Project Number: U2716-113-191

February 2, 2024

Sunmodo
14800 NE 65th Street
Vancouver, WA 98682

REFERENCE: Sunmodo Sunturf Ground Mount A4
Ground Mount PV Array Installation

To Whom It May Concern:

Per request of Sunmodo, we have been asked to prepare the structural design of a ground-mounted PV solar array system with several foundation options as shown in the attached calculations. The adopted building code in this jurisdiction is the 2015 International Building Code. Vector Structural Engineering requires that we review each site specific install, and we are not liable for installs at site specific locations we have not reviewed. This document does not address site-specific installations. The following design parameters are used in our analysis:

- Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)
- Design wind speed for risk category I structures: 110 mph
- Wind exposure: B
- Ground snow load: 70 psf
- The ground screws and helical piers must be tested to 1.5 times uplift and 2.0 times lateral reactions found in the table below. A minimum of one ground screw or helical pier must be tested.

Load (ASD)	Value (lbs)	Factor of Safety	Test Value (lbs)
UPLIFT	1560	1.5	2340
LATERAL	1130	2	2260

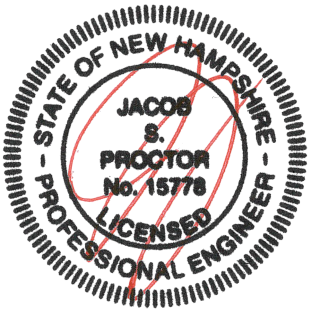
Foundation concrete shall have a minimum compressive strength of 2500 psi at 28 days. Cement for all concrete shall be Type I or II with a minimum of 6% entrained air with a water/cement ratio of 0.50. Maximum aggregate size shall be 3/4". No special inspection of concrete strength is required.

Footings are designed based on an allowable soil bearing pressure of 1500 psf an allowable skin friction of 250 psf, an allowable lateral bearing pressure of 150 pcf, and a coefficient of friction of 0.3. Vector Structural Engineering strongly recommends independent soils testing be performed by a licensed geotechnical engineer to verify the assumed soil parameters.

All ground mounts are to be installed per manufacturer's recommendations. The use of solar panel support span tables provided by the manufacturer is allowed only where the site conditions and solar panel configuration match the description of the span tables. Electrical engineering is beyond our scope. All work performed must be in accordance with accepted industry-wide methods and applicable safety standards. Vector Structural Engineering assumes no responsibility for improper installation of the solar panels.

Very truly yours,

VECTOR STRUCTURAL ENGINEERING, LLC
Firm License: COA 01838



Jacob Proctor, P.E.
License: 15778 - Expires: 09/30/2024
Principal

02/02/2024

Enclosures

JSP/stb

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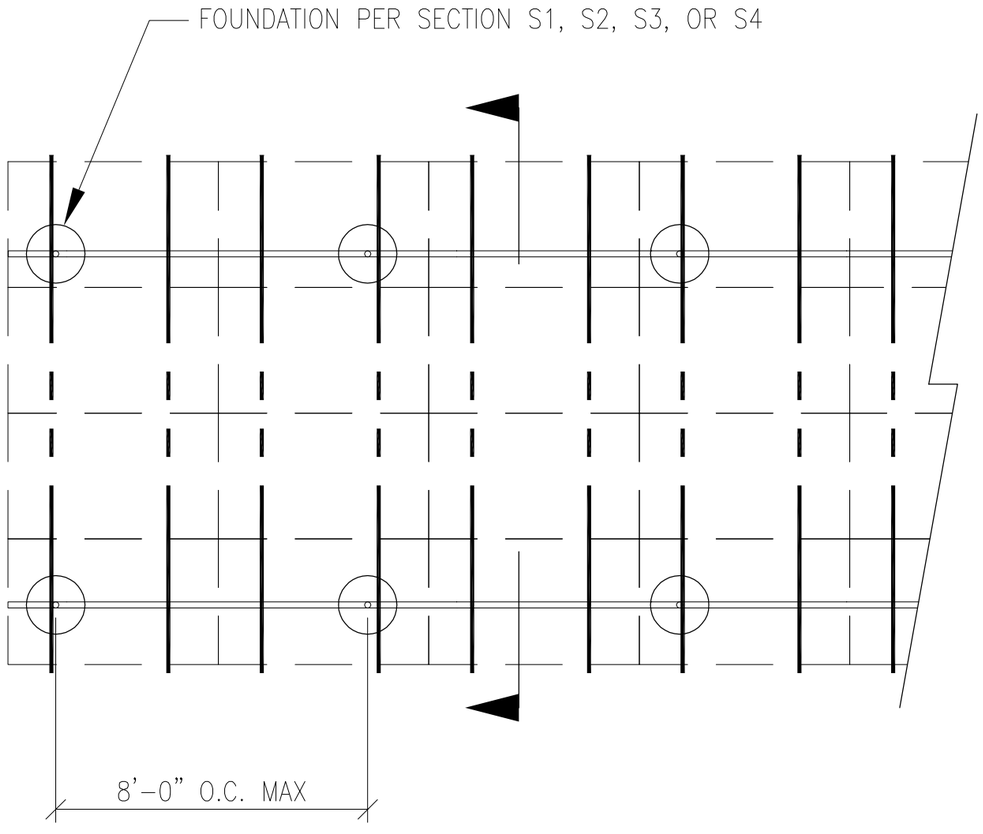
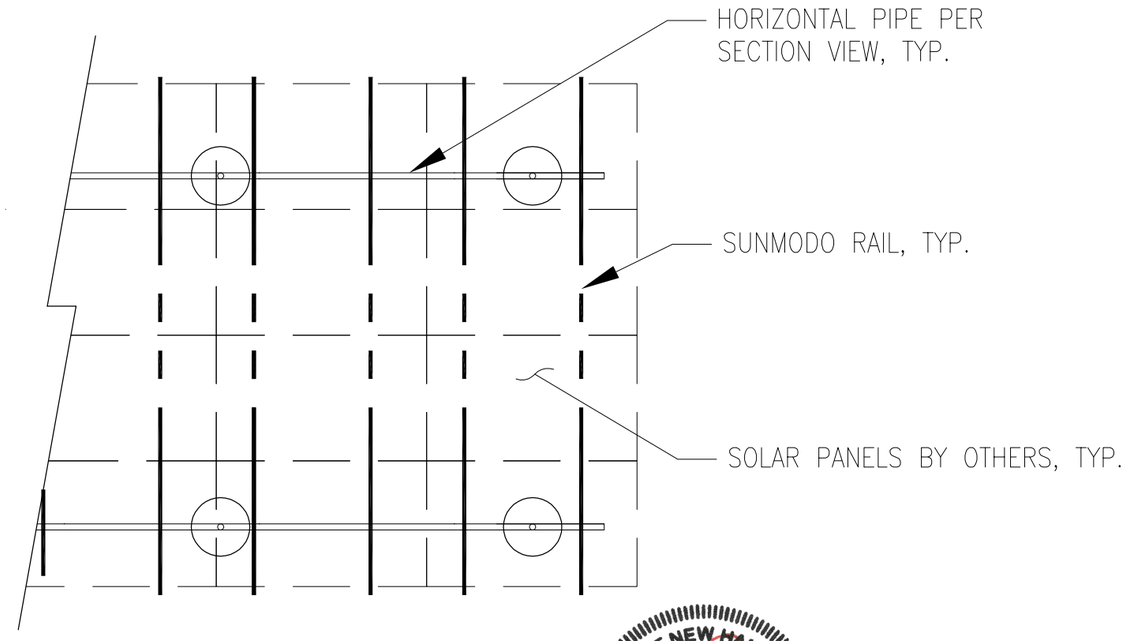
JOB NO. U2716-113-191

PROJECT SUNMODO SUNTURF GROUND MOUNTS A4

SUBJECT ALL OPTIONS





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STATE OF NEW HAMPSHIRE - JACOB S. PROCTOR No. 15778 LICENSED PROFESSIONAL ENGINEER

PV ARRAY PLAN

02/02/2024

N.T.S.

P1

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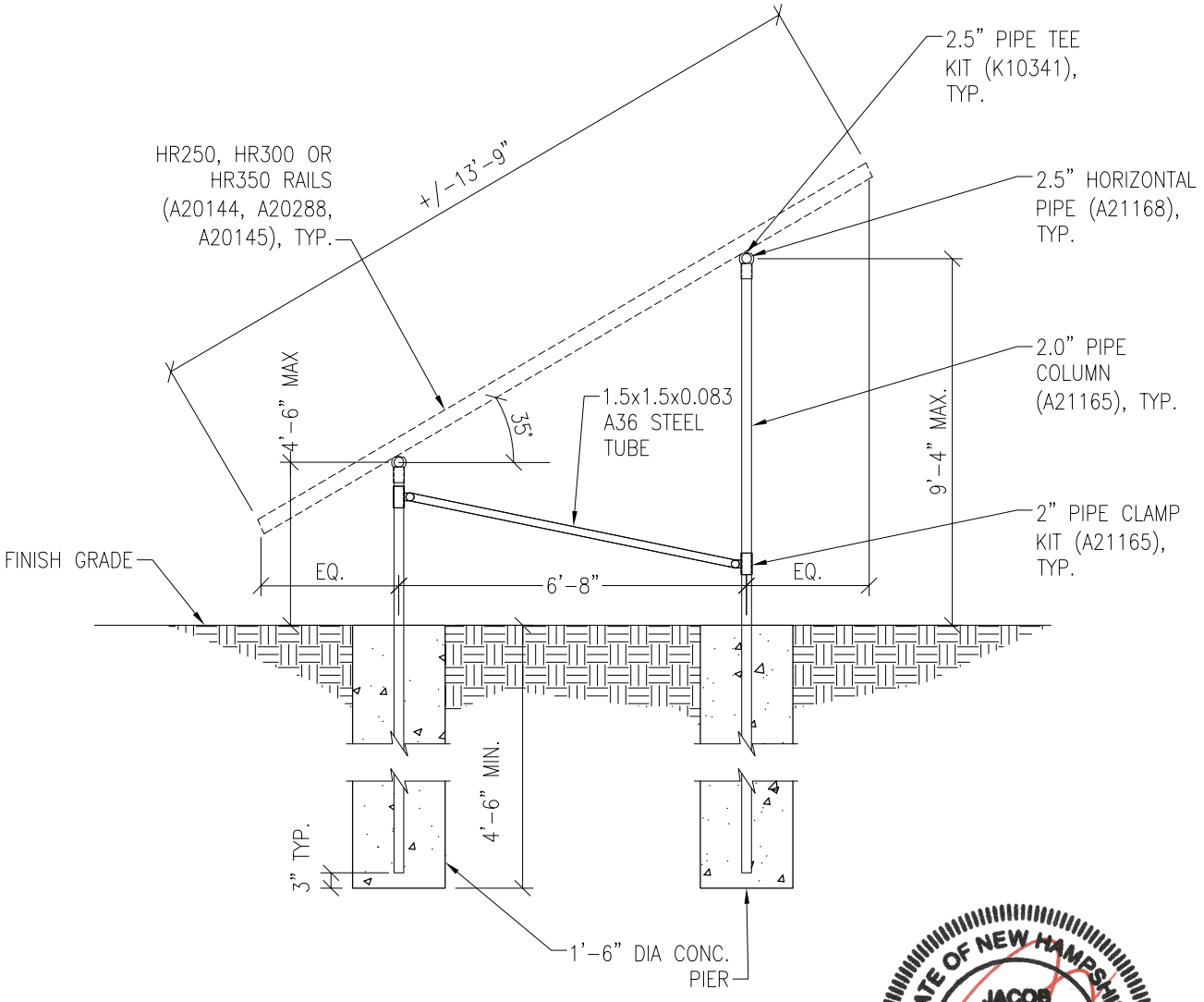
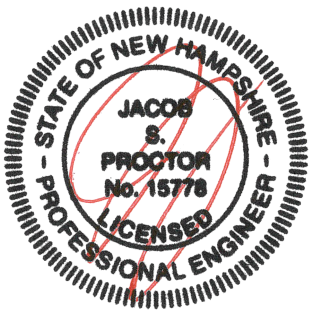
JOB NO. U2716-113-191

PROJECT SUNMODO SUNTURF GROUND MOUNTS A4

SUBJECT DRILLED PIER OPTION





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PV ARRAY SECTION 02/02/2024

N.T.S.

S1

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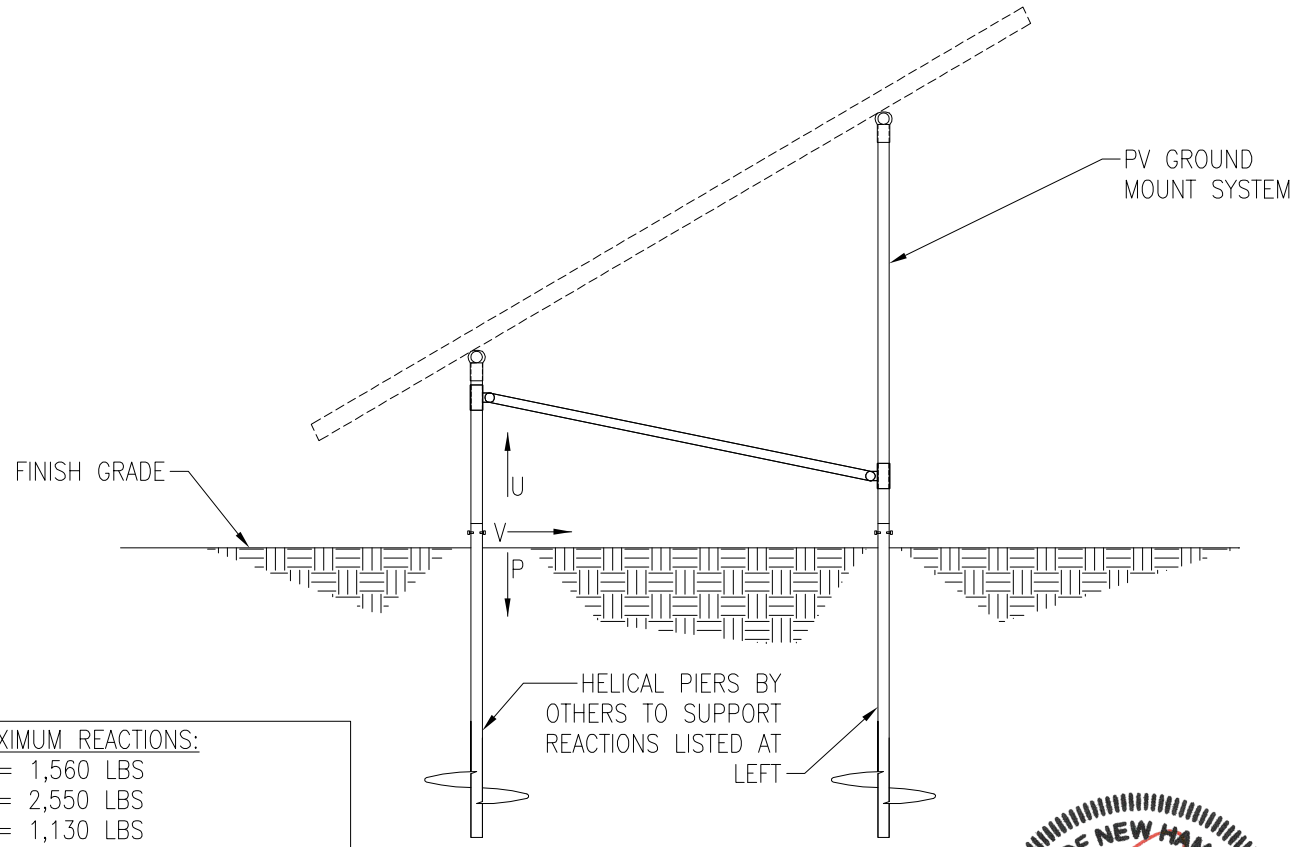
JOB NO. U2716-113-191

PROJECT SUNMODO SUNTURF GROUND MOUNTS A4

SUBJECT HELICAL PIER OPTION

NOTES:

1. For ground mount components see Section S1.
2. A minimum of (1) helical pier must be load-tested as follows:
   - 2.1. Safety factor for uplift = 1.5,
   - 2.2. Safety factor for lateral loads = 2.0
   - 2.3. Upward deflection limit = 1/2"
   - 2.4. Lateral deflection limit = 1"
   - 2.5. The load tests must be performed by an approved contractor.



MAXIMUM REACTIONS:
U = 1,560 LBS
P = 2,550 LBS
V = 1,130 LBS

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VECTOR ENGINEERS

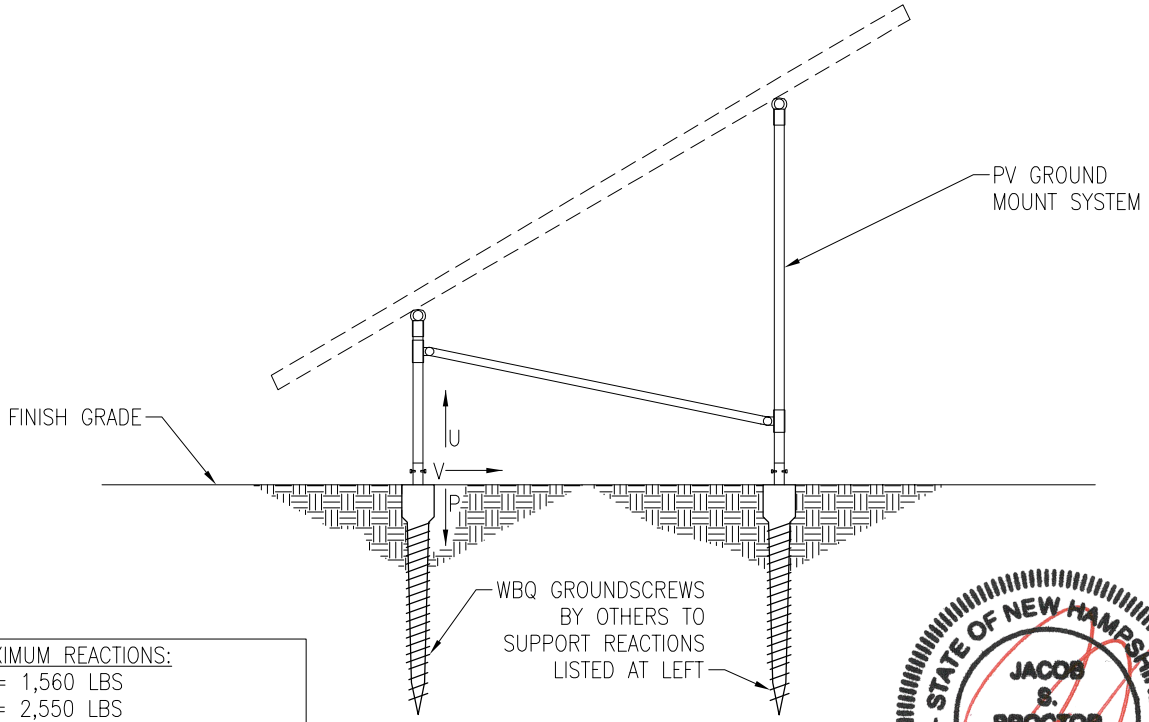
JOB NO. U2716-114-191

PROJECT SUNMODO SUNTURF GROUND MOUNTS A41

SUBJECT GROUND SCREW OPTION

NOTES:

1. For ground mount components see Section S1.
2. A minimum of (1) ground screw must be load-tested as follows:
   - 2.1. Safety factor for uplift = 1.5,
   - 2.2. Safety factor for lateral loads = 2.0
   - 2.3. Upward deflection limit = 1/2"
   - 2.4. Lateral deflection limit = 1"
   - 2.5. The load tests must be performed by an approved contractor.



MAXIMUM REACTIONS:
U = 1,560 LBS
P = 2,550 LBS
V = 1,130 LBS

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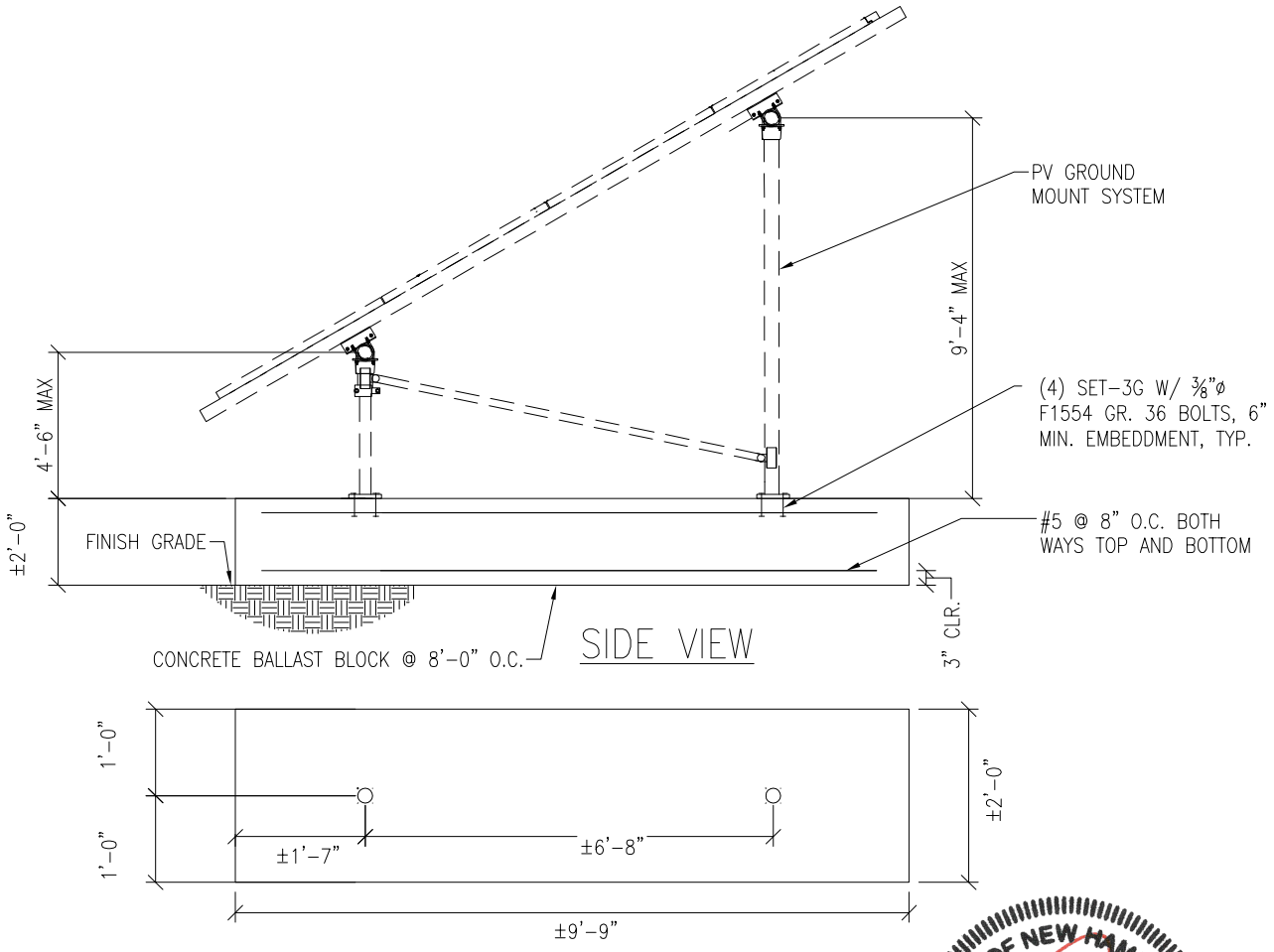
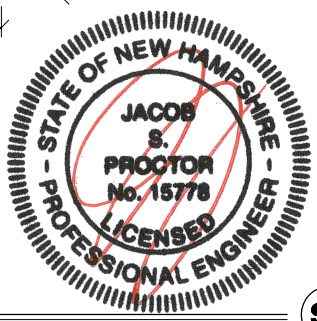
JOB NO. U2716-113-191

PROJECT SUNMODO SUNTURF GROUND MOUNTS A4

SUBJECT BALLASTED BLOCK OPTION

NOTES:
1. For ground mount components see Section S1.





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PV ARRAY SECTION

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JOB NO.: U2716-113-191 **DESIGNED:** STB
DATE: 07/31/19

PROJECT: A4 – Sunmodo Sunturf GM **SUBJECT:** Dead Load

Design Weight:

Individual Panel Weight [lb]:	50.7
Panel Transverse Length (T5) [in]:	41.2
Panel Transverse Length (T5) [ft]:	3.4
Panel Longitudinal Length (L2) [in]:	81.4
Panel Longitudinal Length (L2) [ft]:	6.8
Individual Panel Area [ft^2]:	23.3
Individual Panel Weight [psf]:	2.2
# of Panels in Transverse Direction:	4
Approximate Transverse Length (T4) [ft]:	13.7
# of Panels in Longitudinal Direction:	12
Approximate Longitudinal Length (L1) [ft]:	81.4
Transverse Column Spacing (T1) [ft]:	6.7
Longitudinal Column Spacing (L3) [ft]:	8.0
# of Columns in Longitudinal Direction:	11
# of Columns in Transverse Direction:	2
Total Number of Columns:	22
Panel Slope from Horizontal (a) [°]:	35.0
Short Column Height (H1) [ft]:	4.6
Approximate Tall Column Height (H2) [ft]:	9.3
Transverse Brace between Columns :	Yes
Approximate Brace Length (B1) [ft]:	9.0
Weight of Columns [plf]:	3.7
Weight of Cross Pipe [plf]:	3.7
Weight of Brace [plf]:	3.7
Tributary Transverse Length per Column [ft]:	6.9
Tributary Longitudinal Length per Column [ft]:	8.0
Tributary Area per Column [ft^2]:	54.9
Rail Weight [plf]:	1.0
Transverse Rail Weight per Column [lb]:	27.5
Longitudinal Rail Weight per Column [lb]:	29.2
Tall Column Weight [lb]:	33.9
Panel Weight per Column [lb]:	119.6
Rail Weight per Column [lb]:	27.5
Cross Pipe Weight per Column [lb]:	29.2
Brace Weight per Column [lb]:	16.4
Total Weight per Column (1.0 D) [lb]:	**226.7**

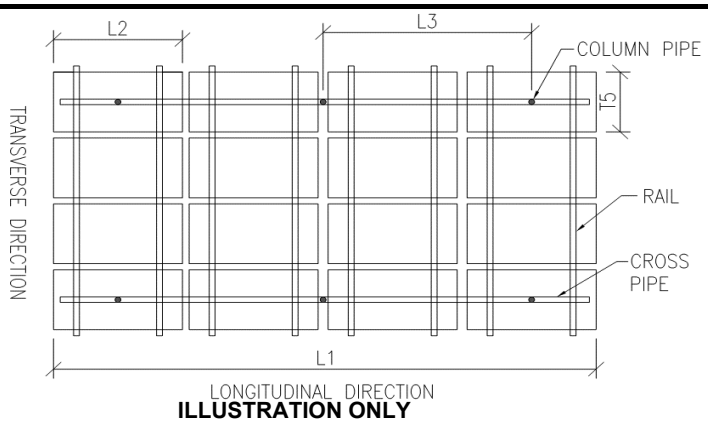


ILLUSTRATION ONLY

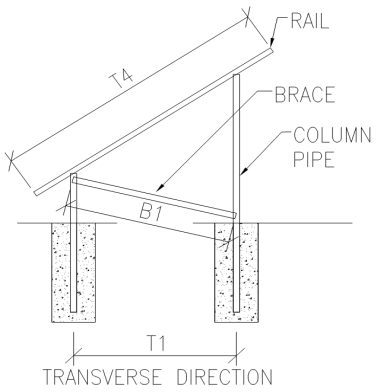


ILLUSTRATION ONLY

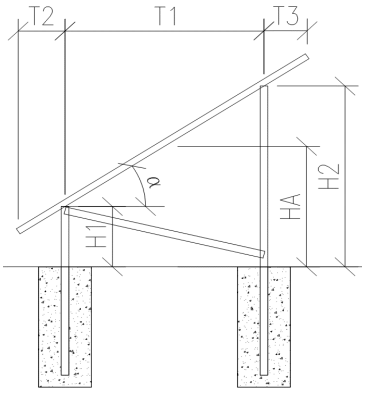


ILLUSTRATION ONLY

Assumptions:
- T2 = T3

JOB NO.: U2716-113-191 **DESIGNED:** STB
DATE: 07/31/19

PROJECT: A4 – Sunmodo Sunturf GM **SUBJECT:** Snow Load

SNOW LOAD (S):

ASCE 7 Standard:	10	
Panel Slope from Horizontal [°]:	35.0	
Snow Ground Load, p_g [psf]:	70.0	(Section 7.2)
Terrain Category:	B	(Table 7-2)
Exposure of Roof:	Fully Exposed	(Table 7-2)
Exposure Factor, C_e:	0.9	(Table 7-2)
Thermal Factor, C_t:	1.2	(Table 7-3)
Risk Category:	I	(Table 1.5-1)
Importance Factor, I_S:	0.8	(Table 1.5-2)
Flat Roof Snow Load, p_f [psf]:	42	(Equation 7.3-1)
Minimum Roof Snow Load, p_m [psf]:	0	(Section 7.3.4)
Unobstructed Slippery Surface?	Yes	(Section 7.4)
Slope Factor Figure:	Figure 7-2c	(Section 7.4)
Roof Slope Factor, C_s:	0.636	(Figure 7-2)
Sloped Roof Snow Load, p_s [psf]:	27	(Equation 7.4-1)
Design Snow Load, S [psf]:	27	
Tributary Transverse Length [ft]:	5.6	
Tributary Longitudinal Length [ft]:	6	
Tributary Area per Column [ft^2]:	33.7	
Snow Load per Column (1.0 S) [lb]:	**909.2**	

JOB NO.: U2716-113-191 **DESIGNED:** STB
DATE: 07/31/19

PROJECT: A4 – Sunmodo Sunturf GM **SUBJECT:** Wind Pressure

Design Wind Load:

ASCE 7 Standard:	10	
Basic Wind Speed, V [mph]:	110	
Risk Category:	I	
Exposure Category	B	(Section 26.7.3)
Velocity Pressure Exposure Coefficient, K_h:	0.57	(Table 27.3-1)
Topographic Factor, K_{ht}:	1.0	(Section 26.8.2)
Wind Directionality Factor, K_d:	0.85	(Table 26.6-1)
Internal Pressure Coefficient, GC_{pi} :	0.00	(Table 26.11-1)
Velocity Pressure, q_h [psf]:	15.0	(Equation 27.3-1)
Gust Effect Factor, G:	0.85	(Section 26.9.1)
Panel Slope [degrees]:	35.0	

Net Pressure Coefficients (C_N) per: (Figure 27.4-4)

Clear Wind Flow	C_{NW}	C_{NL}
Case 1 (γ = 0°, Load Case A)	-1.80	-1.80
Case 2 (γ = 0°, Load Case B)	-2.43	-0.57
Case 3 (γ = 180°, Load Case A)	2.10	2.17
Case 4 (γ = 180°, Load Case B)	2.67	1.07

Design Wind Pressures (p) [psf] per: (Equation 27.4-3)

Clear Wind Flow	q_hGC_{NW}	q_hGC_{NL}
Case 1 (γ = 0°, Load Case A)	-23.0	-23.0
Case 2 (γ = 0°, Load Case B)	-31.0	-7.2
Case 3 (γ = 180°, Load Case A)	26.8	27.6
Case 4 (γ = 180°, Load Case B)	34.0	13.6

Wind Pressure on Each Side of Panels [psf]

Clear Wind Flow	Short Col. Pressure	Long Col. Pressure
Case 1 (γ = 0°, Load Case A)	-23.0	-23.0
Case 2 (γ = 0°, Load Case B)	-7.2	-31.0
Case 3 (γ = 180°, Load Case A)	26.8	27.6
Case 4 (γ = 180°, Load Case B)	34.0	13.6

JOB NO.: U2716-113-191

PROJECT: A4 – Sunmodo Sunturf GM **SUBJECT:** Open Building Wind Loads

Design Wind Load Per ASCE 7-10

$p = q_h G C_n$

Velocity Pressure Exposure Coefficient, K_h:	0.57	(Table 27.3-1)
Topographic Factor, K_{ht}:	1.0	(Section 26.8.2)
Wind Directionality Factor, K_d:	0.85	(Table 26.6-1)
Ultimate Wind Speed, V [mph]:	110	
Velocity Pressure, q_h [psf]:	15.0	(Equation 27.3-1)
Gust Effect Factor, G:	0.85	(Section 26.9.1)

γ= 90° or 270°

Force Coefficient, C_N:

Horizontal Distance from Winward Edge	Roof angle	Load Case	Obstructed Wind Flow CN
<= h	35	A	-0.8
		B	0.8
> h, <= 2h	35	A	-0.6
		B	0.5
> 2h	35	A	-0.3
		B	0.3

Design Wind Pressure, p [psf]:

	Roof angle	Load Case	Obstructed Wind Flow
<= h	35	A	-10.2
		B	10.2
> h, <= 2h	35	A	-7.7
		B	6.4
> 2h	35	A	-3.8
		B	3.8

JOB NO.: U2716-113-191 **DESIGNED:** STB

Foundation Option 1: Drilled Concrete Pier

JOB NO.: U2716-113-191 **DESIGNED:** STB
DATE: 07/31/19

PROJECT: A4 – Sunmodo Sunturf GM

Drilled Pier Design

Design Loads:

Max. Shear, V [k]:	1.1	Max. Down, P_d [k]:	2.5
Max. Moment, M [k-ft]:	0.0	Max. Uplift, P_u [k]:	1.6

Pier Properties:

Pier Diameter, b [ft]:	1.5	Volume of Concrete [ft^3]:	8
Min. Pier Diameter, b_{min} (opt'l) [ft]:		Volume of Concrete [yd^3]:	0.3
Top of Pier Elevation [ft]:	0.00	Weight of Concrete [k]:	1.2
Pier Depth, d [ft]:	4.5		
Min. Pier Depth, d_{min} (opt'l) [ft]:			
Max. Pier Depth, d_{max} (opt'l) [ft]:			

Soil Properties:

Allow. Bearing Pressure [psf]:	1,500	Optional Parameters for Uplift:		
1/3 increase for short term loads?	No			
		Skin Friction [psf]:	250	(IBC 1810.3.3.1.4)
Lateral Bearing, S [pcf]:	150	Top Length to Ignore [ft]:	0.0	
Max. Lateral Bearing (opt'l) [psf]:		1/3 increase for short term loads?	No	
Top Depth to Ignore [ft]:	0.0	Combine w/ Bearing:	No	
1/3 increase for short term loads?	No			
1/2" deflection at t/o pier allowed:	Yes			

Check Bearing:

Bearing Capacity [k]:	5.3	**Bearing capacity OK.**

Check Uplift:

Uplift Capacity [k]:	6.4	**Uplift capacity OK.**

Check Lateral Bearing:

Applied Lateral Force, P [lb]:	1,130	
Point of Application, h [ft]:	0.0	
S_{1_max} [psf]:		
S_1 [psf]:	450	
$A = 2.34*P/(S_1 b)$:	3.92	
Required Pier Depth, d_{reqd} [ft]:	3.9	**Lateral bearing capacity OK.**

JOB NO.: U2716-113-191 **DESIGNED:** STB

Foundation Option 2: Helical Pier

The ground screws and helical piers must be tested to 1.5 times uplift and 2.0 times lateral reactions found in the table below.

Load (ASD)	Value (lbs)	Factor of Safety	Test Value (lbs)
UPLIFT	1560	1.5	2340
LATERAL	1130	2	2260

JOB NO.: U2716-113-191 **DESIGNED:** STB

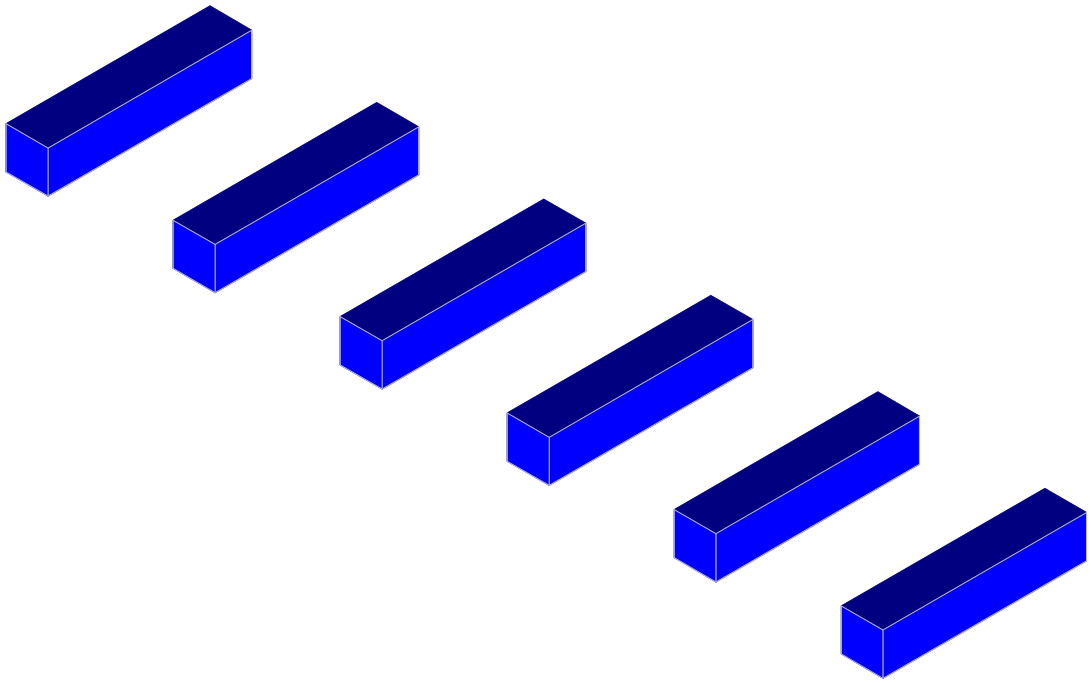
Foundation Option 3: Ground Screw

The ground screws and helical piers must be tested to 1.5 times uplift and 2.0 times lateral reactions found in the table below.

Load (ASD)	Value (lbs)	Factor of Safety	Test Value (lbs)
UPLIFT	1560	1.5	2340
LATERAL	1130	2	2260

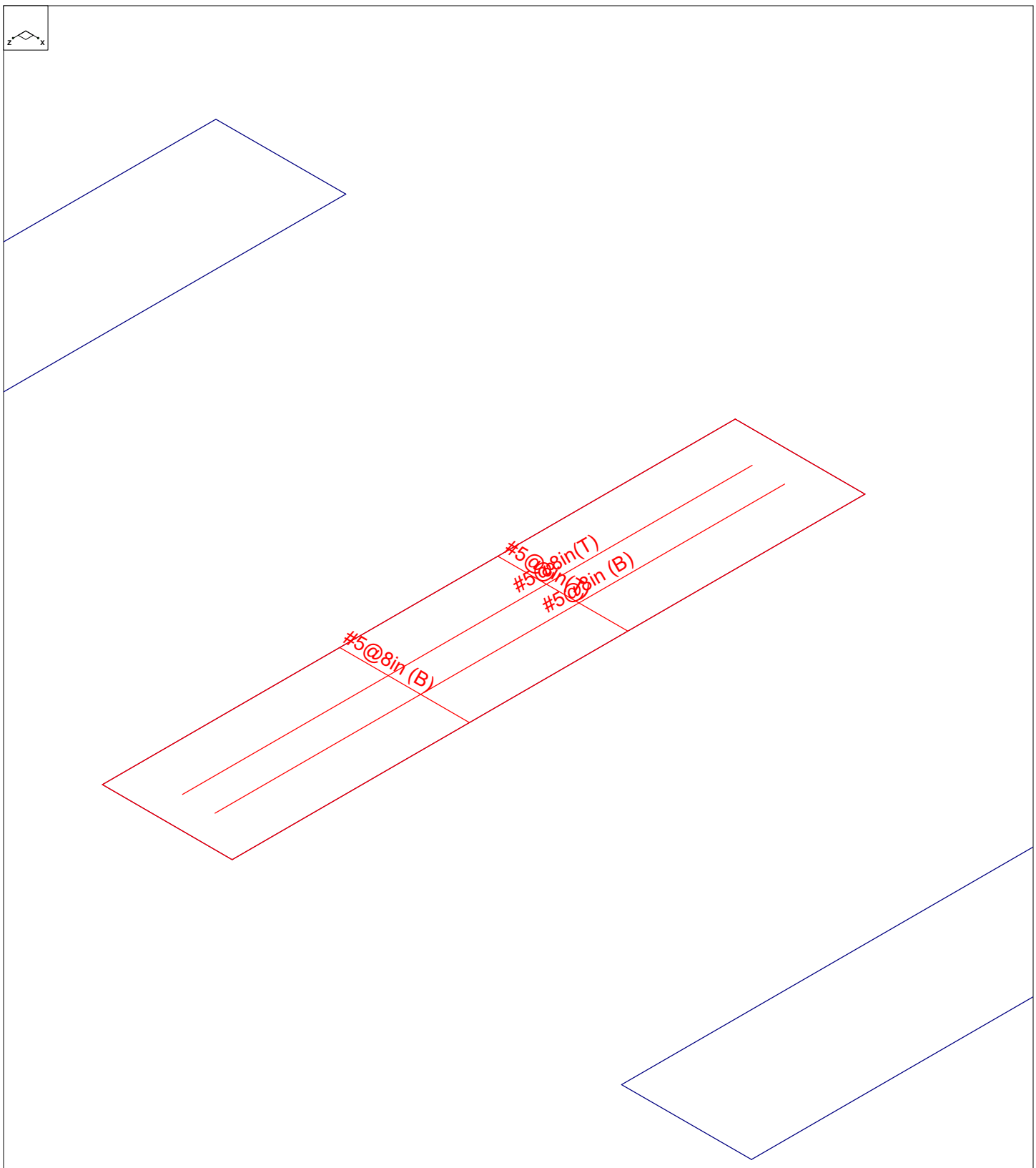
JOB NO.: U2716-113-191 **DESIGNED:** STB

Foundation Option 4: Ballasted Block



Results for LC 1, 1.0 D

Vector Structural Engineeri...	Ground Mount	SK - 1
STB		July 31, 2019 at 4:14 PM
U2716.113.191		New England A4.r3d



Results for LC 1, 1.0 D

Vector Structural Engineeri...	Ground Mount	SK - 2
STB		July 31, 2019 at 4:15 PM
U2716.113.191		New England A4.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	100
Mesh Size (in)	12
Max Iterations	10
Merge Tolerance (in)	.12
Solver	Sparse Accelerated
Coefficient of Friction	.3
No. of Shear Regions	4
Shear Region Spacing Increment (in)	4
Min 1 Bar Dia Spacing for Beams?	No
Optimize footings for OTM / Sliding?	Yes
Parme Beta Factor	.65
Pile Safety Factor	3
Concrete Stress Block	Rectangular
Concrete Rebar Set	ASTM A615
Concrete Code	ACI 318-14
HR Steel Pile Code	AISC 14th(360-10): ASD
Wood Pile Code	AWC NDS-15: ASD

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\...	Density[lb/ft^3]	f'c[psi]	Lambda	Flex Stee..	Shear St...
1	Conc3000NW	3156	1372	.15	.6	145	3000	1	60000	60000
2	Conc3500NW	3409	1482	.15	.6	145	3500	1	60000	60000
3	Conc4000NW	3644	1584	.15	.6	145	4000	1	60000	60000
4	Conc3000LW	2085	907	.15	.6	109.999	3000	.75	60000	60000
5	Conc3500LW	2252	979	.15	.6	109.999	3500	.75	60000	60000
6	Conc4000LW	2408	1047	.15	.6	109.999	4000	.75	60000	60000
7	Conc2500NW	3156	1372	.15	.6	145	2500	1	60000	60000

General Design Parameters

	Label	Max Bending Chk	Max Shear Chk	Top Cover[in]	Bottom Cover[in]
1	Typical	1	1	3	3

Slab Rebar Parameters

	Label	Top Bar	Bottom Bar	Max Top Bar Sp..	Min Top Bar Sp...	Max Bot Bar Sp...	Min Bot Bar Sp...	Spacing Incr..	Rebar Options
1	Typical	#5	#5	8	8	8	8	1	Optimize

Soil Definitions

	Label	Subgrade Modulus[lb/ft^3]	Allowable Bearing[psf]	Depth Properties	Default?
1	Default	1e+5	1500	None	Yes

Point Loads and Moments (Cat 1 : DL)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1_1	X	-14.873
2	R3D_N1_1	Y	226.391
3	R3D_N2	X	-2.934
4	R3D_N2	Y	193.742
5	R3D_N132	X	1.256
6	R3D_N132	Y	215.213
7	R3D_N133	X	2.071
8	R3D_N133	Y	229.748
9	R3D_N109	Y	222.602

Point Loads and Moments (Cat 1 : DL) (Continued)

	Label	Direction	Magnitude[lb,lb-ft]
10	R3D_N110A	Y	236.574
11	R3D_N121	Y	237.266
12	R3D_N122	Y	228.968
13	R3D_N132_1	Y	239.047
14	R3D_N134B	Y	229.84
15	R3D_N151	X	13.668
16	R3D_N151	Y	251.294
17	R3D_N152	Y	216.872

Point Loads and Moments (Cat 6 : RLL)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1_1	X	-84.411
2	R3D_N1_1	Y	1091.135
3	R3D_N2	X	-18.066
4	R3D_N2	Y	1025.849
5	R3D_N132	X	7.772
6	R3D_N132	Y	1064.639
7	R3D_N133	X	12.556
8	R3D_N133	Y	1241.336
9	R3D_N109	X	-2.726
10	R3D_N109	Y	1106.755
11	R3D_N110A	X	2.715
12	R3D_N110A	Y	1281.688
13	R3D_N121	X	1.646
14	R3D_N121	Y	1201.13
15	R3D_N122	X	1.233
16	R3D_N122	Y	1233.798
17	R3D_N132_1	Y	1211.074
18	R3D_N134B	X	3.816
19	R3D_N134B	Y	1238.485
20	R3D_N151	X	77.468
21	R3D_N151	Y	1237.33
22	R3D_N152	X	-2.232
23	R3D_N152	Y	1159.625

Point Loads and Moments (Cat 16 : OL1)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1_1	X	93.004
2	R3D_N1_1	Y	-2199.727
3	R3D_N1_1	Z	1247.929
4	R3D_N2	X	17.333
5	R3D_N2	Y	371.868
6	R3D_N2	Z	-63.936
7	R3D_N132	X	-9.185
8	R3D_N132	Y	-2412.491
9	R3D_N132	Z	1540.373
10	R3D_N133	X	-7.915
11	R3D_N133	Y	477.414
12	R3D_N133	Z	-72.997
13	R3D_N109	X	4.194
14	R3D_N109	Y	-2484.289
15	R3D_N109	Z	1583.425
16	R3D_N110A	X	-7.539
17	R3D_N110A	Y	480.018
18	R3D_N110A	Z	-72.352
19	R3D_N121	X	-2.84

Point Loads and Moments (Cat 16 : OL1) (Continued)

	Label	Direction	Magnitude[lb,lb-ft]
20	R3D_N121	Y	-2551.551
21	R3D_N121	Z	1528.332
22	R3D_N122	Y	472.302
23	R3D_N122	Z	-73.406
24	R3D_N132_1	Y	-2523.73
25	R3D_N132_1	Z	1506.635
26	R3D_N134B	X	-5.904
27	R3D_N134B	Y	432.652
28	R3D_N134B	Z	-72.779
29	R3D_N151	X	-85.352
30	R3D_N151	Y	-2492.948
31	R3D_N151	Z	1424.456
32	R3D_N152	X	3.407
33	R3D_N152	Y	425.478
34	R3D_N152	Z	-69.654

Point Loads and Moments (Cat 17 : OL2)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1_1	X	119.204
2	R3D_N1_1	Y	-2449.417
3	R3D_N1_1	Z	1052.774
4	R3D_N2	X	2.15
5	R3D_N2	Y	859.144
6	R3D_N2	Z	-53.816
7	R3D_N132	X	-11.724
8	R3D_N132	Y	-2651.73
9	R3D_N132	Z	1299.266
10	R3D_N133	X	-3.571
11	R3D_N133	Y	1086.929
12	R3D_N133	Z	-61.526
13	R3D_N109	X	5.13
14	R3D_N109	Y	-2721.396
15	R3D_N109	Z	1323.742
16	R3D_N110A	X	-4.201
17	R3D_N110A	Y	1099.081
18	R3D_N110A	Z	-60.654
19	R3D_N121	X	-3.632
20	R3D_N121	Y	-2834.161
21	R3D_N121	Z	1293.145
22	R3D_N122	X	1.095
23	R3D_N122	Y	1076.921
24	R3D_N122	Z	-61.91
25	R3D_N132_1	Y	-2794.814
26	R3D_N132_1	Z	1258.741
27	R3D_N134B	X	-3.974
28	R3D_N134B	Y	1027.011
29	R3D_N134B	Z	-61.035
30	R3D_N151	X	-109.095
31	R3D_N151	Y	-2769.525
32	R3D_N151	Z	1197.371
33	R3D_N152	X	8.488
34	R3D_N152	Y	978.387
35	R3D_N152	Z	-58.494

Point Loads and Moments (Cat 18 : OL3)

Label	Direction	Magnitude[lb,lb-ft]

Point Loads and Moments (Cat 18 : OL3) (Continued)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1_1	X	-111.398
2	R3D_N1_1	Y	2622.346
3	R3D_N1_1	Z	-1476.364
4	R3D_N2	X	-20.087
5	R3D_N2	Y	-458.273
6	R3D_N2	Z	75.636
7	R3D_N132	X	11
8	R3D_N132	Y	2874.824
9	R3D_N132	Z	-1822.334
10	R3D_N133	X	9.259
11	R3D_N133	Y	-587.803
12	R3D_N133	Z	86.357
13	R3D_N109	X	-5.015
14	R3D_N109	Y	2960.071
15	R3D_N109	Z	-1872.868
16	R3D_N110A	X	8.846
17	R3D_N110A	Y	-591.218
18	R3D_N110A	Z	85.583
19	R3D_N121	X	3.402
20	R3D_N121	Y	3041.528
21	R3D_N121	Z	-1808.224
22	R3D_N122	Y	-581.564
23	R3D_N122	Z	86.842
24	R3D_N132_1	Y	3008.082
25	R3D_N132_1	Z	-1782.014
26	R3D_N134B	X	6.951
27	R3D_N134B	Y	-534.103
28	R3D_N134B	Z	86.089
29	R3D_N151	X	102.222
30	R3D_N151	Y	2971.688
31	R3D_N151	Z	-1685.06
32	R3D_N152	X	-4.219
33	R3D_N152	Y	-524.184
34	R3D_N152	Z	82.395

Point Loads and Moments (Cat 19 : OL4)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1_1	X	-60.265
2	R3D_N1_1	Y	1742.507
3	R3D_N1_1	Z	-1277.234
4	R3D_N2	X	-28.431
5	R3D_N2	Y	86.911
6	R3D_N2	Z	65.543
7	R3D_N132	X	5.994
8	R3D_N132	Y	1940.706
9	R3D_N132	Z	-1576.734
10	R3D_N133	X	10.763
11	R3D_N133	Y	97.809
12	R3D_N133	Z	74.759
13	R3D_N109	X	-2.927
14	R3D_N109	Y	2006.394
15	R3D_N109	Z	-1630.948
16	R3D_N110A	X	9.566
17	R3D_N110A	Y	103.679
18	R3D_N110A	Z	74.379
19	R3D_N121	X	1.847

Point Loads and Moments (Cat 19 : OL4) (Continued)

	Label	Direction	Magnitude[lb,lb-ft]
20	R3D_N121	Y	2027.216
21	R3D_N121	Z	-1560.949
22	R3D_N122	Y	98.159
23	R3D_N122	Z	75.143
24	R3D_N132_1	Y	2012.352
25	R3D_N132_1	Z	-1552.543
26	R3D_N134B	X	6.905
27	R3D_N134B	Y	124.631
28	R3D_N134B	Z	74.798
29	R3D_N151	X	55.564
30	R3D_N151	Y	1980.264
31	R3D_N151	Z	-1461.615
32	R3D_N152	X	1.325
33	R3D_N152	Y	95.485
34	R3D_N152	Z	71.519

Point Loads and Moments (Cat 20 : OL5)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1_1	X	-32.29
2	R3D_N1_1	Y	939.993
3	R3D_N1_1	Z	-540.685
4	R3D_N2	X	-7.917
5	R3D_N2	Y	-158.857
6	R3D_N2	Z	25.505
7	R3D_N132	X	3.586
8	R3D_N132	Y	386.946
9	R3D_N132	Z	-256.123
10	R3D_N133	X	1.402
11	R3D_N133	Y	-79.589
12	R3D_N133	Z	12.286
13	R3D_N109	X	1.244
14	R3D_N109	Y	885.25
15	R3D_N109	Z	-561.839
16	R3D_N110A	X	5.49
17	R3D_N110A	Y	-170.878
18	R3D_N110A	Z	24.034
19	R3D_N121	X	3.117
20	R3D_N121	Y	499.339
21	R3D_N121	Z	-300.71
22	R3D_N122	X	2.429
23	R3D_N122	Y	-92.627
24	R3D_N122	Z	16.555
25	R3D_N132_1	X	1.123
26	R3D_N132_1	Y	406.964
27	R3D_N132_1	Z	-241.9
28	R3D_N134B	Y	-66.848
29	R3D_N134B	Z	12.904
30	R3D_N151	X	23.142
31	R3D_N151	Y	425.1
32	R3D_N151	Z	-235.263
33	R3D_N152	X	-1.358
34	R3D_N152	Y	-70.409
35	R3D_N152	Z	11.567

Point Loads and Moments (Cat 21 : OL6)

Label	Direction	Magnitude[lb,lb-ft]

Point Loads and Moments (Cat 21 : OL6) (Continued)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1_1	X	30.771
2	R3D_N1_1	Y	-929.448
3	R3D_N1_1	Z	535.089
4	R3D_N2	X	7.411
5	R3D_N2	Y	156.356
6	R3D_N2	Z	-24.554
7	R3D_N132	X	-3.366
8	R3D_N132	Y	-387.036
9	R3D_N132	Z	255.284
10	R3D_N133	X	-1.272
11	R3D_N133	Y	79.158
12	R3D_N133	Z	-12.23
13	R3D_N109	X	-1.513
14	R3D_N109	Y	-762.573
15	R3D_N109	Z	488.834
16	R3D_N110A	X	-6.39
17	R3D_N110A	Y	149.302
18	R3D_N110A	Z	-21.771
19	R3D_N121	X	-2.431
20	R3D_N121	Y	-467.088
21	R3D_N121	Z	280.235
22	R3D_N122	Y	84.667
23	R3D_N122	Z	-15.411
24	R3D_N132_1	X	-1.095
25	R3D_N132_1	Y	-413.105
26	R3D_N132_1	Z	245.841
27	R3D_N134B	Y	69.231
28	R3D_N134B	Z	-12.714
29	R3D_N151	X	-22.294
30	R3D_N151	Y	-424.007
31	R3D_N151	Z	235.359
32	R3D_N152	X	1.324
33	R3D_N152	Y	70.502
34	R3D_N152	Z	-11.554

Slabs

	Label	Thickness [in]	Material	Local Axis Angle [deg]	Analysis Offset [in]
1	S1	24	Conc2500NW	0	0
2	S2	24	Conc2500NW	0	0
3	S3	24	Conc2500NW	0	0
4	S4	24	Conc2500NW	0	0
5	S5	24	Conc2500NW	0	0
6	S6	24	Conc2500NW	0	0

Load Combinations

	Label	Solve	Service	A..	SF	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	C...	F...	C...	F...
1	1.0 D	Yes	Yes		1.5	DL	1																		
2	1.0 D + 1....	Yes	Yes		1.5	DL	1	RLL	1																
3	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL1	.6														
4	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL2	.6														
5	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL3	.6														
6	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL4	.6														
7	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL5	.6														
8	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL6	.6														
9	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL1	.45														
10	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL2	.45														

Load Combinations (Continued)

	Label	Solve	Service	A..	SF	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	C...	F...	C...	F...
11	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL3	.45														
12	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL4	.45														
13	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL5	.45														
14	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL6	.45														
15	0.6 D + 0....	Yes	Yes			DL	.6	RLL		OL1	.6														
16	0.6 D + 0....	Yes	Yes			DL	.6	RLL		OL2	.6														
17	0.6 D + 0....	Yes	Yes			DL	.6	RLL		OL3	.6														
18	0.6 D + 0....	Yes	Yes			DL	.6	RLL		OL4	.6														
19	0.6 D + 0....	Yes	Yes			DL	.6	RLL		OL5	.6														
20	0.6 D + 0....	Yes	Yes			DL	.6	RLL		OL6	.6														
21																									
22	1.4D	Yes				DL	1.4																		
23	1.2D+1.6SL	Yes				DL	1.2	RLL	1.6																
24	1.2D+1.6S...	Yes				DL	1.2	RLL	1.6	OL1	.5														
25	1.2D+1.6S...	Yes				DL	1.2	RLL	1.6	OL2	.5														
26	1.2D+1.6S...	Yes				DL	1.2	RLL	1.6	OL3	.5														
27	1.2D+1.6S...	Yes				DL	1.2	RLL	1.6	OL4	.5														
28	1.2D+1.6S...	Yes				DL	1.2	RLL	1.6	OL5	.5														
29	1.2D+1.6S...	Yes				DL	1.2	RLL	1.6	OL6	.5														
30	1.2D+1.0...	Yes				DL	1.2			OL1	1														
31	1.2D-1.0Wx	Yes				DL	1.2			OL2	1														
32	1.2D+1.0...	Yes				DL	1.2			OL3	1														
33	1.2D-1.0Wz	Yes				DL	1.2			OL4	1														
34	1.2D+1.0...	Yes				DL	1.2			OL5	1														
35	1.2D-1.0...	Yes				DL	1.2			OL6	1														
36	.9D+1.0Wx	Yes				DL	.9			OL1	1														
37	.9D-1.0Wx	Yes				DL	.9			OL2	1														
38	.9D+1.0Wz	Yes				DL	.9			OL3	1														
39	.9D-1.0Wz	Yes				DL	.9			OL4	1														
40	.9D+1.0W...	Yes				DL	.9			OL5	1														
41	.9D-1.0W90	Yes				DL	.9			OL6	1														

Design Strips

	Label	Rebar Angle from Pl...	No. of Design Cuts	Design Rule
1	DS1	0	50	Typical
2	DS2	90	50	Typical

Load Categories

	Category	Point Loads	Line Loads	Area Loads
1	DL	17		
2	RLL	23		
3	OL1	34		
4	OL2	35		
5	OL3	34		
6	OL4	34		
7	OL5	35		
8	OL6	34		

Strip Reinforcing

	Label	UC Top	LC	Top Bars	Governing ...	UC Bot	LC	Bot B...	Gover...	UC Shear	LC	Governing ...
1	DS1	.022	26	#5@8in	DS1-X26	.022	37	#5@8in	DS1-...	.044	26	DS1-X15
2	DS2	0	36	#5@8in	DS2-X25	.003	26	#5@8in	DS2-...	.008	26	DS2-X34

Slab Overturning Safety Factors

	LC	Slab	Angle[deg]	Mo-xx[lb-ft]	Ms-xx[lb-ft]	Mo-zz[lb-ft]	Ms-zz[lb-ft]	Ms-xx/Mo-xx	Ms-zz/Mo-zz
1	1	S1	0	0	29525.039	0	6110.757	9.999+	9.999+
2	1	S2	0	0	29872.407	0	6114.186	9.999+	9.999+
3	1	S3	0	0	29832.874	0	6121.243	9.999+	9.999+
4	1	S4	0	0	29842.889	0	6123.897	9.999+	9.999+
5	1	S5	0	0	29804.39	0	6093.317	9.999+	9.999+
6	1	S6	0	0	29755.295	0	6095.839	9.999+	9.999+
7	2	S1	0	0	39715.91	0	8432.694	9.999+	9.999+
8	2	S2	0	0	42198.686	0	8502.65	9.999+	9.999+
9	2	S3	0	0	41913.489	0	8550.415	9.999+	9.999+
10	2	S4	0	0	41977.916	0	8565.824	9.999+	9.999+
11	2	S5	0	0	41731.084	0	8358.637	9.999+	9.999+
12	2	S6	0	0	41281.3	0	8342.322	9.999+	9.999+
13	3	S1	0	11864.792	29707.7	1229.12	6110.757	2.504	4.972
14	3	S2	0	13554.312	29741.004	1206.577	6114.186	2.194	5.067
15	3	S3	0	13823.463	29849.351	1250.957	6121.243	2.159	4.893
16	3	S4	0	13697.546	29865.205	1261.732	6123.897	2.18	4.854
17	3	S5	0	13152.406	29670.42	1181.566	6106.623	2.256	5.168
18	3	S6	0	13458.303	29945.771	1338.816	6150.512	2.225	4.594
19	4	S1	0	12427.682	29707.7	1099.788	6110.757	2.39	5.556
20	4	S2	0	13861.391	29741.004	974.503	6114.186	2.146	6.274
21	4	S3	0	14395.663	29849.351	1057.389	6121.243	2.073	5.789
22	4	S4	0	14207.546	29865.205	1065.451	6123.897	2.102	5.748
23	4	S5	0	13500.548	29670.42	957.234	6106.623	2.198	6.379
24	4	S6	0	14056.797	29945.771	1195.411	6150.512	2.13	5.145
25	5	S1	0	1458.101	29525.039	0	7566.984	9.999+	9.999+
26	5	S2	0	2259.209	29872.407	0	7530.9	9.999+	9.999+
27	5	S3	0	2054.955	29832.874	0	7593.14	9.999+	9.999+
28	5	S4	0	1821.248	29842.889	0	7599.943	9.999+	9.999+
29	5	S5	0	2261.722	29804.39	0	7441.219	9.999+	9.999+
30	5	S6	0	1694.813	29755.295	0	7446.737	9.999+	9.999+
31	6	S1	0	0	30156.594	0	7314.843	9.999+	9.999+
32	6	S2	0	0	30423.802	0	7372.262	9.999+	9.999+
33	6	S3	0	0	30461.646	0	7394.252	9.999+	9.999+
34	6	S4	0	0	30598.249	0	7397.8	9.999+	9.999+
35	6	S5	0	0	30329.842	0	7296.318	9.999+	9.999+
36	6	S6	0	0	30441.074	0	7273.022	9.999+	9.999+
37	7	S1	0	511.568	29525.039	0	6627.688	9.999+	9.999+
38	7	S2	0	650.226	29872.407	0	6534.729	9.999+	9.999+
39	7	S3	0	325.12	29832.874	0	6358.615	9.999+	9.999+
40	7	S4	0	219.08	29842.889	0	6326.618	9.999+	9.999+
41	7	S5	0	318.974	29804.39	0	6271.746	9.999+	9.999+
42	7	S6	0	213.118	29755.295	0	6282.513	9.999+	9.999+
43	8	S1	0	5026.226	29707.7	509.674	6110.757	5.911	9.999+
44	8	S2	0	4162.72	29741.004	377.447	6114.186	7.145	9.999+
45	8	S3	0	2530.324	29849.351	232.37	6121.243	9.999+	9.999+
46	8	S4	0	2241.664	29865.205	207.639	6123.897	9.999+	9.999+
47	8	S5	0	2116.905	29670.42	190.292	6106.623	9.999+	9.999+
48	8	S6	0	2282.753	29945.771	237.268	6150.512	9.999+	9.999+
49	9	S1	0	8898.594	37545.012	921.84	7852.21	4.219	8.518
50	9	S2	0	10165.734	37961.814	904.933	7905.502	3.734	8.736
51	9	S3	0	10367.597	38594.336	938.218	7951.758	3.723	8.475
52	9	S4	0	10273.159	38676.37	946.299	7966.791	3.765	8.419
53	9	S5	0	9864.305	37587.876	886.174	7866.597	3.81	8.877
54	9	S6	0	10093.727	38829.035	1004.112	8061.084	3.847	8.028
55	10	S1	0	9320.761	37545.012	824.841	7852.21	4.028	9.52
56	10	S2	0	10396.043	37961.814	730.878	7905.534	3.652	9.999+
57	10	S3	0	10796.748	38594.336	793.042	7951.758	3.575	9.999+

Slab Overturning Safety Factors (Continued)

	LC	Slab	Angle[deg]	Mo-xx[lb-ft]	Ms-xx[lb-ft]	Mo-zz[lb-ft]	Ms-zz[lb-ft]	Ms-xx/Mo-xx	Ms-zz/Mo-zz
58	10	S4	0	10655.66	38676.37	799.088	7966.791	3.63	9.97
59	10	S5	0	10125.411	37587.876	717.925	7866.597	3.712	9.999+
60	10	S6	0	10542.598	38829.035	896.558	8061.084	3.683	8.991
61	11	S1	0	1093.576	37168.192	0	8944.38	9.999+	9.999+
62	11	S2	0	1694.407	39117.116	0	8968.07	9.999+	9.999+
63	11	S3	0	1541.216	38893.335	0	9047.045	9.999+	9.999+
64	11	S4	0	1365.936	38944.159	0	9062.377	9.999+	9.999+
65	11	S5	0	1696.291	38749.411	0	8803.233	9.999+	9.999+
66	11	S6	0	1271.11	38399.799	0	8793.875	9.999+	9.999+
67	12	S1	0	0	37641.859	0	8755.274	9.999+	9.999+
68	12	S2	0	0	39530.663	0	8849.092	9.999+	9.999+
69	12	S3	0	0	39364.914	0	8897.879	9.999+	9.999+
70	12	S4	0	0	39510.679	0	8910.77	9.999+	9.999+
71	12	S5	0	0	39143.5	0	8694.558	9.999+	9.999+
72	12	S6	0	0	38914.133	0	8663.588	9.999+	9.999+
73	13	S1	0	383.676	37168.192	0	8239.908	9.999+	9.999+
74	13	S2	0	487.669	39117.116	0	8220.941	9.999+	9.999+
75	13	S3	0	243.84	38893.335	0	8121.151	9.999+	9.999+
76	13	S4	0	164.31	38944.159	0	8107.383	9.999+	9.999+
77	13	S5	0	239.23	38749.411	0	7926.128	9.999+	9.999+
78	13	S6	0	159.838	38399.799	0	7920.706	9.999+	9.999+
79	14	S1	0	3769.669	37545.012	382.256	7852.21	9.96	9.999+
80	14	S2	0	3122.04	37961.814	283.085	7905.502	9.999+	9.999+
81	14	S3	0	1897.743	38594.336	174.278	7951.758	9.999+	9.999+
82	14	S4	0	1681.248	38676.37	155.729	7966.791	9.999+	9.999+
83	14	S5	0	1587.679	37587.876	142.719	7866.597	9.999+	9.999+
84	14	S6	0	1712.065	38829.035	177.951	8061.084	9.999+	9.999+
85	15	S1	0	11864.792	17824.62	1229.12	3666.454	1.502	2.983
86	15	S2	0	13554.312	17844.603	1206.577	3668.511	1.317	3.04
87	15	S3	0	13823.463	17909.611	1250.957	3672.746	1.296	2.936
88	15	S4	0	13697.546	17919.123	1261.732	3674.338	1.308	2.912
89	15	S5	0	13152.406	17802.252	1181.566	3663.974	1.354	3.101
90	15	S6	0	13458.303	17967.462	1338.816	3690.307	1.335	2.756
91	16	S1	0	12427.682	17824.62	1099.788	3666.454	1.434	3.334
92	16	S2	0	13861.391	17844.603	974.503	3668.511	1.287	3.764
93	16	S3	0	14395.663	17909.611	1057.389	3672.746	1.244	3.473
94	16	S4	0	14207.546	17919.123	1065.451	3674.338	1.261	3.449
95	16	S5	0	13500.548	17802.252	957.234	3663.974	1.319	3.828
96	16	S6	0	14056.797	17967.462	1195.411	3690.307	1.278	3.087
97	17	S1	0	1458.101	17715.023	0	5122.681	9.999+	9.999+
98	17	S2	0	2259.209	17923.444	0	5085.226	7.934	9.999+
99	17	S3	0	2054.955	17899.724	0	5144.643	8.711	9.999+
100	17	S4	0	1821.248	17905.733	0	5150.384	9.832	9.999+
101	17	S5	0	2261.722	17882.634	0	5003.892	7.907	9.999+
102	17	S6	0	1694.813	17853.177	0	5008.402	9.999+	9.999+
103	18	S1	0	0	18346.579	0	4870.54	9.999+	9.999+
104	18	S2	0	0	18474.839	0	4926.588	9.999+	9.999+
105	18	S3	0	0	18528.496	0	4945.755	9.999+	9.999+
106	18	S4	0	0	18661.094	0	4948.242	9.999+	9.999+
107	18	S5	0	0	18408.086	0	4858.991	9.999+	9.999+
108	18	S6	0	0	18538.956	0	4834.686	9.999+	9.999+
109	19	S1	0	511.568	17715.023	0	4183.385	9.999+	9.999+
110	19	S2	0	650.226	17923.444	0	4089.054	9.999+	9.999+
111	19	S3	0	325.12	17899.724	0	3910.118	9.999+	9.999+
112	19	S4	0	219.08	17905.733	0	3877.06	9.999+	9.999+
113	19	S5	0	318.974	17882.634	0	3834.419	9.999+	9.999+
114	19	S6	0	213.118	17853.177	0	3844.177	9.999+	9.999+

Slab Overturning Safety Factors (Continued)

	LC	Slab	Angle[deg]	Mo-xx[lb-ft]	Ms-xx[lb-ft]	Mo-zz[lb-ft]	Ms-zz[lb-ft]	Ms-xx/Mo-xx	Ms-zz/Mo-zz
115	20	S1	0	5026.226	17824.62	509.674	3666.454	3.546	7.194
116	20	S2	0	4162.72	17844.603	377.447	3668.511	4.287	9.719
117	20	S3	0	2530.324	17909.611	232.37	3672.746	7.078	9.999+
118	20	S4	0	2241.664	17919.123	207.639	3674.338	7.994	9.999+
119	20	S5	0	2116.905	17802.252	190.292	3663.974	8.41	9.999+
120	20	S6	0	2282.753	17967.462	237.268	3690.307	7.871	9.999+

Slab Sliding Safety Factors

	LC	Slab	Angle[deg]	Va-xx[lb]	Vr-xx[lb]	Va-zz[lb]	Vr-zz[lb]	SR-xx	SR-zz
1	1	S1	0	17.807	1822.543	0	1822.543	9.999+	9.999+
2	1	S2	0	0	1834.256	0	1834.256	9.999+	9.999+
3	1	S3	0	0	1836.373	0	1836.373	9.999+	9.999+
4	1	S4	0	0	1837.169	0	1837.169	9.999+	9.999+
5	1	S5	0	3.326	1829.991	0	1829.991	9.999+	9.999+
6	1	S6	0	13.668	1836.953	0	1836.953	9.999+	9.999+
7	2	S1	0	120.284	2457.638	0	2457.638	9.999+	9.999+
8	2	S2	0	.011	2550.789	0	2550.789	9.999+	9.999+
9	2	S3	0	2.879	2566.852	0	2566.852	9.999+	9.999+
10	2	S4	0	3.816	2572.037	0	2572.037	9.999+	9.999+
11	2	S5	0	23.654	2521.784	0	2521.784	9.999+	9.999+
12	2	S6	0	88.905	2556.039	0	2556.039	9.999+	9.999+
13	3	S1	0	48.395	1493.528	710.395	1493.528	9.999+	2.102
14	3	S2	0	2.007	1473.487	906.644	1473.487	9.999+	1.625
15	3	S3	0	1.704	1462.108	872.956	1462.108	9.999+	1.675
16	3	S4	0	3.542	1460.775	860.314	1460.775	9.999+	1.698
17	3	S5	0	6.934	1481.677	880.426	1481.677	9.999+	1.683
18	3	S6	0	35.499	1464.808	812.881	1464.808	9.999+	1.802
19	4	S1	0	55.005	1536.294	599.375	1536.294	9.999+	2.563
20	4	S2	0	.557	1542.239	757.853	1542.239	9.999+	2.035
21	4	S3	0	1.523	1520.07	738.741	1520.07	9.999+	2.058
22	4	S4	0	2.385	1518.964	718.624	1518.964	9.999+	2.114
23	4	S5	0	5.85	1548.327	742.644	1548.327	9.999+	2.085
24	4	S6	0	46.696	1514.548	683.326	1514.548	9.999+	2.216
25	5	S1	0	96.699	2212.076	840.437	2212.076	9.999+	2.632
26	5	S2	0	2.299	2260.649	1072.371	2260.649	9.999+	2.108
27	5	S3	0	2.041	2279.167	1032.829	2279.167	9.999+	2.207
28	5	S4	0	4.171	2282.485	1017.555	2282.485	9.999+	2.243
29	5	S5	0	15.482	2241.655	1041.586	2241.655	9.999+	2.152
30	5	S6	0	72.47	2277.503	961.599	2277.503	9.999+	2.368
31	6	S1	0	71.025	2151.838	727.015	2151.838	9.999+	2.96
32	6	S2	0	3.983	2214.069	933.941	2214.069	9.999+	2.371
33	6	S3	0	1.108	2218.941	891.483	2218.941	9.999+	2.489
34	6	S4	0	4.143	2221.826	886.647	2221.826	9.999+	2.506
35	6	S5	0	13.38	2196.924	901.185	2196.924	9.999+	2.438
36	6	S6	0	47.802	2210.587	834.058	2210.587	9.999+	2.65
37	7	S1	0	41.932	1963.147	309.108	1963.147	9.999+	6.351
38	7	S2	0	4.04	1962.843	322.683	1962.843	9.999+	6.083
39	7	S3	0	3.328	1909.581	170.493	1909.581	9.999+	9.999+
40	7	S4	0	.674	1898.39	137.398	1898.39	9.999+	9.999+
41	7	S5	0	6.319	1885.315	146.303	1885.315	9.999+	9.999+
42	7	S6	0	26.738	1900.797	134.217	1900.797	9.999+	9.999+
43	8	S1	0	5.102	1683.386	306.321	1683.386	9.999+	5.495
44	8	S2	0	4.742	1723.867	280.237	1723.867	9.999+	6.151
45	8	S3	0	1.459	1767.537	158.894	1767.537	9.999+	9.999+
46	8	S4	0	.657	1775.272	139.876	1775.272	9.999+	9.999+
47	8	S5	0	.544	1774.573	145.832	1774.573	9.999+	9.999+

Slab Sliding Safety Factors (Continued)

	LC	Slab	Angle[deg]	Va-xx[lb]	Vr-xx[lb]	Va-zz[lb]	Vr-zz[lb]	SR-xx	SR-zz
48	8	S6	0	1.086	1773.322	134.283	1773.322	9.999+	9.999+
49	9	S1	0	45.013	2052.103	532.796	2052.103	9.999+	3.852
50	9	S2	0	1.513	2101.079	679.983	2101.079	9.999+	3.09
51	9	S3	0	.881	2103.533	654.717	2103.533	9.999+	3.213
52	9	S4	0	.205	2106.024	645.235	2106.024	9.999+	3.264
53	9	S5	0	10.877	2087.6	660.319	2087.6	9.999+	3.162
54	9	S6	0	33.22	2097.159	609.661	2097.159	9.999+	3.44
55	10	S1	0	40.056	2084.177	449.531	2084.177	9.999+	4.636
56	10	S2	0	.41	2152.643	568.39	2152.643	9.999+	3.787
57	10	S3	0	1.017	2147.005	554.056	2147.005	9.999+	3.875
58	10	S4	0	1.074	2149.666	538.968	2149.666	9.999+	3.988
59	10	S5	0	11.69	2137.588	556.983	2137.588	9.999+	3.838
60	10	S6	0	24.822	2134.464	512.494	2134.464	9.999+	4.165
61	11	S1	0	153.834	2591.014	630.328	2591.014	9.999+	4.111
62	11	S2	0	1.716	2691.451	804.278	2691.451	9.999+	3.346
63	11	S3	0	3.69	2716.327	774.622	2716.327	9.999+	3.507
64	11	S4	0	5.99	2722.307	763.166	2722.307	9.999+	3.567
65	11	S5	0	27.689	2657.583	781.189	2657.583	9.999+	3.402
66	11	S6	0	114.197	2706.681	721.199	2706.681	9.999+	3.753
67	12	S1	0	134.578	2545.835	545.261	2545.835	9.999+	4.669
68	12	S2	0	2.979	2656.515	700.456	2656.515	9.999+	3.793
69	12	S3	0	2.99	2671.158	668.613	2671.158	9.999+	3.995
70	12	S4	0	5.97	2676.813	664.985	2676.813	9.999+	4.025
71	12	S5	0	26.113	2624.035	675.889	2624.035	9.999+	3.882
72	12	S6	0	95.696	2656.494	625.543	2656.494	9.999+	4.247
73	13	S1	0	112.759	2404.317	231.831	2404.317	9.999+	9.999+
74	13	S2	0	3.022	2468.096	242.012	2468.096	9.999+	9.999+
75	13	S3	0	4.655	2439.138	127.87	2439.138	9.999+	9.999+
76	13	S4	0	3.368	2434.235	103.049	2434.235	9.999+	9.999+
77	13	S5	0	20.817	2390.329	109.727	2390.329	9.999+	9.999+
78	13	S6	0	79.898	2424.151	100.663	2424.151	9.999+	9.999+
79	14	S1	0	77.483	2194.496	229.741	2194.496	9.999+	9.552
80	14	S2	0	3.565	2288.864	210.178	2288.864	9.999+	9.999+
81	14	S3	0	1.065	2332.605	119.17	2332.605	9.999+	9.999+
82	14	S4	0	2.369	2341.897	104.907	2341.897	9.999+	9.999+
83	14	S5	0	16.486	2307.272	109.374	2307.272	9.999+	9.999+
84	14	S6	0	60.659	2328.545	100.712	2328.545	9.999+	9.999+
85	15	S1	0	55.518	764.511	710.395	764.511	9.999+	1.076
86	15	S2	0	2.007	739.785	906.644	739.785	9.999+	.816
87	15	S3	0	1.704	727.559	872.956	727.559	9.999+	.833
88	15	S4	0	3.542	725.907	860.314	725.907	9.999+	.844
89	15	S5	0	8.264	749.681	880.426	749.681	9.999+	.851
90	15	S6	0	40.966	730.027	812.881	730.027	9.999+	.898
91	16	S1	0	62.128	807.277	599.375	807.277	9.999+	1.347
92	16	S2	0	.557	808.537	757.853	808.537	9.999+	1.067
93	16	S3	0	1.523	785.521	738.741	785.521	9.999+	1.063
94	16	S4	0	2.385	784.097	718.624	784.097	9.999+	1.091
95	16	S5	0	7.181	816.331	742.644	816.331	9.999+	1.099
96	16	S6	0	52.163	779.767	683.326	779.767	9.999+	1.141
97	17	S1	0	89.576	1483.059	840.437	1483.059	9.999+	1.765
98	17	S2	0	2.299	1526.947	1072.371	1526.947	9.999+	1.424
99	17	S3	0	2.041	1544.617	1032.829	1544.617	9.999+	1.496
100	17	S4	0	4.171	1547.618	1017.555	1547.618	9.999+	1.521
101	17	S5	0	14.151	1509.658	1041.586	1509.658	9.999+	1.449
102	17	S6	0	67.003	1542.722	961.599	1542.722	9.999+	1.604
103	18	S1	0	63.902	1422.821	727.015	1422.821	9.999+	1.957
104	18	S2	0	3.983	1480.366	933.941	1480.366	9.999+	1.585

Slab Sliding Safety Factors (Continued)

	LC	Slab	Angle[deg]	Va-xx[lb]	Vr-xx[lb]	Va-zz[lb]	Vr-zz[lb]	SR-xx	SR-zz
105	18	S3	0	1.108	1484.391	891.483	1484.391	9.999+	1.665
106	18	S4	0	4.143	1486.958	886.647	1486.958	9.999+	1.677
107	18	S5	0	12.05	1464.927	901.185	1464.927	9.999+	1.626
108	18	S6	0	42.334	1475.806	834.058	1475.806	9.999+	1.769
109	19	S1	0	34.809	1234.13	309.108	1234.13	9.999+	3.993
110	19	S2	0	4.04	1229.14	322.683	1229.14	9.999+	3.809
111	19	S3	0	3.328	1175.032	170.493	1175.032	9.999+	6.892
112	19	S4	0	.674	1163.522	137.398	1163.522	9.999+	8.468
113	19	S5	0	4.989	1153.319	146.303	1153.319	9.999+	7.883
114	19	S6	0	21.271	1166.016	134.217	1166.016	9.999+	8.688
115	20	S1	0	12.225	954.369	306.321	954.369	9.999+	3.116
116	20	S2	0	4.742	990.165	280.237	990.165	9.999+	3.533
117	20	S3	0	1.459	1032.988	158.894	1032.988	9.999+	6.501
118	20	S4	0	.657	1040.404	139.876	1040.404	9.999+	7.438
119	20	S5	0	.787	1042.576	145.832	1042.576	9.999+	7.149
120	20	S6	0	4.382	1038.541	134.283	1038.541	9.999+	7.734

Envelope Slab Soil Pressures

	Label	UC	LC	Soil Pressure[psf]	Allowable Bearing[psf]	Point
1	S1	.394	11	591.353	1500	N1
2	S2	.404	11	606.659	1500	N18
3	S3	.418	11	627.454	1500	N22
4	S4	.417	11	625.205	1500	N27
5	S5	.398	11	596.671	1500	N31
6	S6	.421	11	631.159	1500	N35

Company:		Date:	5/14/2018
Engineer:		Page:	1/6
Project:			
Address:			
Phone:			
E-mail:			

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-14
Units: Imperial units

Anchor Information:
Anchor type: Bonded anchor
Material: F1554 Grade 36
Diameter (inch): 0.375
Effective Embedment depth, h_{ef} (inch): 4.000
Code report: ICC-ES ESR-4057
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 5.25
c_{ac} (inch): 7.12
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 30.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Periodic
Temperature range, Short/Long: 150/110°F
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 4.75 x 4.75 x 0.31

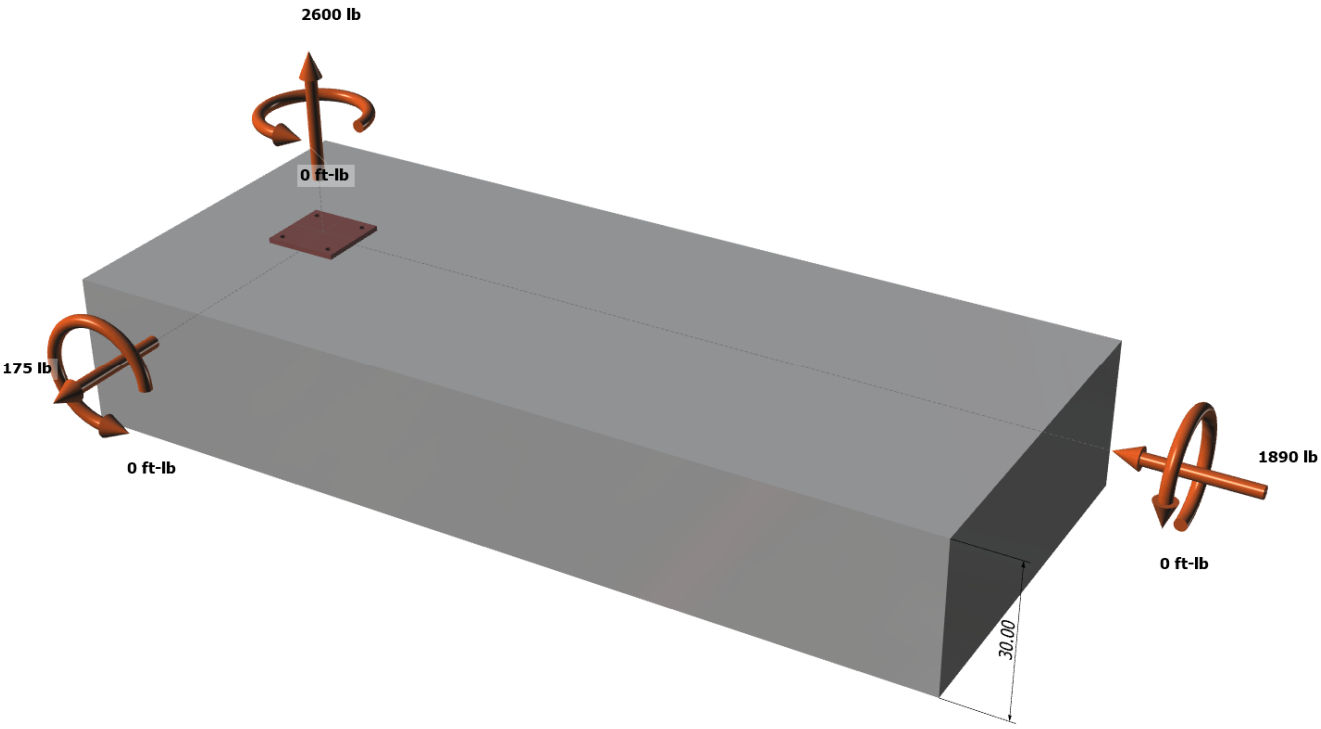
Recommended Anchor
Anchor Name: SET-3G - SET-3G w/ 3/8"Ø F1554 Gr. 36
Code Report: ICC-ES ESR-4057

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: No
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

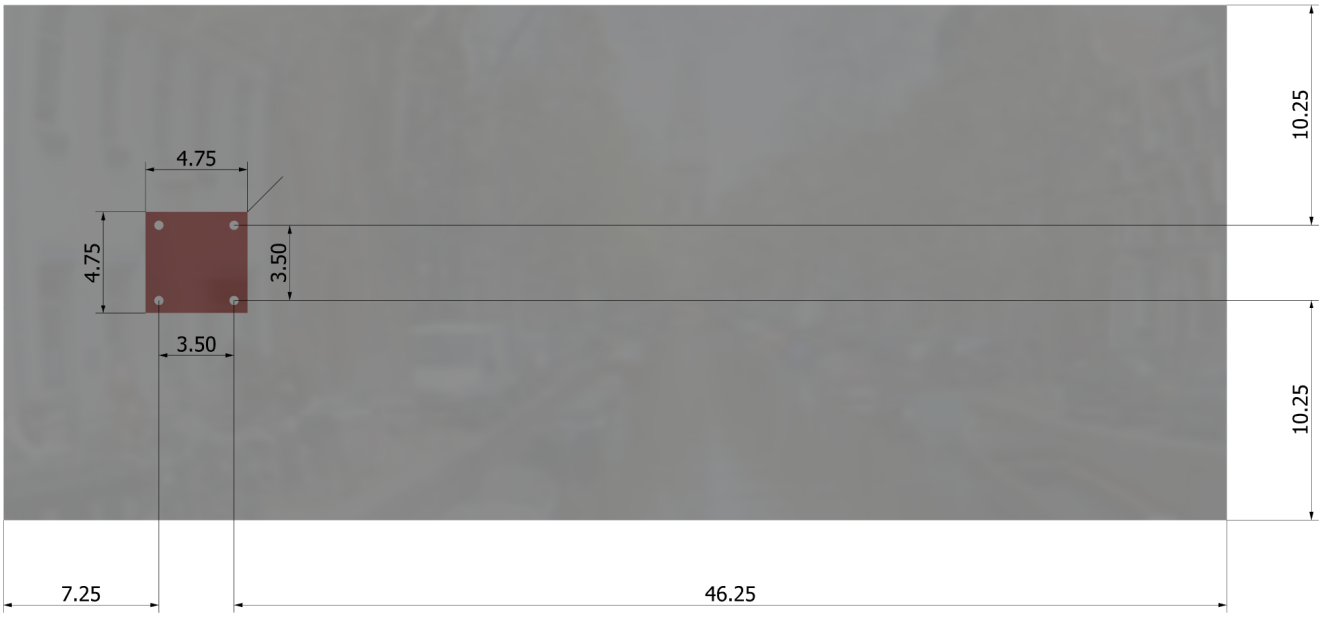
Strength level loads:

N_{ua} [lb]: 2600
V_{uax} [lb]: 175
V_{uay} [lb]: -1890
M_{ux} [ft-lb]: 0
M_{uy} [ft-lb]: 0
M_{uz} [ft-lb]: 0

<Figure 1>



<Figure 2>

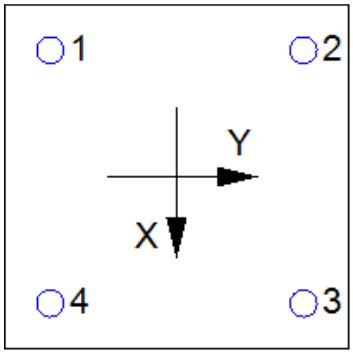


3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	650.0	43.7	-472.5	474.5
2	650.0	43.7	-472.5	474.5
3	650.0	43.7	-472.5	474.5
4	650.0	43.7	-472.5	474.5
Sum	2600.0	175.0	-1890.0	1898.1

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 2600
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
4525	0.75	3394

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. 17.4.2.2a)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	2500	4.000	6800

$\phi N_{cbg} = \phi (A_{Nc} / A_{Nco}) \Psi_{ec,N} \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.4.2.1b)

A_{Nc} (in²)	A_{Nco} (in²)	$c_{a,min}$ (in)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
240.25	144.00	7.25	1.000	1.000	1.00	1.000	6800	0.65	7374

6. Adhesive Strength of Anchor in Tension (Sec. 17.4.5)

$\tau_{k,cr} = \tau_{k,cr} f_{short\text{-}term} K_{sat} (f'_c / 2{,}500)^n$

$\tau_{k,cr}$ (psi)	$f_{short\text{-}term}$	K_{sat}	f'_c (psi)	n	$\tau_{k,cr}$ (psi)
1346	1.00	1.00	2500	0.24	1346

$N_{ba} = \lambda_a \tau_{cr} \pi d_a h_{ef}$ (Eq. 17.4.5.2)

λ_a	τ_{cr} (psi)	d_a (in)	h_{ef} (in)	N_{ba} (lb)
1.00	1346	0.38	4.000	6343

$\phi N_{ag} = \phi (A_{Na} / A_{Na0}) \Psi_{ec,Na} \Psi_{ed,Na} \Psi_{cp,Na} N_{ba}$ (Sec. 17.3.1 & Eq. 17.4.5.1b)

A_{Na} (in²)	A_{Na0} (in²)	c_{Na} (in)	$c_{a,min}$ (in)	$\Psi_{ec,Na}$	$\Psi_{ed,Na}$	$\Psi_{cp,Na}$	N_{ba}(lb)	ϕ	ϕN_{ag} (lb)
198.45	112.09	5.29	7.25	1.000	1.000	1.000	6343	0.55	6176

8. Steel Strength of Anchor in Shear (Sec. 17.5.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
2715	1.0	0.65	1765

9. Concrete Breakout Strength of Anchor in Shear (Sec. 17.5.2)

Shear perpendicular to edge in x-direction:

$V_{bx} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5};\ 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
3.00	0.375	1.00	2500	13.75	16564

$\phi V_{cbgx} = \phi\,(A_{Vc} / A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. 17.3.1 & Eq. 17.5.2.1b)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
647.11	850.78	1.000	0.805	1.000	1.000	16564	0.70	7103

Shear perpendicular to edge in y-direction:

$V_{by} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5};\ 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
3.00	0.375	1.00	2500	10.75	11450

$\phi V_{cbgy} = \phi\,(A_{Vc} / A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. 17.3.1 & Eq. 17.5.2.1b)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbgy} (lb)
387.00	520.03	1.000	0.891	1.000	1.000	11450	0.70	5313

Shear parallel to edge in x-direction:

$V_{by} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5};\ 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
3.00	0.375	1.00	2500	7.25	6342

$\phi V_{cbgx} = \phi\,(2)(A_{Vc} / A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. 17.3.1, 17.5.2.1(c) & Eq. 17.5.2.1b)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbgx} (lb)
261.00	236.53	1.000	1.000	1.000	1.000	6342	0.70	9797

Shear parallel to edge in y-direction:

$V_{bx} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5};\ 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
3.00	0.375	1.00	2500	10.25	10661

$\phi V_{cbgy} = \phi\,(2)(A_{Vc} / A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. 17.3.1, 17.5.2.1(c) & Eq. 17.5.2.1b)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgy} (lb)
401.67	472.78	1.000	1.000	1.000	1.000	10661	0.70	12680

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.5.3)

$\phi V_{cpg} = \phi \min|k_{cp}N_{ag};\ k_{cp}N_{cbg}| = \phi \min|k_{cp}(A_{Na} / A_{Na0})\,\Psi_{ec,Na}\Psi_{ed,Na}\Psi_{cp,Na}N_{ba};\ k_{cp}(A_{Nc} / A_{Nco})\,\Psi_{ec,N}\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b|$ (Sec. 17.3.1 & Eq. 17.5.3.1b)

k_{cp}	A_{Na} (in²)	A_{Na0} (in²)	$\Psi_{ed,Na}$	$\Psi_{ec,Na}$	$\Psi_{cp,Na}$	N_{ba} (lb)	N_a (lb)
2.0	198.45	112.09	1.000	1.000	1.000	6343	11230

A_{Nc} (in²)	A_{Nco} (in²)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ
240.25	144.00	1.000	1.000	1.000	1.000	6800	11345	0.70

ϕV_{cpg} (lb)
15722

11. Results

Interaction of Tensile and Shear Forces (Sec. 17.6.)

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	650	3394	0.19	Pass
Concrete breakout	2600	7374	0.35	Pass
Adhesive	**2600**	**6176**	**0.42**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	475	1765	0.27	Pass
T Concrete breakout x+	175	7103	0.02	Pass
T Concrete breakout y-	1890	5313	0.36	Pass
|| Concrete breakout y-	87	9797	0.01	Pass
|| Concrete breakout x-	945	12680	0.07	Pass
Concrete breakout, combined	**-**	**-**	**0.36**	**Pass (Governs)**
Pryout	1898	15722	0.12	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. 17.6..1	0.42	0.00	42.1%	1.0	Pass

SET-3G w/ 3/8"Ø F1554 Gr. 36 with hef = 4.000 inch meets the selected design criteria.

12. Warnings

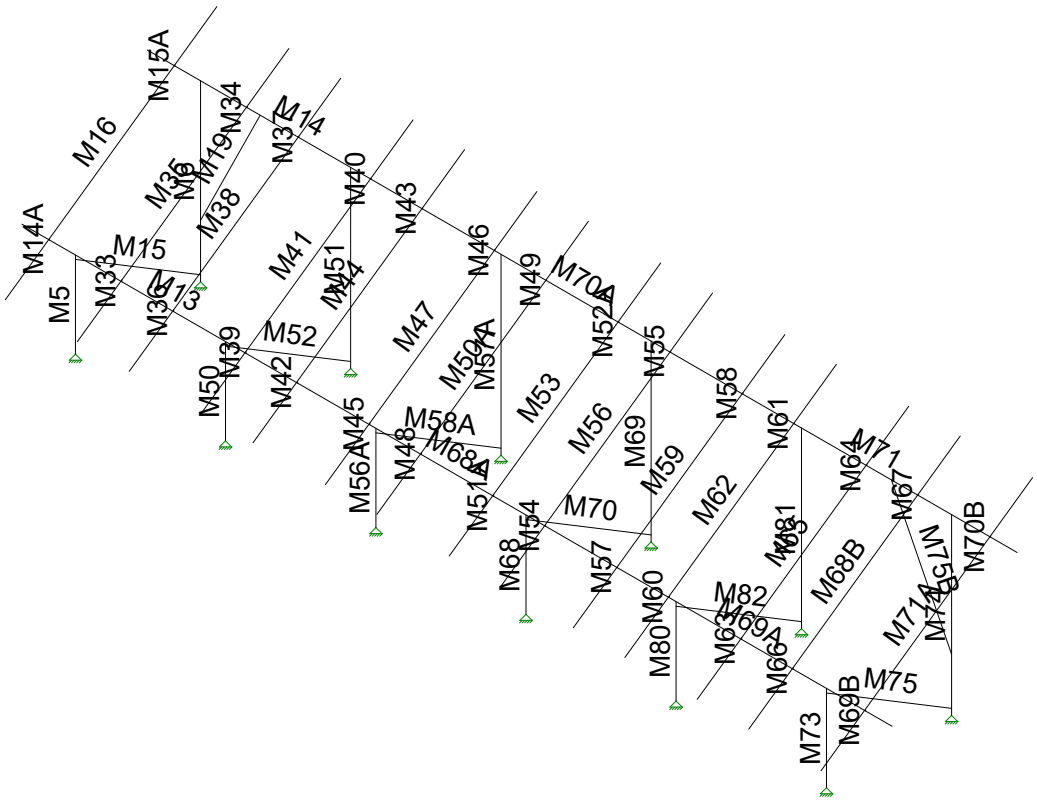
- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

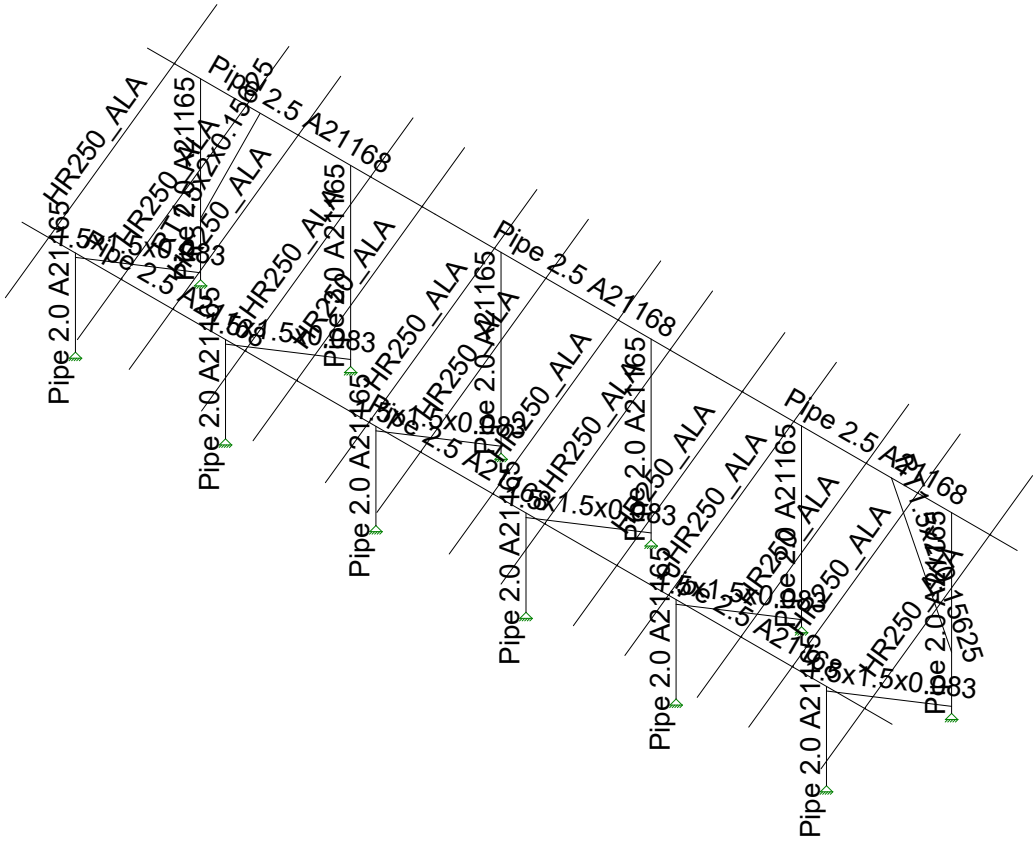
JOB NO.: U2716-070-181 **DESIGNED:** STB

PROJECT: Ground Mount Package for Ontario Canada

Framing Analysis



Vector Structural Engineeri...		SK - 5
STB	Ground Mount	July 31, 2019 at 4:26 PM
U2716.113.191		New England A4.r3d



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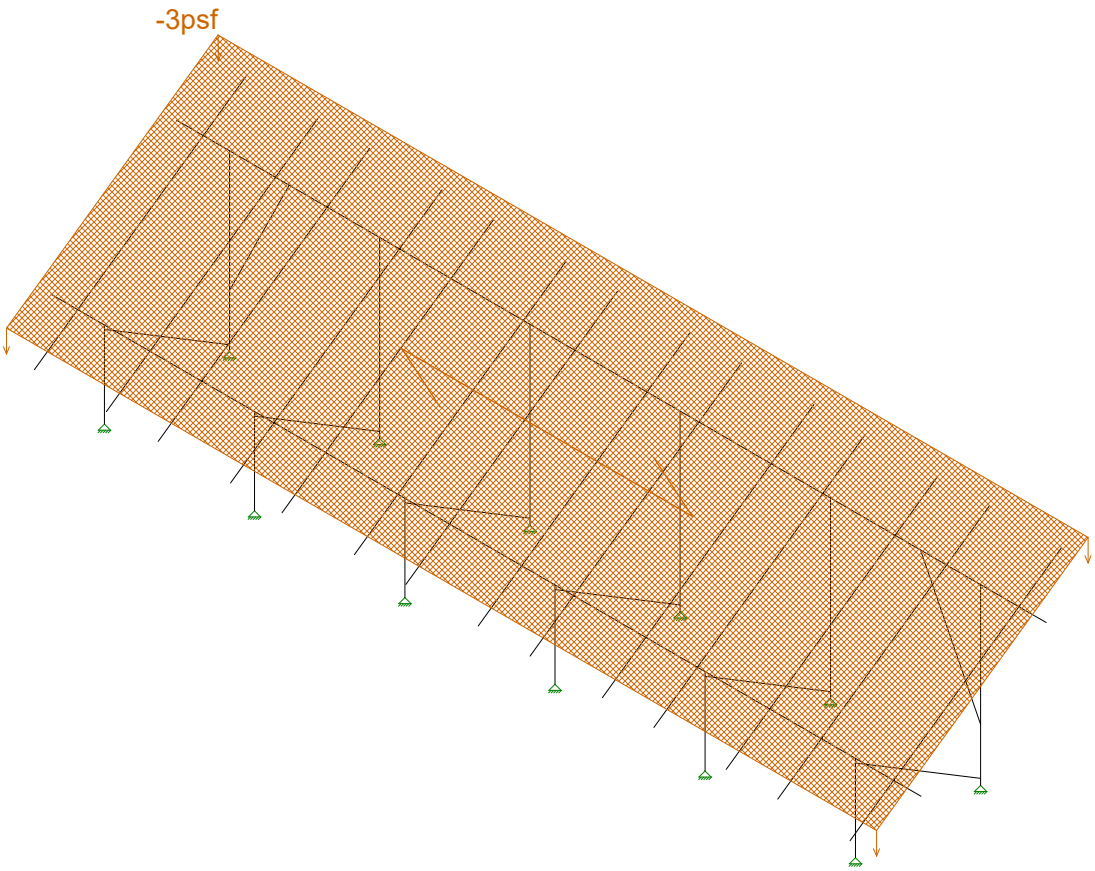
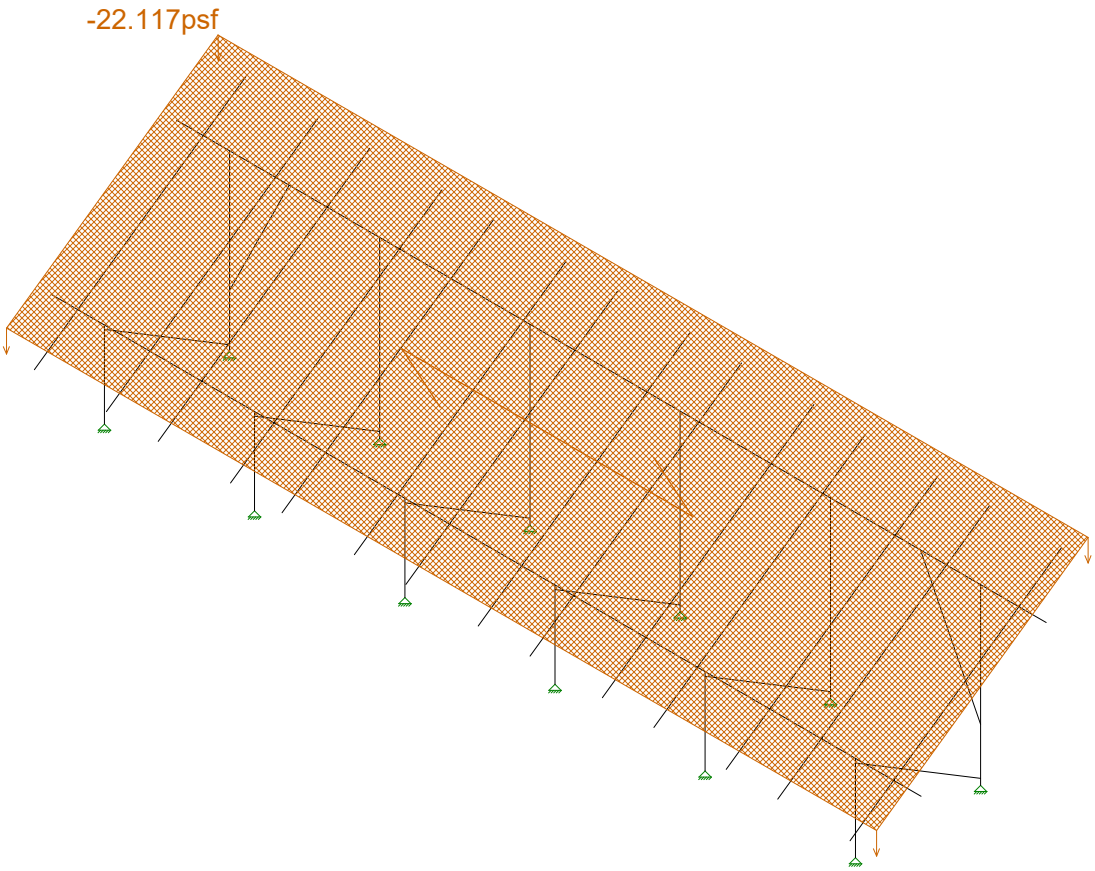


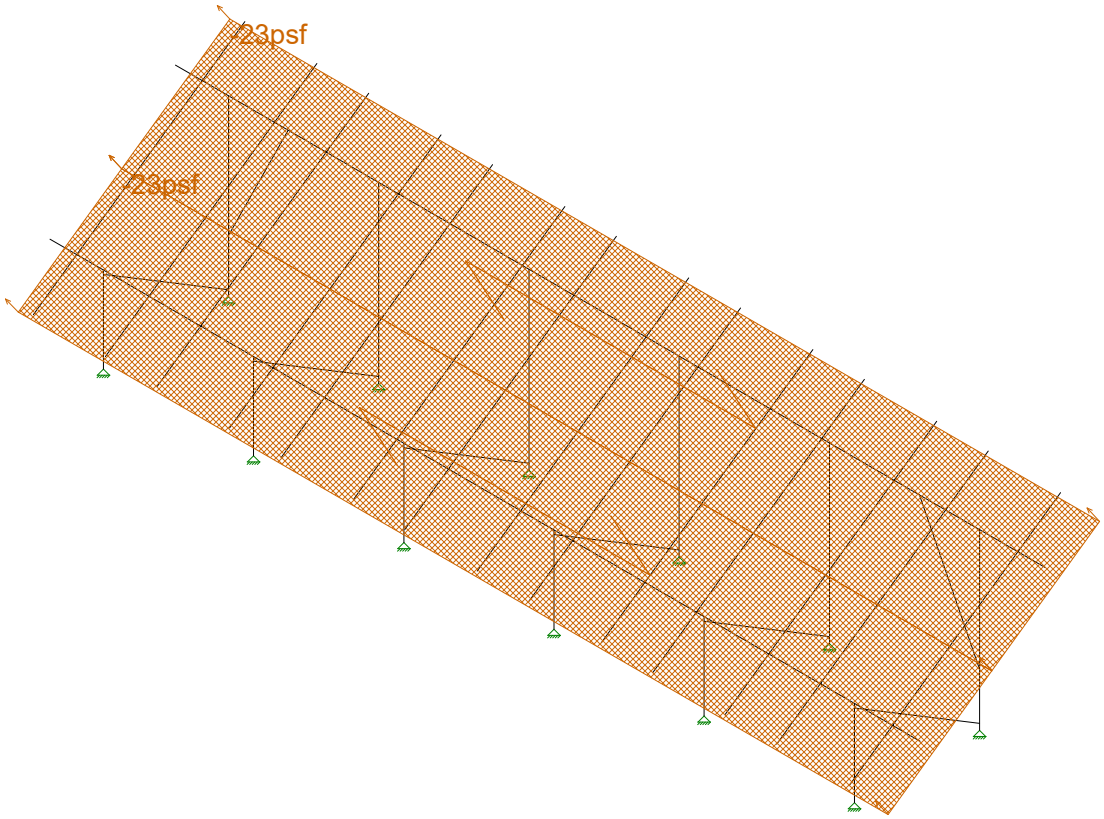
Loads: BLC 2, Solar Panel Weight

Vector Structural Engineeri...		SK - 7
STB	Ground Mount	July 31, 2019 at 4:27 PM
U2716.113.191		New England A4.r3d



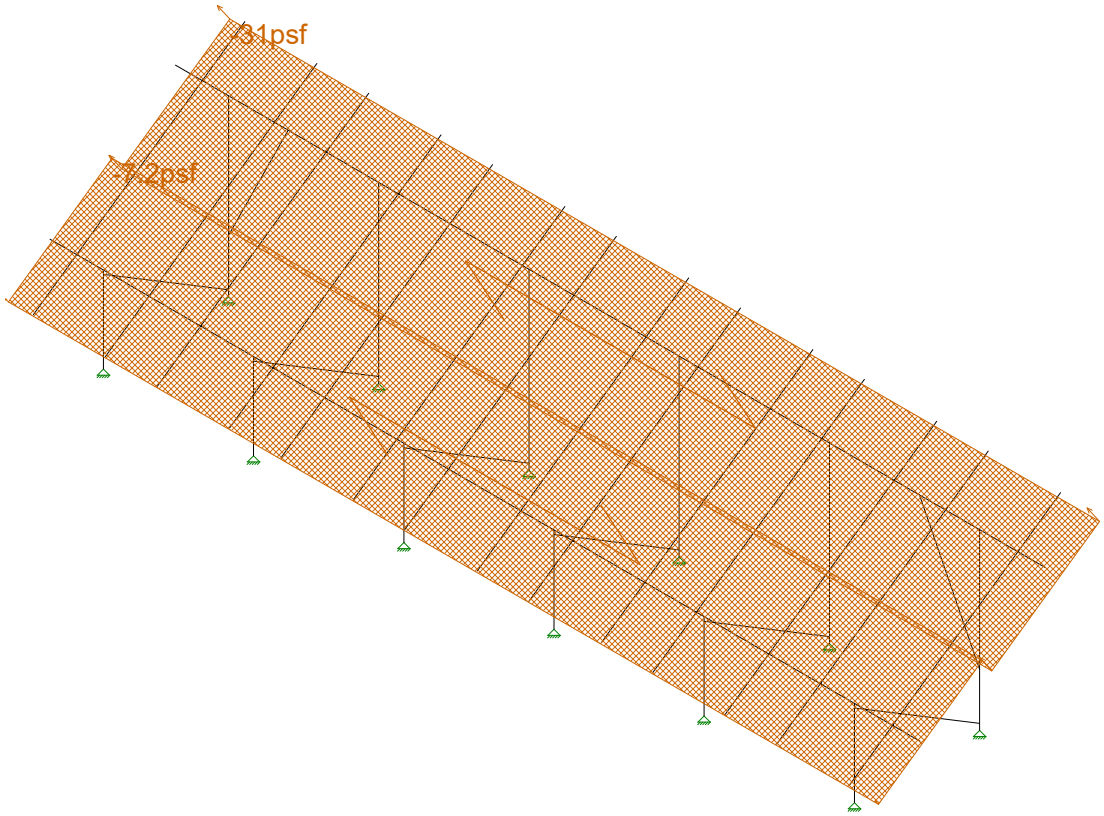
Loads: BLC 3, Roof Live/Snow

Vector Structural Engineeri...		SK - 8
STB	Ground Mount	July 31, 2019 at 4:27 PM
U2716.113.191		New England A4.r3d



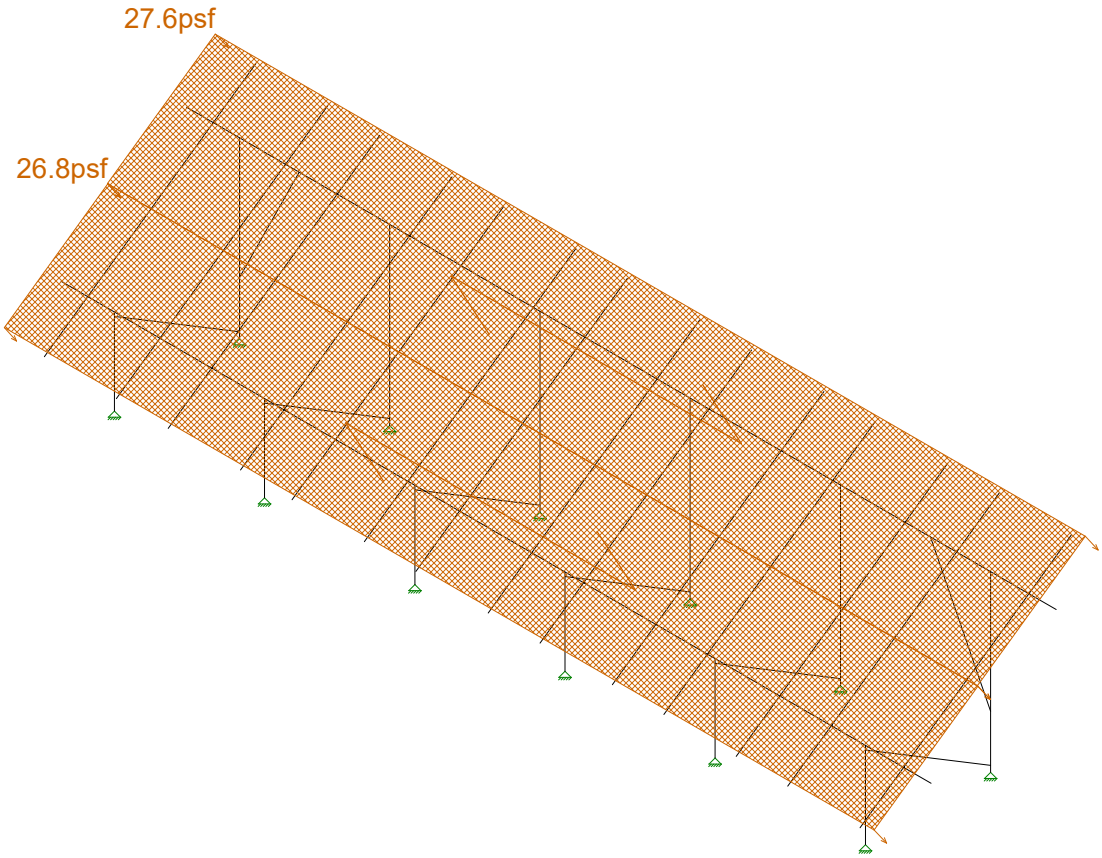
Loads: BLC 4, Wind A 0 deg

Vector Structural Engineeri...	Ground Mount	SK - 9
STB		July 31, 2019 at 4:27 PM
U2716.113.191		New England A4.r3d



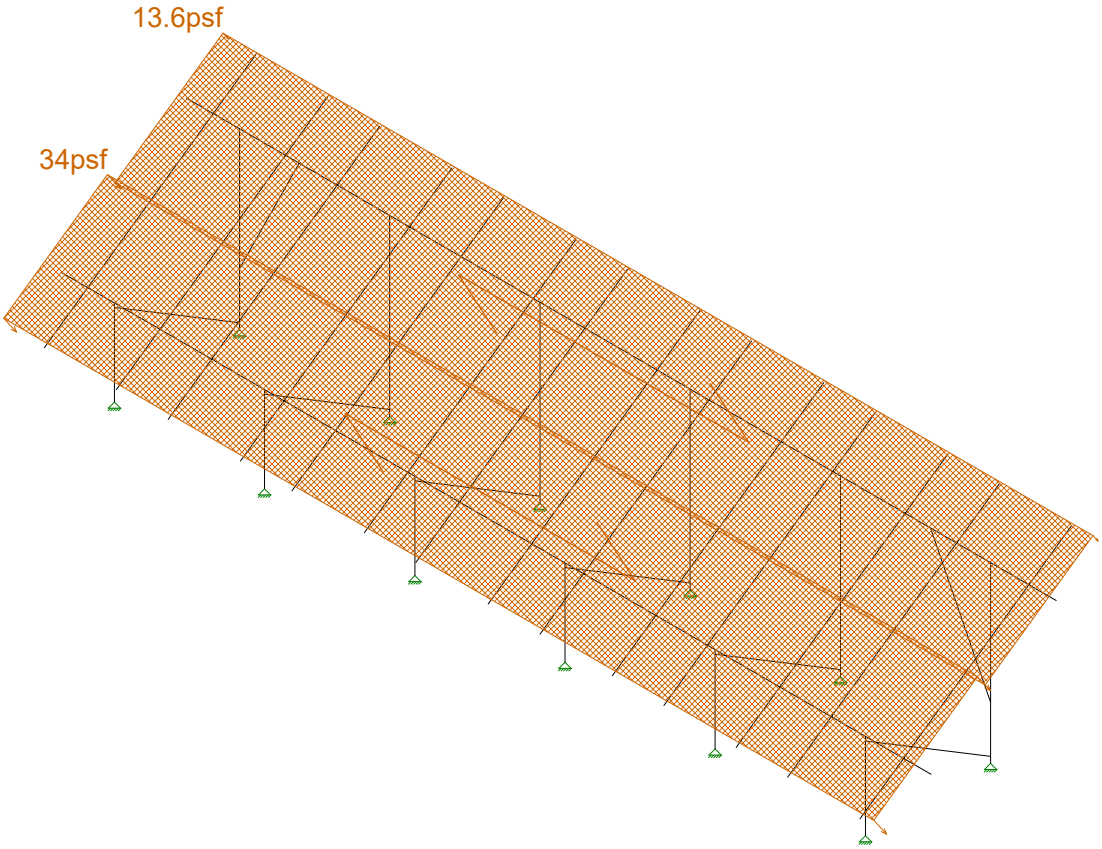
Loads: BLC 5, Wind B 0 deg

Vector Structural Engineeri...	Ground Mount	SK - 10
STB		July 31, 2019 at 4:27 PM
U2716.113.191		New England A4.r3d



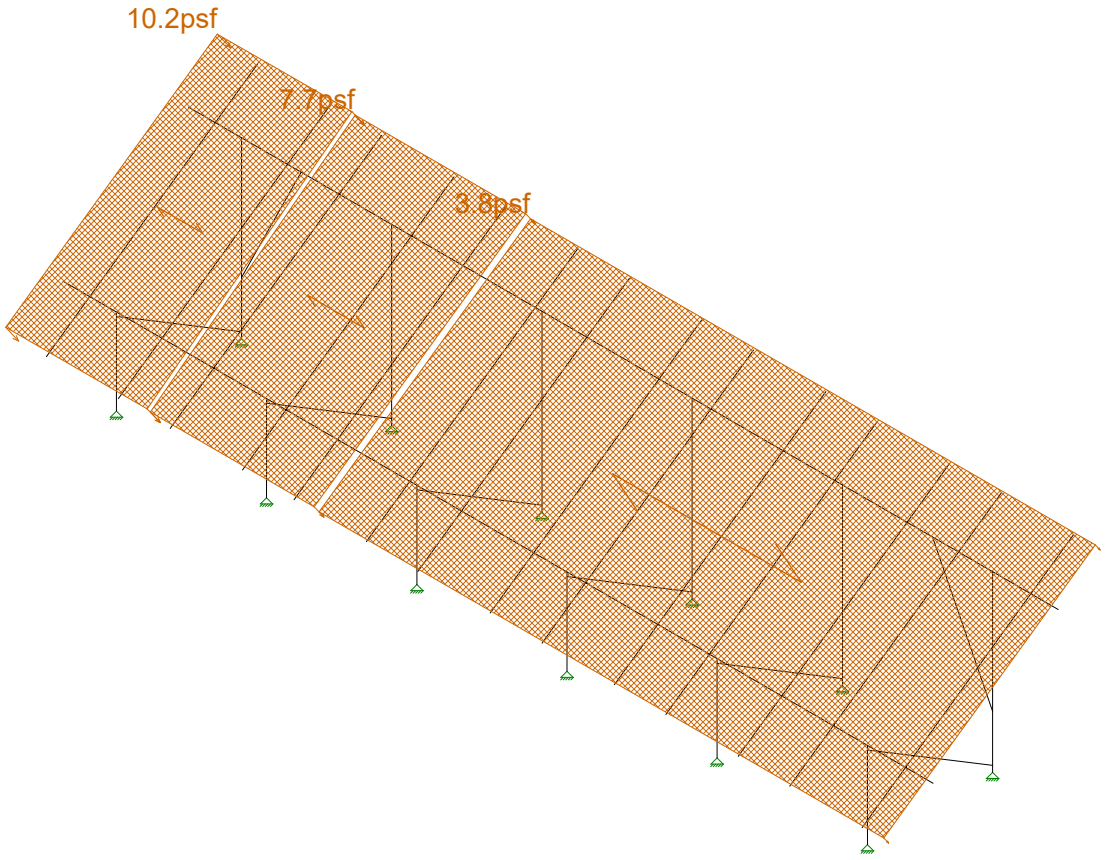
Loads: BLC 6, Wind A 180 deg

Vector Structural Engineeri...		SK - 11
STB	Ground Mount	July 31, 2019 at 4:27 PM
U2716.113.191		New England A4.r3d



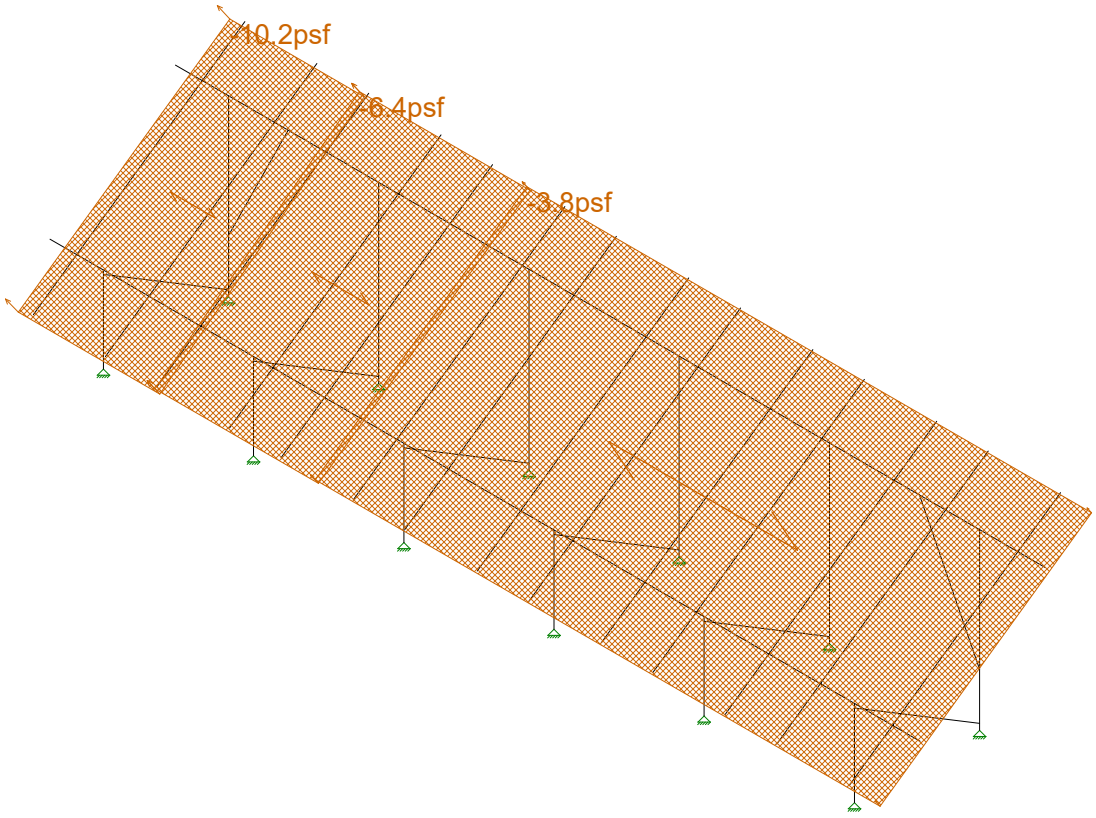
Loads: BLC 7, Wind B 180 deg

Vector Structural Engineeri...	Ground Mount	SK - 12
STB		July 31, 2019 at 4:27 PM
U2716.113.191		New England A4.r3d



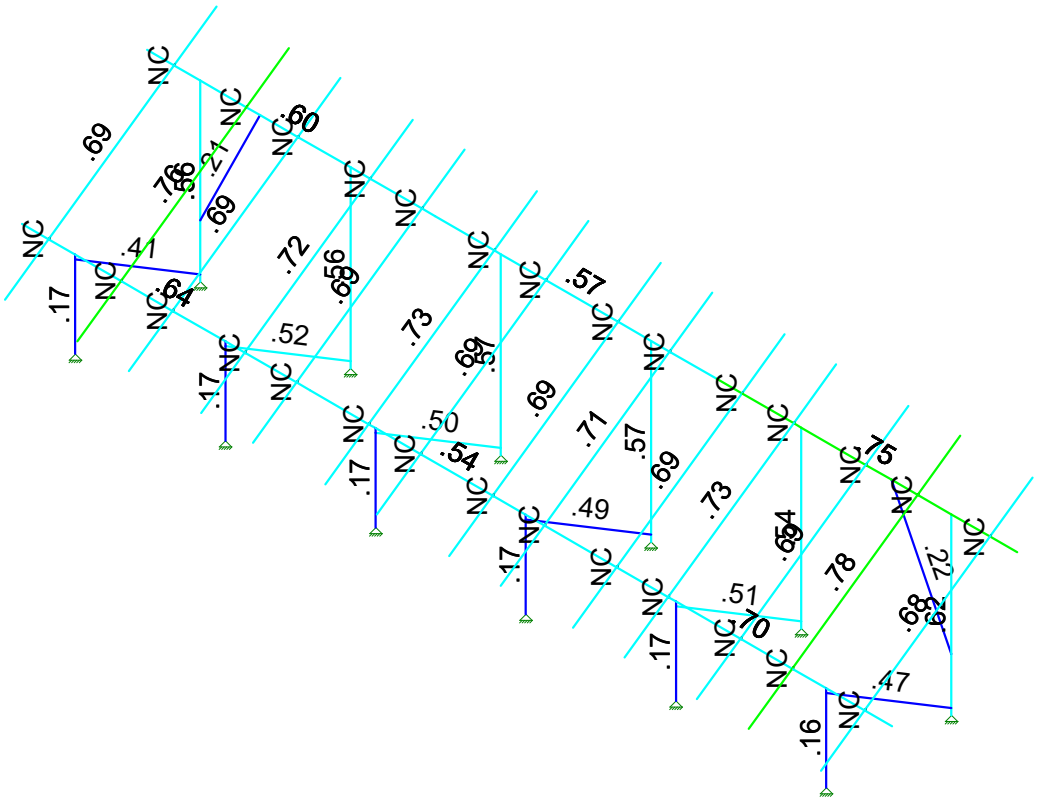
Loads: BLC 8, Wind A 90

Vector Structural Engineeri...	Ground Mount	SK - 13
STB		July 31, 2019 at 4:27 PM
U2716.113.191		New England A4.r3d



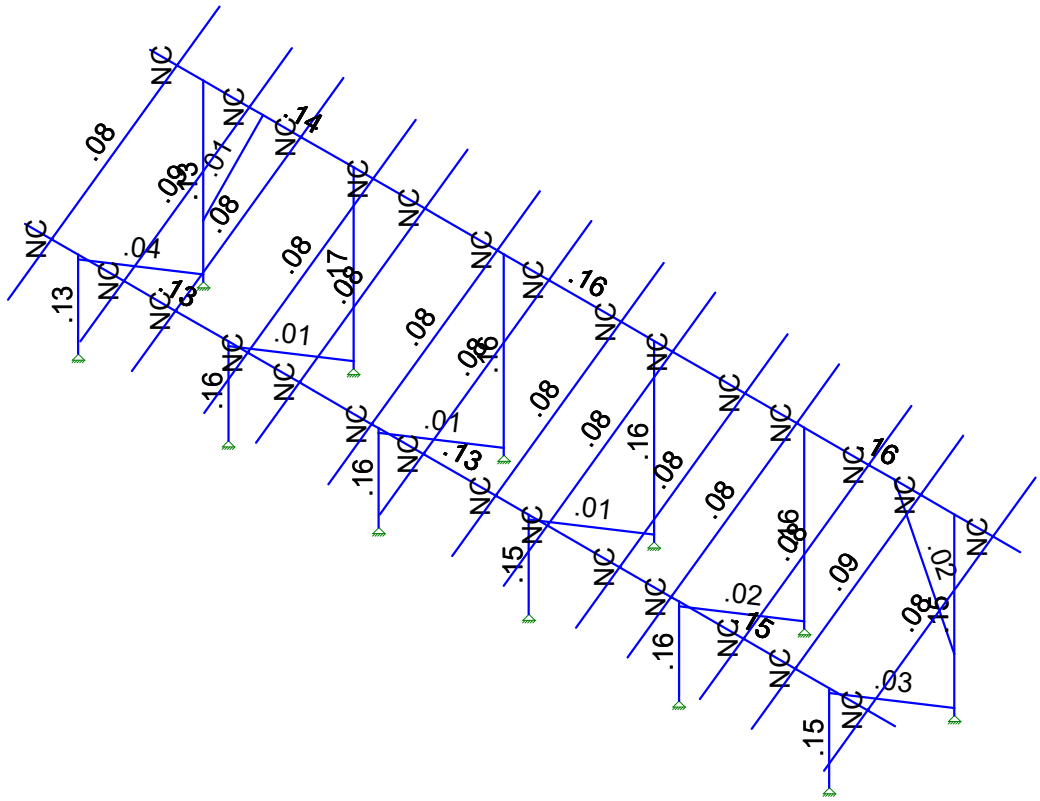
Loads: BLC 9, Wind B 90

Vector Structural Engineeri...		SK - 14
STB	Ground Mount	July 31, 2019 at 4:28 PM
U2716.113.191		New England A4.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Vector Structural Engineeri...		SK - 3
STB	Ground Mount	July 31, 2019 at 4:26 PM
U2716.113.191		New England A4.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Vector Structural Engineeri...	Ground Mount	SK - 4
STB		July 31, 2019 at 4:26 PM
U2716.113.191		New England A4.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-16: ASD
Wood Code	AWC NDS-15: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	ACI 530-13: ASD
Aluminum Code	AA ADM1-15: ASD - Building
	AISC 14th(360-10): ASD

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?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (in)	15600
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
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[lb/ft^3]	Yield[psi]	Ry	Fu[psi]	Rt
1	A992	29000	11154	.3	.65	490	50000	1.1	65000	1.1
2	A36 Gr.36	29000	11154	.3	.65	490	36000	1.5	58000	1.2
3	A572 Gr.50	29000	11154	.3	.65	490	50000	1.1	65000	1.1
4	A500 Gr.B R...	29000	11154	.3	.65	527	42000	1.4	58000	1.3
5	A500 Gr.B Re...	29000	11154	.3	.65	527	46000	1.4	58000	1.3
6	A53 Gr.B	29000	11154	.3	.65	490	35000	1.6	60000	1.2
7	A1085	29000	11154	.3	.65	490	50000	1.4	65000	1.3

Aluminum Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (...	Density[...	Table B.4	kt	Ftu[psi]	Fty[psi]	Fcy[psi]	Fsu[psi]	Ct
1	3003-H14	10100	3787.5	.33	1.3	172.8	Table B.4-1	1	19000	16000	13000	12000	141
2	6061-T6	10100	3787.5	.33	1.3	172.8	Table B.4-2	1	38000	35000	35000	24000	141
3	6063-T5	10100	3787.5	.33	1.3	172.8	Table B.4-2	1	22000	16000	16000	13000	141
4	6063-T6	10100	3787.5	.33	1.3	172.8	Table B.4-2	1	30000	25000	25000	19000	141
5	5052-H34	10200	3787.5	.33	1.3	172.8	Table B.4-1	1	34000	26000	24000	20000	141
6	6061-T6 W	10100	3787.5	.33	1.3	172.8	Table B.4-1	1	24000	15000	15000	15000	141
7	6005-T5	10100	3787.5	.33	1.3	172.8	Table B.4-1	1	38000	35000	35000	24000	141

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Post	Pipe 2.0 A21165	Column	Pipe	A572 Gr.50	Typical	.776	.499	.499	.998
2	Cross Beam	Pipe 2.5 A21168	Beam	Wide Flange	A572 Gr.50	Typical	.947	.907	.907	1.814
3	Diagonal Brace	1.5x1.5x0.083	HBrace	SquareTube	A572 Gr.50	Typical	.47	.158	.158	.236

Aluminum Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	AL Posts	2.375ODX0.188	Column	Pipe	6005-T5	Typical	1.29	.778	.778	1.54
2	AL Brace	RT1.5x2x0.15625	VBrace	Rectangular Tubes	6005-T5	Typical	.996	.327	.524	.602
3	AL Rails	HR250 ALA	Beam	Rectangular Tubes	6005-T5	Typical	.723	.095	.486	.261
4	AL Cross Beam	Cross Rail	Beam	Rectangular Tubes	6005-T5	Typical	1.909	1.97	4.366	4.017

Member Area Loads (BLC 2 : Solar Panel Weight)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N200	N199	N196	Y	A-B	-3

Member Area Loads (BLC 3 : Roof Live/Snow)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N200	N199	N196	PY	A-B	-27

Member Area Loads (BLC 4 : Wind A 0 deg)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N200	N201	N198	Perp	A-B	-23
2	N198	N201	N199	N196	Perp	A-B	-23

Member Area Loads (BLC 5 : Wind B 0 deg)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N200	N201	N198	Perp	A-B	-31
2	N198	N201	N199	N196	Perp	A-B	-7.2

Member Area Loads (BLC 6 : Wind A 180 deg)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N200	N201	N198	Perp	A-B	27.6
2	N198	N201	N199	N196	Perp	A-B	26.8

Member Area Loads (BLC 7 : Wind B 180 deg)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N200	N201	N198	Perp	A-B	13.6
2	N198	N201	N199	N196	Perp	A-B	34

Member Area Loads (BLC 8 : Wind A 90)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N203	N202	N196	Perp	A-B	10.2
2	N203	N209	N208	N202	Perp	A-B	7.7
3	N209	N200	N199	N208	Perp	A-B	3.8

Member Area Loads (BLC 9 : Wind B 90)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N203	N202	N196	Perp	A-B	-10.2
2	N203	N209	N208	N202	Perp	A-B	-6.4
3	N209	N200	N199	N208	Perp	A-B	-3.8

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(M...	Surface...
1	Self Weight	DL		-1.05						
2	Solar Panel Weight	DL							1	

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(M...	Surface...
3	Roof Live/Snow	RLL							1	
4	Wind A 0 deg	OL1							2	
5	Wind B 0 deg	OL2							2	
6	Wind A 180 deg	OL3							2	
7	Wind B 180 deg	OL4							2	
8	Wind A 90	OL5							3	
9	Wind B 90	OL6							3	
10	BLC 2 Transient Area ...	None						34		
11	BLC 3 Transient Area ...	None						34		
12	BLC 4 Transient Area ...	None						120		
13	BLC 5 Transient Area ...	None						120		
14	BLC 6 Transient Area ...	None						120		
15	BLC 7 Transient Area ...	None						120		
16	BLC 8 Transient Area ...	None						98		
17	BLC 9 Transient Area ...	None						98		

Load Combinations

	Description	S...	PD...	SRSS	BLC	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.0 D	Yes	Y		DL	1																		
2	1.0 D + 1.0 S	Yes	Y		DL	1	RLL	1																
3	1.0 D + 0.6 W1	Yes	Y		DL	1	RLL		OL1	.6														
4	1.0 D + 0.6 W2	Yes	Y		DL	1	RLL		OL2	.6														
5	1.0 D + 0.6 W3	Yes	Y		DL	1	RLL		OL3	.6														
6	1.0 D + 0.6 W4	Yes	Y		DL	1	RLL		OL4	.6														
7	1.0 D + 0.6 W5	Yes	Y		DL	1	RLL		OL5	.6														
8	1.0 D + 0.6 W6	Yes	Y		DL	1	RLL		OL6	.6														
9	1.0 D + 0.45 W1 + 0....	Yes	Y		DL	1	RLL	.75	OL1	.45														
10	1.0 D + 0.45 W2 + 0....	Yes	Y		DL	1	RLL	.75	OL2	.45														
11	1.0 D + 0.45 W3 + 0....	Yes	Y		DL	1	RLL	.75	OL3	.45														
12	1.0 D + 0.45 W4 + 0....	Yes	Y		DL	1	RLL	.75	OL4	.45														
13	1.0 D + 0.45 W5 + 0....	Yes	Y		DL	1	RLL	.75	OL5	.45														
14	1.0 D + 0.45 W6 + 0....	Yes	Y		DL	1	RLL	.75	OL6	.45														
15	0.6 D + 0.6 W1	Yes	Y		DL	.6	RLL		OL1	.6														
16	0.6 D + 0.6 W2	Yes	Y		DL	.6	RLL		OL2	.6														
17	0.6 D + 0.6 W3	Yes	Y		DL	.6	RLL		OL3	.6														
18	0.6 D + 0.6 W4	Yes	Y		DL	.6	RLL		OL4	.6														
19	0.6 D + 0.6 W5	Yes	Y		DL	.6	RLL		OL5	.6														
20	0.6 D + 0.6 W6	Yes	Y		DL	.6	RLL		OL6	.6														

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N2	max	29.151	12	1351.371	10	38.932	3	0	1	0	1	0	1
2		min	-8.837	15	-165.026	17	-45.444	5	0	1	0	1	0	1
3	N1	max	117.307	11	2208.692	11	885.972	5	0	1	0	1	0	1
4		min	-64.223	16	-1334.791	16	-749.321	3	0	1	0	1	0	1
5	N132	max	6.922	16	2316.298	11	1094.17	5	0	1	0	1	0	1
6		min	-8.82	11	-1457.719	16	-924.818	3	0	1	0	1	0	1
7	N133	max	3.146	15	1651.394	10	44.571	3	0	1	0	1	0	1
8		min	-17.352	12	-218.567	17	-52.131	5	0	1	0	1	0	1
9	N109	max	6.874	11	2414.631	11	1124.1...	5	0	1	0	1	0	1
10		min	-2.409	16	-1493.515	16	-950.76	3	0	1	0	1	0	1
11	N110A	max	3.757	15	1695.436	10	44.261	3	0	1	0	1	0	1
12		min	-8.661	11	-217.167	17	-51.605	5	0	1	0	1	0	1
13	N121	max	2.648	16	2505.939	11	1084.8...	5	0	1	0	1	0	1

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
14		min	-1.874	7	-1557.321	16	-917.976	3	0	1	0	1	0	1
15	N122	max	.264	20	1640.407	10	44.862	3	0	1	0	1	0	1
16		min	-2.532	13	-215.095	17	-52.268	5	0	1	0	1	0	1
17	N133B	max	3.181	11	2504.714	11	1068.9	5	0	1	0	1	0	1
18		min	-.532	19	-1532.472	16	-904.912	3	0	1	0	1	0	1
19	N134B	max	2.781	15	1622.767	10	44.436	3	0	1	0	1	0	1
20		min	-8.118	11	-185.973	17	-51.897	5	0	1	0	1	0	1
21	N151	max	59.234	16	2521.341	11	1011.0...	5	0	1	0	1	0	1
22		min	-111.054	11	-1510.472	16	-855.447	3	0	1	0	1	0	1
23	N152	max	3.106	11	1530.761	10	42.556	3	0	1	0	1	0	1
24		min	-5.101	16	-190.824	17	-49.408	5	0	1	0	1	0	1
25	Totals:	max	.093	11	19687.82	11	5966.3...	17						
26		min	-.044	16	-5566.468	15	-5043....	3						

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

	Member	Shape	Code Check	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	Pnc/om [...	Pnt/om [lb]	Mnyy/om...	Mnzz/om...	Cb	Eqn
1	M5	Pipe 2.0 A2...	.169	52.645	12	.132	52.645		5	16486.797	23232.186	1397.505	1397.505	1....	H1-1b
2	M6	Pipe 2.0 A2...	.559	33.608	11	.134	0		5	6062.107	23232.186	1397.505	1397.505	1....	H1-1a
3	M13	Pipe 2.5 A2...	.643	130....	12	.127	130....		12	11641.036	28358.413	2081.747	2081.747	1....	H1-1b
4	M14	Pipe 2.5 A2...	.602	130....	11	.143	130....		11	11641.036	28358.413	2081.747	2081.747	2....	H1-1b
5	M15	1.5x1.5x0.083	.412	48.694	5	.041	93.493	y	11	2716.455	14085.15	624.421	624.421	1....	H1-1a
6	M80	Pipe 2.0 A2...	.170	52.645	11	.158	52.645		5	16486.797	23232.186	1397.505	1397.505	1....	H1-1b
7	M81	Pipe 2.0 A2...	.542	3.477	11	.164	0		5	6062.107	23232.186	1397.505	1397.505	1....	H1-1a
8	M82	1.5x1.5x0.083	.505	48.694	5	.017	93.493	y	11	2716.455	14085.15	624.421	624.421	1....	H1-1a
9	M50	Pipe 2.0 A2...	.167	52.073	17	.162	52.645		5	16486.797	23232.186	1397.505	1397.505	1....	H1-1b
10	M51	Pipe 2.0 A2...	.563	3.477	11	.169	0		5	6062.107	23232.186	1397.505	1397.505	1....	H1-1a
11	M52	1.5x1.5x0.083	.519	48.694	5	.007	0	y	14	2716.455	14085.15	624.421	624.421	1....	H1-1a
12	M56A	Pipe 2.0 A2...	.168	52.073	17	.155	52.645		5	16486.797	23232.186	1397.505	1397.505	1....	H1-1b
13	M57A	Pipe 2.0 A2...	.572	3.477	11	.163	0		5	6062.107	23232.186	1397.505	1397.505	1....	H1-1a
14	M58A	1.5x1.5x0.083	.501	48.694	5	.006	0	y	13	2716.455	14085.15	624.421	624.421	1....	H1-1a
15	M68	Pipe 2.0 A2...	.167	52.073	17	.154	52.645		5	16486.797	23232.186	1397.505	1397.505	1....	H1-1b
16	M69	Pipe 2.0 A2...	.570	3.477	11	.161	0		5	6062.107	23232.186	1397.505	1397.505	1....	H1-1a
17	M70	1.5x1.5x0.083	.494	48.694	5	.006	93.493	y	11	2716.455	14085.15	624.421	624.421	1....	H1-1a
18	M68A	Pipe 2.5 A2...	.538	136....	12	.129	41.25		12	11641.036	28358.413	2081.747	2081.747	1....	H1-1b
19	M69A	Pipe 2.5 A2...	.702	150	12	.146	54		12	11641.036	28358.413	2081.747	2081.747	1....	H1-1b
20	M70A	Pipe 2.5 A2...	.571	138.75	11	.161	41.25		11	11641.036	28358.413	2081.747	2081.747	1....	H1-1b
21	M71	Pipe 2.5 A2...	.750	150	11	.163	54		11	11641.036	28358.413	2081.747	2081.747	2....	H1-1b
22	M73	Pipe 2.0 A2...	.159	52.073	17	.148	52.645		5	16486.797	23232.186	1397.505	1397.505	1....	H1-1b
23	M74	Pipe 2.0 A2...	.623	33.608	11	.154	0		5	6062.107	23232.186	1397.505	1397.505	1....	H1-1a
24	M75	1.5x1.5x0.083	.469	48.694	5	.031	0	y	11	2716.455	14085.15	624.421	624.421	1....	H1-1a

Envelope AA ADM1-15: ASD - Building Aluminum Code Checks

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	Pnc/O...	Pnt/Om...	Mny/O...	Mnz/O...	Vny/O...	Vnz/O...	Cb	Eqn
1	M19	RT1.5x2x...	.209	52.977	11	.013	0	z	5	2260.001	19411....	770.742	927.083	6090.199	4101.563	1....	H.1-1
2	M16	HR250_A...	.689	84.234	11	.079	36.1	y	12	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1
3	M35	HR250_A...	.756	82.515	11	.089	36.1	y	12	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1
4	M38	HR250_A...	.690	84.234	11	.082	36.1	y	12	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1
5	M41	HR250_A...	.723	84.234	11	.077	36.1	y	12	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1
6	M44	HR250_A...	.691	82.515	11	.078	36.1	y	12	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1
7	M47	HR250_A...	.728	84.234	11	.078	36.1	y	12	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1
8	M50A	HR250_A...	.688	34.381	12	.079	36.1	y	12	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1
9	M53	HR250_A...	.692	84.234	11	.079	36.1	y	12	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1
10	M56	HR250_A...	.714	84.234	11	.077	36.1	y	12	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1
11	M59	HR250_A...	.688	34.381	12	.078	36.1	y	12	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1

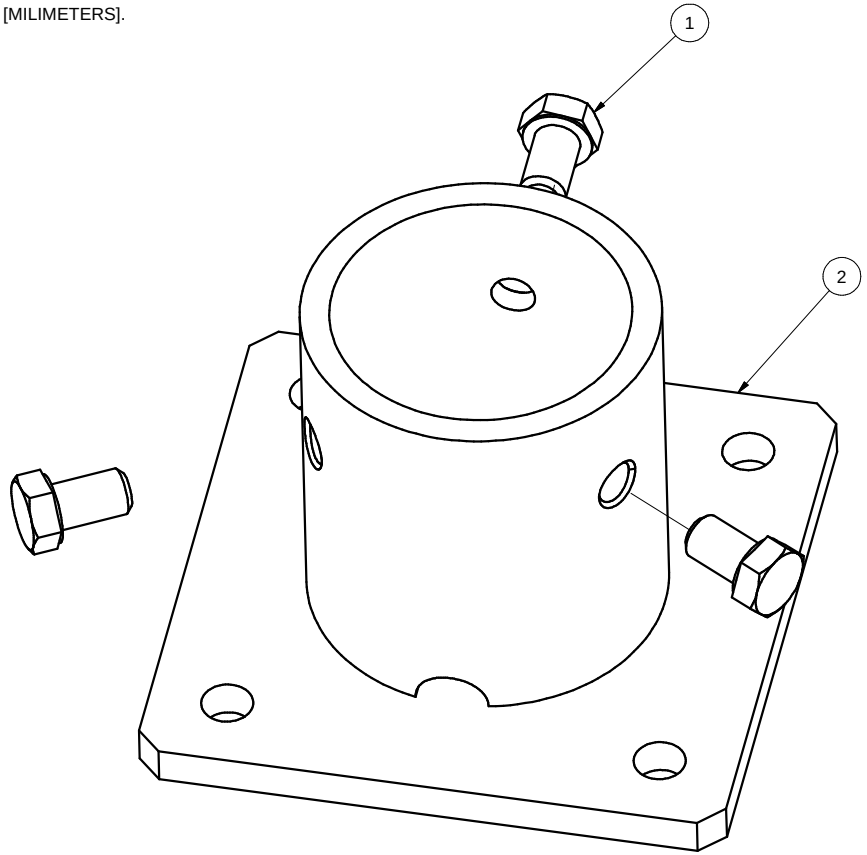
Envelope AA ADM1-15: ASD - Building Aluminum Code Checks (Continued)

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	Pnc/O...	Pnt/Om...	Mny/O...	Mnz/O...	Vny/O...	Vnz/O...	Cb	Eqn
12	M62	HR250_A...	.726	84.234	11	.079	36.1	y	12	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1
13	M65	HR250_A...	.688	34.381	12	.080	36.1	y	12	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1
14	M68B	HR250_A...	.780	80.796	11	.090	36.1	y	12	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1
15	M71A	HR250_A...	.676	84.234	11	.077	36.1	y	11	2598.605	14089....	309.506	624.233	5108.727	1672.364	1	H.1-1
16	M75B	RT1.5x2x...	.224	53.045	11	.024	0	z	5	2254.199	19411....	770.742	927.083	6090.199	4101.563	1...	H.1-1

REVISIONS			
REV	DESCRIPTION	BY	DATE
A	INITIAL RELEASE	LWF	10/20/2016

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].



ITEM	PART NUMBER	DESCRIPTION	QTY
2	A21120-001	2" PIPE BASE	1
1	B15018-011	HEX CAP SCREW 3/8-16 X 5/8	3

MATERIAL: SEE NOTES

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd
Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: LWF
DATE: 10/20/2016
CHECKED BY:
APPROVALS:

Sunmodo Corp.

1905 E 5TH STREET, STE A, VANCOUVER, WA 98661

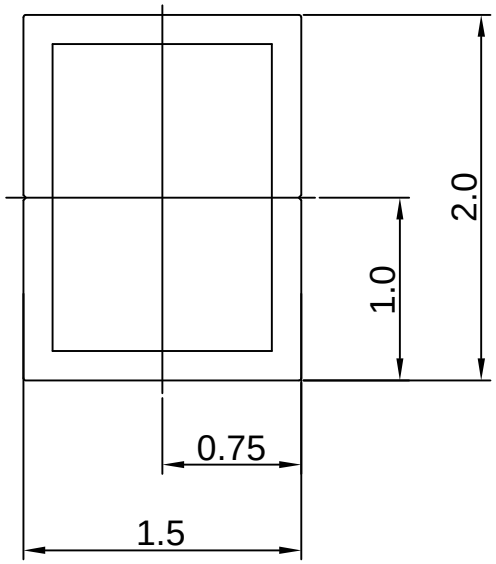
TITLE: 2" PIPE BASE KIT

B
DRAWING NUMBER: K10268-001

SCALE: NONE
SHEET 1 of 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].
2. MATERAIL: ALUMINUM 6005-T5.
   FINISH: CLEAR ANODIZED 10 ųm THICK.
3. THE UNSPECIFIED DIMENSIONS ARE SPECIFIED BY 2D CAD FILE.



Section properties:

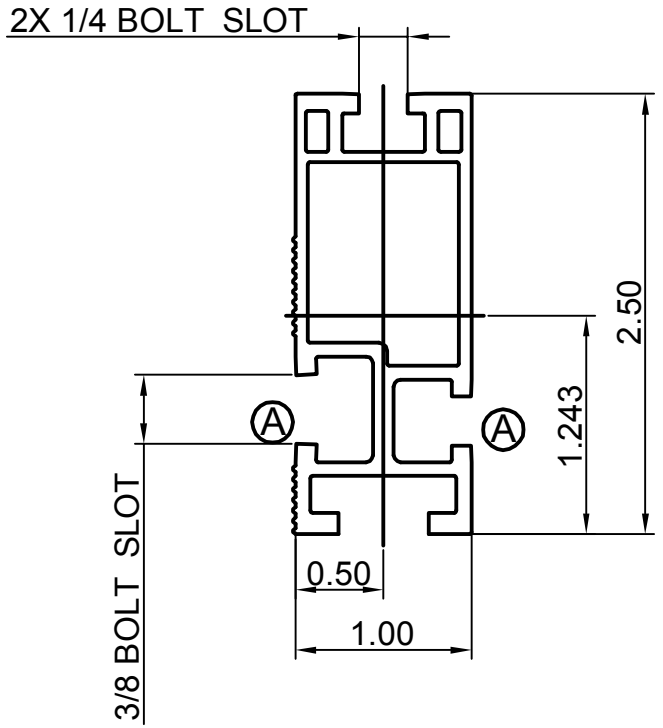
Weight: 1.156 lbs/ft
Area: 0.992 in^2
Perimeter: 12.601 in
Bounding Box: X: -1.000,1.000
Y: -0.750, 0.750
Centroid:(0.000,0.000)
Moments of Inertia(in^4): Ix=0.506,Iy=0.322
Section modulus in bending(in^3): Wx=0.675,Wy=0.322
Radii of Gyration: X: 0.714, Y: 0.570

MATERIAL: SEE NOTES		**Sunmodo Corp.**
Third Angle Projection:		1905 E 5TH STREET, SUITE A, VANCOUVER, WA 98661
GENERAL SPECIFICATIONS: All Dimensions in inches [millimeters]. Tolerances: X.XXX ± 0.01 [0.25mm]; X.XX ± 0.02 [0.50mm]; X.X ± 0.039 [1.0mm]; Unless otherwise spec'd. Break all sharp edges .010-.020 unless otherwise specified.		TITLE: 1.5X2 AL TUBE BRACE EXTRUSION
DRAWN BY: zcg	DATE: 03/12/2014	B — DRAWING NUMBER: A20164
CHECKED BY		
APPROVALS		SCALE: NONE — SHEET 1 of 1

REVISIONS			
REV	DESCRIPTON	BY	DATE
A	ADDED BOTTOM CHANNEL & CHANGED ONE 3/8 CHANNEL TO 1/4	zcg	02/21/2013

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].
2. MATERAIL: ALUMINUM 6005-T5.
   FINISH: CLEAR ANODIZED 15 µm THICK.
3. THE UNSPECIFIED DIMENSIONS ARE SPECIFIED BY 2D CAD FILE.



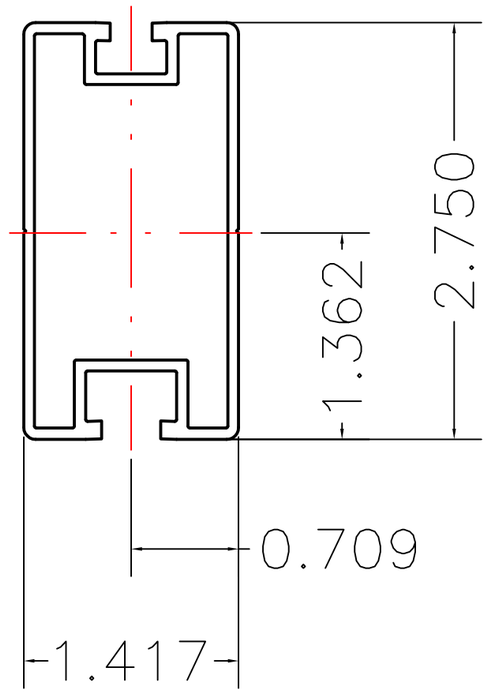
Section properties:

Weight: 0.850 lbs/ft
Area: 0.723 in^2
Perimeter: 17.325 in
Bounding Box: X: -0.500,0.500
Y: -1.243,1.257
Centroid:(0.000,0.000)
Moments of Incertia(in^4): Ix=0.486,Iy=0.095
Section modulus in bending(in^3): Wx=0.387,Wy=0.190
Radii of Gyration: X: 0.820, Y: 0.363

MATERIAL: SEE NOTES		**Sunmodo Corp.**	
Third Angle Projection:		1905 E 5TH STREET, SUITE A, VANCOUVER, WA 98661	
GENERAL SPECIFICATIONS All Dimensions in inches [millimeters] Tolerances X.XXX ± 0.01 [0.25mm] X.XX ± 0.02 [0.50mm] X.X ± 0.039 [1.0mm] Unless otherwise spec'd Break all sharp edges .010-.020 unless otherwise specified.		TITLE: HELIO STANDARD RAIL	
DRAWN BY: zcg	DATE: 02/21/2013	B	DRAWING NUMBER: A20144
CHECKED BY			
APPROVALS		SCALE: NONE	SHEET 1 of 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].
2. MATERIAL: 6005-T5.
   FINISH: CLEAR ANODIZED 10um THICK.
3. THE UNSPECIFIED RADII ARE .02" MAX.
4. THE UNSPECIFIED DIMENSIONS ARE SPECIFIED BY 2D CAD FILE.



Section properties:

Weight: 0.862 lbs/ft
Area: 0.736 in^2
Perimeter: 19.824 in
Bounding Box: X: -0.709,0.709
Y: -1.362,1.388
Centroid:(0.000,0.000)
Moments of Incertia(in^4): Ix=0.727,Iy=0.214
Section modulus in bending(in^3): Wx=0.524,Wy=0.302
Radii of Gyration: X: 994, Y: 0.539

MATERIAL	SEE NOTES
Third Angle Projection:	
GENERAL SPECIFICATIONS	All Dimensions in Inches [millimeters]
Tolerances	X.XXX ±0.01 [0.25mm] X.XX ±0.02 [0.50mm] X.X ±0.039 [1.0mm] Unless otherwise spec'd
	Break all sharp edges .010-.020 unless otherwise specified.
DRAWN BY	KYY
DATE	01/18/2018
CHECKED BY	
APPROVALS	

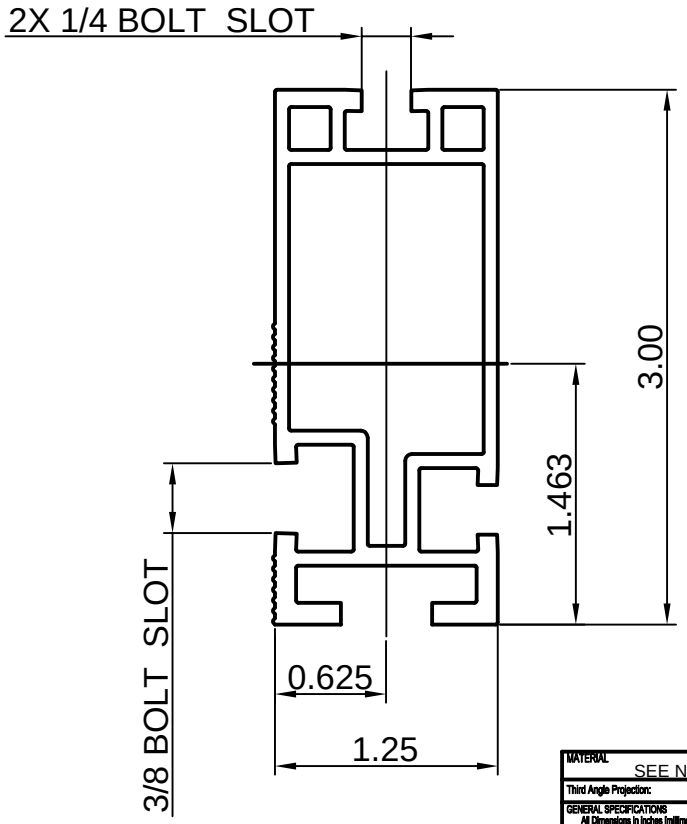
SunModo Corp.
14800 NE 65TH STREET, VANCOUVER WA 98682

TITLE	RAIL, HR300 (SUNRAY), EXTRUSION
B	DRAWING NUMBER A20288
SCALE:	NONE
SHEET	1 of 1

REV	DESCRIPTON	BY	DATE
A	0.44 WAS 0.41, 0.44 WAS 0.33	LWF	11/30/2015

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].
2. MATERAIL: ALUMINUM 6005-T5.
   FINISH: CLEAR ANODIZED 15 ųm THICK.
3. THE UNSPECIFIED DIMENSIONS ARE SPECIFIED BY 2D CAD FILE.



Section properties:

Weight: 1.151 lbs/ft
Area: 0.980 in^2
Perimeter: 22.104 in
Bounding Box: X: -0.625,0.625
Y: -1.463,1.537
Centroid:(0.000,0.000)
Moments of Inertia(in^4): Ix=1.047,Iy=0.207
Section modulus in bending(in^3): Wx=0.681,Wy=0.331
Radii of Gyration: X: 1.034, Y: 0.460

MATERIAL	SEE NOTES
Third Angle Projection:	
GENERAL SPECIFICATIONS All Dimensions in Inches [millimeters] Tolerances X.XXX ±0.01 [0.25mm] X.XX ±0.02 [0.50mm] X.X ±0.039 [1.0mm] Unless otherwise specfd	Break all sharp edges .010-.020 unless otherwise specified.
DRAWN BY: zcg	DATE: 02/21/2013
CHECKED BY	
APPROVALS	

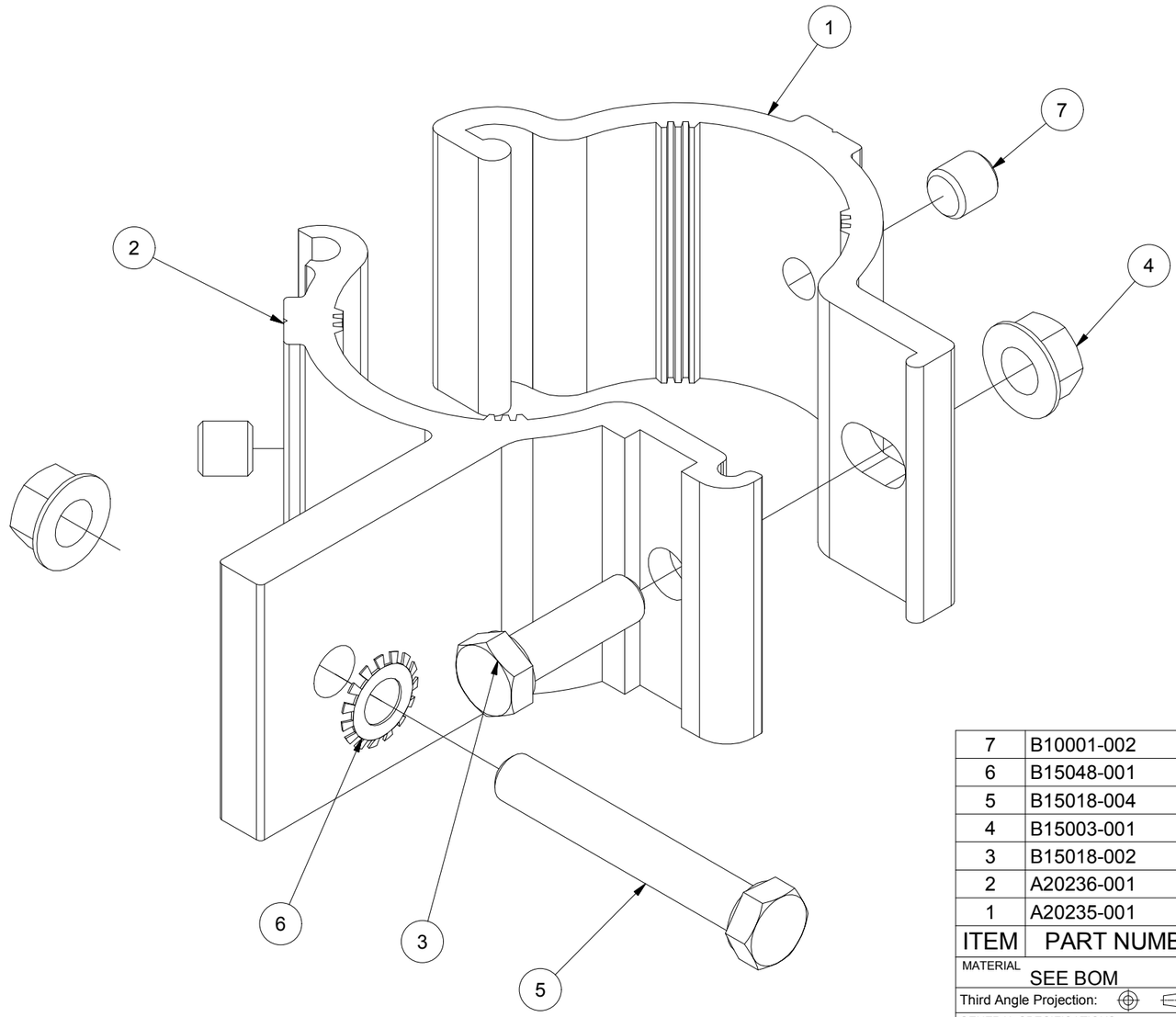
Sunmodo Corp.

1905 E 5TH STREET, SUITE A, VANCOUVER, WA 98661

TITLE: HELIO HEAVY RAIL

B | DRAWING NUMBER: A20145

SCALE: NONE | SHEET 1 of 1



ITEM	PART NUMBER	DESCRIPTION	QTY
7	B10001-002	SET SCREW M10X10	2
6	B15048-001	STAR WASHER FOR 3/8 BOLT	1
5	B15018-004	HEX CAP SCREW 3/8-16 X2.5	1
4	B15003-001	FLANGE NUT 3/8-16	2
3	B15018-002	HEX CAP SCREW 3/8-16 X 1.25	1
2	A20236-001	2 AL PIPE CLAMP, FEMALE	1
1	A20235-001	2 AL PIPE CLAMP, MALE	1

MATERIAL: SEE BOM

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd

Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: zcg
DATE: 08/12/2015
CHECKED BY:
APPROVALS:

Sunmodo Corp.

1905 E 5TH STREET, STE A, VANCOUVER, WA 98661

TITLE: 2 AL PIPE CLAMP KIT

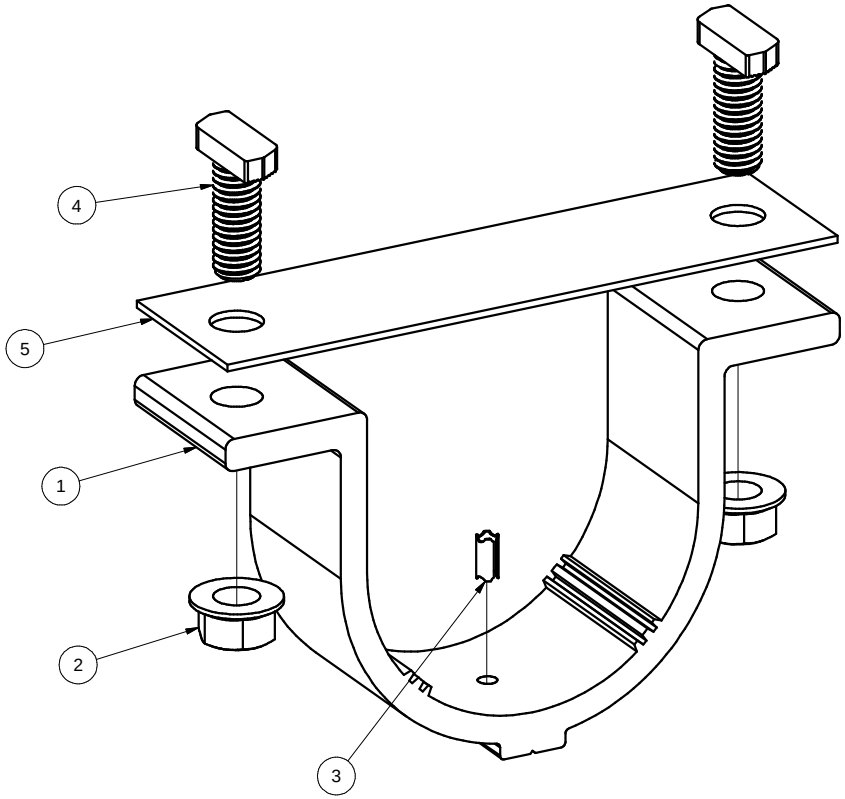
B

DRAWING NUMBER: K10219-001

SCALE: NONE

SHEET 1 of 1

REVISIONS			
REV	DESCRIPTION	BY	DATE
A	INITIAL RELEASE	LWF	06/12/2018
B	ADD C10005-006	LWF	06/27/2018



ITEM	PART NUMBER	DESCRIPTION	QTY
5	C10005-006	PVC GASKTE T=1.5mm	1
4	B50033-001	T-BOLT, RAIL BOTTOM SLOT, 3/8-16 X 1"	2
3	B20018-002	GROUNDING PIN	1
2	B15003-001	FLANGE NUT 3/8-16	2
1	A20329-001	2.5" AL PIPE U-BOLT	1

MATERIAL: SEE NOTES

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd
Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: KYY
DATE: 06/12/2018
CHECKED BY:
APPROVALS:

SunModo Corp.

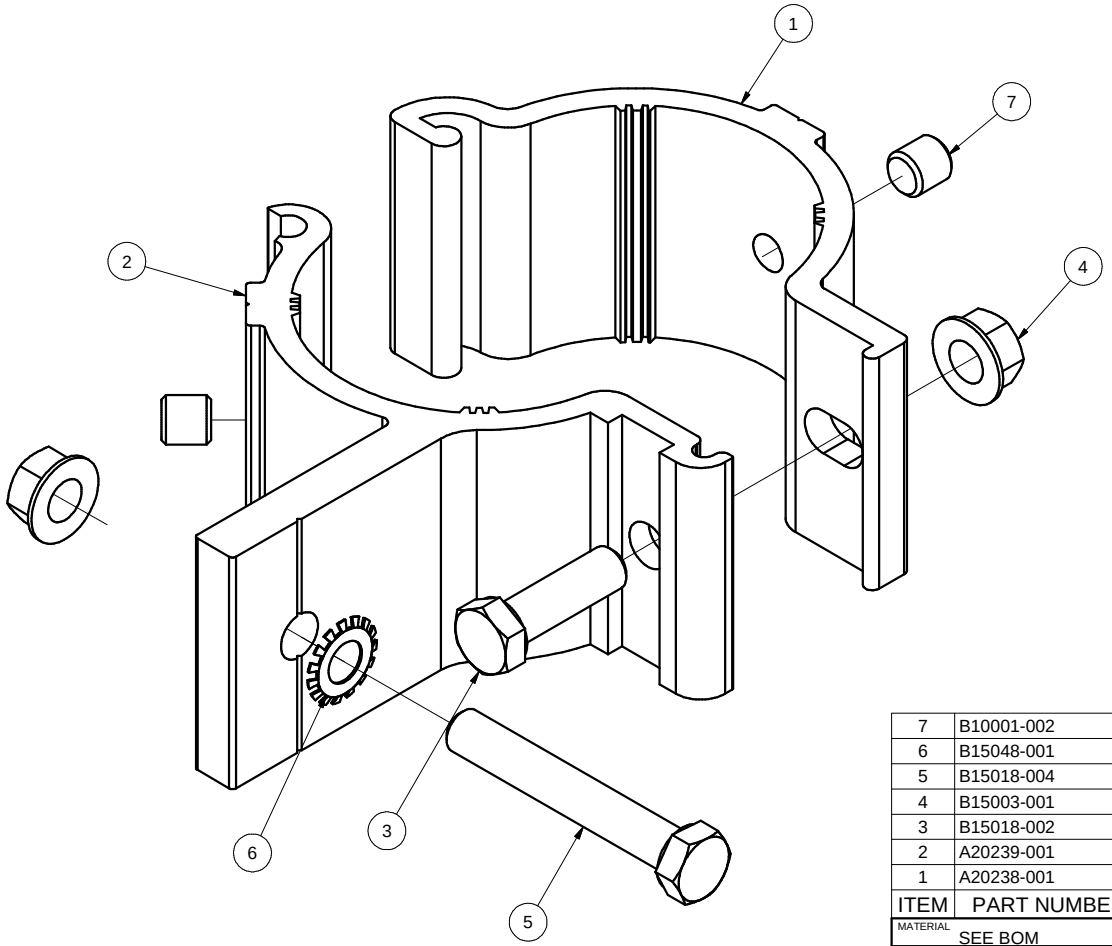
14800 NE 65TH STREET, VANCOUVER WA 98682

TITLE: 2.5" AL PIPE U-CLAMP KIT

B | DRAWING NUMBER: K10343-001

SCALE: NONE | SHEET 1 of 1

REVISIONS			
REV	DESCRIPTION	BY	DATE
A	INITIAL RELEASE	zcg	09/25/2015



ITEM	PART NUMBER	DESCRIPTION	QTY
7	B10001-002	SET SCREW M10X10	2
6	B15048-001	STAR WASHER FOR 3/8 BOLT	1
5	B15018-004	HEX CAP SCREW 3/8-16 X2.5	1
4	B15003-001	FLANGE NUT 3/8-16	2
3	B15018-002	HEX CAP SCREW 3/8-16 X 1.25	1
2	A20239-001	2.5 AL PIPE CLAMP, FEMALE	1
1	A20238-001	2.5 AL PIPE CLAMP, MALE	1

MATERIAL: SEE BOM

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd
Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: LWF
DATE: 08/21/2015
CHECKED BY:
APPROVALS:

Sunmodo Corp.

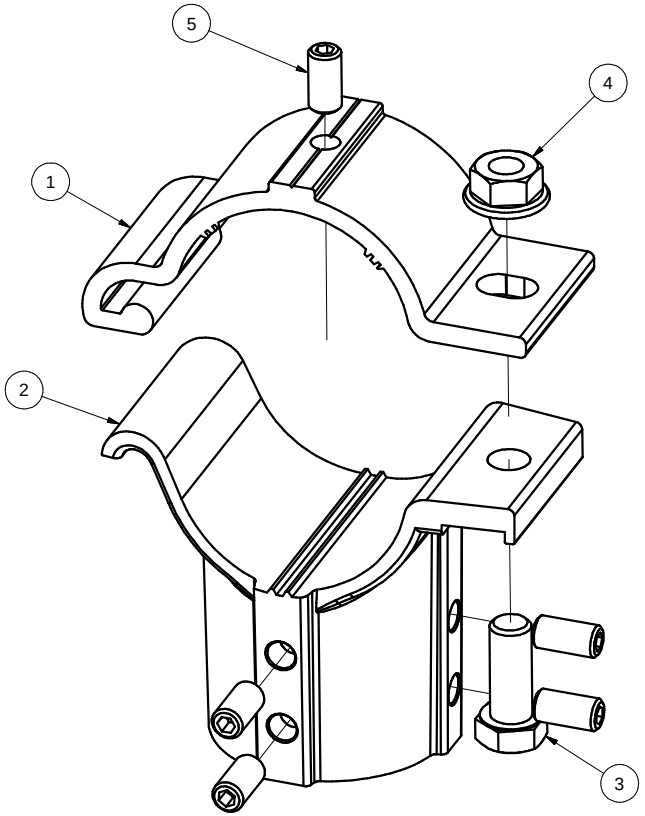
1905 E 5TH STREET, STE A, VANCOUVER, WA 98661

TITLE: 2.5 AL PIPE CLAMP KIT

B | DRAWING NUMBER: K10222-001

SCALE: NONE | SHEET 1 of 1

REVISIONS			
REV	DESCRIPTION	BY	DATE
A	INITIAL RELEASE	LWF	06/12/2018



ITEM	PART NUMBER	DESCRIPTION	QTY
5	B10001-001	SET SCREW M10X20	5
4	B15020-001	FLANGE NUT 1/2-13	1
3	B15014-005	HEX CAP SCREW 1/2-13 X 1.25", 304 SS	1
2	A20327-001	2.5" AL PIPE TEE, FEMALE	1
1	A20326-001	2.5" AL PIPE TEE, MALE	1

MATERIAL: SEE NOTES

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd
Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: LWF
DATE: 06/12/2018
CHECKED BY:
APPROVALS:

SunModo Corp.

14800 NE 65TH STREET, VANCOUVER WA 98682

TITLE: 2.5" PIPE TEE KIT

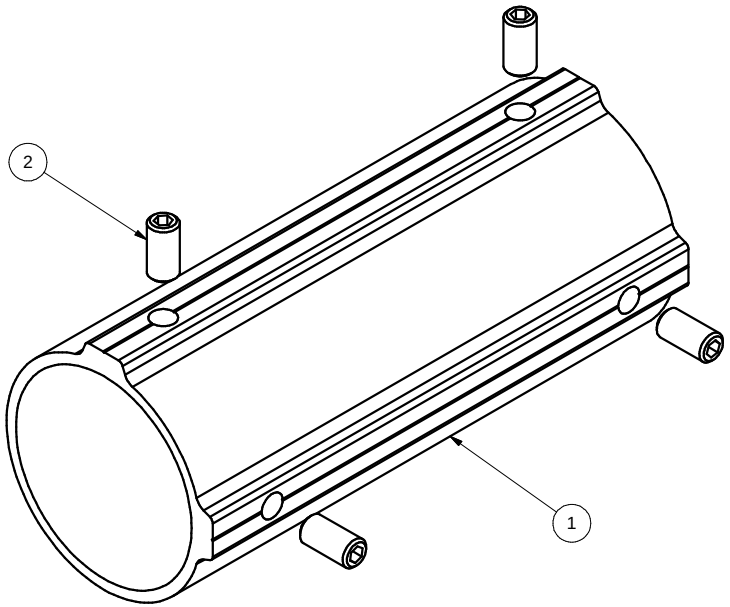
B

DRAWING NUMBER: K10341-001

SCALE: NONE

SHEET 1 of 1

REVISIONS			
REV	DESCRIPTION	BY	DATE
A	INITIAL RELEASE	LWF	06/12/2018



ITEM	PART NUMBER	DESCRIPTION	QTY
2	B10001-001	SET SCREW M10X20	4
1	A20328-001	2.5" PIPE SPLICE	1

MATERIAL: SEE NOTES

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd
Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: LWF
DATE: 06/12/2018
CHECKED BY:
APPROVALS:

SunModo Corp.

14800 NE 65TH STREET, VANCOUVER WA 98682

TITLE: 2.5" PIPE SPLICE KIT

B

DRAWING NUMBER: K10342-001

SCALE: NONE

SHEET 1 of 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].

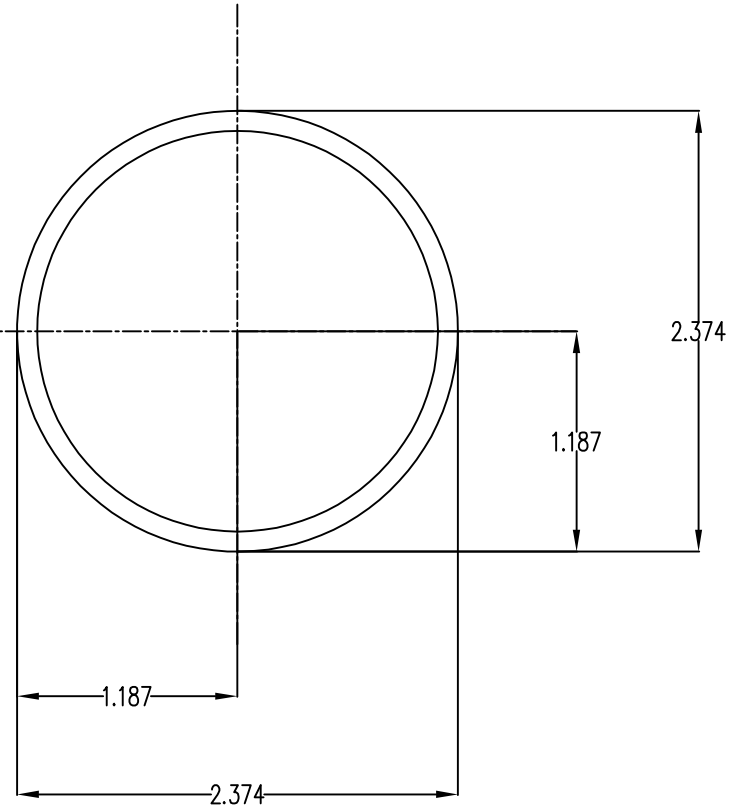
2. MATERAIL:HIGH STRENGTH STEEL PIPE OR TUBE.

3. FINISH: HOT DIP GALVANIZE PER ASTM A123 / A123M - 02.

   MINIMUM 50 KSI YIELD STRESS.

4. BREAK ALL BURRS AND SHARP EDGES.

5. ALL WELDING MUST BE IN COMPLIANCE WITH AWS CODE D1;1.



Section properties:

Weight: 2.641 lbs/ft
Area: 0.776 in^2
Perimeter: 14.238 in
Bounding Box: X: -1.187,1.187
Y: -1.187,1.187
Centroid:(0.000,0.000)
Moments of Inertia(in^4): Ix=0.499,Iy=0.499
Section modulus in bending(in^3): Wx=0.420,Wy=0.420
Radii of Gyration: X: 0.802, Y: 0.802

MATERIAL: SEE NOTES		**Sunmodo Corp.**	
Third Angle Projection:		14800 NE 65TH STREET, VANCOUVER WA 98682	
GENERAL SPECIFICATIONS All Dimensions in Inches [millimeters] Tolerances XXXX ±0.01 [0.25mm] XXX ±0.02 [0.50mm] XX ±0.039 [1.0mm] Unless otherwise spec'd Break all sharp edges .010-.020 unless otherwise specified.		TITLE: PIPE, HSS, 2.375" OD X 12 GAUGE,L=XXX	
DRAWN BY: LWF	DATE: 04/03/2019	B	DRAWING NUMBER: A21165
CHECKED BY			
APPROVALS		SCALE: NONE	SHEET 1 of 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].

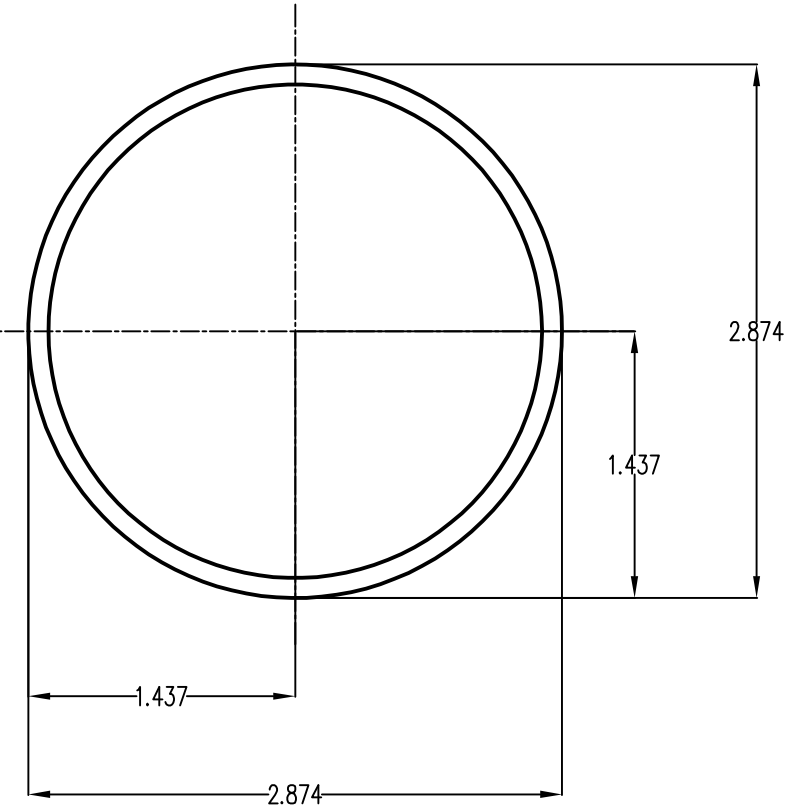
2. MATERAIL:HIGH STRENGTH STEEL PIPE OR TUBE.

3. FINISH: HOT DIP GALVANIZE PER ASTM A123 / A123M - 02.

   MINIMUM 50 KSI YIELD STRESS.

4. BREAK ALL BURRS AND SHARP EDGES.

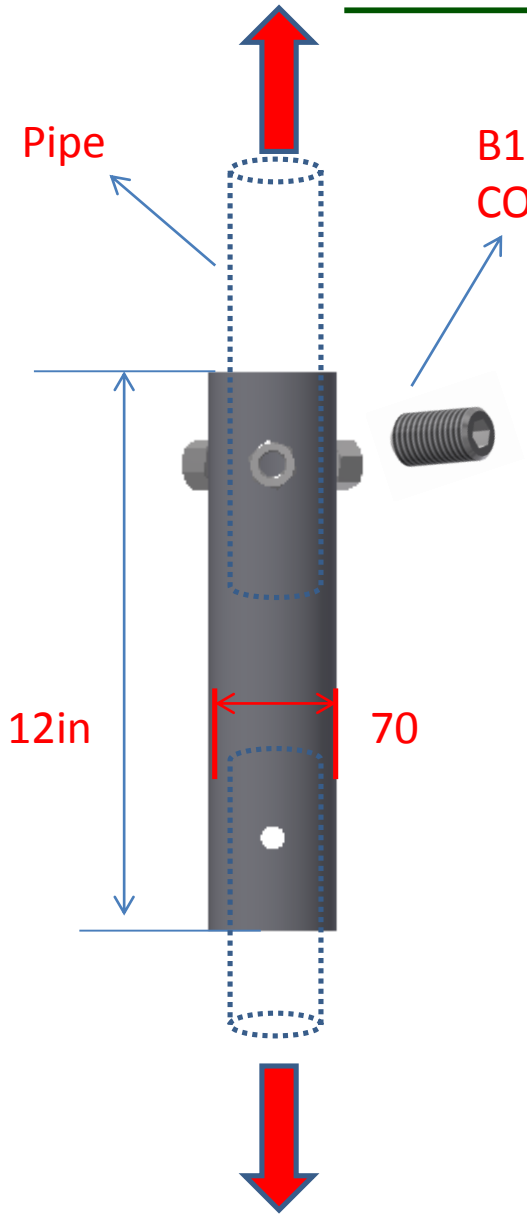
5. ALL WELDING MUST BE IN COMPLIANCE WITH AWS CODE D1;1.



Section properties:

Weight: 3.201 lbs/ft
Area: 0.941 in^2
Perimeter: 17.378 in
Bounding Box: X: -1.437,1.437
Y: -1.437,1.437
Centroid:(0.000,0.000)
Moments of Inertia(in^4): Ix=0.901,Iy=0.901
Section modulus in bending(in^3): Wx=0.627,Wy=0.627
Radii of Gyration: X: 0.979, Y: 0.979

MATERIAL: SEE NOTES		**Sunmodo Corp.**	
Third Angle Projection:		14800 NE 65TH STREET, VANCOUVER WA 98682	
GENERAL SPECIFICATIONS All Dimensions in Inches [millimeters] Tolerances X.XXX ±0.01 [0.25mm] X.XX ±0.02 [0.50mm] X.X ±0.039 [1.0mm] Unless otherwise spec'd Break all sharp edges .010-.020 unless otherwise specified.		TITLE: PIPE, HSS, 2.875" OD X 12 GAUGE,L=XXX	
DRAWN BY: LWF	DATE: 04/03/2019	B	DRAWING NUMBER: A21168
CHECKED BY			
APPROVALS		SCALE: NONE	SHEET 1 of 1



B10051-002, SET SCREW M16X30
CONE TIPPED SET SCRE M16X30

Conditions for load test：

1. The helical auger and ground screw use the same top section, so only one was used for testing
2. A 12 inch section from the top of the auger/ground screw was used
3. Three tests on each pipe type was used
4. The auger/screw material supplied by the auger/screw supplier.