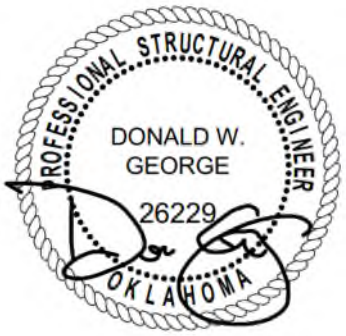
Structural Analysis Report

• Elevated Steel Platform •

Site ID:	**10006301**
Site Name:	**Trails**
Project:	Generator Upgrade
Prepared For:	**AT&T**
Structure Description:	**EMI 4'x10' Equipment Platform** **Diesel Backup Generator**
Site Location:	**1299 State HWY 9, HWY 9W** **Norman, OK 73072** **Cleveland County** **35.186812°, -97.461192°**
Design Codes:	**IBC 2021** **ASCE 7-16** **ASCE 24-14**



Date Signed:
9/20/2024

10006301_Gen Platform Analysis_R0 240919 5492

Revision 0
September 20, 2024

1.0 Introduction

GeoStructural has completed a structural analysis for the proposed elevated steel platform assembly at the existing AT&T *10006301* communications site located in Cleveland County, OK. The scope of this structural analysis is limited to the following:

- EMI, Inc. 1000-0030-0195 4'x10' Steel Equipment Platform w/ (8) 1007-T006-0120 1' extension columns
  - Primary steel framing members and connections (evaluation of helical pier capacity per EMI, Inc.)
- Kohler 50REOZK Diesel Generator Equipment Anchorage.

The existing communications structure/foundation and existing equipment platform(s)/shelter(s) are designed by others and beyond the scope of this analysis.

2.0 Analysis & Design Criteria

This analysis is pursuant to the following design criteria:

- IBC 2021 – International Building Code.
- ASCE 7-16 – Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
- ASCE 24-14 – Flood Resistant Design and Construction
- AISC – Steel Construction Manual.

Gravity Design Loading:	
Kohler 50REOZK 50kW Generator w/ Enclosure = 2,369lbs 270gal Fuel Tank(Dry) = 1,452 lbs Diesel Fuel (100% Fill + 35% Contain) = 7.3 lb/gal(365gal) = 2,661 lbs WET Total Assembly Weight = 6.480 kips ; DRY Total Assembly Weight = 3.820 kips	
Wind Design Loading:	
Design Wind w/o ice = 109 mph *[3-sec gust Ultimate ASCE Figure 26.5-1B]*	
Exposure Category C Risk Category II	Topographic Category 1
Seismic Design Loading:	
Site Class D S_s = 0.349, S_1 = 0.086, S_{DS} = 0.354	Importance Factor, I_p = 1.0
Flood Loading: Non-coastal Zone AE; BFE = 1101.8 ft AMSL NAVD88 per Elevation Certificate	
DFE = BFE+2 = 1103.8 ft AMSL NAVD88	
Ground Elevation (G) = 1101.98 ft AMSL NAVD88 per Elevation Certificate	
Lowest Eroded Ground Elevation (GS) = 1101.98–0.5 = 1101.48 ft, assuming 6" lost to flood erosion	
Design Stillwater Flood Depth (ds)= 2.23 ft *Assuming FIRM BFE includes wave effects	
Freshwater Unit Wt. (γ) = 62.4 lb/ft^3 ; Saltwater Unit Wt. (γ) = 64 lb/ft^3	
Freshwater Mass Density (ρ)= 1.94 slugs/ft^3 ; Saltwater Mass Density (ρ)= 1.99 slugs/ft^3	
Gravitational Constant (g) = 32.2 ft/sec^2	

All data required to complete our structural analysis was furnished by our client. GeoStructural has not conducted an independent study to verify existing site conditions and the results of this analysis are based solely on the information provided.

3.0 Load Generation & Material Strength

Table 3.1 – Wind Design Loading

Wind Load – Velocity Pressure	ASCE 7-16, §29.3
$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2$	Eq. 29.3-1
$K_z = 0.85$	Table 29.3-1
$K_{zt} = 1.00$	§ 26.8.2
$K_d = 0.90$	Table 26.6-1
$V = 109$ mph	Figure 26.5
$q_z = 0.00256*0.85*1.00*0.90*(109^2)/1000 =$ 0.0233 ksf	Eq. 29.3-1
Wind Load on Generator – Other Structures (Tanks & Similar Structures)	**ASCE 7-16, §29.5**
$F = q_z G C_f A_f$	Eq. 29.5-1
$G = 0.85$	§ 26.9
$C_f = 1.32$	Figure 29.5-1
$A_f = 62.4\ ft^2$ Worst Case; $22.4\ ft^2$ Transverse (Side)	Kohler 50REOZK
$F_N = 0.0233*0.85*1.32*62.4 =$ 1.63 kip; $F_T = 0.0233*0.85*1.32*22.4 =$ 0.58 kip	Eq. 29.5-1

Table 3.2 – Wind Anchorage Loading

Wind Load	ASCE 7-16, Chapter 2
0.9D + 1.0W	Eq. 2.3.1-5
Vertical C.O.G. = 6.57/2 = 3.29 ft	
Net OTM = (1.63*3.29)-((0.9*3.820)*1.5) = 0.206 k-ft	
AB Tension = 0.206/(33/12)/(6/2) = 0.025 kip	
Net Shear = 1.63-(0.9*3.820*0.15) = 1.11 kip	
AB Shear = 1.11/(6/2) = 0.37 kip (Assume 1/2 AB engage)	

Table 3.3 – Seismic Design Loading – 100% Fill + 35%

Seismic Load – Non-Structural Components	ASCE 7-16, Chapter 13
$F_p = 0.4a_pS_{DS}W_p\{(1+2(z/h)) / (R_p/I_p)\}$	Eq. 13.3-1
$F_p \leq 1.6S_{DS}I_pW_p$	Eq. 13.3-2
$F_p > 0.3S_{DS}I_pW_p$	Eq. 13.3-3
Reversible Vert Force, $E_v = 0.2S_{DS}W_p = 0.2*0.354*6.480 =$ 0.46 kip	§ 13.3.1
$a_p = 1.0$	Table 13.6-1
$S_{DS} = (2/3)S_{MS} = 0.354$; $S_{D1} = (2/3)S_{M1}$	Eq. 11.4-3 & 4
S_s; S_1	USGS Reference
F_a ; F_v	Tables 11.4-1 & 2
$S_{MS} = F_aS_s$; $S_{M1} = F_vS_1$	Eq. 11.4-1 & 2
$W_p = 6.480$ kip (Wet Weight)	From Section 2.0 Above
$z = 3$ ft (Anchorage Height of Generator Tank to Platform)	
$h = 3+6.57$ ft (Overall Height of Generator with Tank Assembly)	
$R_p = 2.5$	Table 13.6-1
Importance Factor, Ip = 1.0	§ 11.5.1 & 13.1.3
$\rho = 1.0$ (Exception from $\rho = 1.3$, Non-Structural Components)	§ 12.3.4.2 & § 13.3.1
$F_p = 0.4a_pS_{DS}W_p\{(1+2(z/h)) / (R_p/I_p)\}$ = 0.4*1.0*0.354*6.480*(1+2*(3/9.57))/(2.5/1.0) = 0.60 kip	Eq. 13.3-1
$F_p \leq 1.6S_{DS}I_pW_p = 1.6*0.354*1.0*6.480 =$ 3.67 kip	Eq. 13.3-2
$F_p > 0.3S_{DS}I_pW_p = 0.3*0.354*1.0*6.480 =$ 0.69 kip	Eq. 13.3-3

Table 3.4 – Seismic Overstrength Anchorage Loading (ACI 318-19 § 17.2.3.4.3(d) & 17.2.3.5.3(c))

Seismic Load – Non-Structural Components	ASCE 7-16, Chapter 13
$(0.9-0.2(S_{DS}))D + \Omega_0Q_E$	Eq. 12.4.3.2 (7)
$\Omega_0 = 2.0$	Table 13.6-1
Vertical C.O.G. = ((2.369*4.6)+(4.113*1.17))/6.480 = 2.41 ft	
Net OTM = (0.69*2.41*2.0)-((((0.9-(0.2*0.354))*6.480)*1.5) = 0.00 k-ft	
Omega AB Tension = (0.0/(33/12)/(6/2))+((0.46*2.0)/6) = 0.15 kip	
Net Shear = (0.69*2.0)-((((0.9-(0.2*0.354))* 6.480)*0.3) = -0.24 kip	
Omega AB Shear = -0.24/(6/2) = 0.0 kip (Assume 1/2 AB engage)	

Table 3.5 – Flood Loading (ASCE 7-16 § 5, ASCE 24-14 & FEMA 55, A-Zones, Open Foundation)

Flood Load
*Hydrostatic Load (Fsta) = ½*γ*ds^2*w = 0.5*62.4*(2.23^2)*0.9 = 85.66*
*0 lbs N/A since acting in all directions around pile at 0.33*ds*
Width of Element Hit by Water (w) = 6.625/12 = 0.55 ft pile diameter
*Buoyancy Load (Fbuoy) = γ*Ap*de = 62.4*0.24*6 = 89.63*
89.63 lbs uplift per pile
Pile Cross-sectional Area (Ap) = 3.1415(0.55^2)/4 = 0.24 ft^2*
Pile Embedment Depth (de) = 6 ft
*Hydrodynamic Load (Fdyn) = ½*Cd*ρ*V^2*A*
*Range of 7.13 lbs to 102.9 lbs acting at ½*ds = 1.12 ft a.g.s.*
Drag Coefficient (Cd) = 1.2
*A = w*ds = 0.55*2.23 = 1.23 ft2*
Lower Bound Flood Velo (V1) = ds/t = 2.23/1 = 2.23 ft/sec
*Upper Bound Flood Velo (V2) = (g*ds)0.5 = (32.2*2.23)^0.5 = 8.47 ft/sec*
*Fdyn_low = 0.5*1.2*1.94*(2.23^2)*1.23 = 7.13*
*Fdyn_upp = 0.5*1.2*1.94*(8.47^2)*1.23 = 102.9*
*Breaking Wave Load (Fbrkp) = ½*Cdb*γ*D*Hb^2 = 0.5*1.75*62.4*0.55*(1.74^2) = 91.2*
91.2 lbs acting at ds = 2.23 ft a.g.s.
Breaking Wave Drag Coefficient (Cdb) = 1.75
Pile Diameter (a, D) = 0.55 ft
*Breaking Wave Height (Hb) = 0.78*ds = 0.78*2.23 = 1.74 ft*
Wave Slam (Fs) = ½ γ*Cs*ds*hp*wp = 0.5*62.4*2*2.23*0.66*10 = 918.4*
*918.4 lbs acting at 1.55*ds = 3.46 ft a.g.s.*
Slam Coefficient (Cs) = 2
Platform Height (hp) = 0.66 ft ; Platform Width (wp) = 10 ft
*Wave Crest Elevation = 1.55*ds = 1.55*2.23 = 3.46 ft a.g.s.*
Bottom of Platform Beam Elevation (bp) = 2.5 ft a.g.s.,
Debris Impact Load (F_i) not considered in this analysis due to limited flow path
*Scour Localized Around a Single Pile Due to Group (Smax) = 6*a = 6*0.55 = 3.31 ft*
Flood Load Combination shall be the greater of:
• *max(F_{brkp} or F_{dyn}) (front row piles) + F_{dyn} (all others) + F_i (one pile)*
• *F_s (wave slam; breaking waves alone)*

Table 3.6 – Structural Component Material Strengths

Structural Component	Nominal Strength/Material[1]
Connection Bolts & Genset Base Tank Connection Anchors	ASTM A325
Column All-thread Rod	ASTM A193 B7
Structural Shapes (L, C, W, etc.), Plate & Bar	F_y = 36 ksi (A36)
HSS Pipe Columns/ Helicals	F_y = 42 ksi (ASTM A500, Gr. B)

1. *Strengths listed were utilized for this analysis and are based upon ASTM, AISC, RCSC, MSJC, AWS and ACI preferred specification values. Values and materials are consistent with industry standards. Material strengths were taken from original design documents, geotechnical reports, etc. when available.*

Utilizing 5/8"ϕ A325 Bolts, Minimum of (6) per Gen Frame, (3) each side of Generator.

- *Wind Anchorage Forces:*

  Maximum Tension per Bolt, T_u = 0.025 kips/bolt
  Maximum Shear per Bolt, V_u = 0.37 kips/bolt

- *Seismic Anchorage Forces:*

  Maximum Tension per Bolt, T_u = 0.15 kips/bolt
  Maximum Shear per Bolt, V_u = 0.0 kips/bolt

- *Allowable Loads per AISC:*

  Allowable Tension per Bolt, ϕT_n = 13.64 kips/bolt
  Allowable Shear per Bolt, ϕV_n = 6.51 kips/bolt

  (0.025/13.64) + (0.37/6.51) = 0.059 < 1.0, OK

4.0 Conclusion & Recommendations

AT&T's proposed elevated steel platform assembly and generator mechanical anchorage will satisfy the requirements of the applicable design codes and have sufficient capacity to support the proposed backup diesel generator loading considered in this analysis.

- EMI, Inc. 1000-0030-0195 4'x10' Steel Equipment Platform w/ (8) 1007-T006-0120 1' extension columns
  - Primary steel framing members and connections (evaluation of helical pier capacity per EMI, Inc.)
- Kohler 50REOZK Diesel Generator Equipment Anchorage:
  - (6) 5/8"Ø ASTM A325 stainless steel thru-bolts, min. from base tank flange, through platform bar grating, to 3x3 plate washer with nut & lock-washer

Analysis Notes & Assumptions:

- **All data required to complete our structural analysis was furnished by our client. GeoStructural has not conducted a site visit or independent study to verify existing conditions and the results of this analysis are based solely on the information provided.**
- **Proposed anchorage shall be installed in accordance with any recommendations given in approved Construction Drawings.**
- **Proposed platform assembly and helical anchors shall be installed in accordance with manufacturer's listed installation instructions and recommendations.**

If any of the existing or proposed conditions reported in this analysis are not properly represented, please contact our office immediately to request an amended report. We appreciate the opportunity to provide our structural engineering services to you. If you have any questions regarding the content of this structural analysis report, please don't hesitate to contact us.

Prepared by:

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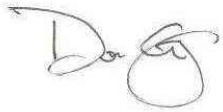
Reviewed and Approved by:



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5.0 Attachments, Calculations & Software Output

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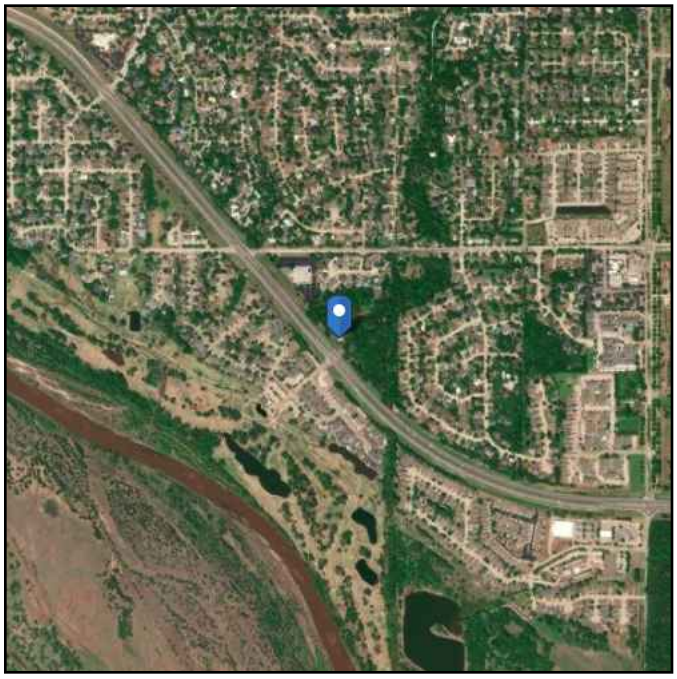
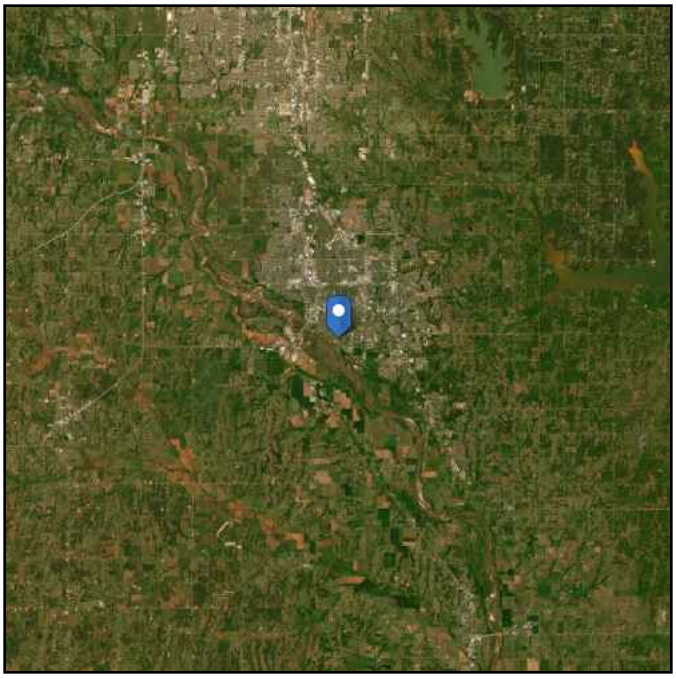
ASCE Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	35.186812
Risk Category:	II	**Longitude:**	-97.461192
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	1102.5294458944581 ft (NAVD 88)





Wind

Results:

Wind Speed	109 Vmph
10-year MRI	75 Vmph
25-year MRI	82 Vmph
50-year MRI	88 Vmph
100-year MRI	93 Vmph

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

Date Accessed: Thu Sep 19 2024

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

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

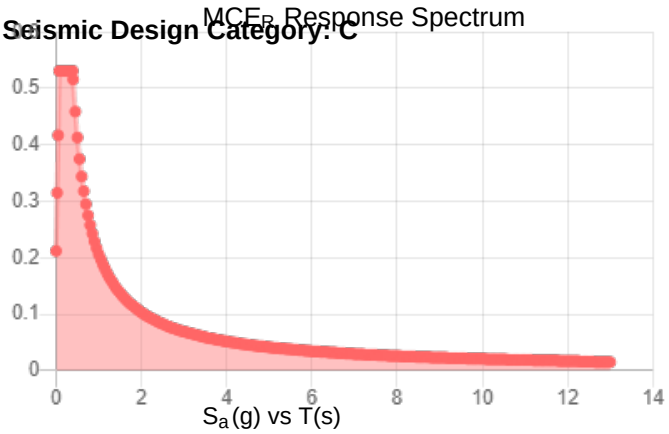
Seismic

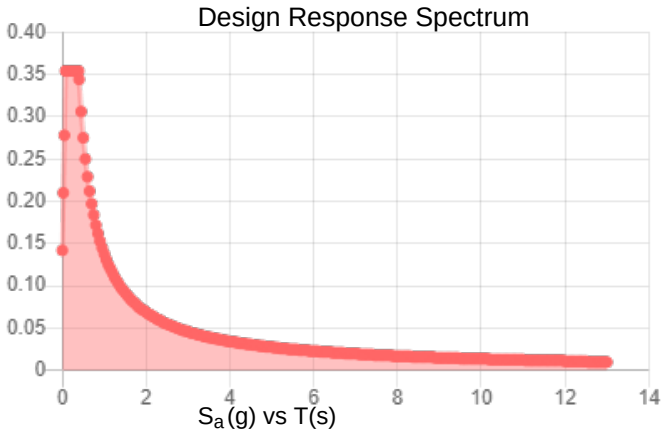
Site Soil Class: D - Default (see Section 11.4.3)

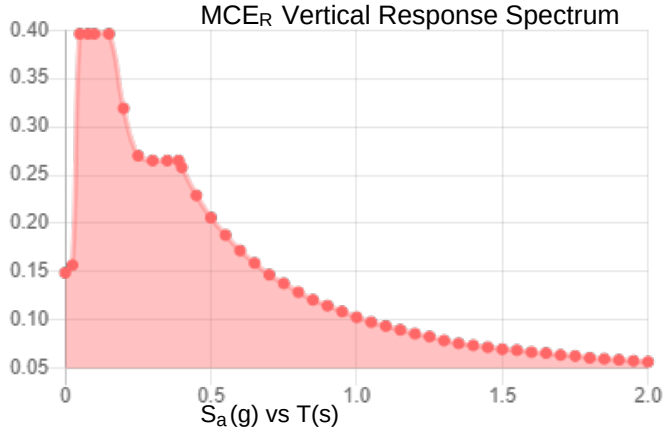
Results:

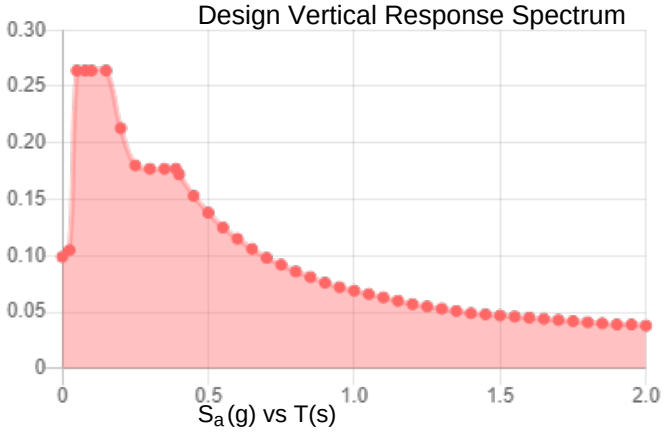
S_S :	0.349	S_{D1} :	0.138
S_1 :	0.086	T_L :	12
F_a :	1.521	PGA :	0.215
F_v :	2.4	PGA_M :	0.298
S_{MS} :	0.531	F_{PGA} :	1.385
S_{M1} :	0.206	I_e :	1
S_{DS} :	0.354	C_v :	0.933

Seismic Design Category: C









Data Accessed: Thu Sep 19 2024

Date Source:

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

Ice

Results:

Ice Thickness:	1.50 in.
Concurrent Temperature:	5 F
Gust Speed	40 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Thu Sep 19 2024

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

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

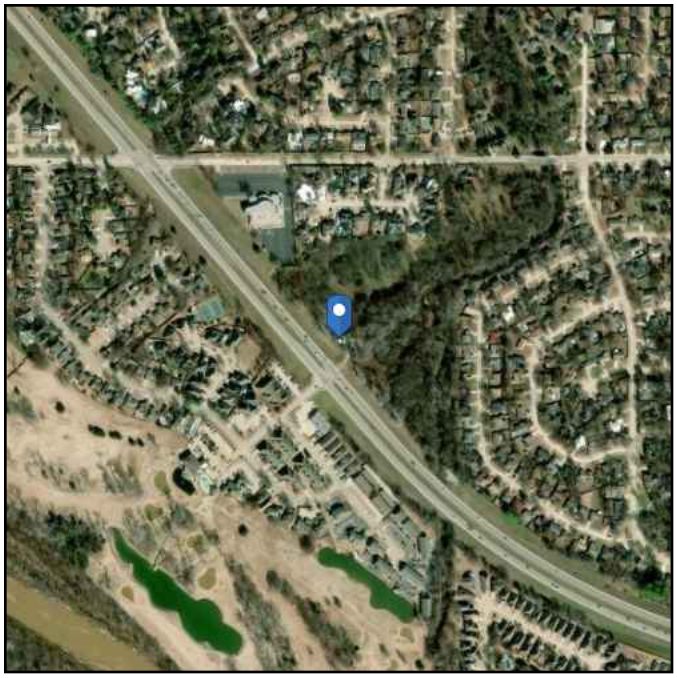
Flood

Results:

Flood Zone Categorization: AE

Base Flood Elevation:

Data Source:	FEMA National Flood Hazard Layer - Effective Flood Hazard Layer for US, where modernized (https://msc.fema.gov/portal/search)
Date Accessed:	Thu Sep 19 2024
FIRM Panel:	If available, download FIRM panel here
Insurance Study Note:	Download FEMA Flood Insurance Study for this area here



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

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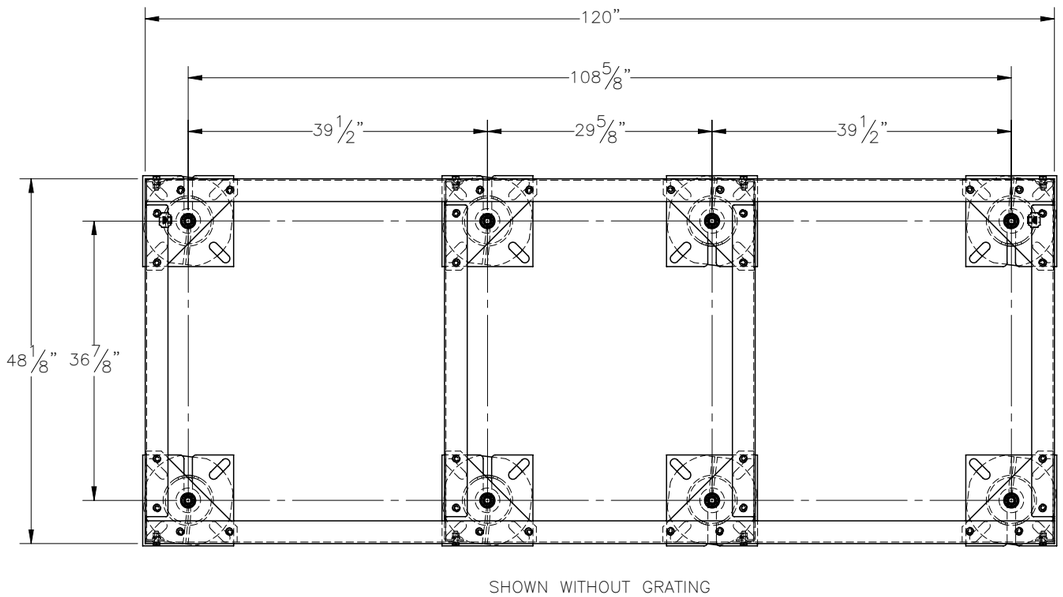

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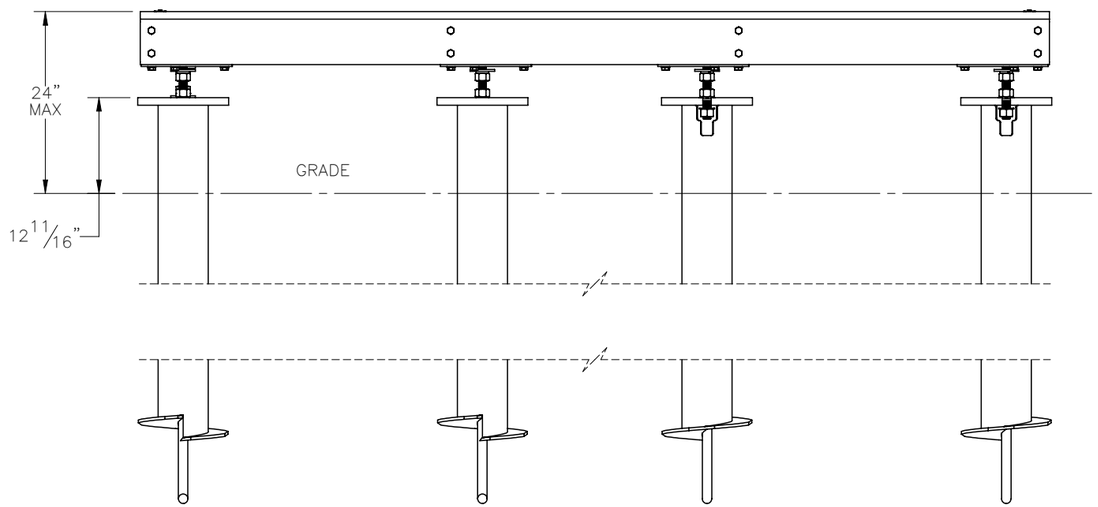
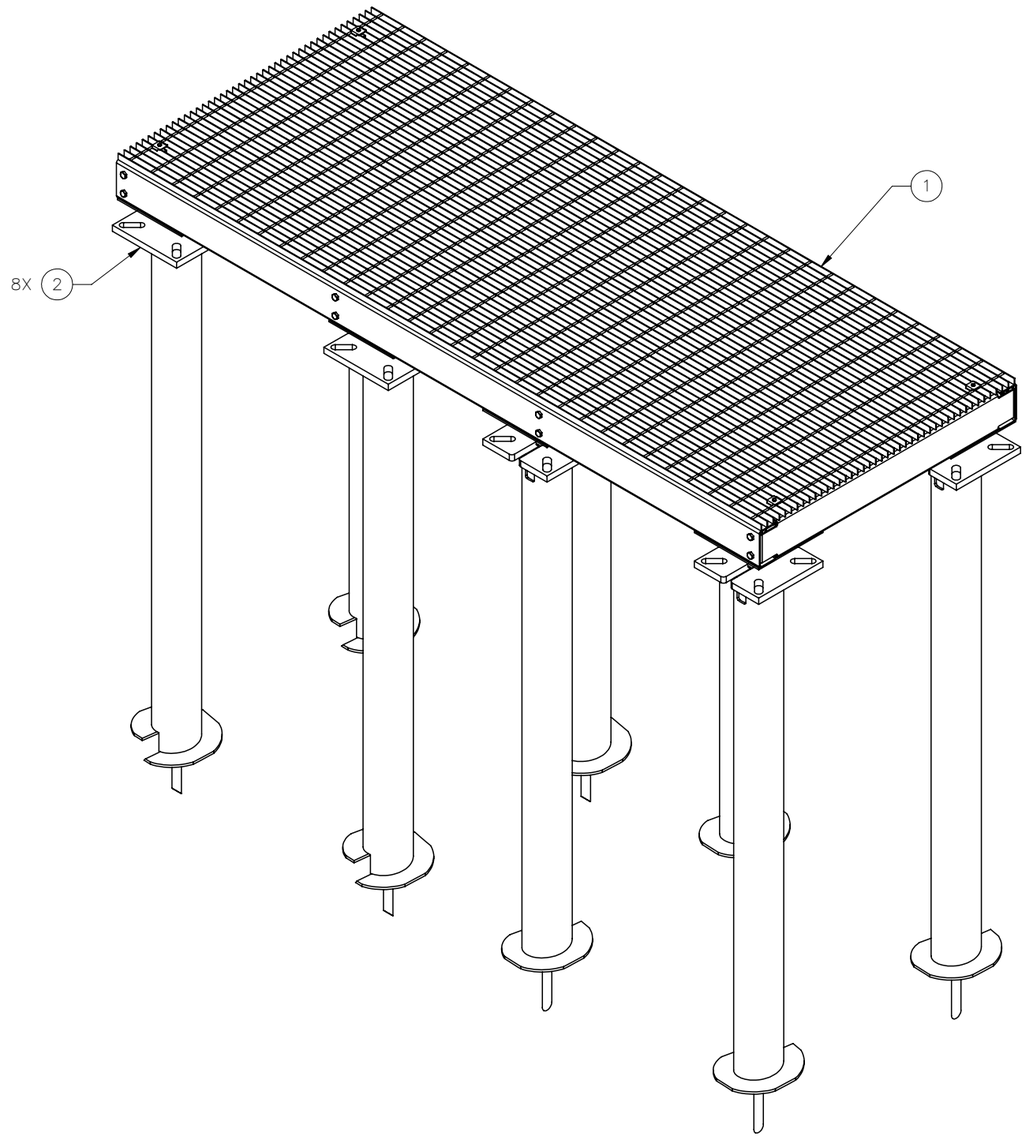




NOTES:

1. OPTIONAL PLATE PROVIDED IF REQUIRED FOR GENERATOR.

ITEM NO.	QTY REQD	PART NUMBER	DESCRIPTION	LENGTH	WEIGHT
1	1	1001-0020-0162	4' X 10' GENERATOR PLATFORM, SKIS		519.6
2	8	1008-0050-0016	6"X7', 1" BASE, 1" HARDWARE HELICAL		182
3	1	P-006-606	RODENT GUARD	36"	2.720

1

SURFACE FINISH: UNLESS OTHERWISE SPECIFIED

MATERIAL: SEE PARTS LIST

THIRD ANGLE PROJECTION

NEXT ASSY | USED ON

APPLICATIONS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES

.0 ± .06
.00 ± .015
.000 ± .005

FRACTIONS ± 1/16

ANGLES ± .25°

HOLES:

DRILLED OR PUNCHED +1/32

BURNED ±1/32

APPROVALS	DATE
DRAWN J. Breen	02/12/2024
CHECKER J. Breen	02/12/2024
ENGINEER J. Breen	02/12/2024
PRODUCTION J. Breen	02/12/2024

ELECTRO MECHANICAL INDUSTRIES, INC.
11230 NEESHAW DRIVE
HOUSTON, TEXAS 77065
1-800-453-0050

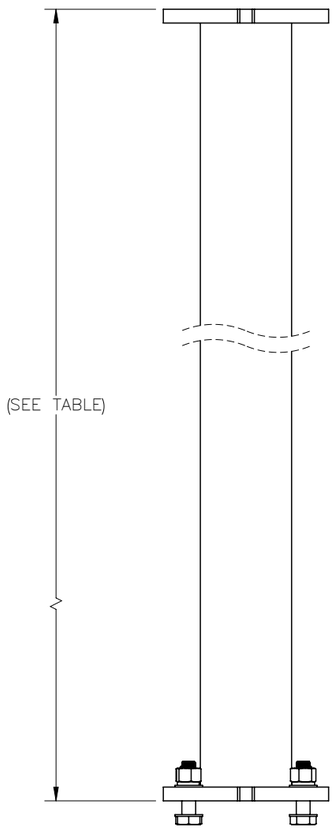
TITLE:

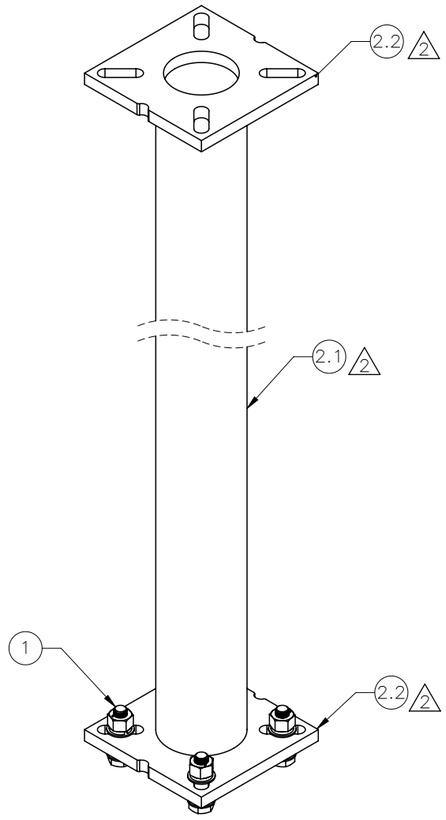
4' X 10' GENERATOR PLATFORM, HELICALS

SIZE B | DRAWING NO. 1000-0030-0195 | REV 0

SCALE: 1:20 | WEIGHT: 1977.3 lbs. | SHEET 1 OF 1

REVISIONS					
REV.	DCN #	DESCRIPTION	DATE	BY	APPROVED
2	01032	CREATED SUB-B.O.M. FOR WELDMENT	4/14/2021	PG	JPB





ITEM NO.	QTY REQD	PART NUMBER	DESCRIPTION	LENGTH	WEIGHT
1	1	1000-0020-0079	1'' X 4'' MOUNTING HARDWARE KIT		8
2	1	1007-T006-0000-W	6" EXTENSION WELDMENT	SEE TABLE	SEE TABLE
2.1	1	1007-T006-0000_1	HSS 6.625 X 0.280, ASTM A500, 42 KSI MIN. YIELD	SEE TABLE	SEE TABLE
2.2	2	P-000-979	TOP PLATE	12"	30.1

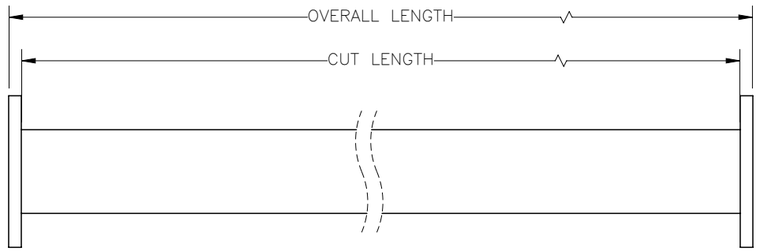
SURFACE FINISH ✓ UNLESS OTHERWISE SPECIFIED		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		APPROVALS	DATE
MATERIAL SEE PARTS LIST		TOLERANCES		DRAWN J. CRITELLI	3.13.19
THIRD ANGLE PROJECTION		.0 ± .06 .00 ± .01 .000 ± .005		CHECKED R. WOODARD	3.15.19
		FRACTIONS	± 1/16	ENGINEER/DESIGNER J. BREEN	3.15.19
		ANGLES	± .25°	PRODUCTION J.K.S.	3.18.19
NEXT ASSY	USED ON	HOLES:			
APPLICATIONS		DRILLED OR PUNCHED	+1/32		
		BURNED	±1/32		

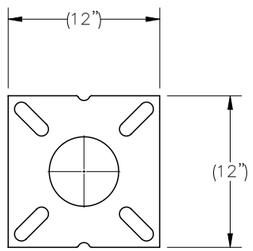
ELECTRO MECHANICAL INDUSTRIES, INC.
11230 NEESHAW DRIVE
HOUSTON, TEXAS 77065
1-800-453-0050

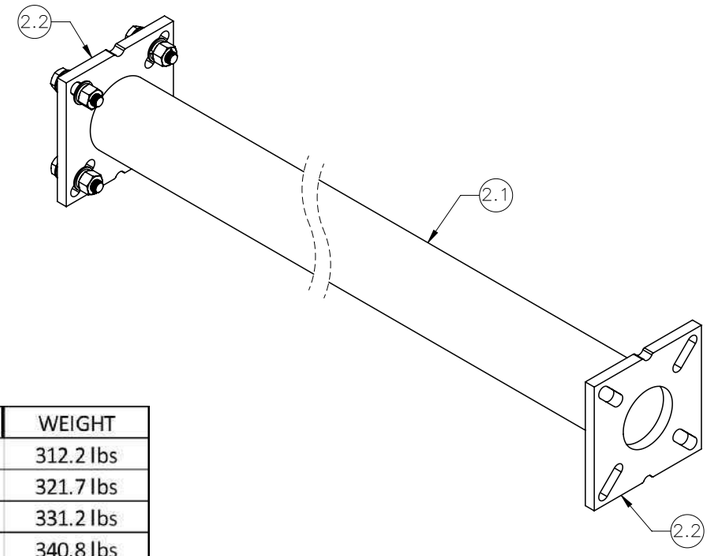
TITLE:
6" EXTENSION TABLE DRAWING

SIZE	DRAWING NO.	REV
B	1007-T006-0000	2

SCALE: 1:11 | WEIGHT: | SHEET 1 OF 2





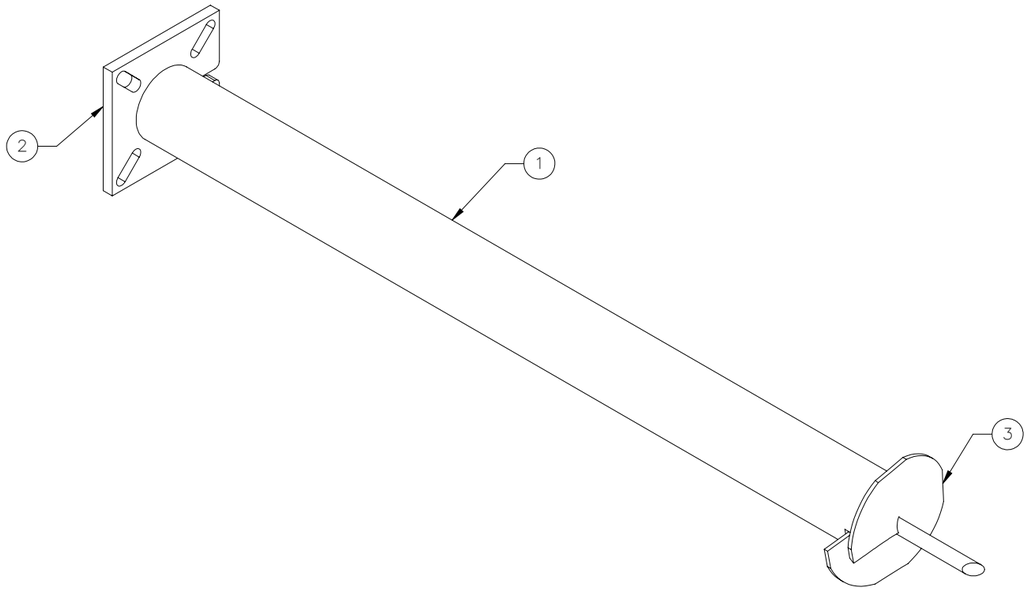


PART #	DESCRIPTION	CUT LENGTH	OVERALL LENGTH	WEIGHT
1007-T006-0060	0.5 FT EXTENSION	4 IN	6 IN	74.2 lbs
1007-T006-0120	1.0 FT EXTENSION	10 IN	12 IN	83.7 lbs
1007-T006-0180	1.5 FT EXTENSION	16 IN	18 IN	93.2 lbs
1007-T006-0240	2.0 FT EXTENSION	22 IN	24 IN	102.7 lbs
1007-T006-0300	2.5 FT EXTENSION	28 IN	30 IN	112.2 lbs
1007-T006-0360	3.0 FT EXTENSION	34 IN	36 IN	121.8 lbs
1007-T006-0420	3.5 FT EXTENSION	40 IN	42 IN	131.3 lbs
1007-T006-0480	4.0 FT EXTENSION	46 IN	48 IN	140.8 lbs
1007-T006-0540	4.5 FT EXTENSION	52 IN	54 IN	150.3 lbs
1007-T006-0600	5.0 FT EXTENSION	58 IN	60 IN	159.8 lbs
1007-T006-0660	5.5 FT EXTENSION	64 IN	66 IN	169.4 lbs
1007-T006-0720	6.0 FT EXTENSION	70 IN	72 IN	178.9 lbs
1007-T006-0780	6.5 FT EXTENSION	76 IN	78 IN	188.4 lbs
1007-T006-0840	7.0 FT EXTENSION	82 IN	84 IN	197.9 lbs
1007-T006-0900	7.5 FT EXTENSION	88 IN	90 IN	207.5 lbs
1007-T006-0960	8.0 FT EXTENSION	94 IN	96 IN	217.0 lbs
1007-T006-1020	8.5 FT EXTENSION	100 IN	102 IN	226.5 lbs
1007-T006-1080	9.0 FT EXTENSION	106 IN	108 IN	236.0 lbs
1007-T006-1140	9.5 FT EXTENSION	112 IN	114 IN	245.5 lbs
1007-T006-1200	10.0 FT EXTENSION	118 IN	120 IN	255.0 lbs
1007-T006-1260	10.5 FT EXTENSION	124 IN	126 IN	264.6 lbs
1007-T006-1320	11.0 FT EXTENSION	130 IN	132 IN	274.0 lbs
1007-T006-1380	11.5 FT EXTENSION	136 IN	138 IN	283.6 lbs
1007-T006-1440	12.0 FT EXTENSION	142 IN	144 IN	293.1 lbs
1007-T006-1500	12.5 FT EXTENSION	148 IN	150 IN	302.7 lbs

PART #	DESCRIPTION	CUT LENGTH	OVERALL LENGTH	WEIGHT
1007-T006-1560	13.0 FT EXTENSION	154 IN	156 IN	312.2 lbs
1007-T006-1620	13.5 FT EXTENSION	160 IN	162 IN	321.7 lbs
1007-T006-1680	14.0 FT EXTENSION	166 IN	168 IN	331.2 lbs
1007-T006-1740	14.5 FT EXTENSION	172 IN	174 IN	340.8 lbs
1007-T006-1800	15.0 FT EXTENSION	178 IN	180 IN	350.3 lbs
1007-T006-1860	15.5 FT EXTENSION	184 IN	186 IN	359.8 lbs
1007-T006-1920	16.0 FT EXTENSION	190 IN	192 IN	369.3 lbs
1007-T006-1980	16.5 FT EXTENSION	196 IN	198 IN	378.9 lbs
1007-T006-2040	17.0 FT EXTENSION	202 IN	204 IN	388.4 lbs
1007-T006-2100	17.5 FT EXTENSION	208 IN	210 IN	397.9 lbs
1007-T006-2160	18.0 FT EXTENSION	214 IN	216 IN	407.4 lbs
1007-T006-2220	18.5 FT EXTENSION	220 IN	222 IN	417.0 lbs
1007-T006-2280	19.0 FT EXTENSION	226 IN	228 IN	426.5 lbs
1007-T006-2340	19.5 FT EXTENSION	232 IN	234 IN	436.0 lbs
1007-T006-2400	20.0 FT EXTENSION	238 IN	240 IN	445.5 lbs
1007-T006-2460	20.5 FT EXTENSION	244 IN	246 IN	455.1 lbs
1007-T006-2520	21.0 FT EXTENSION	250 IN	252 IN	464.6 lbs
1007-T006-2580	21.5 FT EXTENSION	256 IN	258 IN	474.1 lbs
1007-T006-2640	22.0 FT EXTENSION	262 IN	264 IN	483.6 lbs
1007-T006-2700	22.5 FT EXTENSION	268 IN	270 IN	493.2 lbs
1007-T006-2760	23.0 FT EXTENSION	274 IN	276 IN	502.7 lbs
1007-T006-2820	23.5 FT EXTENSION	280 IN	282 IN	512.2 lbs
1007-T006-2880	24.0 FT EXTENSION	286 IN	288 IN	521.8 lbs
1007-T006-2940	24.5 FT EXTENSION	292 IN	294 IN	531.3 lbs
1007-T006-3000	25.0 FT EXTENSION	298 IN	300 IN	540.8 lbs

ELECTRO MECHANICAL INDUSTRIES, INC.
11230 NEESHAW DRIVE
HOUSTON, TEXAS 77065
1-800-453-0050

SIZE	DRAWING NO.	REV
B	1007-T006-0000	2
SCALE: 1:12		SHEET 2 OF 2



SURFACE FINISH ✓ UNLESS OTHERWISE SPECIFIED	
MATERIAL	SEE PARTS LIST
THIRD ANGLE PROJECTION	
NEXT ASSY	USED ON
APPLICATIONS	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES

.0	± .06
.00	± .01
.000	± .005
FRACTIONS	± 1/16
ANGLES	± .25°
HOLES:	
DRILLED OR PUNCHED	+1/32
BURNED	±1/32

APPROVALS	DATE
DRAWN C. SANCHEZ	3.2.18
CHECKED J. BUSHMAN	4.5.18
ENGINEER/DESIGNER J. BUSHMAN	4.5.18
PRODUCTION J.K.S.	4.5.18

ELECTRO MECHANICAL INDUSTRIES, INC.
11230 NEESHAW DRIVE
HOUSTON, TEXAS 77065
1-800-453-0050

TITLE:

6" X 7', HELICAL, SINGLE STUD OPTION

SIZE	DRAWING NO.	REV
B	1008-0050-0015	1

SCALE: 1:12	WEIGHT: 177.2 lbs.	SHEET 1 OF 1

Basic Load Cases

	BLC Description	Category	Y Gravity	Nodal	Distributed	Area(Member)
1	Self Weight	DL	-1			
2	Wind Load AZI 000	WLZ		1		1
3	Wind Load AZI 090	WLX		1		1
4	Ice Weight	OL1			22	
5	Wind + Ice Load AZI 000	OL2				1
6	Wind + Ice Load AZI 090	OL3				1
7	Gen Weight	OL4		1		
8	Seismic Load AZI 000	ELZ		1		
9	Seismic Load AZI 090	ELX		1		
10	Flood Load AZI 000	OL5		8		
11	Live Load	LL				
12	Flood Load AZI 090	OL6		8		
13	Flood slam AZI 000	OL7			1	
14	Flood slam AZI 090	OL8			1	
15	BLC 2 Transient Area Loads	None			78	
16	BLC 3 Transient Area Loads	None			74	
17	BLC 5 Transient Area Loads	None			78	
18	BLC 6 Transient Area Loads	None			74	

Load Combination Design

	Description	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	1.4(D+1.2Dgen)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	1.2Dgen		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	1.0D+1.2Dgen		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	1.2D+1.0Di		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	1.2D+1.6L+0.2Di		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	1.2D+1.6L		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	2) 1.2D+1.0Wo [0deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	2) 1.2D+1.0Wo [30deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	2) 1.2D+1.0Wo [60deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	2) 1.2D+1.0Wo [90deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	2) 1.2D+1.0Wo [120deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	2) 1.2D+1.0Wo [150deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	2) 1.2D+1.0Wo [180deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	2) 1.2D+1.0Wo [210deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	2) 1.2D+1.0Wo [240deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	2) 1.2D+1.0Wo [270deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	2) 1.2D+1.0Wo [300deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	2) 1.2D+1.0Wo [330deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
19	3) 0.9D+1.0Wo [0deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20	3) 0.9D+1.0Wo [30deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
21	3) 0.9D+1.0Wo [60deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
22	3) 0.9D+1.0Wo [90deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
23	3) 0.9D+1.0Wo [120deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
24	3) 0.9D+1.0Wo [150deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
25	3) 0.9D+1.0Wo [180deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
26	3) 0.9D+1.0Wo [210deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
27	3) 0.9D+1.0Wo [240deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
28	3) 0.9D+1.0Wo [270deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
29	3) 0.9D+1.0Wo [300deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
30	3) 0.9D+1.0Wo [330deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
31	4) 1.2D+1.0Di+1.0Wi [0deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
32	4) 1.2D+1.0Di+1.0Wi [30deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
33	4) 1.2D+1.0Di+1.0Wi [60deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Load Combination Design (Continued)

	Description	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
34	4) 1.2D+1.0Di+1.0Wi [90deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
35	4) 1.2D+1.0Di+1.0Wi [120deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
36	4) 1.2D+1.0Di+1.0Wi [150deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
37	4) 1.2D+1.0Di+1.0Wi [180deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
38	4) 1.2D+1.0Di+1.0Wi [210deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
39	4) 1.2D+1.0Di+1.0Wi [240deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
40	4) 1.2D+1.0Di+1.0Wi [270deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
41	4) 1.2D+1.0Di+1.0Wi [300deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
42	4) 1.2D+1.0Di+1.0Wi [330deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
43	7) (1.2+0.2Sds)D+E [0deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
44	7) (1.2+0.2Sds)D+E [30deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
45	7) (1.2+0.2Sds)D+E [60deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
46	7) (1.2+0.2Sds)D+E [90deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
47	7) (1.2+0.2Sds)D+E [120deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
48	7) (1.2+0.2Sds)D+E [150deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
49	7) (1.2+0.2Sds)D+E [180deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
50	7) (1.2+0.2Sds)D+E [210deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
51	7) (1.2+0.2Sds)D+E [240deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
52	7) (1.2+0.2Sds)D+E [270deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
53	7) (1.2+0.2Sds)D+E [300deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
54	7) (1.2+0.2Sds)D+E [330deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
55	8) (0.9-0.2Sds)D+E [0deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
56	8) (0.9-0.2Sds)D+E [30deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
57	8) (0.9-0.2Sds)D+E [60deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
58	8) (0.9-0.2Sds)D+E [90deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
59	8) (0.9-0.2Sds)D+E [120deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
60	8) (0.9-0.2Sds)D+E [150deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
61	8) (0.9-0.2Sds)D+E [180deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
62	8) (0.9-0.2Sds)D+E [210deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
63	8) (0.9-0.2Sds)D+E [240deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
64	8) (0.9-0.2Sds)D+E [270deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
65	8) (0.9-0.2Sds)D+E [300deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
66	8) (0.9-0.2Sds)D+E [330deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
67	1.4(D+Dgen)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
68	1.0Dgen		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
69	1.0D+1.0Dgen		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
70	1.2D+1.0Di		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
71	1.2D+1.6L+0.2Di		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
72	1.2D+1.6L		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
73	2) 1.2D+1.0Wo [0deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
74	2) 1.2D+1.0Wo [30deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
75	2) 1.2D+1.0Wo [60deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
76	2) 1.2D+1.0Wo [90deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
77	2) 1.2D+1.0Wo [120deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
78	2) 1.2D+1.0Wo [150deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
79	2) 1.2D+1.0Wo [180deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
80	2) 1.2D+1.0Wo [210deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
81	2) 1.2D+1.0Wo [240deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
82	2) 1.2D+1.0Wo [270deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
83	2) 1.2D+1.0Wo [300deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
84	2) 1.2D+1.0Wo [330deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
85	3) 0.9D+1.0Wo [0deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
86	3) 0.9D+1.0Wo [30deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
87	3) 0.9D+1.0Wo [60deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
88	3) 0.9D+1.0Wo [90deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Load Combination Design (Continued)

	Description	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
89	3) 0.9D+1.0Wo [120deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
90	3) 0.9D+1.0Wo [150deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
91	3) 0.9D+1.0Wo [180deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
92	3) 0.9D+1.0Wo [210deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
93	3) 0.9D+1.0Wo [240deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
94	3) 0.9D+1.0Wo [270deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
95	3) 0.9D+1.0Wo [300deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
96	3) 0.9D+1.0Wo [330deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
97	4) 1.2D+1.0Di+1.0Wi [0deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
98	4) 1.2D+1.0Di+1.0Wi [30deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
99	4) 1.2D+1.0Di+1.0Wi [60deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
100	4) 1.2D+1.0Di+1.0Wi [90deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
101	4) 1.2D+1.0Di+1.0Wi [120deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
102	4) 1.2D+1.0Di+1.0Wi [150deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
103	4) 1.2D+1.0Di+1.0Wi [180deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
104	4) 1.2D+1.0Di+1.0Wi [210deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
105	4) 1.2D+1.0Di+1.0Wi [240deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
106	4) 1.2D+1.0Di+1.0Wi [270deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
107	4) 1.2D+1.0Di+1.0Wi [300deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
108	4) 1.2D+1.0Di+1.0Wi [330deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
109	2) 1.2D+0.5Wo [0deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
110	2) 1.2D+0.5Wo [90deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
111	2) 1.2D+0.5Wo [180deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
112	2) 1.2D+0.5Wo [270deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
113	3) 0.9D+0.5Wo [0deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
114	3) 0.9D+0.5Wo [90deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
115	3) 0.9D+0.5Wo [180deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
116	3) 0.9D+0.5Wo [270deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
117	2) 1.2D+0.5Wo [0deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
118	2) 1.2D+0.5Wo [90deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
119	2) 1.2D+0.5Wo [180deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
120	2) 1.2D+0.5Wo [270deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
121	3) 0.9D+0.5Wo [0deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
122	3) 0.9D+0.5Wo [90deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
123	3) 0.9D+0.5Wo [180deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
124	3) 0.9D+0.5Wo [270deg]+1.0Fa		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
125	2) 1.2D+1.0Wo [150deg]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B RECT	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A500 Gr.C RND	29000	11154	0.3	0.65	0.527	46	1.4	62	1.3
7	A500 Gr.C RECT	29000	11154	0.3	0.65	0.527	50	1.4	62	1.3
8	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
9	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
10	A913 Gr.65	29000	11154	0.3	0.65	0.49	65	1.1	80	1.1
11	A325	29000	11154	0.3	0.65	0.49	90	1.1	120	1.1
12	A193 B7	29000	11154	0.3	0.65	0.49	105	1.1	125	1.1

Cold Formed Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	C6X3X0.188	C6X3X0.188	Beam	Channel	A36 Gr.36	Typical	2.13	1.888	11.817	3.366
2	HSS6.625X0.280	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical	5.2	26.4	26.4	52.7
3	SR1.0	SR1.0	Beam	BAR	A193 B7	Typical	0.785	0.049	0.049	0.098
4	SR0.5	SR0.5	Beam	BAR	A325	Typical	0.196	0.003	0.003	0.006
5	SR0.625	SR0.625	Beam	BAR	A325	Typical	0.307	0.007	0.007	0.015
6	C6x8.2	C6X8.2	Beam	Channel	A36 Gr.36	Typical	2.39	0.687	13.1	0.074
7	W6x15	W6X15	Beam	Wide Flange	A992	Typical	4.43	9.32	29.1	0.101
8	L2x2x4	L2X2X4	HBrace	Single Angle	A36 Gr.36	Typical	0.944	0.346	0.346	0.021
9	L2.5x2.5x4	L2.5X2.5X4	Beam	Single Angle	A36 Gr.36	Typical	1.19	0.692	0.692	0.026
10	HSS10.750x0.375	HSS10.750X0.375	Column	HSS Pipe	A500 Gr.B RND	Typical	11.4	154	154	309
11	3/8"X4"	3/8"X4"	Column	RECT	A36 Gr.36	Typical	1.5	0.018	2	0.066
12	SR1.0_1	SR1.0	Beam	BAR	A36 Gr.36	Typical	0.785	0.049	0.049	0.098

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	CF1	8CU1.25X057	Beam	CU	A653 SS Gr33	Typical	0.581	0.057	4.41	0.00063

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N5	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
2	M2	N2	N6	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
3	M3	N4	N8	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
4	M4	N3	N7	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
5	M5	N9	N1	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
6	M6	N10	N2	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
7	M7	N12	N4	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
8	M8	N11	N3	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
9	M53	N704	N697	C6X3X0.188	Beam	Channel	A36 Gr.36	Typical
10	M54	N11	N88	SR1.0	Beam	BAR	A193 B7	Typical
11	M57	N12	N89	SR1.0	Beam	BAR	A193 B7	Typical
12	M58	N9	N90	SR1.0	Beam	BAR	A193 B7	Typical
13	M59	N10	N91	SR1.0	Beam	BAR	A193 B7	Typical
14	M61	N274	N269	SR0.5	Beam	BAR	A325	Typical
15	M60	N275	N262	SR0.5	Beam	BAR	A325	Typical
16	M39	N346	N439	SR0.5	Beam	BAR	A325	Typical
17	M40	N442	N337	SR0.5	Beam	BAR	A325	Typical
18	M41	N494	N602	SR0.5	Beam	BAR	A325	Typical
19	M42	N607	N484	SR0.5	Beam	BAR	A325	Typical
20	M44	N517	N584	SR0.5	Beam	BAR	A325	Typical
21	M45	N696	N633	SR0.5	Beam	BAR	A325	Typical
22	M46	N697	N698	C6X3X0.188	Beam	Channel	A36 Gr.36	Typical
23	M47	N700	N118	SR0.5	Beam	BAR	A325	Typical
24	M48	N701	N208	SR0.5	Beam	BAR	A325	Typical
25	M49	N702	N514	SR0.5	Beam	BAR	A325	Typical
26	M50	N703	N529	SR0.5	Beam	BAR	A325	Typical
27	M51	N705	N704	C6X3X0.188	Beam	Channel	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
28	M52	N706	N364	SR0.5	Beam	BAR	A325	Typical
29	M55	N707	N374	SR0.5	Beam	BAR	A325	Typical
30	M56	N708	N445	SR0.5	Beam	BAR	A325	Typical
31	M62	N709	N658	SR0.5	Beam	BAR	A325	Typical
32	M63	N698	N705	C6X3X0.188	Beam	Channel	A36 Gr.36	Typical
33	M64	N605	N711	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
34	M65	N710	N712	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
35	M66	N713	N605	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
36	M67	N714	N710	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
37	M68	N713	N719	SR1.0	Beam	BAR	A193 B7	Typical
38	M69	N714	N720	SR1.0	Beam	BAR	A193 B7	Typical
39	M70	N771	N879	SR0.5	Beam	BAR	A325	Typical
40	M71	N883	N761	SR0.5	Beam	BAR	A325	Typical
41	M72	N794	N861	SR0.5	Beam	BAR	A325	Typical
42	M73	N972	N909	SR0.5	Beam	BAR	A325	Typical
43	M74	N974	N791	SR0.5	Beam	BAR	A325	Typical
44	M75	N975	N806	SR0.5	Beam	BAR	A325	Typical
45	M76	N977	N723	SR0.5	Beam	BAR	A325	Typical
46	M77	N978	N934	SR0.5	Beam	BAR	A325	Typical
47	M78	N973	N976	C6X3X0.188	Beam	Channel	A36 Gr.36	Typical
48	M79	N980	N982	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
49	M80	N979	N981	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
50	M81	N984	N980	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
51	M82	N983	N979	HSS6.625X0.280	Column	HSS Pipe	A500 Gr.B RND	Typical
52	M83	N1246	N1243	C6X3X0.188	Beam	Channel	A36 Gr.36	Typical
53	M84	N983	N989	SR1.0	Beam	BAR	A193 B7	Typical
54	M85	N984	N990	SR1.0	Beam	BAR	A193 B7	Typical
55	M86	N1115	N1110	SR0.5	Beam	BAR	A325	Typical
56	M87	N1116	N1103	SR0.5	Beam	BAR	A325	Typical
57	M88	N1154	N1239	SR0.5	Beam	BAR	A325	Typical
58	M89	N1242	N1145	SR0.5	Beam	BAR	A325	Typical
59	M90	N1244	N999	SR0.5	Beam	BAR	A325	Typical
60	M91	N1245	N1050	SR0.5	Beam	BAR	A325	Typical
61	M92	N1247	N1172	SR0.5	Beam	BAR	A325	Typical
62	M93	N1248	N1182	SR0.5	Beam	BAR	A325	Typical
63	M225_1	N1286	N1277	RIGID	None	None	RIGID	Typical
64	M227_1	N1276	N1285	RIGID	None	None	RIGID	Typical
65	M235_1	N1288	N1278	RIGID	None	None	RIGID	Typical
66	M237_1	N1279	N1287	RIGID	None	None	RIGID	Typical
67	M242_1	N304_1	N305_1	RIGID	None	None	RIGID	Typical
68	M243_1	N306_1	N307_1	RIGID	None	None	RIGID	Typical
69	M244_1	N313_1	N312_1	RIGID	None	None	RIGID	Typical
70	M112	N1270	N1271	RIGID	None	None	RIGID	Typical
71	M113	N1268	N1269	RIGID	None	None	RIGID	Typical
72	M114	N1270	N1265	RIGID	None	None	RIGID	Typical
73	M115	N1271	N1266	RIGID	None	None	RIGID	Typical
74	M116	N1275	N1274	RIGID	None	None	RIGID	Typical
75	M117	N1272	N1273	RIGID	None	None	RIGID	Typical
76	M118	N1275	N1209	RIGID	None	None	RIGID	Typical
77	M119	N1274	N1267	RIGID	None	None	RIGID	Typical
78	M120	N1277	N1276	RIGID	None	None	RIGID	Typical
79	M121	N1278	N1279	RIGID	None	None	RIGID	Typical
80	M122	N1279	N1276	RIGID	None	None	RIGID	Typical
81	M123	N1278	N1277	RIGID	None	None	RIGID	Typical
82	M124	N1271	N1274	RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
83	M125	N1281	N1282	RIGID	None	None	RIGID	Typical
84	M98	N1249	N1250	RIGID	None	None	RIGID	Typical
85	M99	N1251	N1252	RIGID	None	None	RIGID	Typical
86	M101	N1251	N1254	RIGID	None	None	RIGID	Typical
87	M105	N1252	N1256	RIGID	None	None	RIGID	Typical
88	M106	N1283	N1284	RIGID	None	None	RIGID	Typical
89	M107	N1260	N1261	RIGID	None	None	RIGID	Typical
90	M108	N1283	N1253	RIGID	None	None	RIGID	Typical
91	M109	N1284	N1259	RIGID	None	None	RIGID	Typical
92	M126	N1285	N1286	RIGID	None	None	RIGID	Typical
93	M127	N1287	N1288	RIGID	None	None	RIGID	Typical
94	M128	N1287	N1285	RIGID	None	None	RIGID	Typical
95	M129	N1288	N1286	RIGID	None	None	RIGID	Typical
96	M130	N1252	N1284	RIGID	None	None	RIGID	Typical
97	M131	N1291	N1290	RIGID	None	None	RIGID	Typical
98	M100	N307_1	N1281	RIGID	None	None	RIGID	Typical
99	M102	N306_1	N1291	RIGID	None	None	RIGID	Typical

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N5	max	-0.035	85	1.823	13	1.123	8	2.569	8	0	125	2.989	13
2		min	-1.28	13	0.243	85	0.163	92	0.433	92	0	1	0.082	85
3	N6	max	-0.035	91	1.823	7	-0.163	96	-0.432	121	0	125	2.989	7
4		min	-1.28	7	0.243	91	-1.123	12	-2.569	12	0	1	0.082	91
5	N7	max	1.28	13	1.823	13	1.123	18	2.569	18	0	125	-0.082	85
6		min	0.035	85	0.243	85	0.163	90	0.433	90	0	1	-2.989	13
7	N8	max	1.28	7	1.823	7	-0.163	86	-0.432	121	0	125	-0.082	91
8		min	0.035	91	0.243	91	-1.123	14	-2.569	14	0	1	-2.989	7
9	N711	max	-0.002	86	1.822	13	1.09	7	2.481	7	0	125	3.13	14
10		min	-1.354	14	0.243	85	0.19	91	0.504	91	0	1	0.036	86
11	N712	max	-0.002	90	1.822	7	-0.165	121	-0.416	121	0	125	3.13	18
12		min	-1.354	18	0.243	91	-1.09	13	-2.481	13	0	1	0.036	90
13	N981	max	1.354	125	1.822	13	1.09	7	2.481	7	0	125	-0.036	96
14		min	0.002	96	0.243	85	0.19	91	0.504	91	0	1	-3.13	12
15	N982	max	1.354	8	1.822	7	-0.165	121	-0.416	121	0	125	-0.036	92
16		min	0.002	92	0.243	91	-1.09	13	-2.481	13	0	1	-3.13	8
17	Totals:	max	1.451	114	11.781	1	2.441	7						
18		min	-1.303	94	6.407	91	-2.441	13						

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M91	SR0.5	0.151	0	117	0.334	0		117	15.903	15.904	0.133	0.133	1	H1-1b
2	M75	SR0.5	0.151	0	117	0.334	0		117	15.903	15.904	0.133	0.133	1	H1-1b
3	M48	SR0.5	0.135	0	117	0.297	0		117	15.903	15.904	0.133	0.133	1	H1-1b
4	M50	SR0.5	0.135	0	117	0.297	0		117	15.903	15.904	0.133	0.133	1	H1-1b
5	M86	SR0.5	0.133	0	119	0.272	0		119	15.903	15.904	0.133	0.133	1	H1-1b
6	M70	SR0.5	0.133	0	119	0.272	0		119	15.903	15.904	0.133	0.133	1	H1-1b
7	M41	SR0.5	0.127	0	119	0.259	0		119	15.903	15.904	0.133	0.133	1	H1-1b
8	M61	SR0.5	0.127	0	119	0.259	0		119	15.903	15.904	0.133	0.133	1	H1-1b
9	M44	SR0.5	0.099	0	1	0.204	0.1		1	15.903	15.904	0.133	0.133	1	H1-1b
10	M39	SR0.5	0.099	0	1	0.204	0.1		1	15.903	15.904	0.133	0.133	1	H1-1b
11	M72	SR0.5	0.098	0	1	0.201	0.1		1	15.903	15.904	0.133	0.133	1	H1-1b
12	M88	SR0.5	0.098	0	1	0.201	0.1		1	15.903	15.904	0.133	0.133	1	H1-1b

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
13	M89	SR0.5	0.109	0	7	0.187	0.1		7	15.903	15.904	0.133	0.133	1	H1-1b
14	M73	SR0.5	0.109	0	7	0.187	0.1		7	15.903	15.904	0.133	0.133	1	H1-1b
15	M87	SR0.5	0.109	0	13	0.187	0.1		13	15.903	15.904	0.133	0.133	1	H1-1b
16	M71	SR0.5	0.109	0	13	0.187	0.1		13	15.903	15.904	0.133	0.133	1	H1-1b
17	M45	SR0.5	0.109	0	7	0.187	0.1		7	15.903	15.904	0.133	0.133	1	H1-1b
18	M40	SR0.5	0.109	0	7	0.187	0.1		7	15.903	15.904	0.133	0.133	1	H1-1b
19	M42	SR0.5	0.109	0	13	0.187	0.1		13	15.903	15.904	0.133	0.133	1	H1-1b
20	M60	SR0.5	0.109	0	13	0.187	0.1		13	15.903	15.904	0.133	0.133	1	H1-1b
21	M62	SR0.5	0.069	0	1	0.138	0.1		1	15.903	15.904	0.133	0.133	1	H1-1b
22	M55	SR0.5	0.069	0	1	0.138	0.1		1	15.903	15.904	0.133	0.133	1	H1-1b
23	M93	SR0.5	0.067	0	1	0.133	0.1		1	15.903	15.904	0.133	0.133	1	H1-1b
24	M77	SR0.5	0.067	0	1	0.133	0.1		1	15.903	15.904	0.133	0.133	1	H1-1b
25	M49	SR0.5	0.076	0	125	0.133	0.001		119	15.903	15.904	0.133	0.133	1	H1-1b
26	M47	SR0.5	0.076	0	14	0.133	0.001		119	15.903	15.904	0.133	0.133	1	H1-1b
27	M74	SR0.5	0.072	0	119	0.13	0		119	15.903	15.904	0.133	0.133	1	H1-1b
28	M90	SR0.5	0.072	0	119	0.13	0		119	15.903	15.904	0.133	0.133	1	H1-1b
29	M56	SR0.5	0.076	0	8	0.127	0.002		8	15.903	15.904	0.133	0.133	1	H1-1b
30	M52	SR0.5	0.076	0	18	0.127	0.002		18	15.903	15.904	0.133	0.133	1	H1-1b
31	M92	SR0.5	0.067	0	18	0.109	0.003		18	15.903	15.904	0.133	0.133	1	H1-1b
32	M76	SR0.5	0.067	0	8	0.109	0.003		8	15.903	15.904	0.133	0.133	1	H1-1b
33	M46	C6X3X0.188	0.167	5.026	117	0.093	40.208	z	117	68.411	69.012	3.62	12.864	1.331	H1-1b
34	M83	C6X3X0.188	0.124	11.086	7	0.055	4.031	y	7	66.114	69.012	3.022	12.864	2.192	H1-1b
35	M78	C6X3X0.188	0.124	37.289	7	0.055	44.344	y	7	66.114	69.012	3.022	12.864	2.192	H1-1b
36	M63	C6X3X0.188	0.125	37.289	7	0.051	44.344	y	7	66.114	69.012	3.022	12.864	2.192	H1-1b
37	M53	C6X3X0.188	0.125	11.086	7	0.051	4.031	y	7	66.114	69.012	3.022	12.864	2.192	H1-1b
38	M69	SR1.0	0	2.063	125	0.043	0.924		18	73.448	74.22	1.237	1.237	1	H1-1a
39	M85	SR1.0	0	2.063	125	0.043	0.924		8	73.448	74.22	1.237	1.237	1	H1-1a
40	M84	SR1.0	0	2.063	125	0.043	0.924		125	73.448	74.22	1.237	1.237	1	H1-1a
41	M68	SR1.0	0	2.063	125	0.043	0.924		14	73.448	74.22	1.237	1.237	1	H1-1a
42	M57	SR1.0	0	2.063	125	0.042	0.924		7	73.448	74.22	1.237	1.237	1	H1-1a
43	M59	SR1.0	0	2.063	125	0.042	0.924		7	73.448	74.22	1.237	1.237	1	H1-1a
44	M58	SR1.0	0	2.063	125	0.042	0.924		13	73.448	74.22	1.237	1.237	1	H1-1a
45	M54	SR1.0	0	2.063	125	0.042	0.924		13	73.448	74.22	1.237	1.237	1	H1-1a
46	M51	C6X3X0.188	0.097	109.316	18	0.039	76.647	y	7	65.762	69.012	3.022	12.864	2.148	H1-1b
47	M65	HSS6.625X0.280	0.106	12.688	18	0.024	12.688		18	196.178	196.56	33.075	33.075	1	H1-1b
48	M79	HSS6.625X0.280	0.106	12.688	8	0.024	12.688		8	196.178	196.56	33.075	33.075	1	H1-1b
49	M80	HSS6.625X0.280	0.106	12.688	125	0.024	12.688		125	196.178	196.56	33.075	33.075	1	H1-1b
50	M64	HSS6.625X0.280	0.106	12.688	14	0.024	12.688		14	196.178	196.56	33.075	33.075	1	H1-1b
51	M67	HSS6.625X0.280	0.056	10	18	0.024	10		18	196.322	196.56	33.075	33.075	1	H1-1b
52	M81	HSS6.625X0.280	0.056	10	8	0.024	10		8	196.322	196.56	33.075	33.075	1	H1-1b
53	M82	HSS6.625X0.280	0.056	10	125	0.024	10		125	196.322	196.56	33.075	33.075	1	H1-1b
54	M66	HSS6.625X0.280	0.056	10	14	0.024	10		14	196.322	196.56	33.075	33.075	1	H1-1b
55	M7	HSS6.625X0.280	0.054	10	7	0.024	0		7	196.322	196.56	33.075	33.075	1	H1-1b
56	M6	HSS6.625X0.280	0.054	10	7	0.024	0		7	196.322	196.56	33.075	33.075	1	H1-1b
57	M5	HSS6.625X0.280	0.054	10	13	0.024	0		13	196.322	196.56	33.075	33.075	1	H1-1b
58	M8	HSS6.625X0.280	0.054	10	13	0.024	0		13	196.322	196.56	33.075	33.075	1	H1-1b
59	M3	HSS6.625X0.280	0.102	12.688	7	0.023	0		7	196.178	196.56	33.075	33.075	1	H1-1b
60	M2	HSS6.625X0.280	0.102	12.688	7	0.023	0		7	196.178	196.56	33.075	33.075	1	H1-1b
61	M1	HSS6.625X0.280	0.102	12.688	13	0.023	0		13	196.178	196.56	33.075	33.075	1	H1-1b
62	M4	HSS6.625X0.280	0.102	12.688	13	0.023	0		13	196.178	196.56	33.075	33.075	1	H1-1b

Envelope AISI S100-16: ASD Member Cold Formed Steel Code Checks

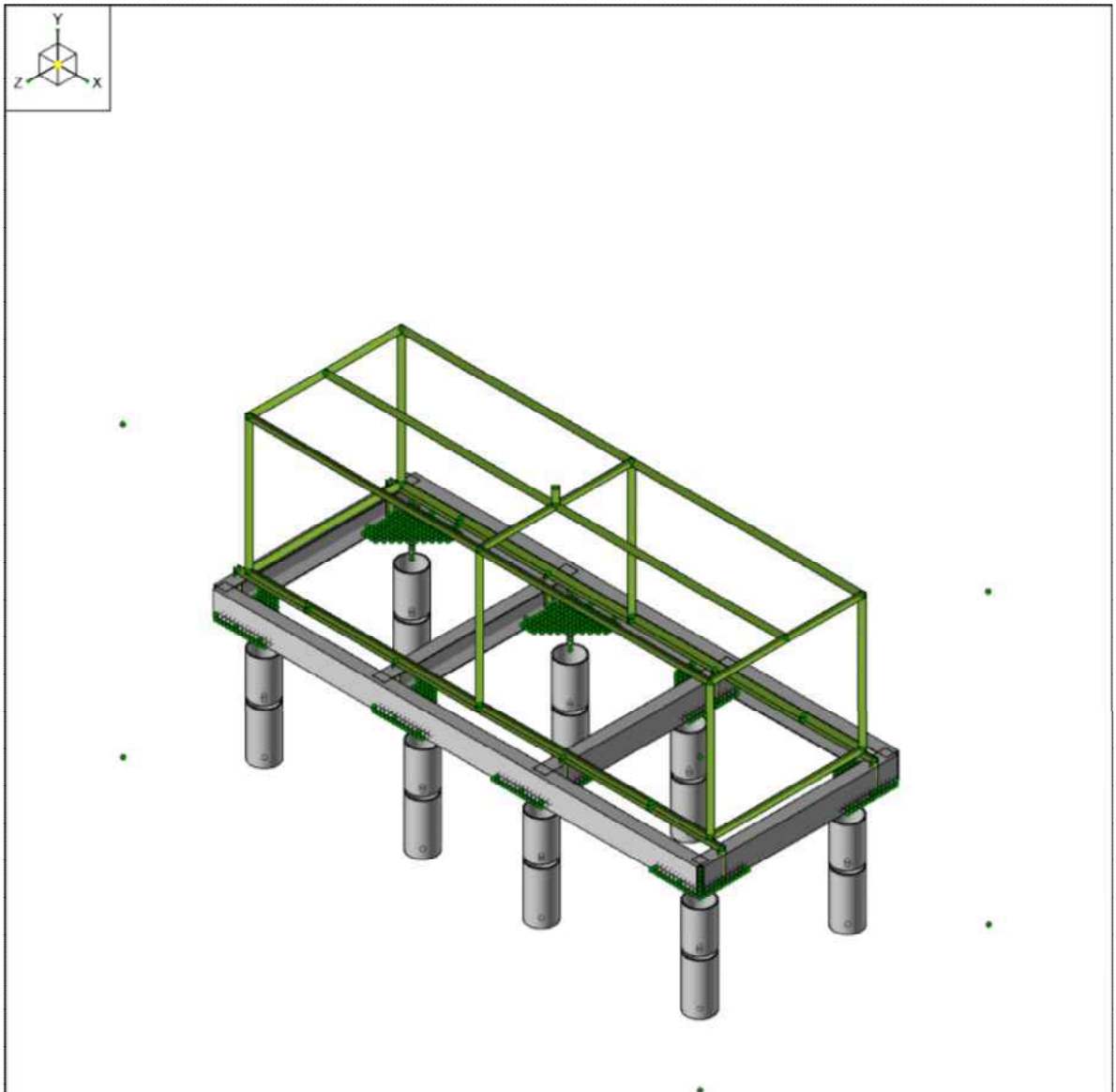
No Data to Print...

Envelope Plate Principal Stresses

	Plate		Surface	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
1	P683	max	T	-6.696	91	-16.823	123	6.859	7	2.077	63	46.999	7
2		min		-39.67	1	-52.332	7	0.218	119	-0.655	15	14.704	91
3		max	B	50.817	7	36.348	1	7.42	7	2.356	45	45.26	7
4		min		15.65	91	6.749	91	0.409	63	-0.779	101	13.596	91
5	P730	max	T	-6.696	85	-16.861	85	6.859	13	2.077	57	46.999	13
6		min		-39.67	1	-52.332	13	0.729	45	-0.655	9	14.704	85
7		max	B	50.817	13	36.347	1	7.42	13	2.356	51	45.26	13
8		min		15.65	85	6.749	85	0.409	57	-0.779	107	13.596	85
9	P485	max	T	-6.525	91	-15.9	92	6.932	7	2.155	63	46.822	7
10		min		-39.342	1	-52.188	7	0.384	119	-0.611	93	13.784	92
11		max	B	50.624	7	36.272	8	7.456	7	2.355	108	45.058	7
12		min		14.658	92	6.593	91	0.231	63	-0.785	107	12.694	92
13	P391	max	T	-6.525	85	-15.9	86	6.932	13	2.155	57	46.822	13
14		min		-39.341	1	-52.188	13	0.543	45	-0.611	87	13.784	86
15		max	B	50.623	13	36.272	14	7.456	13	2.355	102	45.058	13
16		min		14.658	86	6.593	85	0.231	57	-0.785	101	12.694	86
17	P881	max	T	50.817	7	36.348	1	7.42	7	2.356	53	45.26	7
18		min		15.65	91	6.749	91	0.409	59	-0.779	105	13.596	91
19		max	B	-6.696	91	-16.823	123	6.859	7	2.077	59	46.999	7
20		min		-39.67	1	-52.332	7	0.218	119	-0.655	11	14.704	91
21	P588	max	T	50.816	13	36.347	1	7.42	13	2.356	47	45.259	13
22		min		15.65	85	6.749	85	0.409	65	-0.779	99	13.596	85
23		max	B	-6.696	85	-16.861	85	6.859	13	2.077	65	46.999	13
24		min		-39.67	1	-52.332	13	0.729	53	-0.655	17	14.704	85
25	P188	max	T	50.624	7	36.272	18	7.456	7	2.355	98	45.058	7
26		min		14.658	90	6.593	91	0.231	59	-0.785	99	12.694	90
27		max	B	-6.525	91	-15.9	90	6.932	7	2.155	59	46.822	7
28		min		-39.342	1	-52.188	7	0.384	119	-0.611	89	13.784	90
29	P291	max	T	50.624	13	36.272	125	7.456	13	2.355	104	45.058	13
30		min		14.658	96	6.593	85	0.231	65	-0.785	105	12.694	96
31		max	B	-6.525	85	-15.9	96	6.932	13	2.155	65	46.822	13
32		min		-39.342	1	-52.188	13	0.543	53	-0.611	95	13.784	96
33	P638	max	T	11.045	91	0.483	91	16.379	7	1.969	91	44.541	7
34		min		-17.958	7	-50.717	7	3.575	89	1.046	85	6.213	89
35		max	B	47.801	7	18	7	14.901	7	0.385	91	41.815	7
36		min		-1.152	91	-9.465	91	2.859	89	-0.546	86	5.004	89
37	P721	max	T	11.045	85	0.483	85	16.379	13	1.969	85	44.541	13
38		min		-17.958	13	-50.717	13	3.575	95	1.046	91	6.213	95
39		max	B	47.801	13	18	13	14.901	13	0.385	85	41.815	13
40		min		-1.152	85	-9.465	85	2.859	95	-0.546	92	5.004	95
41	P353	max	T	11.212	91	0.693	91	16.281	7	1.979	91	44.175	7
42		min		-17.723	7	-50.284	7	4.256	115	1.043	85	7.73	89
43		max	B	47.311	7	17.778	7	14.766	7	0.393	91	41.392	7
44		min		-1.338	91	-9.624	91	3.534	115	-0.547	85	6.574	89
45	P379	max	T	11.212	85	0.693	85	16.28	13	1.979	85	44.175	13
46		min		-17.723	13	-50.284	13	4.257	113	1.043	91	7.73	95
47		max	B	47.311	13	17.778	13	14.766	13	0.393	85	41.392	13
48		min		-1.338	85	-9.624	85	3.534	113	-0.547	91	6.574	95
49	P834	max	T	47.801	7	18	7	14.901	7	0.385	91	41.815	7
50		min		-1.152	91	-9.465	91	2.859	93	-0.546	96	5.004	93
51		max	B	11.045	91	0.483	91	16.379	7	1.969	91	44.541	7
52		min		-17.958	7	-50.717	7	3.575	93	1.046	85	6.213	93
53	P538	max	T	47.801	13	18	13	14.901	13	0.385	85	41.815	13
54		min		-1.152	85	-9.465	85	2.859	87	-0.546	90	5.004	87
55		max	B	11.045	85	0.483	85	16.379	13	1.969	85	44.541	13

Envelope Plate Principal Stresses (Continued)

	Plate		Surface	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
3136		min		0.794	90	0.138	90	0.268	87	0.775	59	0.725	89
3137	P663	max	T	1.734	7	-0.045	123	1.31	7	0.391	96	2.308	7
3138		min		-0.018	91	-0.923	51	0.158	91	0.216	91	0.325	91
3139		max	B	0.947	18	0.033	92	1.458	7	2.276	79	2.577	7
3140		min		-0.175	123	-1.976	7	0.074	92	-0.66	90	0.143	90
3141	P769	max	T	1.734	13	1.086	123	1.31	13	2.144	117	2.308	13
3142		min		-0.018	85	-0.923	45	0.049	123	-0.366	123	0.325	85
3143		max	B	0.947	125	0.033	86	1.458	13	2.276	73	2.577	13
3144		min		-1.079	119	-2.432	121	0.074	86	-0.66	96	0.143	96
3145	P464	max	T	2.524	8	0.656	8	0.939	117	1.467	121	2.269	8
3146		min		0.703	92	0.118	92	0.293	92	0.921	92	0.652	92
3147		max	B	-0.103	92	-1.109	92	1.273	44	0.019	86	2.932	44
3148		min		-0.705	1	-3.209	8	0.457	62	-0.557	92	1.062	92
3149	P166	max	T	0.351	49	0.049	91	1.183	18	2.29	78	2.237	18
3150		min		-0.319	122	-2.082	18	0.045	91	-0.633	89	0.122	91
3151		max	B	1.856	18	0.14	121	1.117	18	0.358	86	2.072	18
3152		min		-0.05	90	-0.562	49	0.136	90	0.16	122	0.3	90
3153	P268	max	T	0.351	43	0.049	85	1.183	125	2.29	84	2.237	125
3154		min		-1.2	119	-2.082	12	0.045	85	-0.633	95	0.122	85
3155		max	B	1.856	125	1.054	123	1.117	125	2.319	117	2.072	125
3156		min		-0.05	96	-0.562	43	0.101	123	-0.368	123	0.3	96
3157	P465	max	T	1.856	8	0.14	121	1.117	8	0.358	96	2.072	8
3158		min		-0.05	92	-0.562	49	0.136	92	0.19	123	0.3	92
3159		max	B	0.351	49	0.049	91	1.183	8	2.29	80	2.237	8
3160		min		-0.279	123	-2.082	8	0.045	91	-0.633	93	0.122	91
3161	P433	max	T	1.856	14	1.054	123	1.117	14	2.319	117	2.072	14
3162		min		-0.05	86	-0.562	43	0.101	123	-0.368	123	0.3	86
3163		max	B	0.351	43	0.049	85	1.183	14	2.29	74	2.237	14
3164		min		-1.2	119	-2.082	14	0.045	85	-0.633	87	0.122	85
3165	P662	max	T	2.054	44	0.759	7	0.702	44	1.399	121	1.818	44
3166		min		0.794	92	0.138	92	0.268	95	0.775	63	0.725	93
3167		max	B	-0.137	92	-1.047	94	0.937	45	0.077	85	2.337	44
3168		min		-0.852	7	-2.619	44	0.28	95	-0.587	63	0.916	94



Envelope Only Solution

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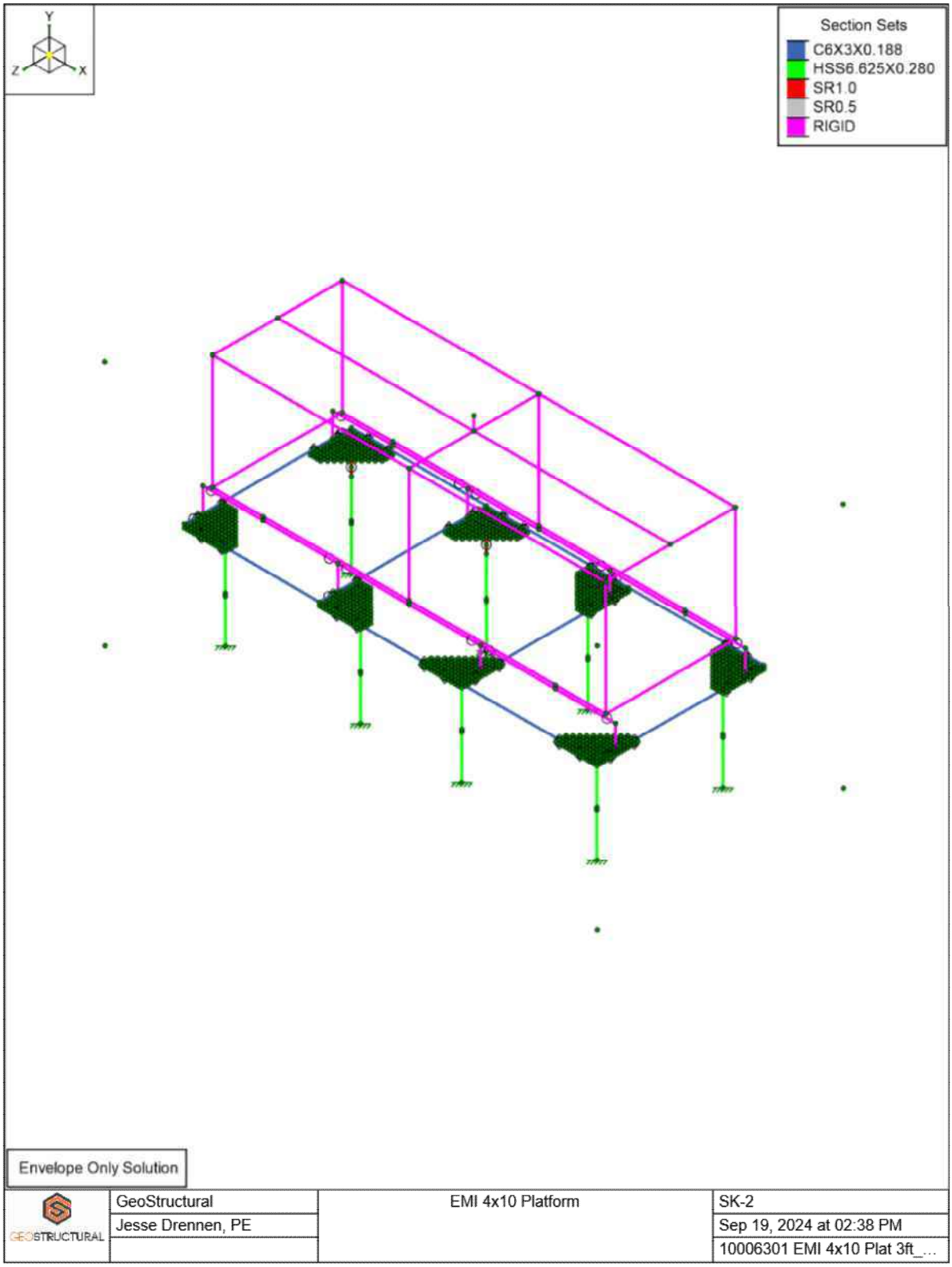
Y
Z
X
Section Sets
C6X3X0.188
HSS6.625X0.280
SR1.0
SR0.5
RIGID
Envelope Only Solution
GeoStructural
Jesse Drennen, PE
EMI 4x10 Platform
SK-2
Sep 19, 2024 at 02:38 PM
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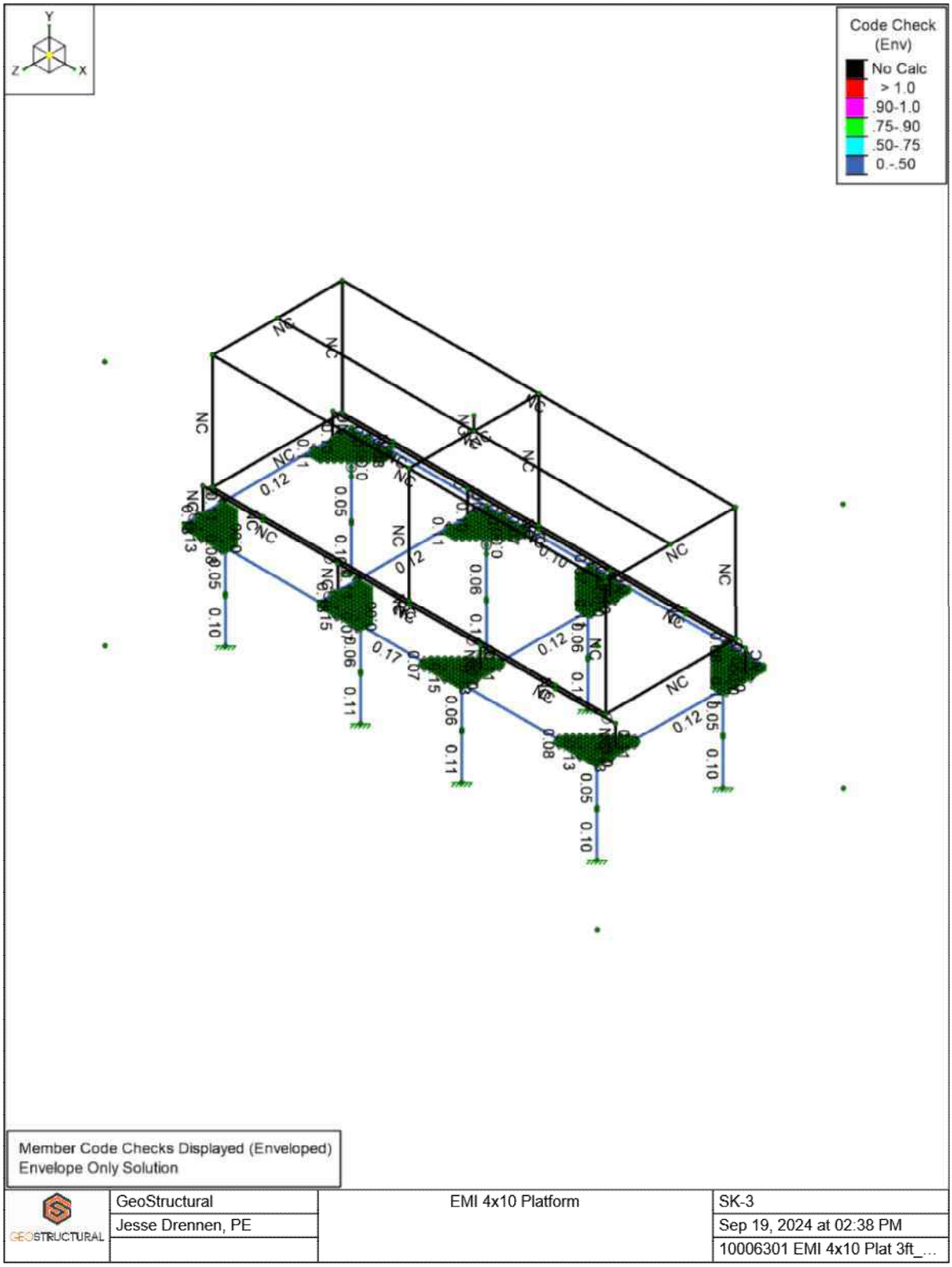
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(Env)
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> 1.0
.90-1.0
.75-.90
.50-.75
0.-.50
Member Code Checks Displayed (Enveloped)
Envelope Only Solution
GeoStructural
Jesse Drennen, PE
EMI 4x10 Platform
SK-3
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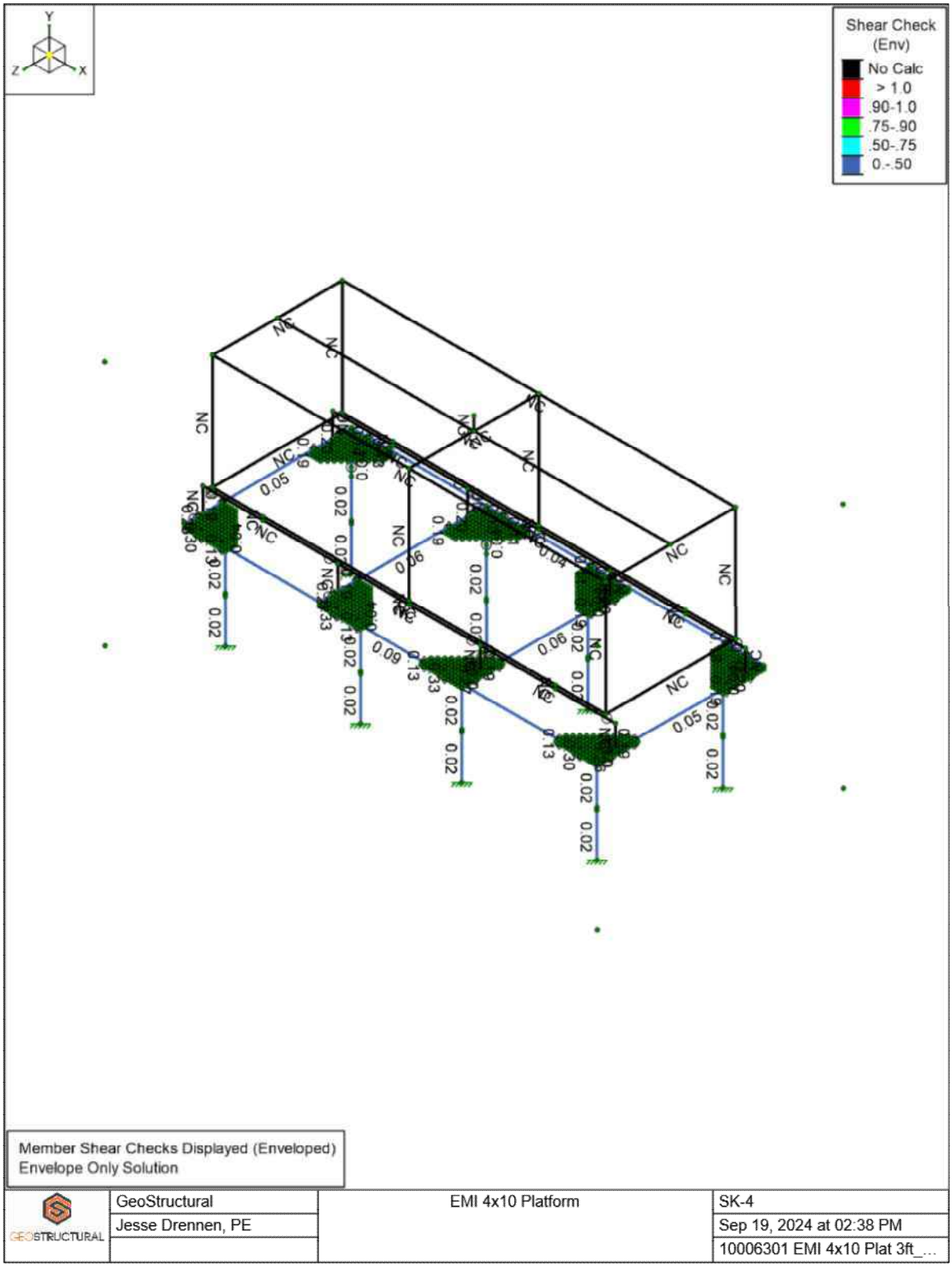
Shear Check
(Env)
No Calc
> 1.0
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.75-.90
.50-.75
0.-.50
Member Shear Checks Displayed (Enveloped)
Envelope Only Solution
GeoStructural
Jesse Drennen, PE
EMI 4x10 Platform
SK-4
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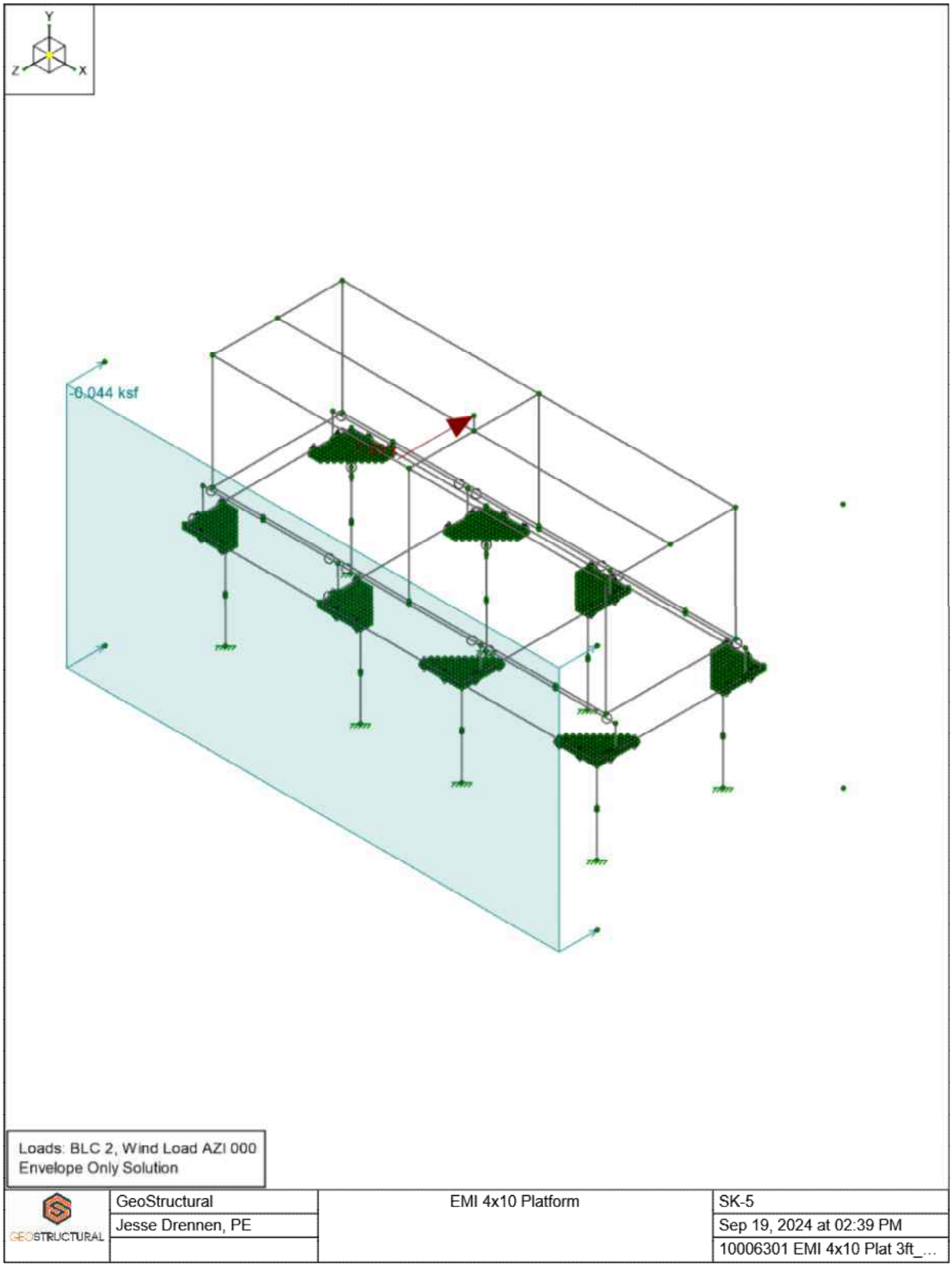
Y
Z
X
-0.044 ksf
Loads: BLC 2, Wind Load AZI 000
Envelope Only Solution
GeoStructural
Jesse Drennen, PE
EMI 4x10 Platform
SK-5
Sep 19, 2024 at 02:39 PM
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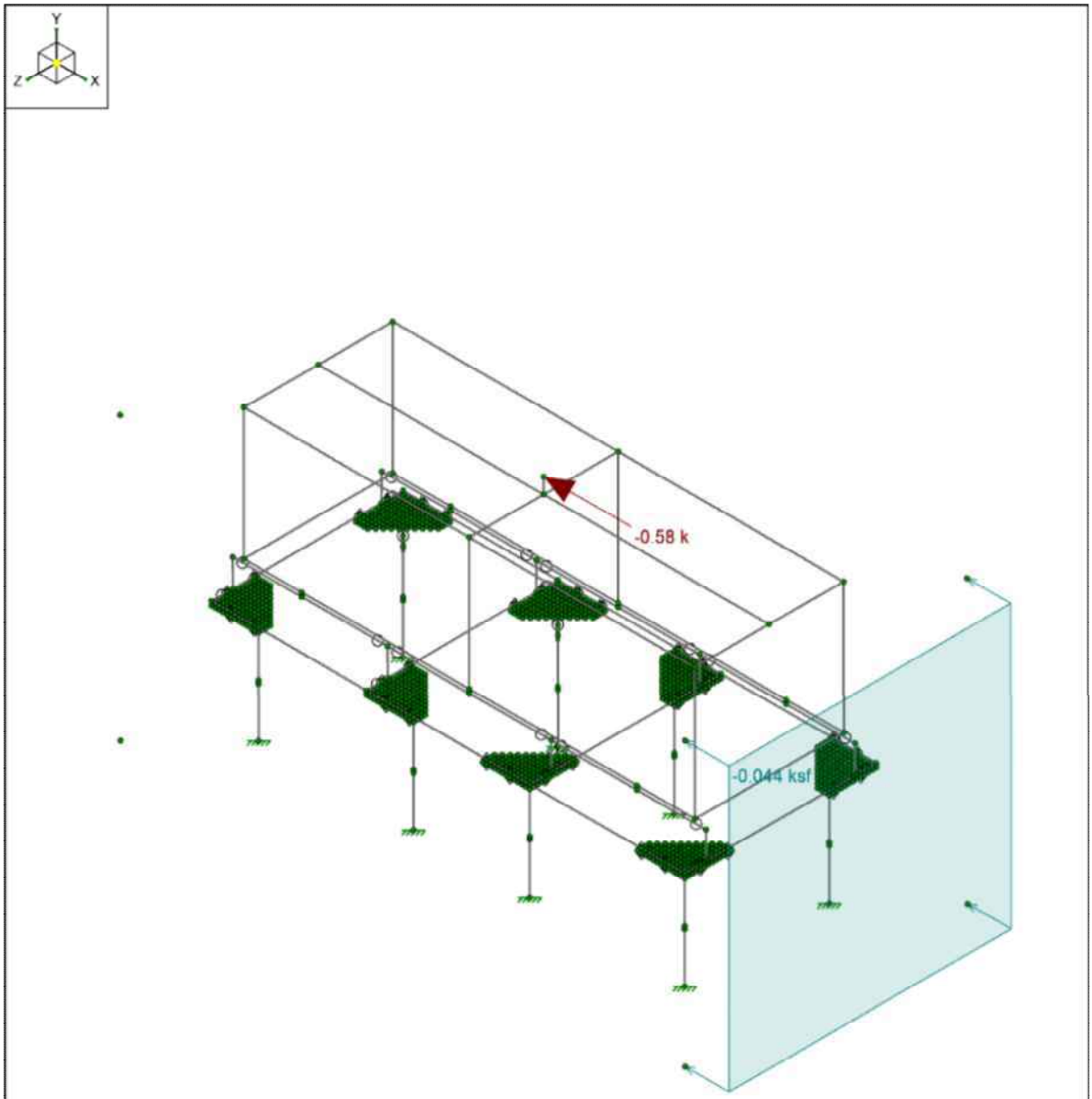

GeoStructural		EMI 4x10 Platform	SK-6
Jesse Drennen, PE			Sep 19, 2024 at 02:39 PM
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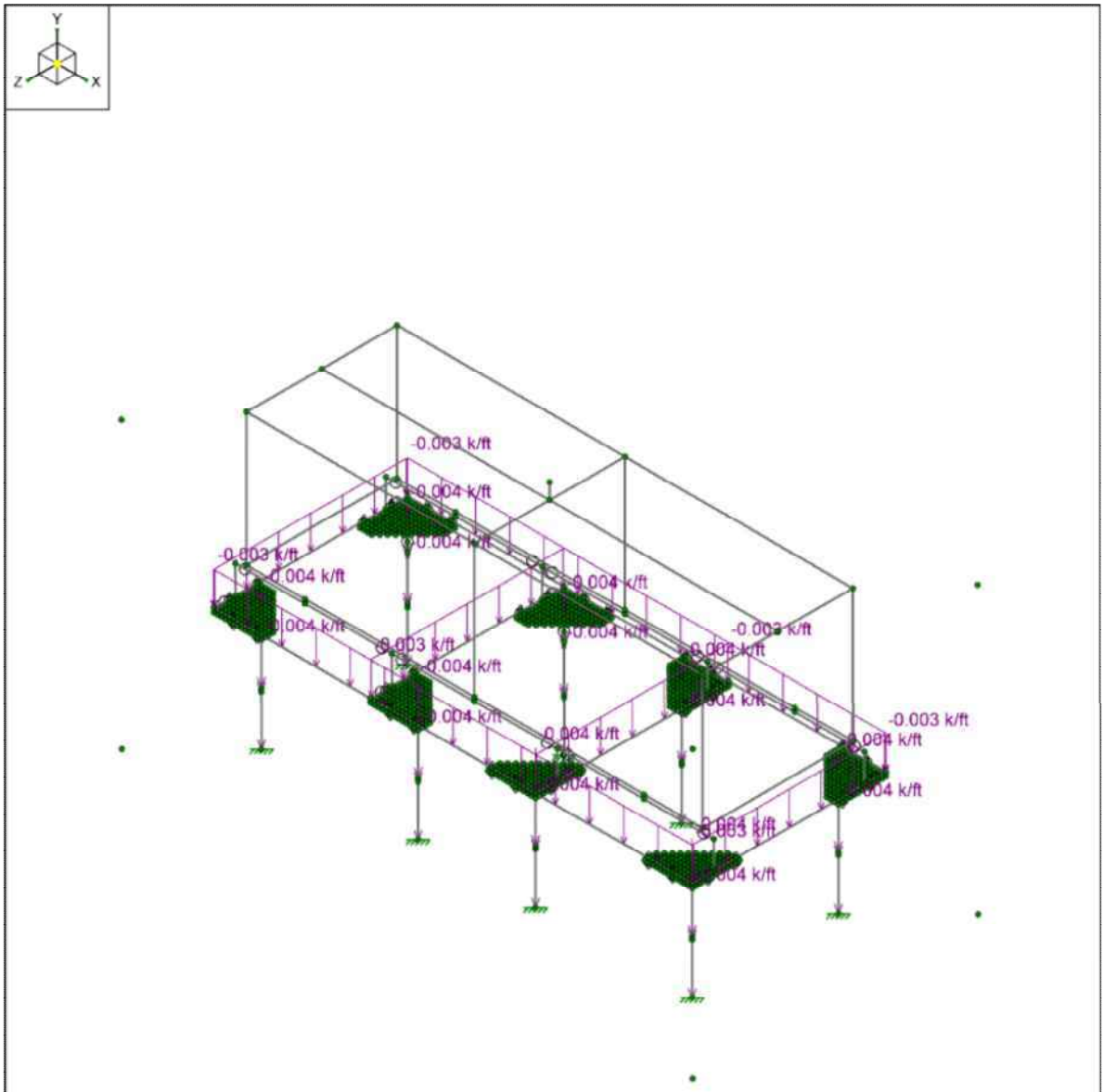

Loads: BLC 4, Ice Weight
Envelope Only Solution

GeoStructural		EMI 4x10 Platform	SK-7
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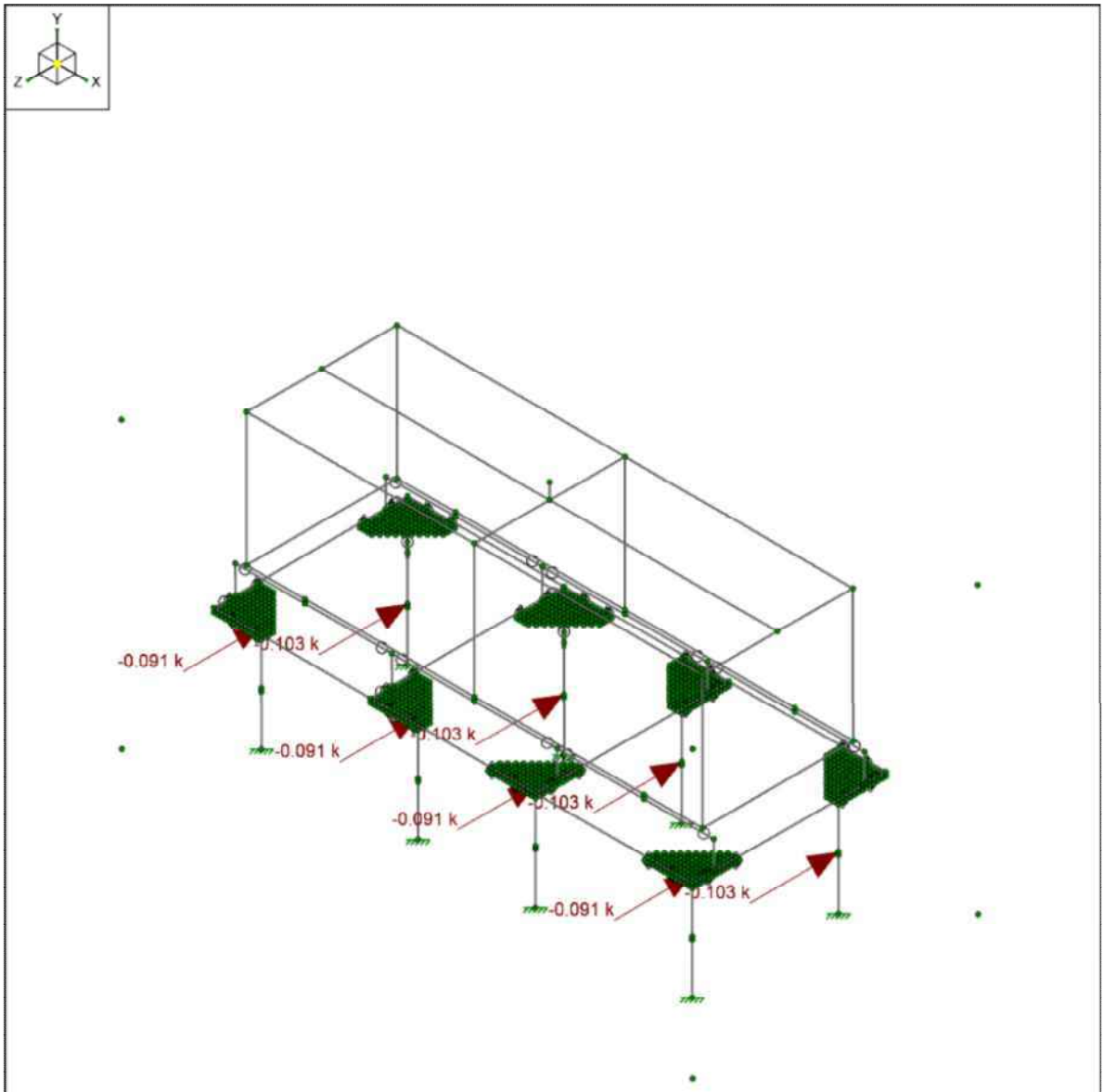
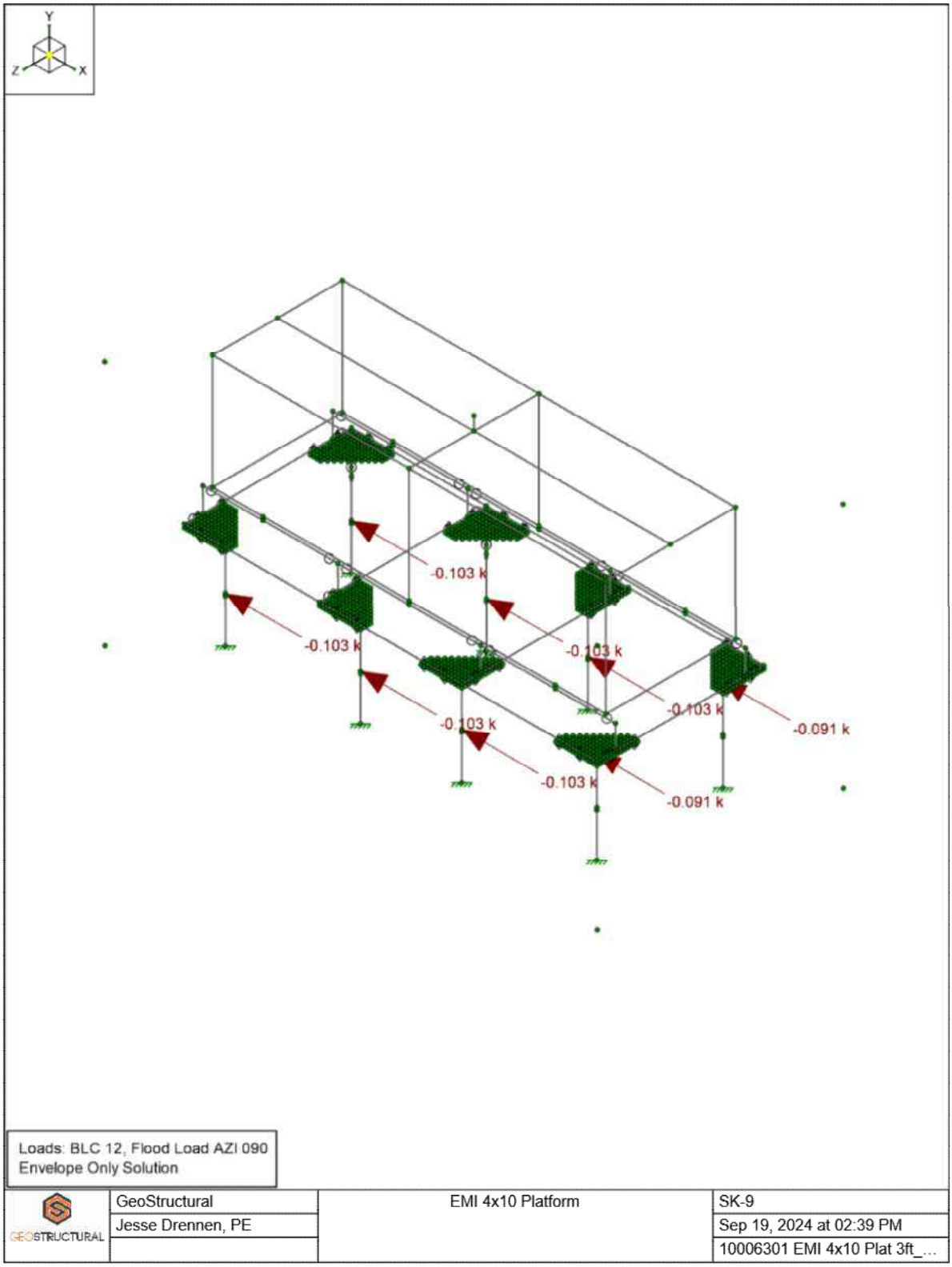

Y
Z
X
-0.091 k
-0.103 k
-0.091 k
-0.103 k
-0.091 k
-0.103 k
-0.091 k
-0.103 k
Loads: BLC 10, Flood Load AZI 000
Envelope Only Solution
GeoStructural
Jesse Drennen, PE
EMI 4x10 Platform
SK-8
Sep 19, 2024 at 02:39 PM
10006301 EMI 4x10 Plat 3ft_...


Y
Z
X
-0.103 k
-0.103 k
-0.103 k
-0.103 k
-0.103 k
-0.103 k
-0.091 k
-0.091 k
Loads: BLC 12, Flood Load AZI 090
Envelope Only Solution
GeoStructural
Jesse Drennen, PE
EMI 4x10 Platform
SK-9
Sep 19, 2024 at 02:39 PM
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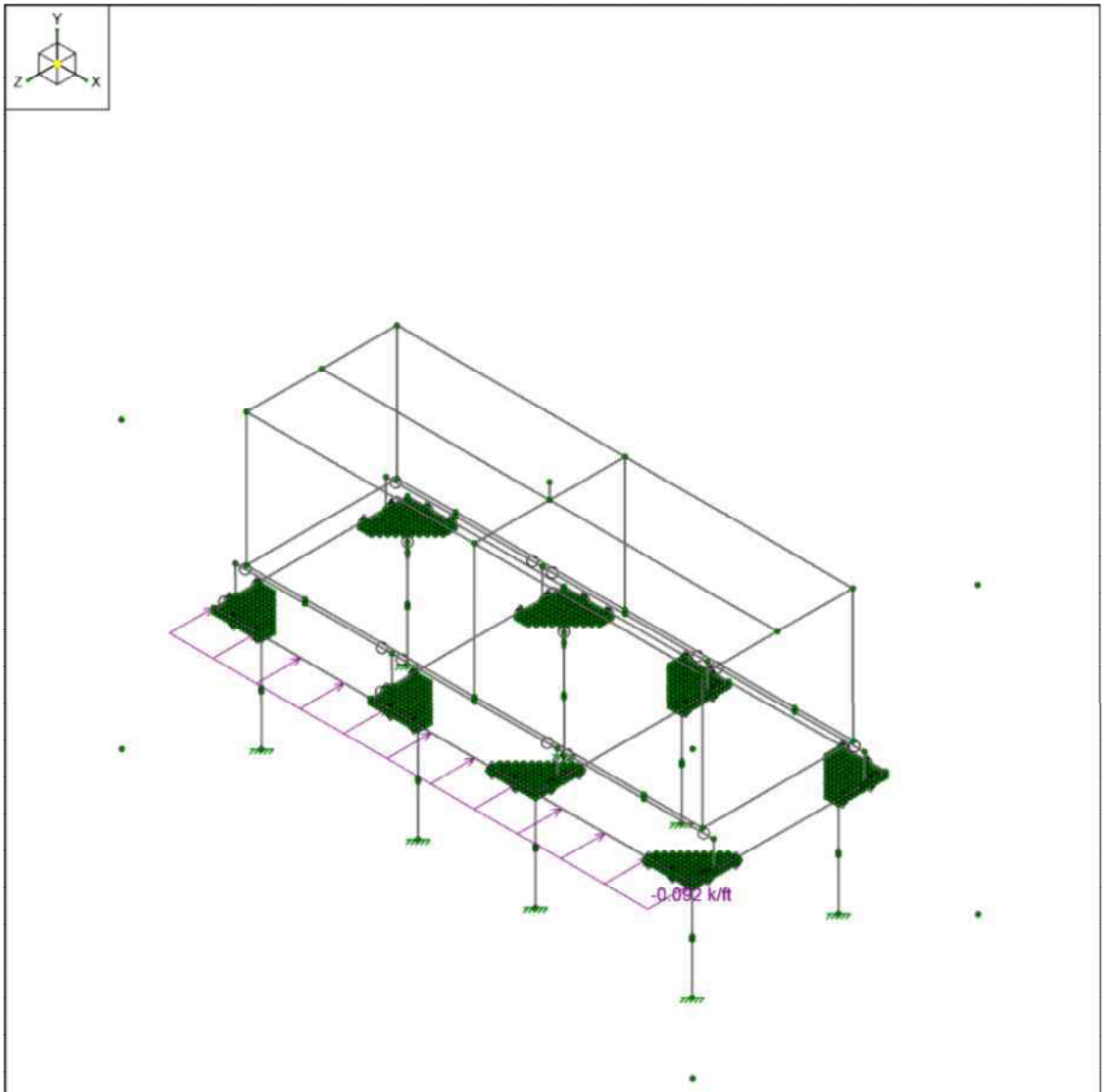

Loads: BLC 13, Flood slam AZI 000
Envelope Only Solution

GEOSTRUCTURAL	GeoStructural	EMI 4x10 Platform	SK-10
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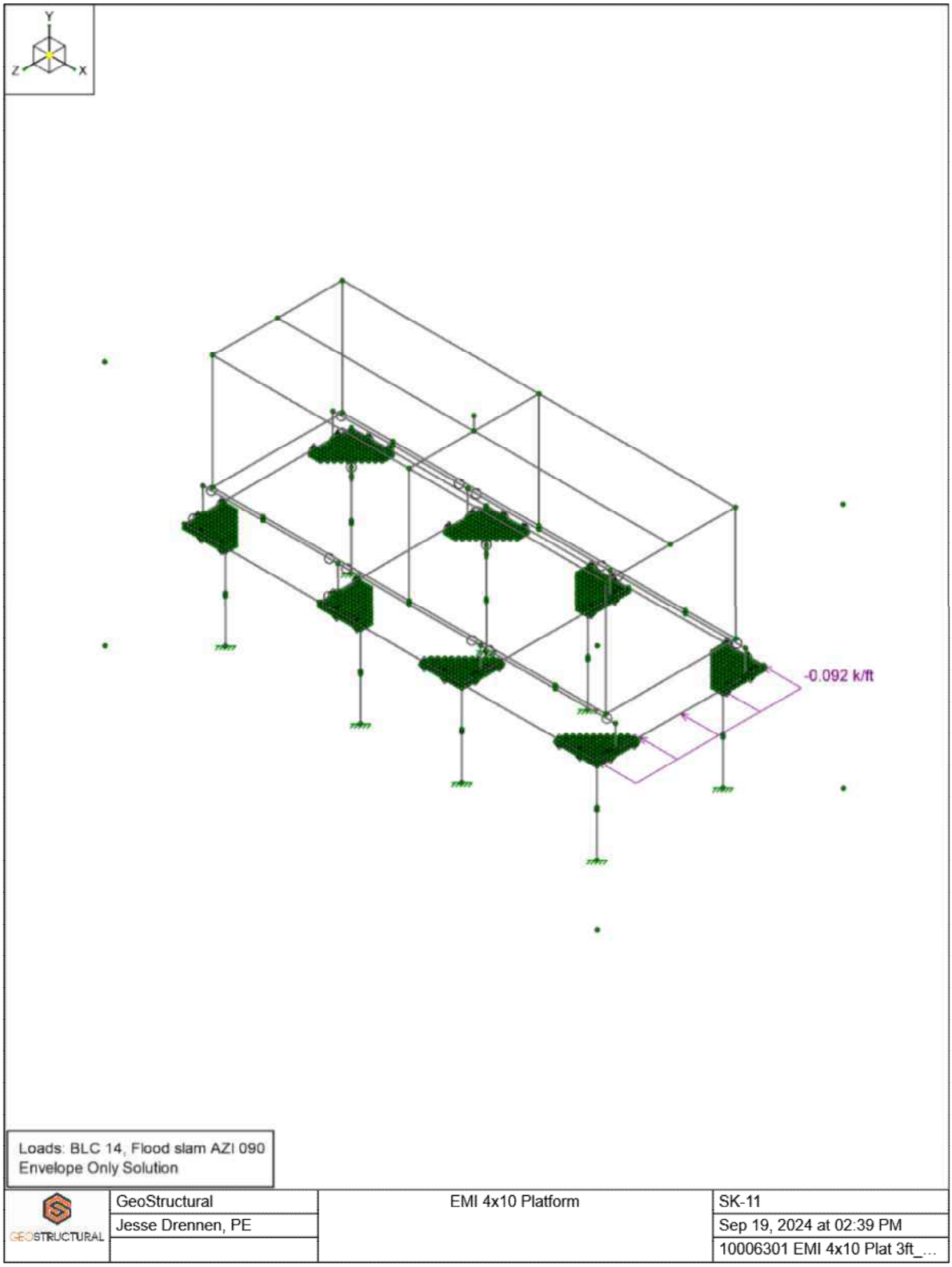

Y
Z
X
-0.092 k/ft
Loads: BLC 14, Flood slam AZI 090
Envelope Only Solution
GeoStructural
Jesse Drennen, PE
EMI 4x10 Platform
SK-11
Sep 19, 2024 at 02:39 PM
10006301 EMI 4x10 Plat 3ft_...

PLATFORM COMPONENT EFFECTIVE WIND AREAS

Designer: JD Date: 9/19/2024

LOAD DESCRIPTION:

				Round (Ca=1.2)	Flat (Ca=2.0)	
q_z =	22	psf	Ult Wind Load w/o Ice	26	44	psf
q_z =	3	psf	3-sec Wind Load w/ Ice	4	6	psf
Ice Thickness?	1.18	in.				
Ice Density?	56	pcf				

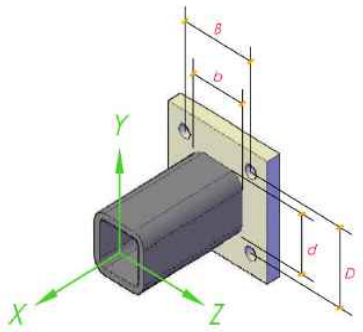
	Member 1	Member 2	Member 3	Member 4	Member 5	Member 6	Member 7
Width/Dia (in.)				6.625	6	6	
Length (ft.)				4	4	10	
Shape?				Round	Flat	Flat	
C_A =				0.81	1.43	1.83	
ΣA_A =				2.21	2.00	5.00	
ΣA_A (ICE)=				3.14	2.92	7.10	
$\Sigma C_A A_A$ =				1.78	2.87	9.15	
$\Sigma C_A A_A$ (ICE) =				2.53	4.19	12.99	
W o (klf)	#VALUE!	#VALUE!	#VALUE!	0.010	0.016	0.020	#VALUE!
W i (klf)	#VALUE!	#VALUE!	#VALUE!	0.002	0.003	0.004	#VALUE!
D i (klf)	#DIV/0!	#DIV/0!	#DIV/0!	0.012	0.014	0.013	#DIV/0!

Plate Connection Capacities at Columns

ASCE 7-16 & IBC 2018/2021
AISC 360-16

Design Parmeters:

n =	4	# of Bolts in Conn		P_x =	0	kip	*Applied Factored Tension X*
D_b =	0.5	in	*Bolt Diameter*	V_Y =	0.106	kip	*Applied Factored Shear Y*
Grade A	325	*Bolt Material*		V_Z =	1.059	kip	*Applied Factored Shear Z*
(Y/N)	Y	Threads Included?		M_X =	0	k-ft	*Applied Factored Torsion X*
Grade A	36	*Standoff Plate Material*		M_Y =	1.248	k-ft	*Applied Factored Moment Y*
				M_Z =	0.15	k-ft	*Applied Factored Moment Z*
t =	0.375	in	*Stand Plate Thick*				
W =	12	in	*Stand Plate Width*	φ =	0.75		*Tensile/Shear Phi Factor*
H =	12	in	*Stand Plate Height*	φ =	0.8		*Bolt Bearing Phi Factor*
B =	8	in	*Bolt Spacing B*				
D =	8	in	*Bolt Spacing D*				
b (dia)=	6.625	in	*Standoff Width (or Diameter)*				
d =	6.625	in	*Standoff Height*				
	P	***Is Standoff Tube or Pipe? (T or P)*					
wl =	3	*Fillet Weld Leg Width (16ths)*					
F_{EXX} =	70	*ksi*	*Weld Electrode*				



Weld Capacity Calculations

ϕR_n = MIN [φ(0.6)(0.707)(F_{EXX})(wl/16) , φ(0.6)($F_{y\ plate}$)(t_{plate}) , φ(0.6)($F_{u\ plate}$)(t_{plate})]

$F_{y\ plate}$ =	36	ksi	*Standoff Plate Yield Strength*
$F_{u\ plate}$ =	58	ksi	*Standoff Plate Minimum Tensile Strength*

φRn =	4.18	kip/in	Available Shear Resistance per Inch of Weld
φRn =	8.10	kip/in	Available Shear Yield of Standoff Plate
φRn =	9.79	kip/in	Available Shear Rupture of Standoff Plate

φRn =	**4.18**	**kip/in**	**Available Shear Strength per Inch of Weld**

$Ru = \sqrt{(Rux^2 + Ruy^2 + Ruz^2)}$

Rux = P/lw + Mz/Sz + My/Sy — *Axial Weld Tension + Bending Force on Weld in Z and Y*

lw =	20.81	in	*Total Weld Length*
Sz =	34.47	in^2	*Unit Section Modulus of Weld about Z*
Sy =	34.47	in^2	*Unit Section Modulus of Weld about Y*
Rux =	0.49	kip/in	

Ruy = Vy/lw + Mx(b/2)/Jw — *Vertical Shear on Weld + Vertical Component of Torsional Shear*

Jw =	228.37	in^3	*Unit Polar Moment of Intertia of Weld*
Ruy =	0.01	kip/in	

Ruz = Vz/Iw + Mx(d/2)/Jw — *Horizontal Shear on Weld + Horiz Component of Torsional Shear*

Ruz = 0.05 kip/in

Ru =	0.49	kip/in	**Applied Shear per Inch of Weld Length**

Weld Capacity on Resultant Force

Ru / φRnv ≤ 1.0

CSR =	11.72%	**Utilization Ratio of 3/16 in. Standoff Perimeter Fillet Weld**

Bolt Capacity Calculations

Available Bolt Tension

$\varphi R_{nt} = \varphi(Fub)(Anb)$

Fub =	90	ksi	*Bolt Minimum Tensile Strength*
Agb =	0.20	in^2	*Bolt Area Shank*
Anb =	0.14	in^2	*Bolt Area Net*

φRnt =	9.58	kip	**Available Bolt Tension**

Available Bolt Bearing Strength

$\varphi R_{nv} = \varphi(1.2)(Lc + D/4)(t)(Fu)$ ≤ $\varphi(2.4)(D)(t)(Fu)$

Fu =	58	ksi	*Connected Part Minimum Tensile Strength*
Lc =	1.22	in	*Clear Distance, edge of hole to edge of part*
Lc(override) =		in	*Input Override Value as Desired*
t =	0.38	in	*Thinnest Connected Part*

φRnv = 28.06 ≤ 20.88

φRnv =	20.88	kip	**Available Bolt Bearing**

Available Bolt Shear Strength

$\varphi R_{nv} = \varphi(0.625)(Rb)(Fub)(Agb)$ OR *[Threads Included]* $\varphi R_{nv} = \varphi(0.625)(Rb)(Fub)(0.8)(Agb)$

Lb =	9.00	in	*Length Betw First and Last Bolt in Multi-Bolt Conn Assuming 3" o.c.*
Lb(override) =		in	*Input Override Value as Desired*
Rb =	1.00		*Connection Length Reduction Factor*

φRnv =	6.63	kip	**Available Bolt Shear**

Available Bolt Resultant Forces

Tu = P/n + [My(B/2)/Iy + Mz(D/2)/Iz] Anb

Iy =	9.08	in^4	*Bolt Group Moment of Inertia about Y*
Iz =	9.08	in^4	*Bolt Group Moment of Inertia about Z*

Tu =	1.05	kip	**Applied Tension per Bolt**

$Vu = \sqrt{(Vy^2 + Vz^2)}/n + (Mx(r)/J)Anb$

r =	5.66	in	*Diagonal Distance from Standoff Centroid to Bolt*

J = 18.16 in^4 *Bolt Group Polar Moment of Inertia*

Vu = 0.27 kip	**Applied Shear per Bolt**

Bolt Capacities on Resultant Force

Tu / φRnt ≤ 1.0

CSR = 10.95%	**Utilization Ratio of (1) 0.5 in. A325 bolt**

Vu / φRnv ≤ 1.0

CSR = 4.02%	**Utilization Ratio of (1) 0.5 in. A325 bolt**

$\sqrt{(Tub / \phi Rnt)^2 + (Vub / \phi Rnv)^2} \leq 1.0$

CSR = 11.66%	**Combined Utilization Ratio of (1) 0.5 in. A325 bolt**