.144e-02	16
352		min	-3.863	16	-2.404	4	-2.89	14	-4.039e-02	26	-4.235e-02	17	-4.405e-02	3
353	N177	max	1.284	17	1.584	21	1.164	17	3.576e-02	13	4.064e-02	17	4.159e-02	16
354		min	-1.209	6	-2.391	10	-1.114	22	-3.257e-02	26	-3.637e-02	18	-4.331e-02	3
355	N178	max	1.638	17	1.594	15	.599	21	3.757e-02	13	3.572e-02	18	3.822e-02	16
356		min	-1.506	18	-2.388	4	-.589	10	-3.693e-02	26	-4.011e-02	17	-4.097e-02	3
357	N179	max	2.866	3	.89	26	5.941	25	5.736e-02	25	6.525e-03	15	3.762e-02	4
358		min	-2.912	4	-2.214	55	-6.181	14	-5.736e-02	14	-7.102e-03	4	-3.679e-02	15
359	N180	max	.1	3	.889	26	2.051	25	4.148e-02	25	1.529e-03	11	2.883e-02	4
360		min	-.095	18	-2.213	55	-2.316	26	-4.175e-02	14	-9.566e-04	22	-2.801e-02	15
361	N181	max	2.905	3	1.222	26	5.941	25	5.736e-02	25	6.525e-03	15	3.762e-02	4
362		min	-2.955	4	-2.246	55	-6.181	14	-5.736e-02	14	-7.102e-03	4	-3.679e-02	15
363	N182	max	.1	5	1.127	26	2.051	25	4.148e-02	25	1.529e-03	11	2.883e-02	4
364		min	-.098	18	-2.221	55	-2.316	26	-4.175e-02	14	-9.566e-04	22	-2.801e-02	15
365	N183	max	5.203	19	.885	20	3.951	11	4.426e-02	13	6.519e-03	22	5.319e-02	4

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
366		min	-5.407	8	-2.222	49	-3.822	24	-4.146e-02	26	-7.117e-03	9	-5.236e-02	15
367	N184	max	1.764	19	.884	20	1.125	20	3.348e-02	13	7.596e-04	47	3.944e-02	4
368		min	-1.998	20	-2.222	49	-.996	19	-3.061e-02	26	-2.293e-04	23	-3.855e-02	15
369	N185	max	5.204	19	1.223	20	3.97	11	4.426e-02	13	6.519e-03	22	5.319e-02	4
370		min	-5.407	4	-2.256	49	-3.839	24	-4.146e-02	26	-7.117e-03	9	-5.236e-02	15
371	N186	max	1.762	19	1.127	20	1.125	20	3.348e-02	13	7.596e-04	47	3.944e-02	4
372		min	-1.998	20	-2.234	49	-.998	19	-3.061e-02	26	-2.293e-04	23	-3.855e-02	15
373	N187	max	5.446	3	.878	17	3.932	9	4.307e-02	13	7.621e-03	23	5.258e-02	16
374		min	-5.24	16	-2.274	48	-3.855	22	-4.152e-02	26	-8.221e-03	12	-5.421e-02	3
375	N188	max	1.98	17	.877	17	1.138	17	3.284e-02	13	9.519e-04	6	3.821e-02	16
376		min	-1.757	18	-2.273	48	-1.002	18	-3.122e-02	26	-1.077e-03	15	-3.99e-02	3
377	N189	max	5.46	3	1.214	17	3.948	9	4.307e-02	13	7.621e-03	23	5.258e-02	16
378		min	-5.253	16	-2.315	48	-3.875	22	-4.152e-02	26	-8.221e-03	12	-5.421e-02	3
379	N190	max	1.982	17	1.118	17	1.135	17	3.284e-02	13	9.519e-04	6	3.821e-02	16
380		min	-1.76	18	-2.292	48	-.998	18	-3.122e-02	26	-1.077e-03	15	-3.99e-02	3
381	N191	max	1.62	3	.889	26	4.023	25	4.748e-02	25	2.1e-03	17	3.673e-02	4
382		min	-1.639	4	-2.213	55	-4.242	26	-4.901e-02	14	-2.356e-03	6	-3.628e-02	3
383	N192	max	.733	3	.889	26	2.94	25	4.338e-02	25	1.687e-03	11	3.523e-02	4
384		min	-.742	4	-2.213	55	-3.176	26	-4.477e-02	14	-1.16e-03	24	-3.471e-02	3
385	N193	max	1.605	3	.469	26	4.023	25	4.748e-02	25	2.1e-03	17	3.673e-02	4
386		min	-1.62	4	-2.222	55	-4.242	26	-4.901e-02	14	-2.356e-03	6	-3.628e-02	3
387	N194	max	.74	3	.506	26	2.94	25	4.338e-02	25	1.687e-03	11	3.523e-02	4
388		min	-.752	4	-2.225	55	-3.176	26	-4.477e-02	14	-1.16e-03	24	-3.471e-02	3
389	N195	max	3.768	19	.885	20	2.752	11	4.055e-02	13	2.606e-03	22	4.756e-02	4
390		min	-3.961	8	-2.222	49	-2.666	24	-3.716e-02	26	-3.075e-03	9	-4.548e-02	15
391	N196	max	2.785	19	.885	20	1.869	23	4.097e-02	13	3.969e-04	5	4.479e-02	4
392		min	-2.985	20	-2.222	49	-1.802	24	-3.762e-02	26	-2.525e-04	26	-4.243e-02	15
393	N197	max	3.767	19	.443	20	2.74	11	4.055e-02	13	2.606e-03	22	4.756e-02	4
394		min	-3.961	8	-2.22	49	-2.656	24	-3.716e-02	26	-3.075e-03	9	-4.548e-02	15
395	N198	max	2.786	19	.487	20	1.868	23	4.097e-02	13	3.969e-04	5	4.479e-02	4
396		min	-2.985	20	-2.234	49	-1.803	24	-3.762e-02	26	-2.525e-04	26	-4.243e-02	15
397	N199	max	3.928	5	.878	17	2.762	9	3.976e-02	13	3.666e-03	23	4.569e-02	16
398		min	-3.76	18	-2.273	48	-2.69	22	-3.727e-02	26	-4.136e-03	12	-4.836e-02	3
399	N200	max	2.963	17	.878	17	1.886	21	4.077e-02	13	8.361e-04	4	4.241e-02	16
400		min	-2.777	18	-2.273	48	-1.816	22	-3.8e-02	26	-1.037e-03	15	-4.516e-02	3
401	N201	max	3.924	5	.438	17	2.754	9	3.976e-02	13	3.666e-03	23	4.569e-02	16
402		min	-3.759	18	-2.26	48	-2.677	22	-3.727e-02	26	-4.136e-03	12	-4.836e-02	3
403	N202	max	2.96	17	.482	17	1.887	21	4.077e-02	13	8.361e-04	4	4.241e-02	16
404		min	-2.774	18	-2.275	48	-1.82	22	-3.8e-02	26	-1.037e-03	15	-4.516e-02	3
405	N203	max	1.82	3	2.176	18	1.793	13	3.528e-02	13	1.738e-02	23	3.602e-02	4
406		min	-1.832	4	-2.653	5	-1.795	14	-3.577e-02	14	-1.78e-02	12	-3.469e-02	15
407	N204	max	.635	3	2.175	18	.602	13	3.451e-02	13	8.07e-03	23	3.448e-02	4
408		min	-.637	4	-2.651	5	-.603	14	-3.454e-02	14	-8.099e-03	24	-3.426e-02	3
409	N205	max	1.8	3	2.228	18	1.793	13	3.528e-02	13	1.738e-02	23	3.602e-02	4
410		min	-1.813	4	-2.705	5	-1.795	14	-3.577e-02	14	-1.78e-02	12	-3.469e-02	15
411	N206	max	.627	3	2.228	18	.602	13	3.451e-02	13	8.07e-03	23	3.448e-02	4
412		min	-.629	4	-2.704	5	-.603	14	-3.454e-02	14	-8.099e-03	24	-3.426e-02	3
413	N207	max	2.669	3	2.228	18	2.68	13	3.752e-02	13	1.665e-02	23	3.807e-02	4
414		min	-2.714	4	-2.705	5	-2.688	14	-3.764e-02	14	-1.711e-02	12	-3.674e-02	15
415	N208	max	.134	5	2.228	18	.104	9	3.413e-02	13	7.748e-03	25	3.4e-02	4
416		min	-.133	6	-2.704	5	-.108	10	-3.397e-02	14	-7.962e-03	26	-3.378e-02	3
417	N209	max	2.449	3	2.228	18	2.455	13	3.752e-02	13	1.665e-02	23	3.807e-02	4
418		min	-2.486	4	-2.705	5	-2.462	14	-3.764e-02	14	-1.711e-02	12	-3.674e-02	15
419	N210	max	.334	3	2.228	18	.307	13	3.413e-02	13	7.748e-03	25	3.4e-02	4
420		min	-.334	4	-2.704	5	-.308	14	-3.397e-02	14	-7.962e-03	26	-3.378e-02	3
421	N211	max	2.417	3	2.337	18	2.455	13	3.752e-02	13	1.665e-02	23	3.807e-02	4
422		min	-2.456	4	-2.815	5	-2.462	14	-3.764e-02	14	-1.711e-02	12	-3.674e-02	15

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
423	N212	max	.329	5	2.332	18	.307	13	3.413e-02	13	7.748e-03	25	3.4e-02	4
424		min	-.328	6	-2.811	5	-.308	14	-3.397e-02	14	-7.962e-03	26	-3.378e-02	3
425	N213	max	1.61	3	2.176	18	1.58	13	3.576e-02	13	1.578e-02	23	3.62e-02	4
426		min	-1.615	4	-2.653	5	-1.579	14	-3.602e-02	14	-1.612e-02	12	-3.545e-02	3
427	N214	max	.751	3	2.175	18	.719	13	3.502e-02	13	9.058e-03	23	3.497e-02	4
428		min	-.753	4	-2.651	5	-.72	14	-3.502e-02	14	-9.121e-03	24	-3.49e-02	3
429	N215	max	1.664	3	2.017	18	1.58	13	3.576e-02	13	1.578e-02	23	3.62e-02	4
430		min	-1.669	4	-2.493	5	-1.579	14	-3.602e-02	14	-1.612e-02	12	-3.545e-02	3
431	N216	max	.778	3	2.015	18	.719	13	3.502e-02	13	9.058e-03	23	3.497e-02	4
432		min	-.781	4	-2.488	5	-.72	14	-3.502e-02	14	-9.121e-03	24	-3.49e-02	3
433	N245	max	1.24	3	.817	24	3.502	25	4.525e-02	25	1.559e-02	26	3.852e-02	4
434		min	-1.255	4	-2.219	53	-3.72	26	-4.698e-02	14	-1.428e-02	25	-3.728e-02	15
435	N246	max	3.033	19	.819	16	2.127	23	4.308e-02	13	1.664e-02	20	4.503e-02	4
436		min	-3.222	20	-2.207	45	-2.057	24	-3.919e-02	26	-1.533e-02	19	-4.271e-02	15
437	N247	max	3.213	17	.809	21	2.128	21	4.064e-02	13	1.6e-02	17	4.424e-02	16
438		min	-3.04	18	-2.268	52	-2.063	22	-3.841e-02	26	-1.473e-02	18	-4.725e-02	3
439	N248	max	.396	15	.075	19	.421	11	2.352e-02	13	5.897e-04	11	2.917e-02	4
440		min	-.572	8	-.105	8	-.322	24	-1.976e-02	26	-6.14e-04	12	-2.161e-02	15
441	N249	max	.021	15	.075	19	.022	13	7.391e-03	8	2.133e-03	9	1.281e-02	8
442		min	-.027	4	-.105	8	-.019	26	-5.484e-03	19	-2.148e-03	10	-9.476e-03	19
443	N250	max	.574	5	.075	18	.403	9	2.351e-02	13	5.872e-04	11	2.177e-02	16
444		min	-.398	16	-.104	5	-.305	22	-1.983e-02	26	-5.93e-04	12	-2.891e-02	3
445	N251	max	.026	3	.075	18	.02	9	7.354e-03	5	1.743e-03	12	9.546e-03	18
446		min	-.021	16	-.104	5	-.017	22	-5.525e-03	18	-1.744e-03	11	-1.271e-02	5
447	N252	max	.277	3	.075	25	.448	25	2.268e-02	25	5.934e-04	11	1.977e-02	4
448		min	-.279	4	-.105	14	-.669	14	-3.177e-02	14	-6.011e-04	12	-1.961e-02	3
449	N253	max	.018	3	.075	25	.024	25	1.093e-02	25	2.205e-03	4	1.285e-03	4
450		min	-.018	4	-.105	14	-.03	14	-1.482e-02	14	-2.196e-03	3	-1.279e-03	3
451	N226	max	1.874	3	2.158	25	1.831	13	3.625e-02	13	1.478e-02	15	3.736e-02	4
452		min	-1.871	4	-2.676	14	-1.861	14	-3.568e-02	14	-1.529e-02	4	-3.767e-02	3
453	N227	max	.663	3	2.157	25	.651	13	3.405e-02	13	6.153e-03	19	3.353e-02	4
454		min	-.665	4	-2.675	14	-.663	14	-3.467e-02	14	-6.393e-03	20	-3.361e-02	3
455	N228	max	1.851	3	2.211	25	1.841	13	3.625e-02	13	1.478e-02	15	3.736e-02	4
456		min	-1.849	4	-2.729	14	-1.871	14	-3.568e-02	14	-1.529e-02	4	-3.767e-02	3
457	N229	max	.654	3	2.21	25	.656	13	3.405e-02	13	6.153e-03	19	3.353e-02	4
458		min	-.656	4	-2.729	14	-.668	14	-3.467e-02	14	-6.393e-03	20	-3.361e-02	3
459	N230	max	3.425	3	2.211	25	3.351	13	4.404e-02	13	1.453e-02	19	4.506e-02	16
460		min	-3.396	4	-2.73	14	-3.371	14	-4.395e-02	14	-1.525e-02	8	-4.606e-02	3
461	N231	max	.176	16	2.21	25	.199	14	3.113e-02	13	6.141e-03	19	3.053e-02	4
462		min	-.187	3	-2.729	14	-.19	25	-3.204e-02	14	-6.405e-03	20	-3.106e-02	3
463	N232	max	3.149	3	2.211	25	3.087	13	4.404e-02	13	1.453e-02	19	4.506e-02	16
464		min	-3.126	4	-2.73	14	-3.107	14	-4.395e-02	14	-1.525e-02	8	-4.606e-02	3
465	N233	max	.098	19	2.21	25	.09	13	3.113e-02	13	6.141e-03	19	3.053e-02	4
466		min	-.103	8	-2.729	14	-.089	14	-3.204e-02	14	-6.405e-03	20	-3.106e-02	3
467	N234	max	3.11	3	2.339	25	3.122	13	4.404e-02	13	1.453e-02	19	4.506e-02	16
468		min	-3.085	4	-2.863	14	-3.141	14	-4.395e-02	14	-1.525e-02	8	-4.606e-02	3
469	N235	max	.08	19	2.306	25	.111	13	3.113e-02	13	6.141e-03	19	3.053e-02	4
470		min	-.085	4	-2.83	14	-.109	14	-3.204e-02	14	-6.405e-03	20	-3.106e-02	3
471	N236	max	1.648	3	2.158	25	1.614	13	3.602e-02	13	1.327e-02	15	3.727e-02	4
472		min	-1.647	4	-2.676	14	-1.646	14	-3.609e-02	14	-1.369e-02	4	-3.741e-02	3
473	N237	max	.778	3	2.157	25	.766	13	3.444e-02	13	7.002e-03	19	3.435e-02	4
474		min	-.779	4	-2.675	14	-.78	14	-3.519e-02	14	-7.277e-03	20	-3.437e-02	3
475	N238	max	1.708	3	1.997	25	1.587	13	3.602e-02	13	1.327e-02	15	3.727e-02	4
476		min	-1.709	4	-2.513	14	-1.62	14	-3.609e-02	14	-1.369e-02	4	-3.741e-02	3
477	N239	max	.809	3	1.997	25	.748	13	3.444e-02	13	7.002e-03	19	3.435e-02	4
478		min	-.811	4	-2.511	14	-.763	14	-3.519e-02	14	-7.277e-03	20	-3.437e-02	3
479	N240	max	1.811	3	2.161	19	1.866	13	3.731e-02	25	1.551e-02	18	3.525e-02	4

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation [...	LC
480		min	-1.841	4	-2.67	8	-1.895	14	-3.871e-02	14	-1.62e-02	5	-3.563e-02	3
481	N241	max	.633	3	2.16	19	.67	13	3.273e-02	13	7.081e-03	18	3.514e-02	4
482		min	-.644	4	-2.669	8	-.676	14	-3.33e-02	14	-7.367e-03	17	-3.454e-02	3
483	N242	max	1.83	3	2.212	19	1.839	13	3.731e-02	25	1.551e-02	18	3.525e-02	4
484		min	-1.859	4	-2.723	8	-1.868	14	-3.871e-02	14	-1.62e-02	5	-3.563e-02	3
485	N243	max	.642	3	2.211	19	.662	13	3.273e-02	13	7.081e-03	18	3.514e-02	4
486		min	-.654	4	-2.722	8	-.667	14	-3.33e-02	14	-7.367e-03	17	-3.454e-02	3
487	N244	max	3.315	3	2.212	19	3.385	13	4.515e-02	25	1.546e-02	18	4.364e-02	4
488		min	-3.346	4	-2.723	8	-3.477	14	-4.699e-02	14	-1.626e-02	5	-4.33e-02	3
489	N245A	max	.228	4	2.211	19	.165	10	2.981e-02	13	7.172e-03	16	3.259e-02	4
490		min	-.217	15	-2.722	8	-.154	21	-3.068e-02	14	-7.487e-03	15	-3.159e-02	15
491	N246A	max	3.055	3	2.212	19	3.115	13	4.515e-02	25	1.546e-02	18	4.364e-02	4
492		min	-3.084	4	-2.723	8	-3.195	14	-4.699e-02	14	-1.626e-02	5	-4.33e-02	3
493	N247A	max	.068	3	2.211	19	.129	11	2.981e-02	13	7.172e-03	16	3.259e-02	4
494		min	-.065	4	-2.722	8	-.122	24	-3.068e-02	14	-7.487e-03	15	-3.159e-02	15
495	N225	max	3.098	3	2.335	19	3.075	13	4.515e-02	25	1.546e-02	18	4.364e-02	4
496		min	-3.125	4	-2.854	8	-3.157	14	-4.699e-02	14	-1.626e-02	5	-4.33e-02	3
497	N224	max	.091	3	2.303	19	.14	11	2.981e-02	13	7.172e-03	16	3.259e-02	4
498		min	-.087	4	-2.822	8	-.134	24	-3.068e-02	14	-7.487e-03	15	-3.159e-02	15
499	N250A	max	1.597	3	2.161	19	1.643	13	3.716e-02	13	1.4e-02	18	3.574e-02	4
500		min	-1.628	4	-2.67	8	-1.664	14	-3.813e-02	14	-1.461e-02	5	-3.562e-02	3
501	N251A	max	.749	3	2.16	19	.782	13	3.368e-02	13	7.931e-03	18	3.552e-02	4
502		min	-.763	4	-2.669	8	-.789	14	-3.415e-02	14	-8.252e-03	17	-3.483e-02	3
503	N252A	max	1.546	3	2.006	19	1.716	13	3.716e-02	13	1.4e-02	18	3.574e-02	4
504		min	-1.579	4	-2.51	8	-1.735	14	-3.813e-02	14	-1.461e-02	5	-3.562e-02	3
505	N253A	max	.717	3	2.007	19	.814	13	3.368e-02	13	7.931e-03	18	3.552e-02	4
506		min	-.733	4	-2.508	8	-.822	14	-3.415e-02	14	-8.252e-03	17	-3.483e-02	3
507	N254	max	1.629	3	.817	24	3.977	25	4.374e-02	25	1.582e-02	26	3.561e-02	4
508		min	-1.656	4	-2.219	53	-4.191	26	-4.564e-02	14	-1.493e-02	25	-3.494e-02	3
509	N255	max	.748	3	.818	24	2.888	25	4.677e-02	25	1.53e-02	26	3.593e-02	4
510		min	-.75	4	-2.219	53	-3.112	26	-4.885e-02	14	-1.346e-02	25	-3.558e-02	3
511	N256	max	1.633	3	.478	24	3.977	25	4.374e-02	25	1.582e-02	26	3.561e-02	4
512		min	-1.66	4	-2.252	53	-4.191	26	-4.564e-02	14	-1.493e-02	25	-3.494e-02	3
513	N257	max	.776	3	.454	24	2.888	25	4.677e-02	25	1.53e-02	26	3.593e-02	4
514		min	-.777	4	-2.248	53	-3.112	26	-4.885e-02	14	-1.346e-02	25	-3.558e-02	3
515	N266	max	1.406	3	2.21	25	1.407	13	3.593e-02	13	1.161e-02	15	3.637e-02	4
516		min	-1.406	4	-2.729	14	-1.436	14	-3.65e-02	14	-1.203e-02	8	-3.654e-02	3
517	N259	max	3.454	19	.819	16	2.516	11	4.038e-02	13	1.7e-02	20	4.37e-02	4
518		min	-3.637	20	-2.207	45	-2.434	24	-3.689e-02	26	-1.612e-02	19	-4.094e-02	15
519	N260	max	2.492	19	.819	16	1.629	23	4.175e-02	13	1.619e-02	20	4.599e-02	4
520		min	-2.689	20	-2.207	45	-1.571	24	-3.841e-02	26	-1.434e-02	19	-4.297e-02	15
521	N261	max	3.382	19	.477	16	2.632	11	4.038e-02	13	1.7e-02	20	4.37e-02	4
522		min	-3.56	20	-2.237	45	-2.544	24	-3.689e-02	26	-1.612e-02	19	-4.094e-02	15
523	N262	max	2.428	19	.452	16	1.747	23	4.175e-02	13	1.619e-02	20	4.599e-02	4
524		min	-2.616	20	-2.234	45	-1.682	24	-3.841e-02	26	-1.434e-02	19	-4.297e-02	15
525	N263	max	3.627	17	.809	21	2.503	21	3.879e-02	13	1.632e-02	17	4.239e-02	16
526		min	-3.458	18	-2.268	52	-2.44	22	-3.598e-02	26	-1.548e-02	18	-4.527e-02	3
527	N264	max	2.677	17	.809	21	1.653	21	3.976e-02	13	1.56e-02	17	4.513e-02	16
528		min	-2.497	18	-2.268	52	-1.584	22	-3.667e-02	26	-1.379e-02	18	-4.803e-02	3
529	N265	max	3.7	17	.468	21	2.391	21	3.879e-02	13	1.632e-02	17	4.239e-02	16
530		min	-3.528	18	-2.287	52	-2.333	22	-3.598e-02	26	-1.548e-02	18	-4.527e-02	3
531	N266A	max	2.747	17	.444	21	1.555	21	3.976e-02	13	1.56e-02	17	4.513e-02	16
532		min	-2.559	18	-2.284	52	-1.5	22	-3.667e-02	26	-1.379e-02	18	-4.803e-02	3

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-in]	MY [k-in]	MZ [k-in]
1	56	N20	-.01	6.066	-16.697	233.384	.436	-.11
2	56	COG (ft):	X: -.048	Y: 1.887	Z: -.038			

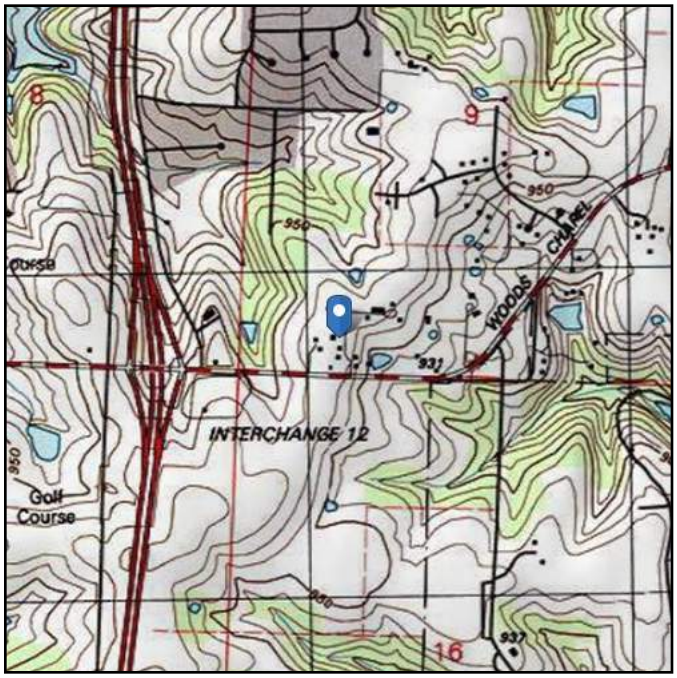
7. ATTACHMENTS

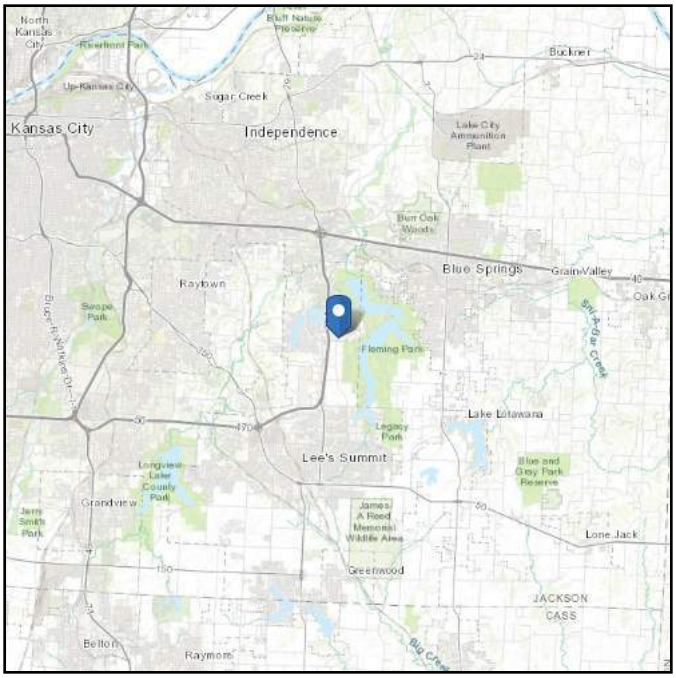
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 978.36 ft (NAVD 88)
Latitude: 38.98333
Longitude: -94.34972





Wind

Results:

Wind Speed:	115 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A, incorporating errata of March 12, 2014
Date Accessed:	Wed Dec 20 2017

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

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

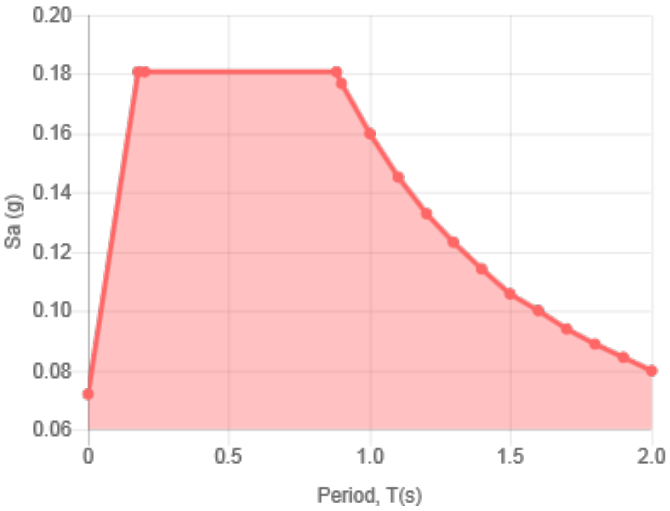
Seismic

Site Soil Class: D - Stiff Soil

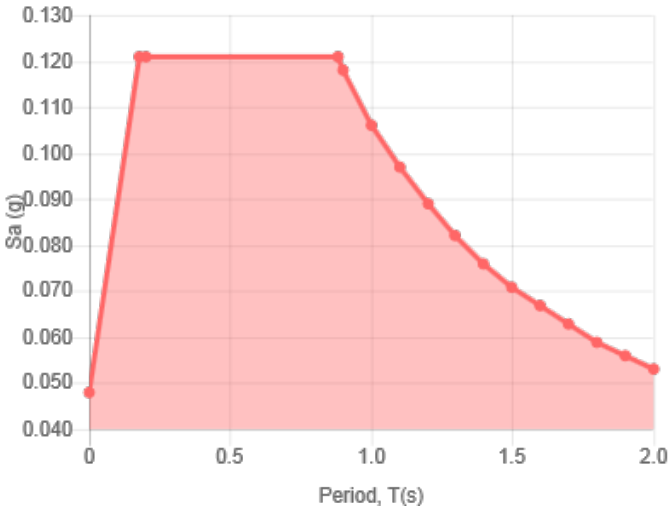
Results:

S_S:	0.113
S_1:	0.067
S_{MS}:	0.181
S_{M1}:	0.160
S_{DS}:	0.121
S_{D1}:	0.106

MCEr Spectrum



Design Response Spectrum



Data Source: USGS Seismic Design Maps

Date Accessed: Wed Dec 20 2017

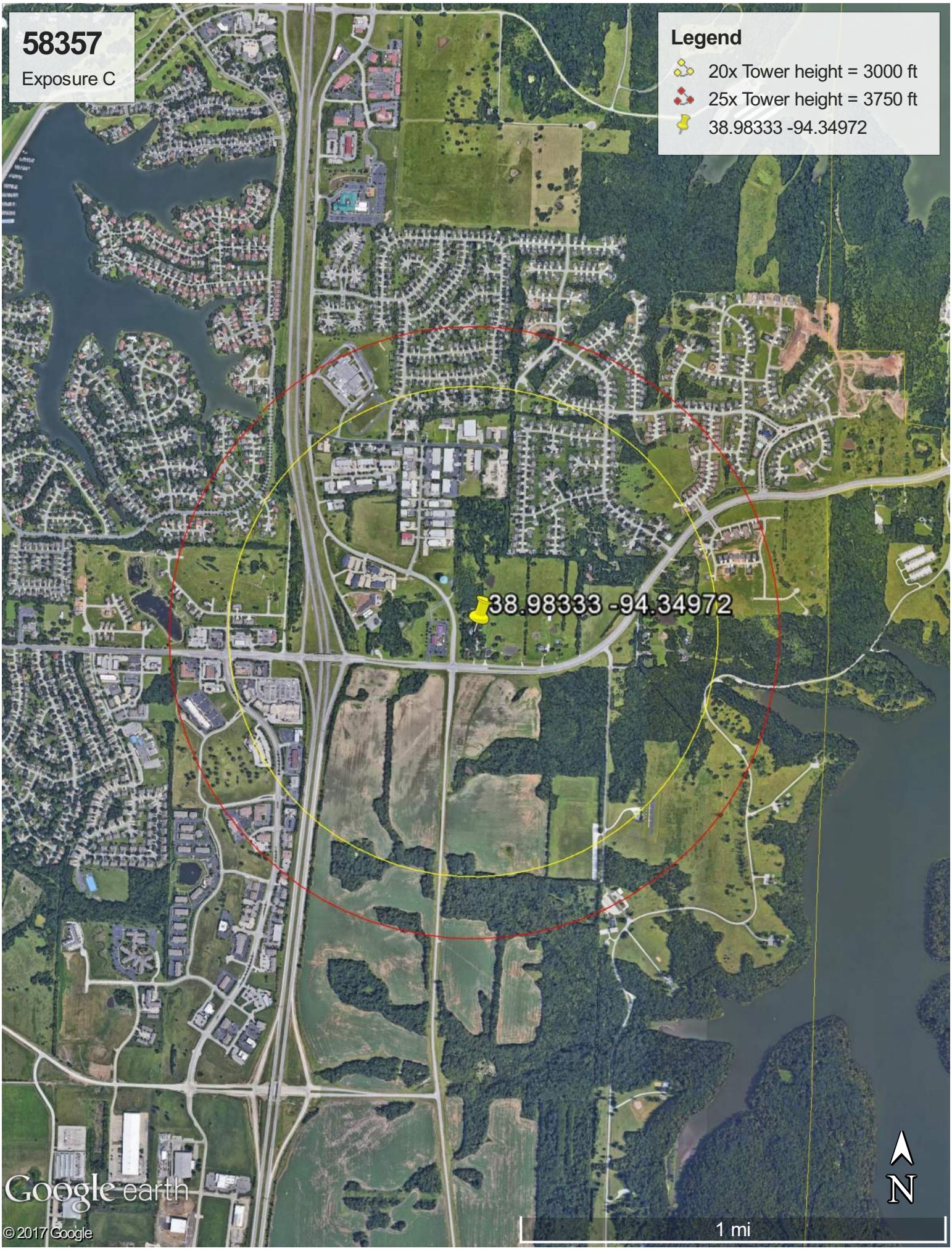
Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	40 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Wed Dec 20 2017

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

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


58357
Exposure C
Legend
20x Tower height = 3000 ft
25x Tower height = 3750 ft
38.98333 -94.34972
38.98333 -94.34972
Google earth
© 2017 Google
N
1 mi

Mount Mapping Report

Name:

Sprint Chagrin Fls -LTE 2C

Site Number:

OH5075

Date Site Was Visited:

12/4/2015

Prepared For:

Engineering Firm: BLACK & VEATCH Building a world of difference.

Tower Owner/Carrier: at&t

Prepared By:

Inspectors:	John Barrett Cameron TenEyck
Report Prepared By:	Tyler Svitak
Report Review By:	Joe Long / Nick Grubel

HighTower Solutions Inc.
15225 Highway 36
Bennington, NE 68007
402-915-5337

Table of Contents

Site Information

Identification	
Tower Type	Monopole
Address	7207 A Chagrin Rd
City,State	Bainbridge, OH
FCC #	1052316
Latitude	41.42045
Longitude	-81.38575
Tower Height	223'10"

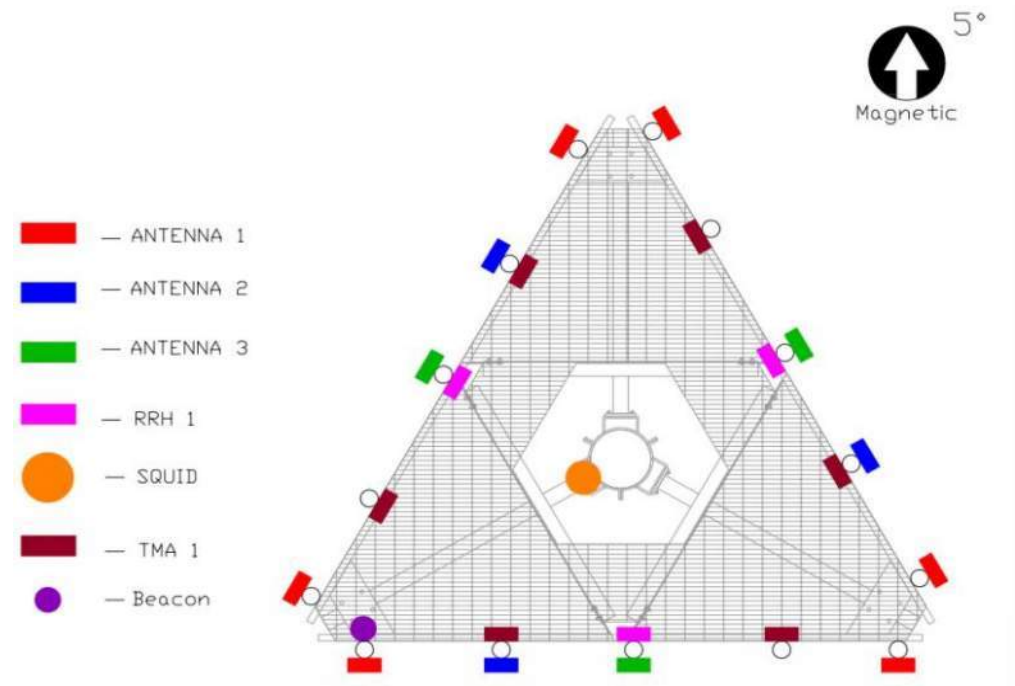
Tower Tag Information	
Tower MF.	Valmont
Model #	14770-96
	1-800-VALM0NT
	EXT 3765

Full View Tower

Site Sign

FCC Sign

Mount Overview



Mount Locations Information

Description	Location	Magnetic Azimuth
Boom Azimuths	Alpha	58°
	Beta	175°
	Gamma	293°
Side Arm Azimuths	Alpha	5°
	Beta	113°
	Gamma	233°
Panel Azimuths	Alpha	58°
	Beta	175°
	Gamma	293°

Mount Heights Information

Description	Height to Base
Collar Mount	219'6"
Face Mount	N/A
Universal Mount	N/A
Side Arm	219'6"
Boom	220'
Foundation AGL	6"

*Note: All measurements are taken from top of foundation.

Typical Abbreviations

AGL	Above Ground Level	fm	Face Mount	SBS	Stich Bolt Spacing
A	Alpha	L	Long	Sq.	Square
B	Beta	LLH	Long Leg Horizontal	Sp	Spacing
bm	Boom	LLV	Long Leg Vertical	SR	Solid Rod
BP	Bent Plate	MB	Middle Bolt	Sq.	Square
Circ.	Circumference	Pl	Plate	T	Tall
D	Depth	pm	Pipe Mount	Th	Thickness
DA	Double Angle	rl	Rail	Tri.	Triangle
Dia.	Diameter	sa	Side Arm	W	Wide
G	Gamma	SB	Stich Bolt		

Crew Comments

Mount is in overall good condition.

Mount Overview Pictures

Front of ALPHA Boom (Zoomed in, taken from ground)

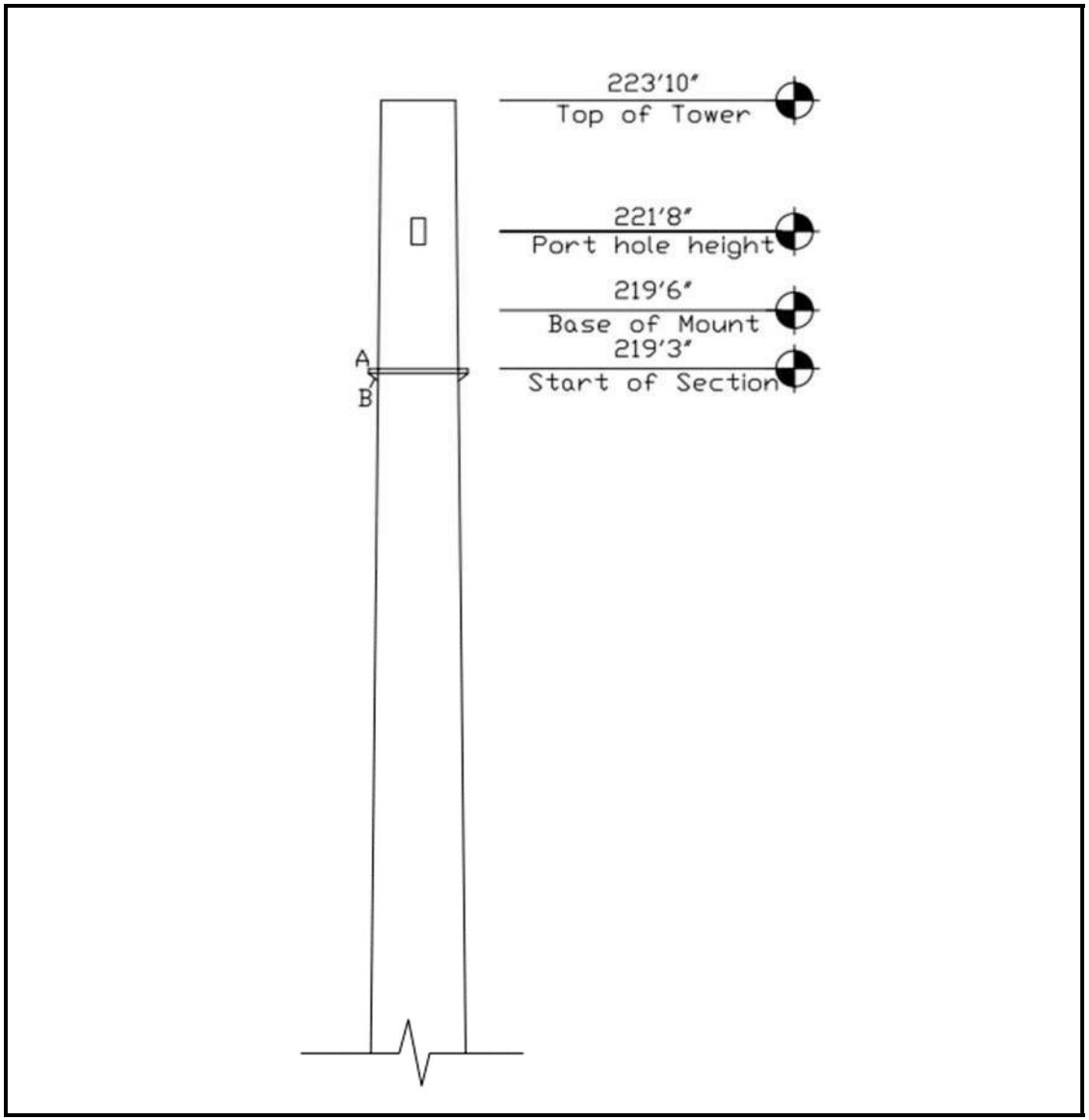
Front of BETA Boom (Zoomed in, taken from ground)

Front of GAMMA Boom (Zoomed in, taken from ground)

All Booms on Structure (Zoomed in, taken from ground)

Tower Section Detail

Label	Member Size	Bolt size
	Porthole Size	3-1'Tx6"W
	Circumference at Mount	4' Circm.
	Thickness at Mount	.268"
A	2'6" Dia.x.62"	Welded
B	6-4.5"Tx3"Wx.50"	Welded



Tower Section Pictures

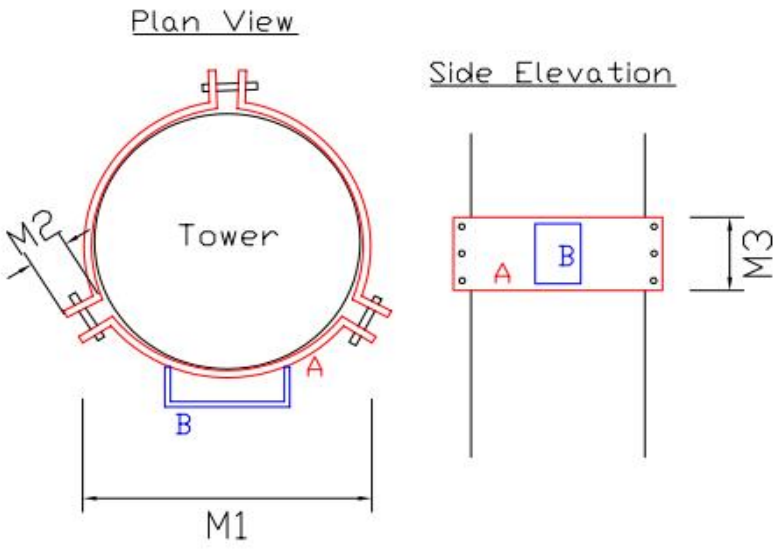
Mount Section - North Face (Entire Section, Taken From Ground)

Mount Section - East Face (Entire Section, Taken From Ground)

Mount Section - South Face (Entire Section, Taken From Ground)

N/A

Collar Mount Detail



Front View of Collar Mount
(Zoomed in, taken from ground)

Letter	Member Size	Member Length	Connection	Top Edge to Center of Bolt	Side Edge to Center of Bolt	Bolt to Bolt
A	.50"	13.5"T	4-.62" Bolt	1"	1.25"	3.5"
B	9"x3"x.40" Channel	8"T	Welded	N/A	N/A	N/A

Measurements	
M1	1'9"
M2	2"
M3	13.5"

Collar Mount Pictures

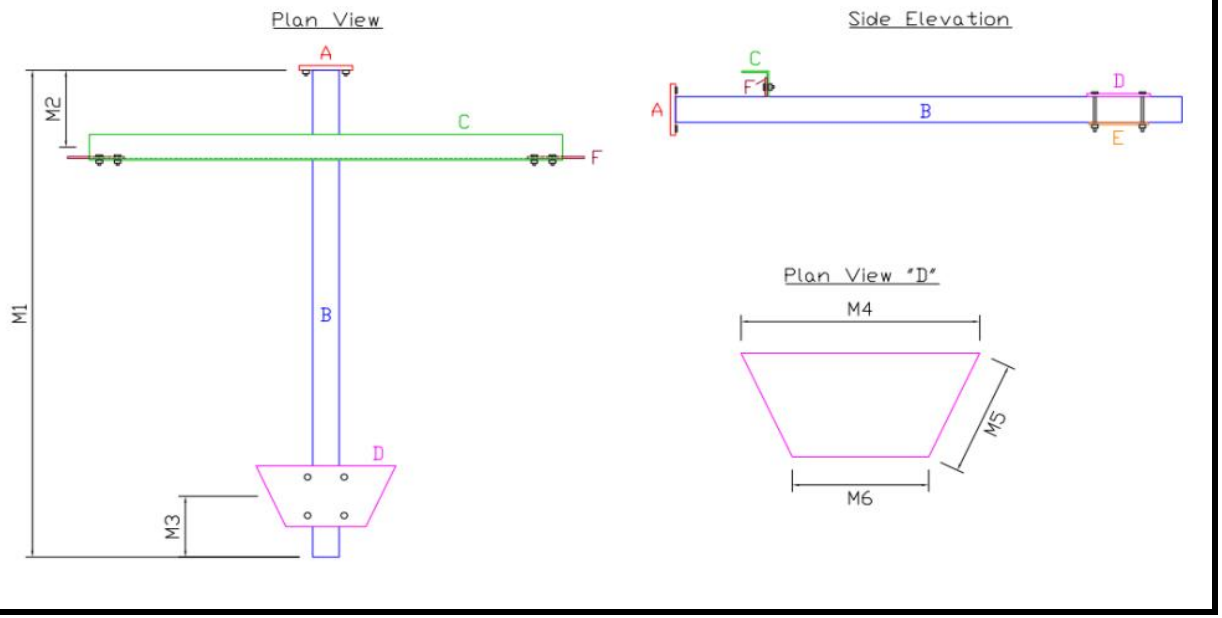
Front Connection at Tower (Level & Perpendicular)

Side Connection at Tower (Level & Perpendicular)

Underneath Collar Mount (Straight Up)

Top of Collar Mount (Straight Down)

Side Arm Detail



Side Arm
(Zoomed in, taken from ground)

Letter	Member Size	Member Length	Connection	Top Edge to Center of Bolt	Side Edge to Center of Bolt	Bolt to Bolt
A	8"x8"x.75"	8"	4-.62"	1"	1"	6"
B	4" Sq.Tube x.185"	6'5"	Welded to A	N/A	N/A	N/A
C	4"x4"x.25"Angle	5'11"	2-.62"	N/A	1"	2.5"
D	9"Tx.40"	N/A	Share W/ E	N/A	N/A	N/A
E	9"Tx6"Wx.40"	9"T	4-.62"	1"	1.5"	4"
F	3"Tx10"Wx.40"	3"	Share W/ B	N/A	N/A	N/A

Measurements	
M1	6'5.75"
M2	1'1"
M3	9"
M4	1'11"
M5	10"
M6	1'

Side Arm Pictures

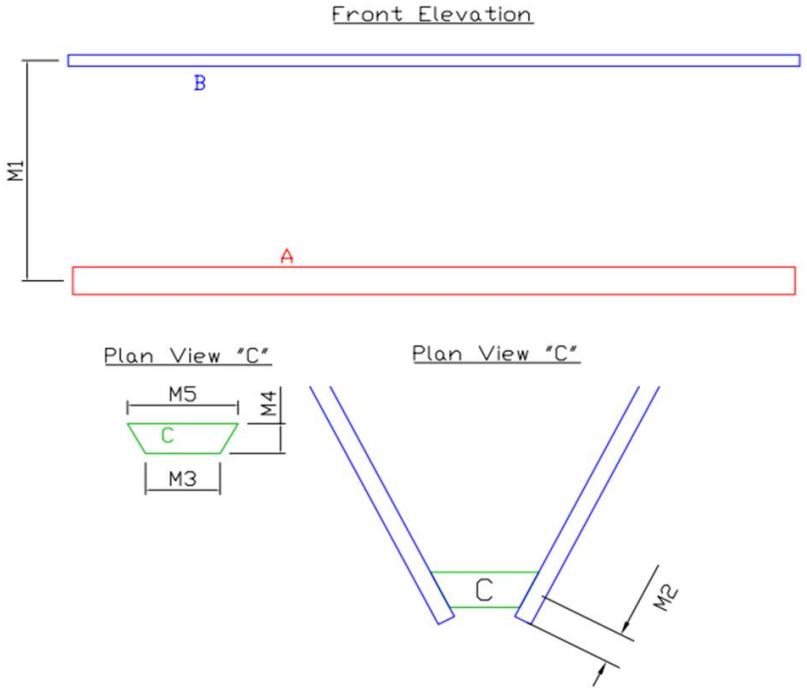
Front Connection at Tower (Level & Perpendicular)

Side Connection at Tower (Level & Perpendicular)

Underneath Side Arm (Straight Up)

Top of Side Arm (Straight Down)

Boom Detail



Front of Boom
(Zoomed in, taken from ground)

Letter	Member Size	Member Length	Connection	Top Edge to Center of Bolt	Side Edge to Center of Bolt	Bolt to Bolt
A	5"x2"x.27"Channel	12'6"	3-.62"	N/A	.75"	3.5"
B	3"x3"x.25"Angle	12'8"	2-.62" Bolt	1.5"	N/A	3.5"
C	6"x.50"	N/A	Share w/ B	N/A	N/A	N/A

Measurements	
M1	4'3"
M2	10.5"
M3	11.5"
M4	7"
M5	1'6"

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Boom Pictures

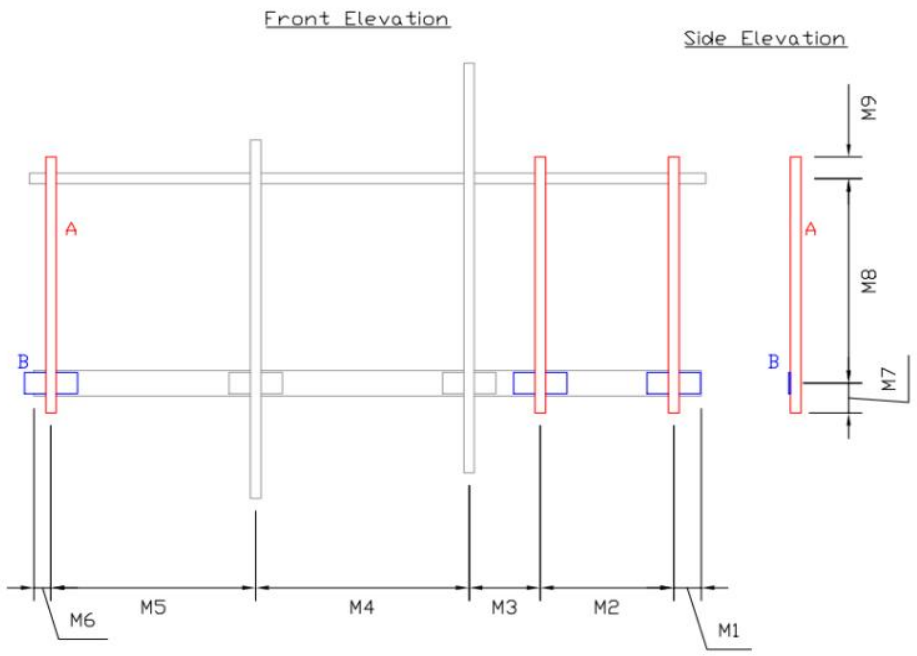
Back Side Connection at Side Arm (Level & Perpendicular)

Top of Connection at Side Arm (Straight Down)

Left Half of Boom (Level and Perpendicular, Taken from Tower)

Right Half of Boom (Level and Perpendicular, Taken from Tower)

Pipe Mount Detail



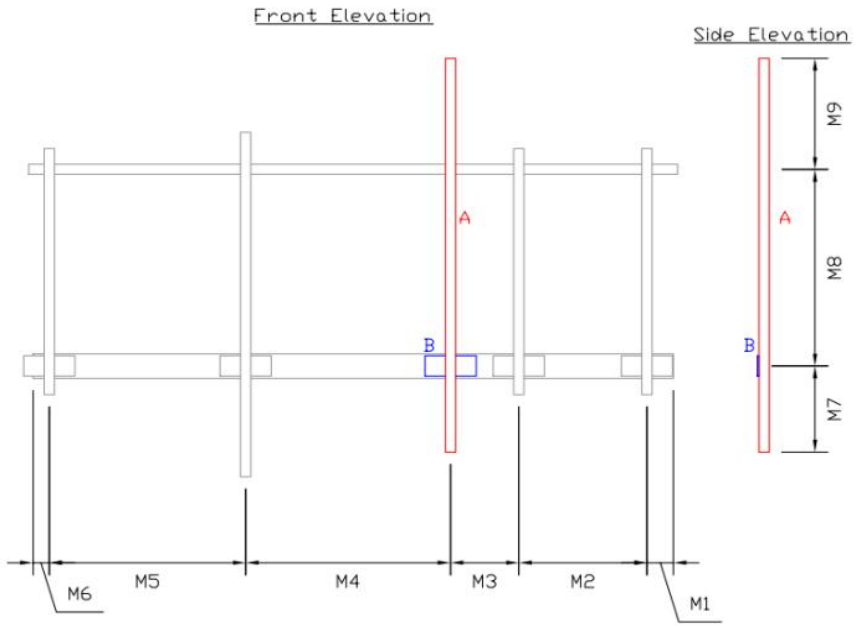
Back Side View of Full Pipe Mounts Pos.#1,2,5

Letter	Member Size	Member Length	Connection	Top Edge to Center of Bolt	Side Edge to Center of Bolt	Bolt to Bolt
A	2.38"Dia.x.197"	5'	1-.62" to HR	N/A	N/A	N/A
B	5"Tx12"Wx.38"	N/A	4-.62"	1"	1"	10"

Measurements	
M1	5"
M2	2'6"
M3	1'4"
M4	4'
M5	3'10"
M6	5"
M7	7"
M8	4'3"
M9	2"

Position #1,2,5

Pipe Mount Detail



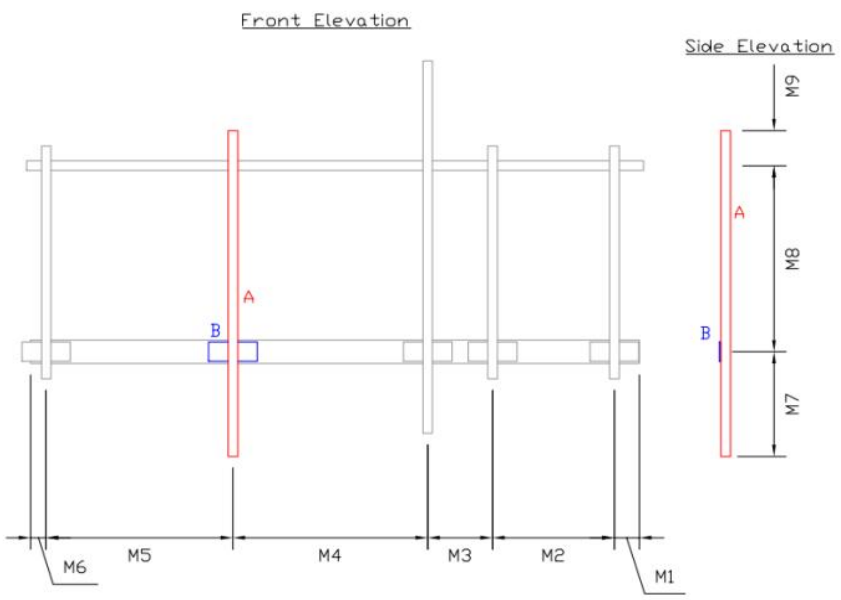
Back Side View of Full Pipe Mounts Pos.#3

Letter	Member Size	Member Length	Connection	Top Edge to Center of Bolt	Side Edge to Center of Bolt	Bolt to Bolt
A	2.38"Dia.x.171"	8'	1-.38"U Bolt to HR	N/A	N/A	N/A
B	2-2"Tx12"Wx.40"	N/A	4-.62"	.75"	1"	10"

Measurements	
M1	5"
M2	2'6"
M3	1'4"
M4	4'
M5	3'10"
M6	5"
M7	1'9"
M8	4'3"
M9	2'

Position #3

Pipe Mount Detail



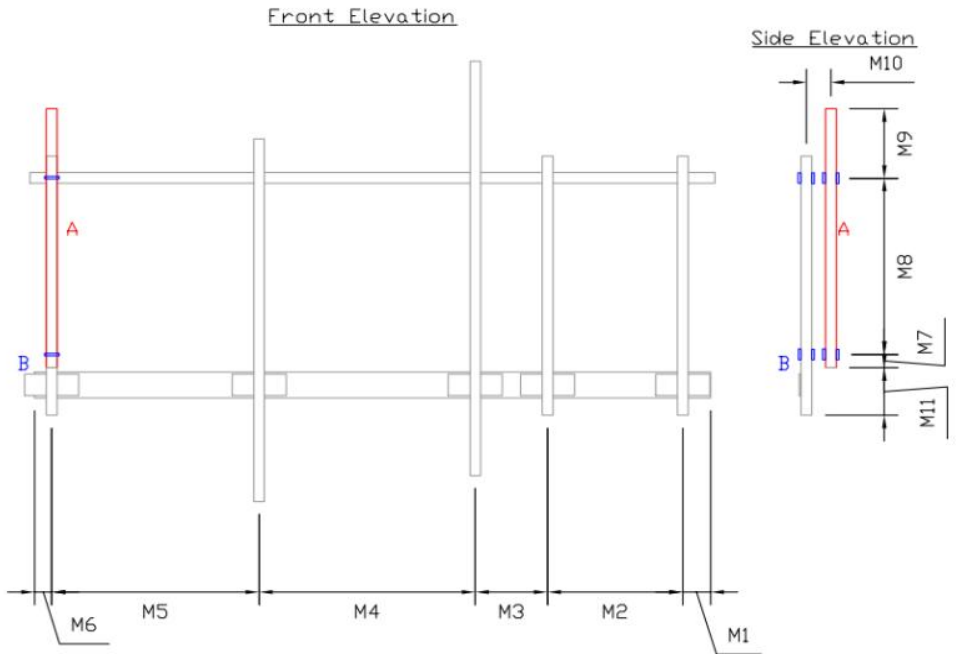
Back Side View of Full Pipe Mounts Pos.#4

Letter	Member Size	Member Length	Connection	Top Edge to Center of Bolt	Side Edge to Center of Bolt	Bolt to Bolt
A	2.38"Dia.x.169"	7'	1-.62" to HR	N/A	N/A	N/A
B	2"Tx12"Wx.40"	N/A	4-.62"	.75"	1"	10"

Measurements	
M1	5"
M2	2'6"
M3	1'4"
M4	4'
M5	3'10"
M6	5"
M7	2'3"
M8	4'3"
M9	6"

Position #4

Pipe Mount Detail



Back Side View of Full Pipe Mounts Pos.#5 Beta

Letter	Member Size	Member Length	Connection	Top Edge to Center of Bolt	Side Edge to Center of Bolt	Bolt to Bolt
A	2.38" Dia.x.155"	5'	2-.50" ALL Thread	.50"	.75"	3.5"
B	4-1.5"Tx5"Wx.38"	N/A	Share W/ A	.75"	.75"	3.5"

Measurements	
M1	5"
M2	2'6"
M3	1'4"
M4	4'
M5	3'10"
M6	5"
M7	3"
M8	3'5"
M9	1'4"
M10	3.5"
M11	11"

Position #5 Beta

Pipe Mount Pictures - Pos. #1,2,5

Back Side of Top Connection at Boom (Level & Perpendicular)

Side View of Top Connection at Boom (Level & Perpendicular)

Back Side of Bottom Connection at Boom (Level & Perpendicular)

Side View of Bottom Connection at Boom (Level & Perpendicular)

Pipe Mount Pictures - Pos. #3

Back Side of Top Connection at Boom (Level & Perpendicular)

Side View of Top Connection at Boom (Level & Perpendicular)

Back Side of Bottom Connection at Boom (Level & Perpendicular)

Side View of Bottom Connection at Boom (Level & Perpendicular)

Pipe Mount Pictures - Pos. #4

Back Side of Top Connection at Boom (Level & Perpendicular)

Side View of Top Connection at Boom (Level & Perpendicular)

Back Side of Bottom Connection at Boom (Level & Perpendicular)

Side View of Bottom Connection at Boom (Level & Perpendicular)

Pipe Mount Pictures - Pos. #5 Beta

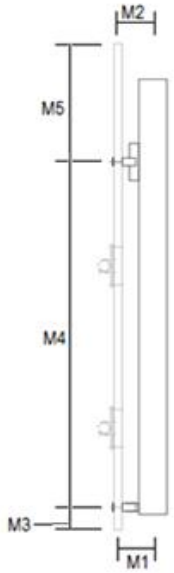
Back Side of Top Connection at Boom (Level & Perpendicular)

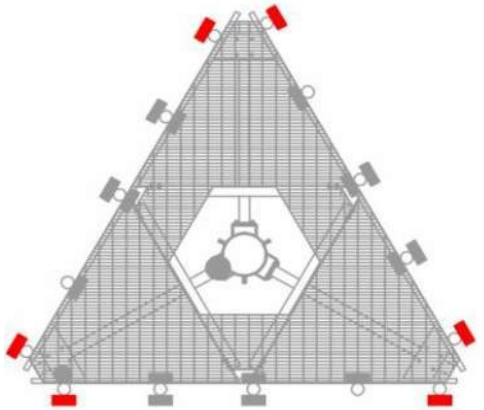
Side View of Top Connection at Boom (Level & Perpendicular)

Back Side of Bottom Connection at Boom (Level & Perpendicular)

Side View of Bottom Connection at Boom (Level & Perpendicular)

Antenna Detail





Antenna #1 Location

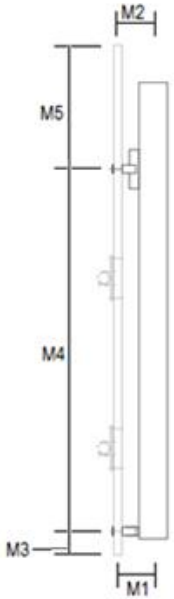
Antenna #	Height to Center or Base	Quanity	Make	Type	Model
1	223'	6	Algon	Panel	AWS6518.02D

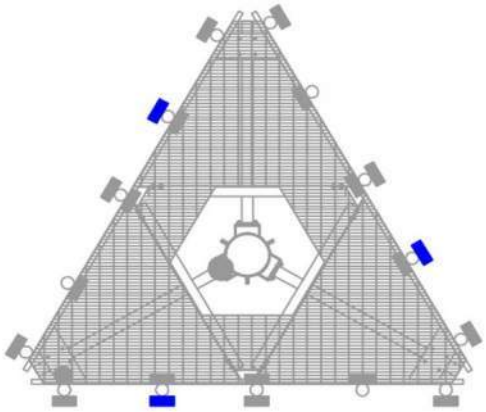
Antenna #	Dimmensions	Leg or Face	Azimuth	Coax Quanity	Coax Make	Coax Model	Coax Size
1	4'3"Tx5.5"Wx3"D	Pos 1/5	58°,175°,293°	6	Andrew	N/A	1 5/8"

Measurements	
M1	5.5"
M2	5.5"
M3	1'5"
M4	3'3"
M5	4"

Antenna #1

Antenna Detail





Antenna #2 Location

Antenna #	Height to Center or Base	Quanity	Make	Type	Model
2	223'	3	Powerwave	Panel	P65-16-XLH-RRF

Antenna #	Dimmensions	Leg or Face	Azimuth	Coax Quanity	Coax Make	Coax Model	Coax Size
2	6'Tx1'Wx6"D	Pos 4	58°,175°,293°	6	Andrew	N/A	1 5/8"

Measurements	
M1	9"
M2	9"
M3	1'4"
M4	5'5"
M5	3"

Antenna #2

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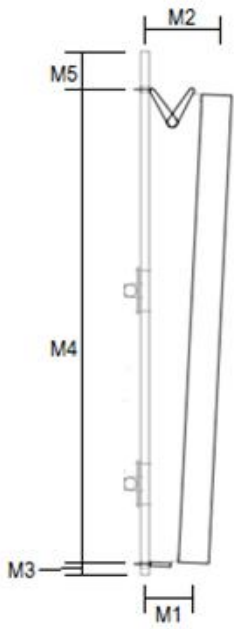
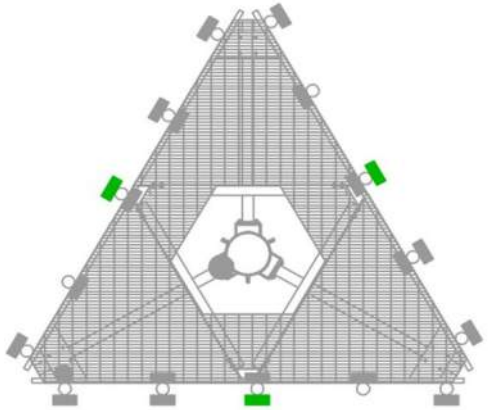
Antenna Detail





Antenna #3 Location

Antenna #	Height to Center or Base	Quanity	Make	Type	Model
3	224'2"	3	Andrew	Panel	DBXNH-6565B-R2M

Antenna #	Dimmensions	Leg or Face	Azimuth	Coax Quanity	Coax Make	Coax Model	Coax Size
3	6'Tx1'Wx5.5"D	Pos 3	58°,175°, 293°	2/1	Fiber/Black Cable	N/A	.80"/.40"

Measurements	
M1	8"
M2	10.5"
M3	2'3"
M4	5'
M5	9"

Antenna #3

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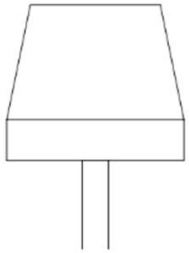
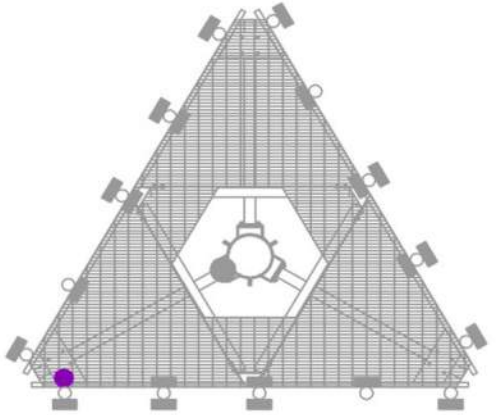
Antenna Detail





Antenna #4 Location

Measurements	
Antenna #4	

Antenna #	Height to Center or Base	Quanity	Make	Type	Model
4	225'8"	1	N/A	Large Strobe/Beacon	N/A

Antenna #	Dimmensions	Leg or Face	Azimuth	Coax Quanity	Coax Make	Coax Model	Coax Size
4	16"Tx16" Dia.	B5	N/A	1	S.O. Cord	N/A	.60"

Antenna
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Antenna #1 Pictures

Back Side of Full Ant. #1 (Level & Perpendicular)

Full Side Ant. #1 Showing Downtilt Brackets(Level & Perpendicular)

Antenna #1 Tag

Centerline of Antenna #1 with Laser Tape

Antenna
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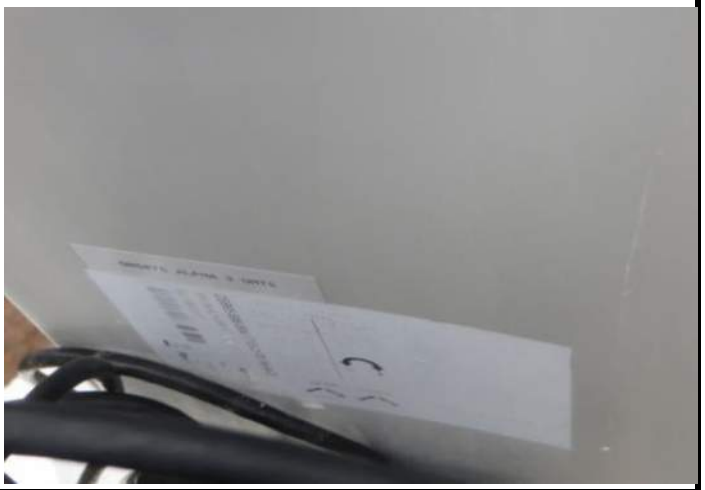
Antenna #2 Pictures

Back Side of Full Ant. #2 (Level & Perpendicular)

Full Side Ant. #2 Showing Downtilt Brackets(Level & Perpendicular)



Antenna #2 Tag

Centerline of Antenna #2 with Laser Tape

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Antenna #3 Pictures

Back Side of Full Ant. #3 (Level & Perpendicular)

Full Side Ant. #3 Showing Downtilt Brackets(Level & Perpendicular)

Antenna #3 Tag

Centerline of Antenna #3 with Laser Tape

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Antenna #4 Pictures

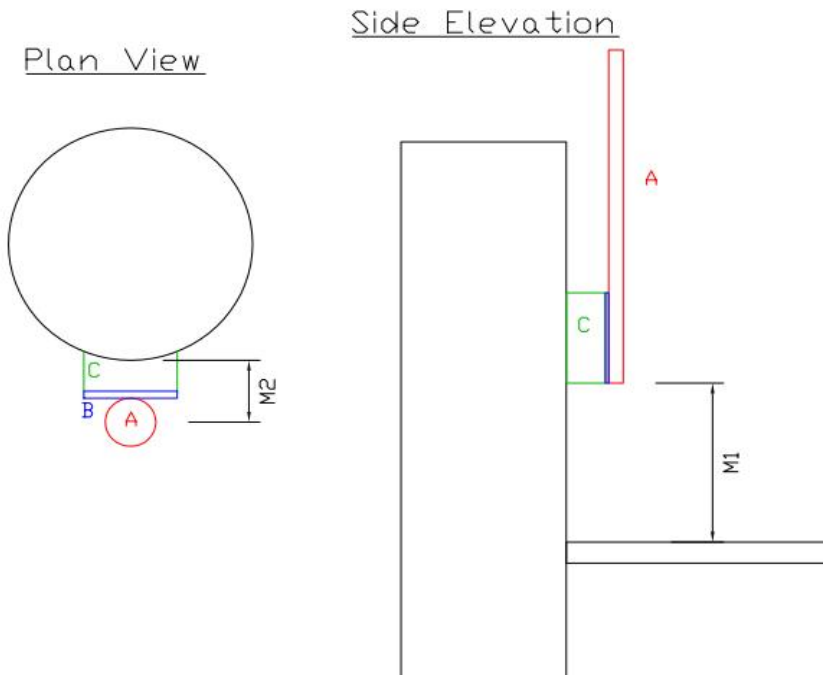
Back Side of Full Ant. #4 (Level & Perpendicular)

Full Side Ant. #4 Showing Downtilt Brackets(Level & Perpendicular)

N/A

N/A

RRH Pipe Mount Detail



Front View of RRH Pipe Mount #1
(Zoomed in, taken from ground)

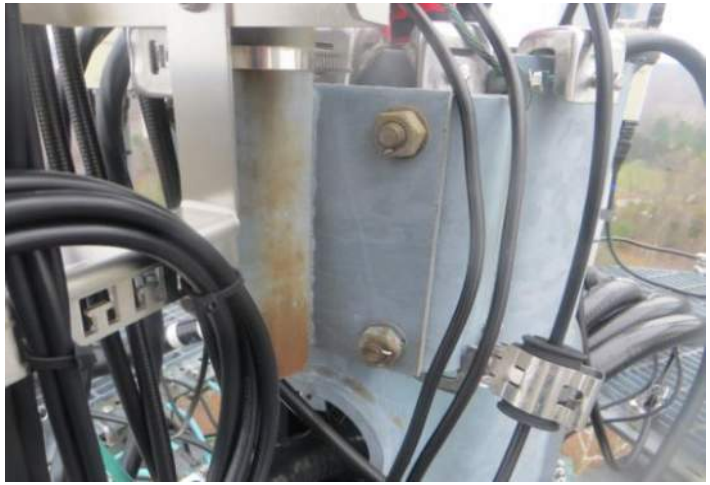
Letter	Member Size	Member Length	Connection	Top Edge to Center of Bolt	Side Edge to Center of Bolt	Bolt to Bolt
A	2.38" Dia. X.159"	4'	Welded to B	N/A	N/A	N/A
B	8"x8"x.38"	8"	4-.62"	1"	1"	6"
C	9"x3"x.40"	8"T	Welded to Tower	N/A	N/A	N/A

Measurements	
M1	2'3"
M2	4"

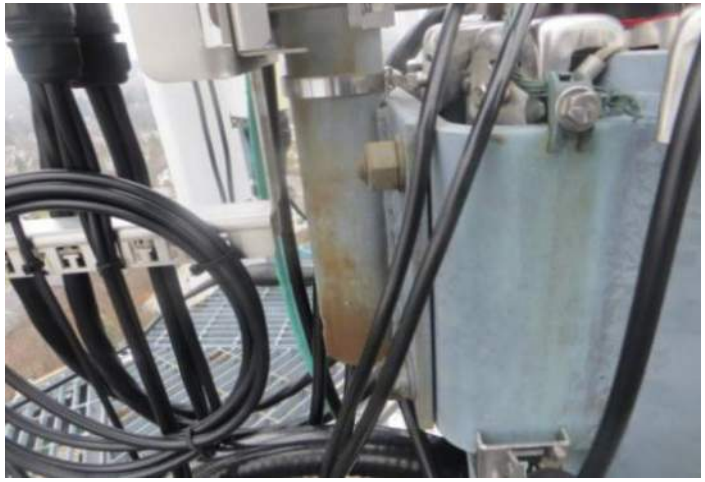
RRH Pipe Mount #1

RRH Pipe Mount #1 Pictures

Back Side of Top Connection at Boom (Level & Perpendicular)



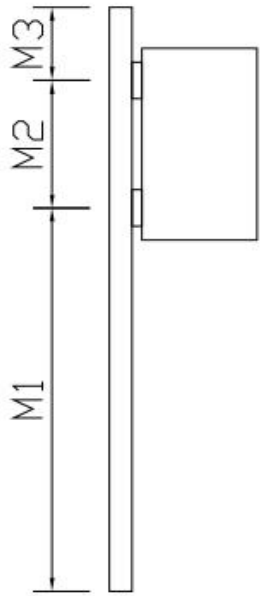
Side View of Top Connection at Boom (Level & Perpendicular)

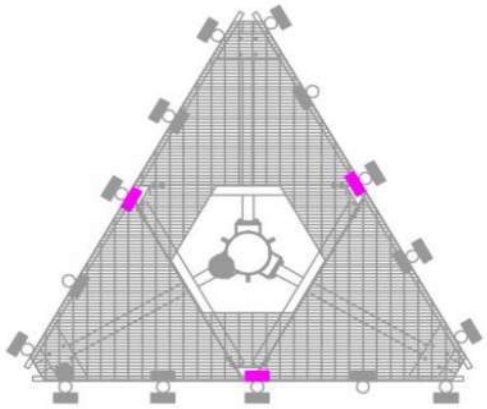


Back Side of Bottom Connection at Boom (Level & Perpendicular)

N/A

RRH and Other Equipment Information



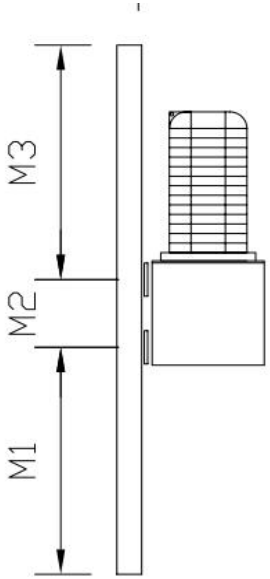


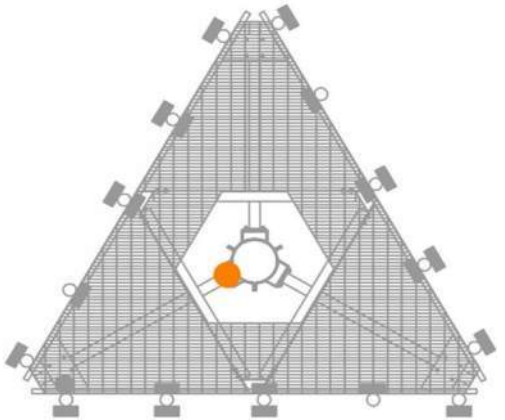
RRH #1 Location

Location	Height to Base	Type	Manufacturer	Model	Dimensions
A3	221'1O"	RRH	Alcatel Lucent	9442 RRH2x40-07L	21"Tx12"Wx12"D
B3	221'1O"	RRH	Alcatel Lucent	9442 RRH2x40-07L	21"Tx12"Wx12"D
G3	221'1O"	RRH	Alcatel Lucent	9442 RRH2x40-07L	21"Tx12"Wx12"D

Measurements					
	M1	M2	M3		
A3	3'8"	1'2"	3'2"		
B3	3'8"	1'2"	3'2"		
G3	3'8"	1'2"	3'2"		
RRH #1					

RRH and Other Equipment Information



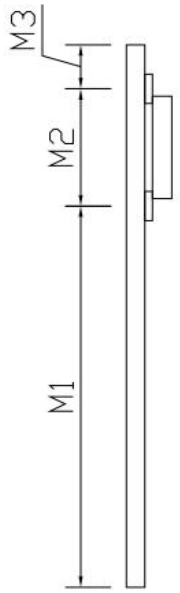


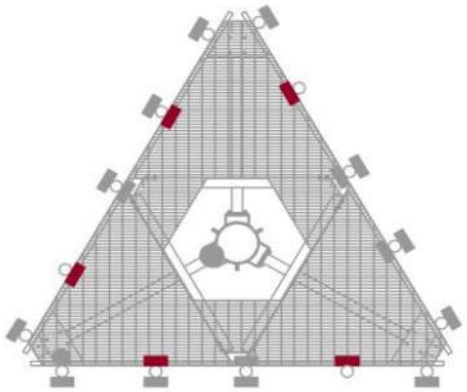
Surge Protector Location

Location	Height to Base	Type	Manufacturer	Model	Dimensions
215°	223'3"	Squid	Raycap	DC6-48-60-18-8F	18"x9"Dia.

Measurements					
	M1	M2	M3		
A1	11"	5"	2'8"		
Surge Protector					

RRH and Other Equipment Information





TMA 1 Locations

(Qty)Location	Height to Base	Type	Manufacturer	Model	Dimensions
A2/A4	222'	TMA	Powerwave	LGP18601	10.5"Tx6"Wx3"D
B2/B4	222'	TMA	Powerwave	LGP18601	10.5"Tx6"Wx3"D
G2/G4	222'	TMA	Powerwave	LGP18601	10.5"Tx6"Wx3"D

Measurements					
	M1	M2	M3		
A2	2'8"	12"	1'4"		
A4	4'	12"	2'		
B2	2'8"	12"	1'4"		
B4	4'	12"	2'		
G2	2'8"	12"	1'4"		
G4	4'	12"	2'		
TMA #1					

RRH and Other Equipment Pictures- RRH #1

Back Side of Full RRH #1 (Level & Perpendicular)

Full Side RRH #1 (Level & Perpendicular)

RRH #1 Tag

N/A

RRH and Other Equipment Pictures- Surge Protector

Back Side of Full Surge Protector (Level & Perpendicular)

Full Side Surge Protector(Level & Perpendicular)

Surge Protector Tag

N/A

RRH and Other Equipment Pictures- TMA #1

Back Side of Full TMA(s) (Level & Perpendicular)

Full Side TMA(s) (Level & Perpendicular)

TMA Tag

N/A