Project Number: U2716-0217-201

April 15, 2020

Sunmodo
14800 NE 65th Street
Vancouver, WA 98682

REFERENCE: Sunmodo Sunturf Ground Mount A7
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 New York State Uniform Code, 2017 Edition (2015 IBC). 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. 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: C
- Ground snow load: 50 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	2430	1.5	3650
LATERAL	1710	2	3420

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
NY Firm License: COA0012807

Wells Holmes, P.E.
License: 90187 - Expires: 09/30/2023
Project Engineer

Enclosures

WLH/stb

04/15/2021

VECTOR ENGINEERS
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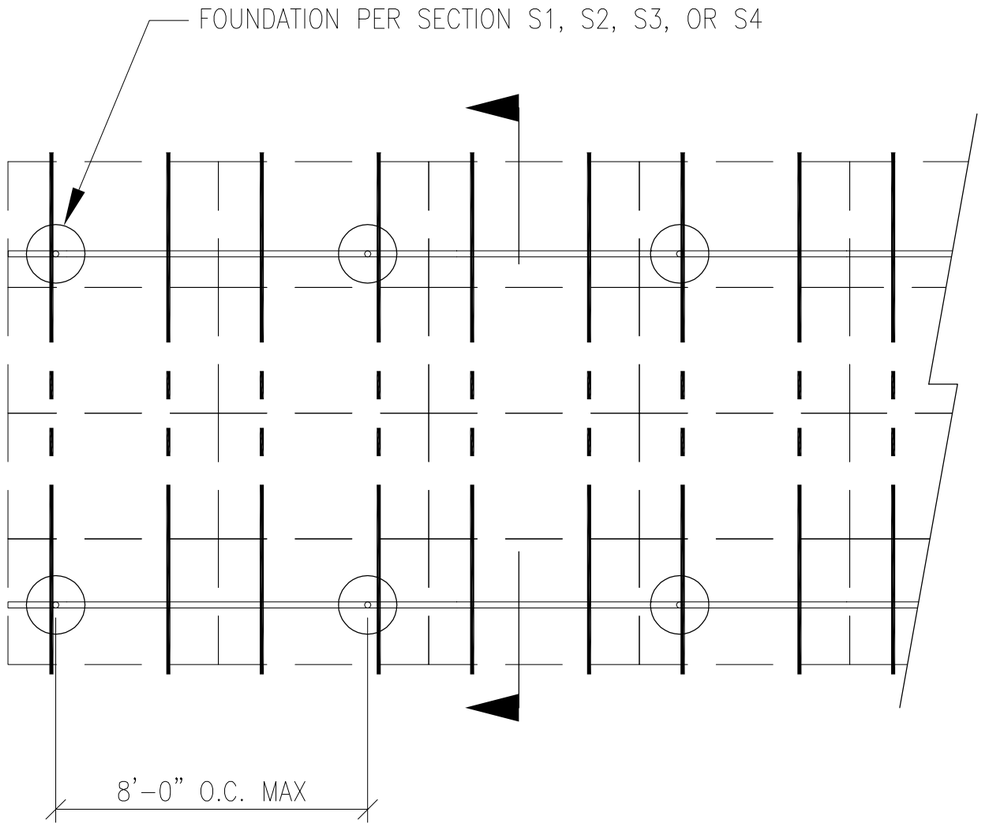
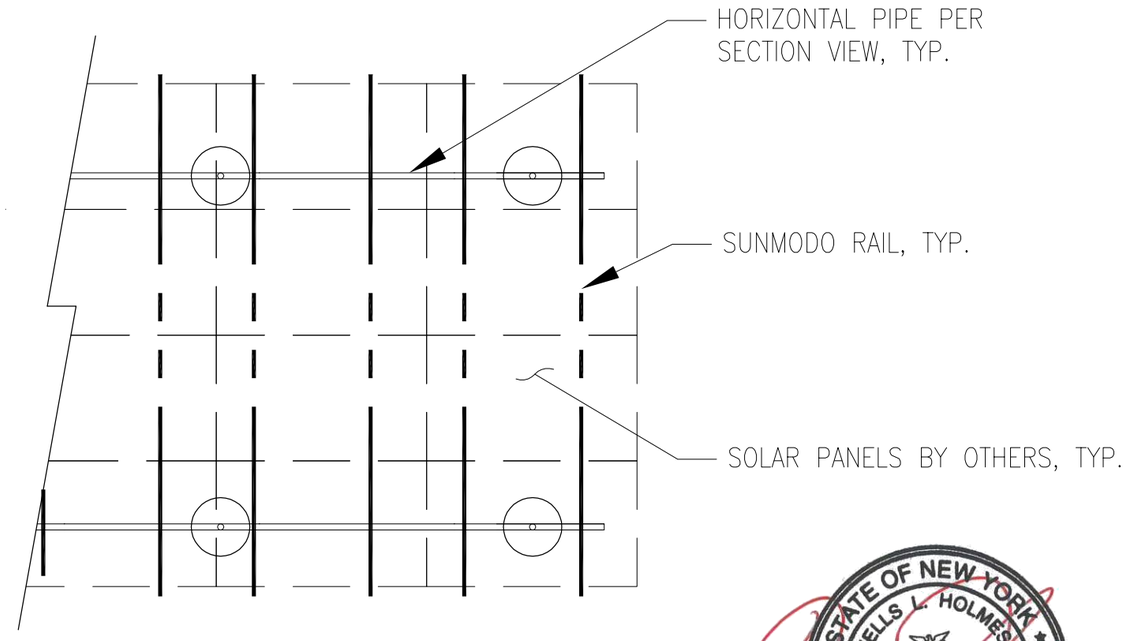
JOB NO. U2716-0217-201

PROJECT SUNMODO SUNTURF GROUND MOUNTS A7

SUBJECT ALL OPTIONS





STATE OF NEW YORK
WELLS L. HOLMES
090187
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04/15/2021

PV ARRAY PLAN

N.T.S.

P1

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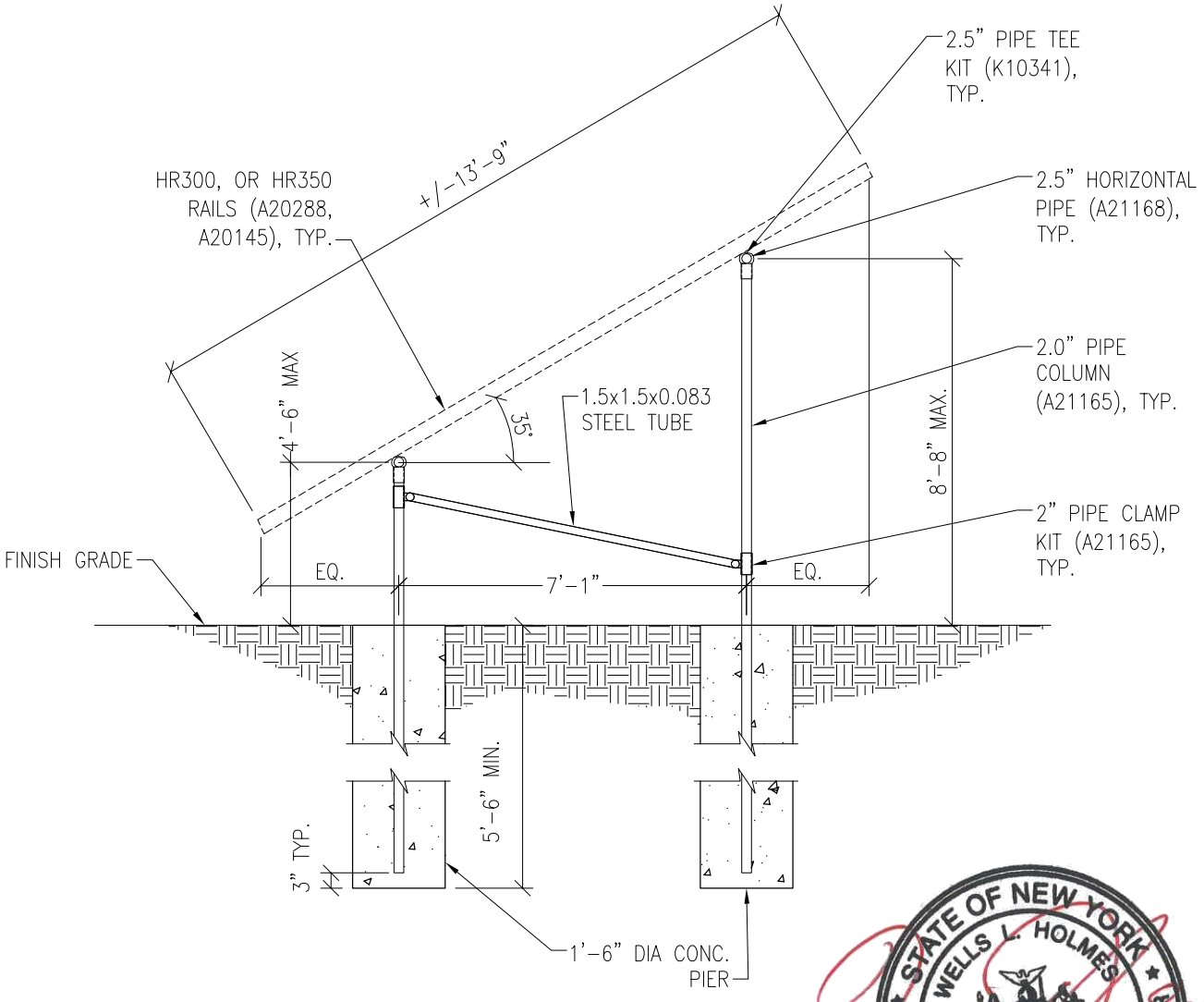
JOB NO. U2716-0217-201

PROJECT SUNMODO SUNTURF GROUND MOUNTS A7

SUBJECT DRILLED PIER OPTION



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PV ARRAY SECTION 04/15/2021 S1

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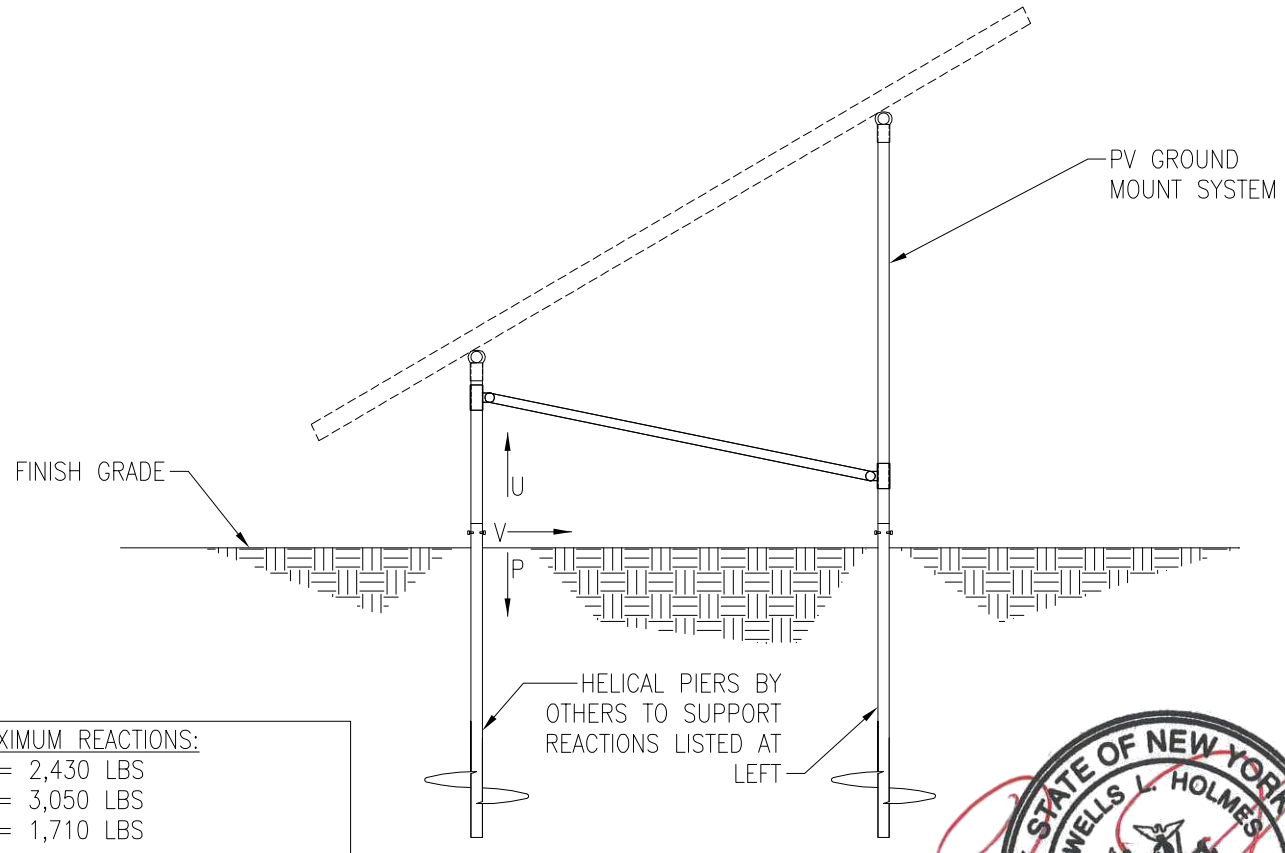
JOB NO. U2716-0217-201

PROJECT SUNMODO SUNTURF GROUND MOUNTS A7

SUBJECT HELICAL PIER OPTION

NOTES:

1. For ground mount components see Section S1.
2. A minimum of (1) installed helical pier must be tested as follows:
   - 2.1. Safety factor for uplift to be 1.5
   - 2.2. S.F. for lateral loads to be 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 = 2,430 LBS
P = 3,050 LBS
V = 1,710 LBS

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PV ARRAY SECTION

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S2

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VECTOR ENGINEERS

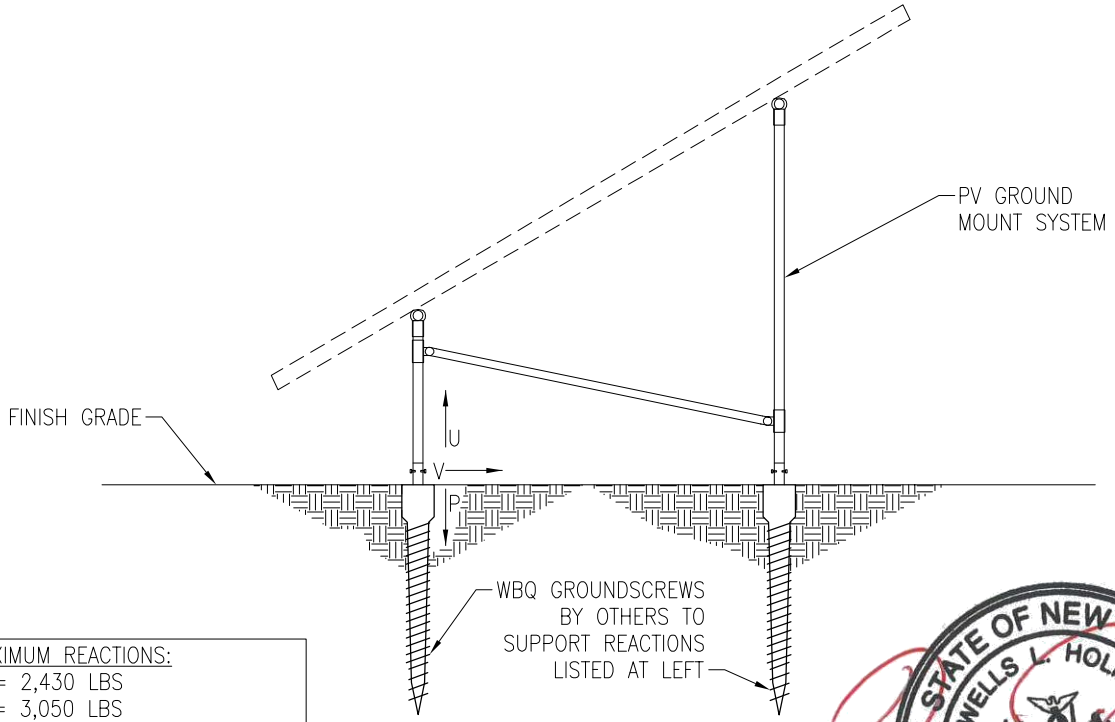
JOB NO. U2716-217-201

PROJECT SUNMODO SUNTURF GROUND MOUNTS A7

SUBJECT GROUND SCREW OPTION

NOTES:

1. For ground mount components see Section S1.
2. A minimum of (1) installed ground screw must be tested as follows:
   - 2.1. Safety factor for uplift to be 1.5
   - 2.2. S.F. for lateral loads to be 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 = 2,430 LBS
P = 3,050 LBS
V = 1,710 LBS

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PV ARRAY SECTION

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S3

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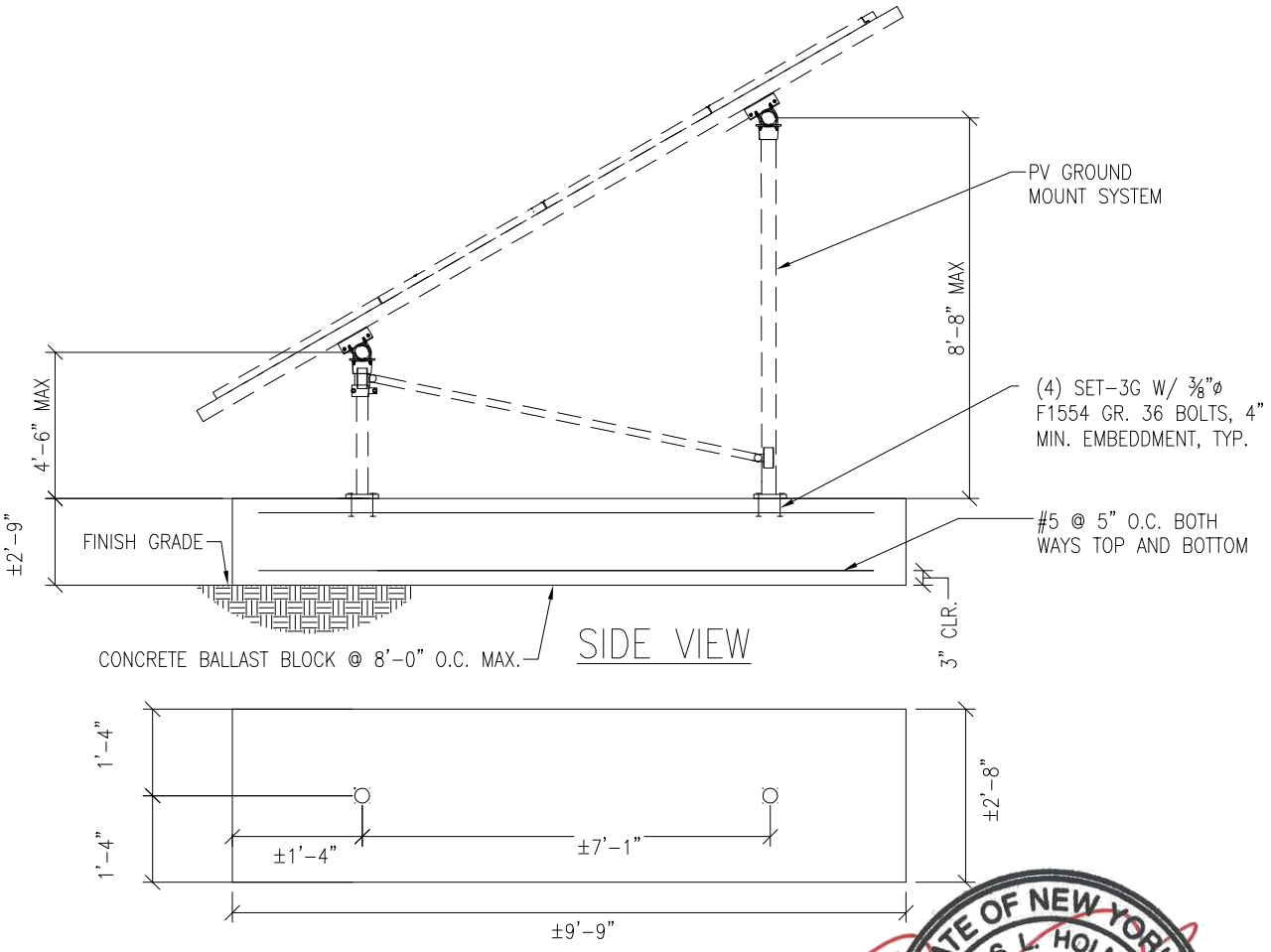
JOB NO. U2716-0217-201

PROJECT SUNMODO SUNTURF GROUND MOUNTS A7

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.: U2716-0217-201 **DESIGNED:** STB
DATE: 06/25/20

PROJECT: A7 – 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]:	50.0	(Section 7.2)
Terrain Category:	C	(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]:	30	(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]:	19	(Equation 7.4-1)
Design Snow Load, S [psf]:	19	

JOB NO.: U2716-0217-201 **DESIGNED:** STB
DATE: 06/25/20

PROJECT: A7 – Sunmodo Sunturf GM **SUBJECT:** Wind Pressure

Design Wind Load:

ASCE 7 Standard:	10	
Basic Wind Speed, V [mph]:	110	
Risk Category:	I	
Exposure Category	C	(Section 26.7.3)
Velocity Pressure Exposure Coefficient, K_h:	0.85	(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]:	22.4	(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)	-34.2	-34.2
Case 2 (γ = 0°, Load Case B)	-46.3	-10.8
Case 3 (γ = 180°, Load Case A)	39.9	41.2
Case 4 (γ = 180°, Load Case B)	50.7	20.3

JOB NO.: U2716-0217-201 **DESIGNED:** STB

Foundation Option 1: Drilled Concrete Pier

JOB NO.: U2716-0217-201 **DESIGNED:** STB
DATE: 06/25/20

PROJECT: A7 – Sunmodo Sunturf GM

Drilled Pier Design

Design Loads:

Max. Shear, V [k]:	1.7	Max. Down, P_d [k]:	3.1
Max. Moment, M [k-ft]:	0.0	Max. Uplift, P_u [k]:	2.4

Pier Properties:

Pier Diameter, b [ft]:	1.5	Volume of Concrete [ft^3]:	10
Min. Pier Diameter, b_{min} (opt'l) [ft]:		Volume of Concrete [yd^3]:	0.4
Top of Pier Elevation [ft]:	0.00	Weight of Concrete [k]:	1.5
Pier Depth, d [ft]:	5.5		
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]:	6.5	**Bearing capacity OK.**

Check Uplift:

Uplift Capacity [k]:	7.8	**Uplift capacity OK.**

Check Lateral Bearing:

Applied Lateral Force, P [lb]:	1,710	
Point of Application, h [ft]:	0.0	
S_{1_max} [psf]:		
S_1 [psf]:	550	
$A = 2.34*P/(S_1 b)$:	4.85	
Required Pier Depth, d_{reqd} [ft]:	4.9	**Lateral bearing capacity OK.**

JOB NO.: U2716-0217-201 **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. A minimum of one ground screw or helical pier must be tested.

Load (ASD)	Value (lbs)	Factor of Safety	Test Value (lbs)
UPLIFT	2430	1.5	3650
LATERAL	1710	2	3420

JOB NO.: U2716-0217-201 **DESIGNED:** STB

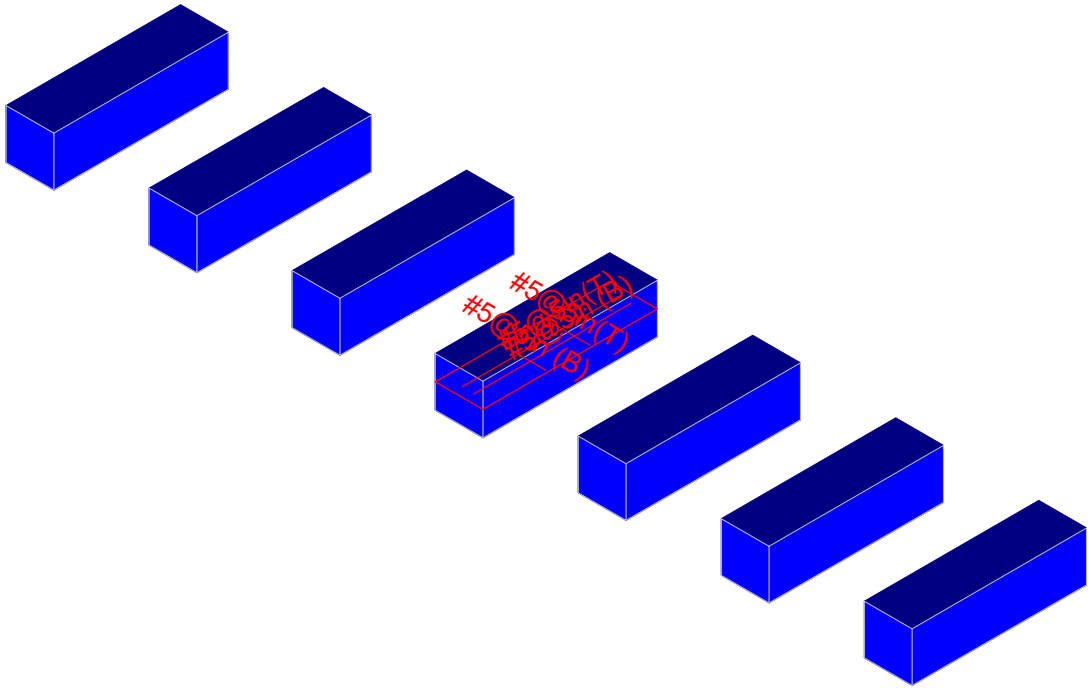
Foundation Option 3: Ground Screw

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. A minimum of one ground screw or helical pier must be tested.

Load (ASD)	Value (lbs)	Factor of Safety	Test Value (lbs)
UPLIFT	2430	1.5	3650
LATERAL	1710	2	3420

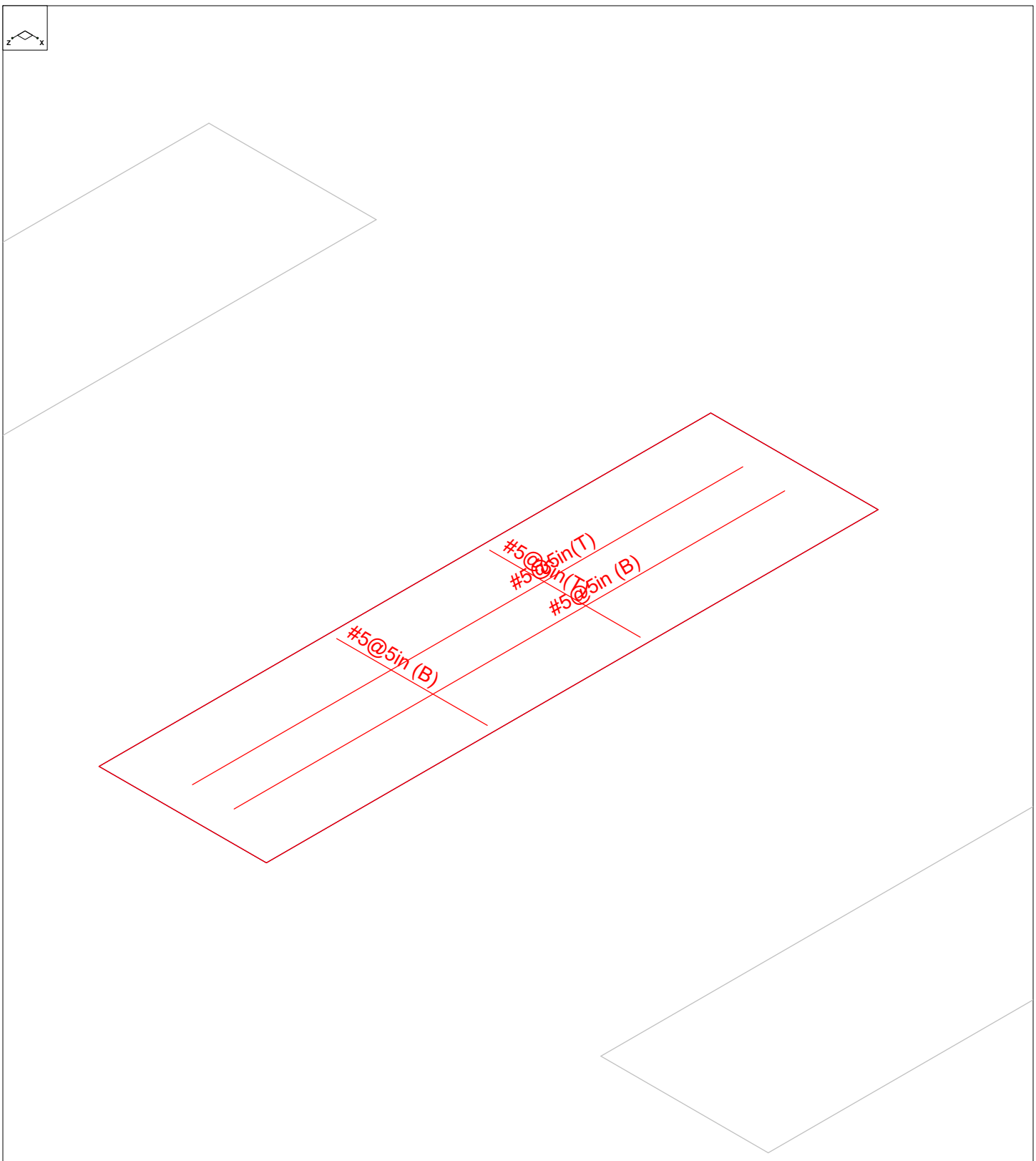
JOB NO.: U2716-0217-201 **DESIGNED:** STB

Foundation Option 4: Ballasted Block



Results for LC 2, 1.0 D

Vector Structural Engineeri...		SK - 1
STB	Ground Mount	June 25, 2020 at 10:43 AM
U2716.0219.201		Sunmodo Sunturf A7.r3d



Results for LC 2, 1.0 D

Vector Structural Engineeri...	Ground Mount	SK - 2
STB		June 25, 2020 at 10:43 AM
U2716.0219.201		Sunmodo Sunturf A7.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	0
Concrete Rebar Set	Rectangular
Concrete Code	ASTM A615
HR Steel Pile Code	ACI 318-14
Wood Pile Code	AISC 14th (360-10): ASD AWC NDS-15: ASD

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/...	Density[k/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	.11	3000	.75	60000	60000
5	Conc3500LW	2252	979	.15	.6	.11	3500	.75	60000	60000
6	Conc4000LW	2408	1047	.15	.6	.11	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	18	5	18	5	1	Optimize

Soil Definitions

	Label	Subgrade Modulus[k/ft^3]	Allowable Bearing[psf]	Depth Properties	Default?
1	Default	172.8	1500	None	Yes

Point Loads and Moments (Cat 1 : DL)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1	X	-8.665
2	R3D_N1	Y	236.255
3	R3D_N2	X	-1.957
4	R3D_N2	Y	199.139
5	R3D_N115_1	Y	248.369
6	R3D_N116_1	Y	237.452
7	R3D_N99_1	Y	248.528
8	R3D_N100_1	Y	237.428

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

	Label	Direction	Magnitude[lb,lb-ft]
9	R3D_N105A_1	Y	247.044
10	R3D_N106A_1	Y	233.23
11	R3D_N111A	Y	247.422
12	R3D_N112A	Y	233.972
13	R3D_N117A	Y	247.06
14	R3D_N118A	Y	233.227
15	R3D_N123	X	8.718
16	R3D_N123	Y	236.5
17	R3D_N124	X	1.957
18	R3D_N124	Y	198.957

Point Loads and Moments (Cat 6 : RLL)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1	X	-31.789
2	R3D_N1	Y	775.627
3	R3D_N1	Z	-1.267
4	R3D_N2	X	-6.925
5	R3D_N2	Y	742.543
6	R3D_N115_1	X	1.928
7	R3D_N115_1	Y	851.564
8	R3D_N115_1	Z	4.543
9	R3D_N116_1	X	4.573
10	R3D_N116_1	Y	906.279
11	R3D_N99_1	X	-1.938
12	R3D_N99_1	Y	852.034
13	R3D_N99_1	Z	4.543
14	R3D_N100_1	X	-4.633
15	R3D_N100_1	Y	906.171
16	R3D_N105A_1	Y	894.119
17	R3D_N105A_1	Z	-2.881
18	R3D_N106A_1	X	-3.394
19	R3D_N106A_1	Y	888.743
20	R3D_N111A	Y	887.431
21	R3D_N112A	Y	891.921
22	R3D_N117A	Y	894.197
23	R3D_N117A	Z	-2.872
24	R3D_N118A	X	3.331
25	R3D_N118A	Y	888.731
26	R3D_N123	X	31.984
27	R3D_N123	Y	776.743
28	R3D_N123	Z	-1.313
29	R3D_N124	X	6.938
30	R3D_N124	Y	741.642

Point Loads and Moments (Cat 16 : OL1)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1	X	71.106
2	R3D_N1	Y	-3281.902
3	R3D_N1	Z	1970.1
4	R3D_N2	X	7.26
5	R3D_N2	Y	517.84
6	R3D_N2	Z	-106.199
7	R3D_N115_1	X	-6.398
8	R3D_N115_1	Y	-3755.109
9	R3D_N115_1	Z	2368.395
10	R3D_N116_1	Y	630.59

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

	Label	Direction	Magnitude[lb,lb-ft]
11	R3D_N116_1	Z	-118.36
12	R3D_N99_1	X	6.417
13	R3D_N99_1	Y	-3756.349
14	R3D_N99_1	Z	2368.737
15	R3D_N100_1	Y	630.796
16	R3D_N100_1	Z	-118.366
17	R3D_N105A_1	Y	-3893.863
18	R3D_N105A_1	Z	2400.4
19	R3D_N106A_1	X	7.846
20	R3D_N106A_1	Y	676.326
21	R3D_N106A_1	Z	-123.946
22	R3D_N111A	Y	-3798.754
23	R3D_N111A	Z	2334.489
24	R3D_N112A	Y	596.95
25	R3D_N112A	Z	-120.579
26	R3D_N117A	Y	-3894.165
27	R3D_N117A	Z	2400.541
28	R3D_N118A	X	-7.769
29	R3D_N118A	Y	676.436
30	R3D_N118A	Z	-123.947
31	R3D_N123	X	-71.562
32	R3D_N123	Y	-3281.513
33	R3D_N123	Z	1970.386
34	R3D_N124	X	-7.032
35	R3D_N124	Y	516.77
36	R3D_N124	Z	-106.206

Point Loads and Moments (Cat 17 : OL2)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1	X	88.796
2	R3D_N1	Y	-3642.569
3	R3D_N1	Z	1643.177
4	R3D_N2	X	1.638
5	R3D_N2	Y	1298.94
6	R3D_N2	Z	-88.29
7	R3D_N115_1	X	-7.842
8	R3D_N115_1	Y	-4127.114
9	R3D_N115_1	Z	1973.616
10	R3D_N116_1	X	6.703
11	R3D_N116_1	Y	1559.535
12	R3D_N116_1	Z	-98.848
13	R3D_N99_1	X	7.867
14	R3D_N99_1	Y	-4128.609
15	R3D_N99_1	Z	1973.91
16	R3D_N100_1	X	-6.636
17	R3D_N100_1	Y	1559.809
18	R3D_N100_1	Z	-98.853
19	R3D_N105A_1	X	1.064
20	R3D_N105A_1	Y	-4296.389
21	R3D_N105A_1	Z	2016.179
22	R3D_N106A_1	X	4.574
23	R3D_N106A_1	Y	1605.657
24	R3D_N106A_1	Z	-104.066
25	R3D_N111A	Y	-4180.029
26	R3D_N111A	Z	1934.037
27	R3D_N112A	Y	1508.134

Point Loads and Moments (Cat 17 : OL2) (Continued)

	Label	Direction	Magnitude[lb,lb-ft]
28	R3D_N112A	Z	-100.109
29	R3D_N117A	Y	-4296.726
30	R3D_N117A	Z	2016.295
31	R3D_N118A	X	-4.461
32	R3D_N118A	Y	1605.773
33	R3D_N118A	Z	-104.067
34	R3D_N123	X	-89.366
35	R3D_N123	Y	-3642.583
36	R3D_N123	Z	1643.447
37	R3D_N124	X	-1.443
38	R3D_N124	Y	1298.189
39	R3D_N124	Z	-88.297

Point Loads and Moments (Cat 18 : OL3)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1	X	-85.386
2	R3D_N1	Y	3924.323
3	R3D_N1	Z	-2335.84
4	R3D_N2	X	-8.446
5	R3D_N2	Y	-645.725
6	R3D_N2	Z	125.904
7	R3D_N115_1	X	7.677
8	R3D_N115_1	Y	4488.67
9	R3D_N115_1	Z	-2808.013
10	R3D_N116_1	Y	-785.506
11	R3D_N116_1	Z	140.338
12	R3D_N99_1	X	-7.7
13	R3D_N99_1	Y	4490.157
14	R3D_N99_1	Z	-2808.419
15	R3D_N100_1	Y	-785.754
16	R3D_N100_1	Z	140.345
17	R3D_N105A_1	Y	4655.144
18	R3D_N105A_1	Z	-2846.54
19	R3D_N106A_1	X	-9.23
20	R3D_N106A_1	Y	-840.025
21	R3D_N106A_1	Z	146.981
22	R3D_N111A	Y	4541.022
23	R3D_N111A	Z	-2767.398
24	R3D_N112A	Y	-744.766
25	R3D_N112A	Z	142.947
26	R3D_N117A	Y	4655.505
27	R3D_N117A	Z	-2846.707
28	R3D_N118A	X	9.137
29	R3D_N118A	Y	-840.156
30	R3D_N118A	Z	146.983
31	R3D_N123	X	85.934
32	R3D_N123	Y	3923.874
33	R3D_N123	Z	-2336.181
34	R3D_N124	X	8.176
35	R3D_N124	Y	-644.462
36	R3D_N124	Z	125.913

Point Loads and Moments (Cat 19 : OL4)

	Label	Direction	Magnitude[lb,lb-ft]
1	R3D_N1	X	-48.6
2	R3D_N1	Y	2633.506

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

	Label	Direction	Magnitude[lb,lb-ft]
3	R3D_N1	Z	-2046.231
4	R3D_N2	X	-11.323
5	R3D_N2	Y	204.621
6	R3D_N2	Z	110.548
7	R3D_N115_1	X	4.499
8	R3D_N115_1	Y	3048.046
9	R3D_N115_1	Z	-2461.427
10	R3D_N116_1	X	6.19
11	R3D_N116_1	Y	230.142
12	R3D_N116_1	Z	122.824
13	R3D_N99_1	X	-4.511
14	R3D_N99_1	Y	3048.94
15	R3D_N99_1	Z	-2461.776
16	R3D_N100_1	X	-6.153
17	R3D_N100_1	Y	230.015
18	R3D_N100_1	Z	122.829
19	R3D_N105A_1	Y	3146.308
20	R3D_N105A_1	Z	-2481.079
21	R3D_N106A_1	X	-9.836
22	R3D_N106A_1	Y	189.467
23	R3D_N106A_1	Z	128.146
24	R3D_N111A	Y	3079.238
25	R3D_N111A	Z	-2435.887
26	R3D_N112A	Y	245.091
27	R3D_N112A	Z	125.632
28	R3D_N117A	Y	3146.549
29	R3D_N117A	Z	-2481.227
30	R3D_N118A	X	9.798
31	R3D_N118A	Y	189.374
32	R3D_N118A	Z	128.148
33	R3D_N123	X	48.913
34	R3D_N123	Y	2632.811
35	R3D_N123	Z	-2046.502
36	R3D_N124	X	11.09
37	R3D_N124	Y	205.853
38	R3D_N124	Z	110.555

Slabs

	Label	Thickness [in]	Material	Local Axis Angle ...	Analysis Offset [in]	Passive Pressur...	Soil Overburden [psf]
1	S1	33	Conc2500NW	0	0	0	0
2	S2	33	Conc2500NW	0	0	0	0
3	S3	33	Conc2500NW	0	0	0	0
4	S4	33	Conc2500NW	0	0	0	0
5	S5	33	Conc2500NW	0	0	0	0
6	S6	33	Conc2500NW	0	0	0	0
7	S7	33	Conc2500NW	0	0	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	ASD Loads																								
2	1.0 D	Yes	Yes		1.5	DL	1																		
3	1.0 D + 1....	Yes	Yes		1.5	DL	1	RLL	1																
4	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL1	.6														
5	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL2	.6														
6	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL3	.6														
7	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL4	.6														

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...
8	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL1	.45														
9	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL2	.45														
10	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL3	.45														
11	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL4	.45														
12	0.6 D + 0....	Yes	Yes			DL	.6	RLL		OL1	.6														
13	0.6 D + 0....	Yes	Yes			DL	.6	RLL		OL2	.6														
14	0.6 D + 0....	Yes	Yes			DL	.6	RLL		OL3	.6														
15	0.6 D + 0....	Yes	Yes			DL	.6	RLL		OL4	.6														
16																									
17	LRFD Loa...																								
18	1.4 D	Yes				DL	1.4	RLL																	
19	1.2 D + 1....	Yes				DL	1.2	RLL	1.6	OL1	.5														
20	1.2 D + 1....	Yes				DL	1.2	RLL	1.6	OL2	.5														
21	1.2 D + 1....	Yes				DL	1.2	RLL	1.6	OL3	.5														
22	1.2 D + 1....	Yes				DL	1.2	RLL	1.6	OL4	.5														
23	1.2 D + 1....	Yes				DL	1.2	RLL		OL1	1														
24	1.2 D + 1....	Yes				DL	1.2	RLL		OL2	1														
25	1.2 D + 1....	Yes				DL	1.2	RLL		OL3	1														
26	1.2 D + 1....	Yes				DL	1.2	RLL		OL4	1														
27	0.9 D + 1....	Yes				DL	.9	RLL		OL1	1														
28	0.9 D + 1....	Yes				DL	.9	RLL		OL2	1														
29	0.9 D + 1....	Yes				DL	.9	RLL		OL3	1														
30	0.9 D + 1....	Yes				DL	.9	RLL		OL4	1														

Design Strips

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

Load Categories

	Category	Point Loads	Line Loads	Area Loads
1	DL	18		
2	RLL	30		
3	OL1	36		
4	OL2	39		
5	OL3	36		
6	OL4	38		

Strip Reinforcing

	Label	UC Top	LC	Top Bars	Governing ...	UC Bot	LC	Bot B...	Gover...	UC Shear	LC	Governing De...
1	DS1	0	27	#5@5in	DS1-X26	.002	21	#5@5in	DS1-...	.005	21	DS1-X37
2	DS2	.01	21	#5@5in	DS2-X25	.01	28	#5@5in	DS2-...	.023	28	DS2-X15

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	2	S1	0	0	52532.824	0	14433.093	9.999+	9.999+
2	2	S2	0	0	52871.459	0	14471.299	9.999+	9.999+
3	2	S3	0	0	52834.144	0	14463.722	9.999+	9.999+
4	2	S4	0	0	52840.898	0	14465.217	9.999+	9.999+
5	2	S5	0	0	52834.143	0	14463.741	9.999+	9.999+
6	2	S6	0	0	52871.444	0	14471.118	9.999+	9.999+
7	2	S7	0	0	52531.624	0	14374.609	9.999+	9.999+
8	3	S1	0	0	59813.242	0	16563.783	9.999+	9.999+
9	3	S2	0	0	61646.925	0	16833.64	9.999+	9.999+
10	3	S3	0	0	61498.628	0	16850.206	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
11	3	S4	0	0	61531.137	0	16837.687	9.999+	9.999+
12	3	S5	0	0	61498.655	0	16831.816	9.999+	9.999+
13	3	S6	0	0	61647.201	0	16797.033	9.999+	9.999+
14	3	S7	0	0	59805.823	0	16292.088	9.999+	9.999+
15	4	S1	0	19234.804	52795.746	2340.553	14433.093	2.745	6.167
16	4	S2	0	22178.079	52950.097	2511.03	14471.299	2.387	5.763
17	4	S3	0	22879.136	52932.004	2586.975	14463.722	2.314	5.591
18	4	S4	0	22359.142	52936.181	2561.443	14465.217	2.368	5.647
19	4	S5	0	22880.805	52932.14	2587.002	14463.741	2.313	5.591
20	4	S6	0	22171.425	52948.786	2510.171	14471.118	2.388	5.765
21	4	S7	0	19234.155	52797.564	2341.475	14433.325	2.745	6.164
22	5	S1	0	19921.413	52795.746	2024.12	14433.093	2.65	7.131
23	5	S2	0	22695.503	52950.097	2057.071	14471.299	2.333	7.035
24	5	S3	0	23567.259	52932.004	2161.889	14463.722	2.246	6.69
25	5	S4	0	22928.655	52936.181	2137.516	14465.217	2.309	6.767
26	5	S5	0	23569.057	52932.14	2160.123	14463.741	2.246	6.696
27	5	S6	0	22687.695	52948.786	2055.943	14471.118	2.334	7.039
28	5	S7	0	19922.522	52797.564	2025.351	14433.325	2.65	7.126
29	6	S1	0	3767.857	52532.824	0	17210.794	9.999+	9.999+
30	6	S2	0	4778.262	52871.459	0	17447.527	9.999+	9.999+
31	6	S3	0	4972.293	52834.144	0	17531.047	9.999+	9.999+
32	6	S4	0	4458.607	52840.898	0	17502.222	9.999+	9.999+
33	6	S5	0	4972.94	52834.143	0	17500.943	9.999+	9.999+
34	6	S6	0	4777.54	52871.444	0	17420.982	9.999+	9.999+
35	6	S7	0	3762.384	52531.624	0	16842.857	9.999+	9.999+
36	7	S1	0	53.745	52532.824	0	16802.467	9.999+	9.999+
37	7	S2	0	258.543	52871.459	0	17112.059	9.999+	9.999+
38	7	S3	0	408.491	52834.144	0	17148.572	9.999+	9.999+
39	7	S4	0	110.829	52840.898	0	17124.68	9.999+	9.999+
40	7	S5	0	409.012	52834.143	0	17116.313	9.999+	9.999+
41	7	S6	0	258.048	52871.444	0	17076.032	9.999+	9.999+
42	7	S7	0	48.512	52531.624	0	16546.536	9.999+	9.999+
43	8	S1	0	14426.103	58437.073	1755.414	16031.111	4.051	9.132
44	8	S2	0	16633.56	59225.39	1883.273	16243.055	3.561	8.625
45	8	S3	0	17159.352	59470.844	1940.231	16253.585	3.466	8.377
46	8	S4	0	16769.357	59430.041	1921.082	16244.57	3.544	8.456
47	8	S5	0	17160.604	59471.437	1940.251	16253.539	3.466	8.377
48	8	S6	0	16628.569	59221.222	1882.629	16242.369	3.561	8.627
49	8	S7	0	14425.616	58445.13	1756.106	16031.987	4.051	9.129
50	9	S1	0	14941.06	58437.073	1518.09	16031.111	3.911	9.999+
51	9	S2	0	17021.627	59225.39	1542.804	16243.055	3.479	9.999+
52	9	S3	0	17675.444	59470.844	1621.417	16253.585	3.365	9.999+
53	9	S4	0	17196.491	59430.041	1603.137	16244.57	3.456	9.999+
54	9	S5	0	17676.793	59471.437	1620.092	16253.539	3.364	9.999+
55	9	S6	0	17015.771	59221.222	1541.957	16242.369	3.48	9.999+
56	9	S7	0	14941.891	58445.13	1519.013	16031.987	3.911	9.999+
57	10	S1	0	2825.893	57993.138	0	18114.386	9.999+	9.999+
58	10	S2	0	3583.696	59453.059	0	18475.226	9.999+	9.999+
59	10	S3	0	3729.22	59332.507	0	18554.079	9.999+	9.999+
60	10	S4	0	3343.955	59358.578	0	18522.323	9.999+	9.999+
61	10	S5	0	3729.705	59332.527	0	18517.699	9.999+	9.999+
62	10	S6	0	3583.155	59453.262	0	18427.952	9.999+	9.999+
63	10	S7	0	2821.788	57987.274	0	17663.904	9.999+	9.999+
64	11	S1	0	40.309	57993.138	0	17808.141	9.999+	9.999+
65	11	S2	0	193.907	59453.059	0	18223.625	9.999+	9.999+
66	11	S3	0	306.368	59332.507	0	18267.222	9.999+	9.999+
67	11	S4	0	83.122	59358.578	0	18239.167	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
68	11	S5	0	306.759	59332.527	0	18229.226	9.999+	9.999+
69	11	S6	0	193.536	59453.262	0	18169.239	9.999+	9.999+
70	11	S7	0	36.384	57987.274	0	17441.663	9.999+	9.999+
71	12	S1	0	19234.804	31677.447	2340.553	8659.856	1.647	3.7
72	12	S2	0	22178.079	31770.058	2511.03	8682.779	1.432	3.458
73	12	S3	0	22879.136	31759.202	2586.975	8678.233	1.388	3.355
74	12	S4	0	22359.142	31761.709	2561.443	8679.13	1.421	3.388
75	12	S5	0	22880.805	31759.284	2587.002	8678.244	1.388	3.355
76	12	S6	0	22171.425	31769.271	2510.171	8682.671	1.433	3.459
77	12	S7	0	19234.155	31678.538	2341.475	8659.995	1.647	3.699
78	13	S1	0	19921.413	31677.447	2024.12	8659.856	1.59	4.278
79	13	S2	0	22695.503	31770.058	2057.071	8682.779	1.4	4.221
80	13	S3	0	23567.259	31759.202	2161.889	8678.233	1.348	4.014
81	13	S4	0	22928.655	31761.709	2137.516	8679.13	1.385	4.06
82	13	S5	0	23569.057	31759.284	2160.123	8678.244	1.347	4.017
83	13	S6	0	22687.695	31769.271	2055.943	8682.671	1.4	4.223
84	13	S7	0	19922.522	31678.538	2025.351	8659.995	1.59	4.276
85	14	S1	0	3767.857	31519.694	0	11437.557	8.365	9.999+
86	14	S2	0	4778.262	31722.875	0	11659.007	6.639	9.999+
87	14	S3	0	4972.293	31700.487	0	11745.558	6.375	9.999+
88	14	S4	0	4458.607	31704.539	0	11716.135	7.111	9.999+
89	14	S5	0	4972.94	31700.486	0	11715.447	6.375	9.999+
90	14	S6	0	4777.54	31722.867	0	11632.535	6.64	9.999+
91	14	S7	0	3762.384	31518.975	0	11093.014	8.377	9.999+
92	15	S1	0	53.745	31519.694	0	11029.229	9.999+	9.999+
93	15	S2	0	258.543	31722.875	0	11323.539	9.999+	9.999+
94	15	S3	0	408.491	31700.487	0	11363.083	9.999+	9.999+
95	15	S4	0	110.829	31704.539	0	11338.593	9.999+	9.999+
96	15	S5	0	409.012	31700.486	0	11330.817	9.999+	9.999+
97	15	S6	0	258.048	31722.867	0	11287.585	9.999+	9.999+
98	15	S7	0	48.512	31518.975	0	10796.692	9.999+	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	2	S1	0	10.622	3240.874	0	3240.874	9.999+	9.999+
2	2	S2	0	0	3256.042	0	3256.042	9.999+	9.999+
3	2	S3	0	0	3254.337	0	3254.337	9.999+	9.999+
4	2	S4	0	0	3254.674	0	3254.674	9.999+	9.999+
5	2	S5	0	0	3254.342	0	3254.342	9.999+	9.999+
6	2	S6	0	0	3256.002	0	3256.002	9.999+	9.999+
7	2	S7	0	10.676	3240.893	0	3240.893	9.999+	9.999+
8	3	S1	0	49.336	3696.325	1.267	3696.325	9.999+	9.999+
9	3	S2	0	6.57	3783.504	4.543	3783.504	9.999+	9.999+
10	3	S3	0	3.394	3789.196	2.881	3789.196	9.999+	9.999+
11	3	S4	0	0	3788.48	0	3788.48	9.999+	9.999+
12	3	S5	0	3.331	3789.22	2.872	3789.22	9.999+	9.999+
13	3	S6	0	6.501	3783.355	4.543	3783.355	9.999+	9.999+
14	3	S7	0	49.598	3696.408	1.313	3696.408	9.999+	9.999+
15	4	S1	0	36.397	2743.342	1118.34	2743.342	9.999+	2.453
16	4	S2	0	3.85	2693.443	1350.223	2693.443	9.999+	1.995
17	4	S3	0	4.708	2675.181	1365.872	2675.181	9.999+	1.959
18	4	S4	0	0	2678.349	1328.346	2678.349	9.999+	2.016
19	4	S5	0	4.661	2675.15	1365.956	2675.15	9.999+	1.958
20	4	S6	0	3.839	2693.588	1350.021	2693.588	9.999+	1.995
21	4	S7	0	36.481	2743.239	1118.508	2743.239	9.999+	2.453
22	5	S1	0	43.639	2819.02	932.932	2819.02	9.999+	3.022

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
23	5	S2	0	.739	2793.658	1125.034	2793.658	9.999+	2.483
24	5	S3	0	3.383	2770.006	1147.267	2770.006	9.999+	2.414
25	5	S4	0	0	2773.733	1100.357	2773.733	9.999+	2.521
26	5	S5	0	2.677	2769.97	1147.337	2769.97	9.999+	2.414
27	5	S6	0	.684	2793.837	1124.861	2793.837	9.999+	2.484
28	5	S7	0	43.81	2818.902	933.09	2818.902	9.999+	3.021
29	6	S1	0	66.921	3831.021	1325.961	3831.021	9.999+	2.889
30	6	S2	0	4.62	3922.835	1600.844	3922.835	9.999+	2.45
31	6	S3	0	5.538	3941.059	1619.735	3941.059	9.999+	2.433
32	6	S4	0	0	3938	1574.671	3938	9.999+	2.501
33	6	S5	0	5.482	3941.104	1619.835	3941.104	9.999+	2.433
34	6	S6	0	4.606	3922.571	1600.605	3922.571	9.999+	2.451
35	6	S7	0	67.142	3831.187	1326.161	3831.187	9.999+	2.889
36	7	S1	0	46.576	3751.736	1161.41	3751.736	9.999+	3.23
37	7	S2	0	6.399	3846.254	1403.368	3846.254	9.999+	2.741
38	7	S3	0	5.902	3854.777	1411.76	3854.777	9.999+	2.73
39	7	S4	0	0	3853.053	1386.153	3853.053	9.999+	2.78
40	7	S5	0	5.879	3854.808	1411.847	3854.808	9.999+	2.73
41	7	S6	0	6.413	3846.075	1403.162	3846.075	9.999+	2.741
42	7	S7	0	46.677	3751.852	1161.568	3751.852	9.999+	3.23
43	8	S1	0	4.393	3209.314	837.805	3209.314	9.999+	3.831
44	8	S2	0	2.04	3229.689	1016.074	3229.689	9.999+	3.179
45	8	S3	0	.985	3221.114	1022.244	3221.114	9.999+	3.151
46	8	S4	0	0	3222.785	996.26	3222.785	9.999+	3.235
47	8	S5	0	.997	3221.107	1022.313	3221.107	9.999+	3.151
48	8	S6	0	1.997	3229.706	1015.923	3229.706	9.999+	3.179
49	8	S7	0	4.5	3209.289	837.897	3209.289	9.999+	3.83
50	9	S1	0	1.038	3266.072	698.749	3266.072	9.999+	4.674
51	9	S2	0	4.374	3304.85	847.183	3304.85	9.999+	3.901
52	9	S3	0	.008	3292.233	858.29	3292.233	9.999+	3.836
53	9	S4	0	0	3294.322	825.268	3294.322	9.999+	3.992
54	9	S5	0	.491	3292.222	858.349	3292.222	9.999+	3.836
55	9	S6	0	4.363	3304.893	847.053	3304.893	9.999+	3.902
56	9	S7	0	.997	3266.036	698.833	3266.036	9.999+	4.674
57	10	S1	0	81.882	4025.073	995.421	4025.073	9.999+	4.044
58	10	S2	0	8.393	4151.733	1197.226	4151.733	9.999+	3.468
59	10	S3	0	6.699	4170.522	1216.962	4170.522	9.999+	3.427
60	10	S4	0	0	4167.523	1181.003	4167.523	9.999+	3.529
61	10	S5	0	6.61	4170.572	1217.03	4170.572	9.999+	3.427
62	10	S6	0	8.33	4151.443	1197.046	4151.443	9.999+	3.468
63	10	S7	0	82.217	4025.25	995.605	4025.25	9.999+	4.043
64	11	S1	0	66.623	3965.609	872.008	3965.609	9.999+	4.548
65	11	S2	0	9.727	4094.297	1049.119	4094.297	9.999+	3.903
66	11	S3	0	6.972	4105.811	1060.98	4105.811	9.999+	3.87
67	11	S4	0	0	4103.813	1039.615	4103.813	9.999+	3.947
68	11	S5	0	6.907	4105.85	1061.039	4105.85	9.999+	3.87
69	11	S6	0	9.685	4094.072	1048.964	4094.072	9.999+	3.903
70	11	S7	0	66.868	3965.749	872.161	3965.749	9.999+	4.547
71	12	S1	0	40.646	1446.993	1118.34	1446.993	9.999+	1.294
72	12	S2	0	3.85	1391.026	1350.223	1391.026	9.999+	1.03
73	12	S3	0	4.708	1373.446	1365.872	1373.446	9.999+	1.006
74	12	S4	0	0	1376.48	1328.346	1376.48	9.999+	1.036
75	12	S5	0	4.661	1373.414	1365.956	1373.414	9.999+	1.005
76	12	S6	0	3.839	1391.187	1350.021	1391.187	9.999+	1.03
77	12	S7	0	40.751	1446.882	1118.508	1446.882	9.999+	1.294
78	13	S1	0	47.887	1522.671	932.932	1522.671	9.999+	1.632
79	13	S2	0	.739	1491.241	1125.034	1491.241	9.999+	1.326

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
80	13	S3	0	3.383	1468.271	1147.267	1468.271	9.999+	1.28
81	13	S4	0	0	1471.863	1100.357	1471.863	9.999+	1.338
82	13	S5	0	2.677	1468.233	1147.337	1468.233	9.999+	1.28
83	13	S6	0	.684	1491.437	1124.861	1491.437	9.999+	1.326
84	13	S7	0	48.08	1522.545	933.09	1522.545	9.999+	1.632
85	14	S1	0	62.672	2534.672	1325.961	2534.672	9.999+	1.912
86	14	S2	0	4.62	2620.418	1600.844	2620.418	9.999+	1.637
87	14	S3	0	5.538	2639.324	1619.735	2639.324	9.999+	1.629
88	14	S4	0	0	2636.13	1574.671	2636.13	9.999+	1.674
89	14	S5	0	5.482	2639.368	1619.835	2639.368	9.999+	1.629
90	14	S6	0	4.606	2620.17	1600.605	2620.17	9.999+	1.637
91	14	S7	0	62.871	2534.83	1326.161	2534.83	9.999+	1.911
92	15	S1	0	42.327	2455.387	1161.41	2455.387	9.999+	2.114
93	15	S2	0	6.399	2543.837	1403.368	2543.837	9.999+	1.813
94	15	S3	0	5.902	2553.042	1411.76	2553.042	9.999+	1.808
95	15	S4	0	0	2551.183	1386.153	2551.183	9.999+	1.84
96	15	S5	0	5.879	2553.071	1411.847	2553.071	9.999+	1.808
97	15	S6	0	6.413	2543.675	1403.162	2543.675	9.999+	1.813
98	15	S7	0	42.407	2455.495	1161.568	2455.495	9.999+	2.114

Envelope Slab Soil Pressures

	Label	UC	LC	Soil Pressure[psf]	Allowable Bearing[psf]	Point
1	S1	.48	6	720.133	1500	N198
2	S2	.51	6	764.645	1500	N205
3	S3	.519	6	778.03	1500	N212
4	S4	.512	6	767.282	1500	N219
5	S5	.519	6	778.062	1500	N226
6	S6	.51	6	764.51	1500	N233
7	S7	.48	6	720.105	1500	N240

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): 33.00
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

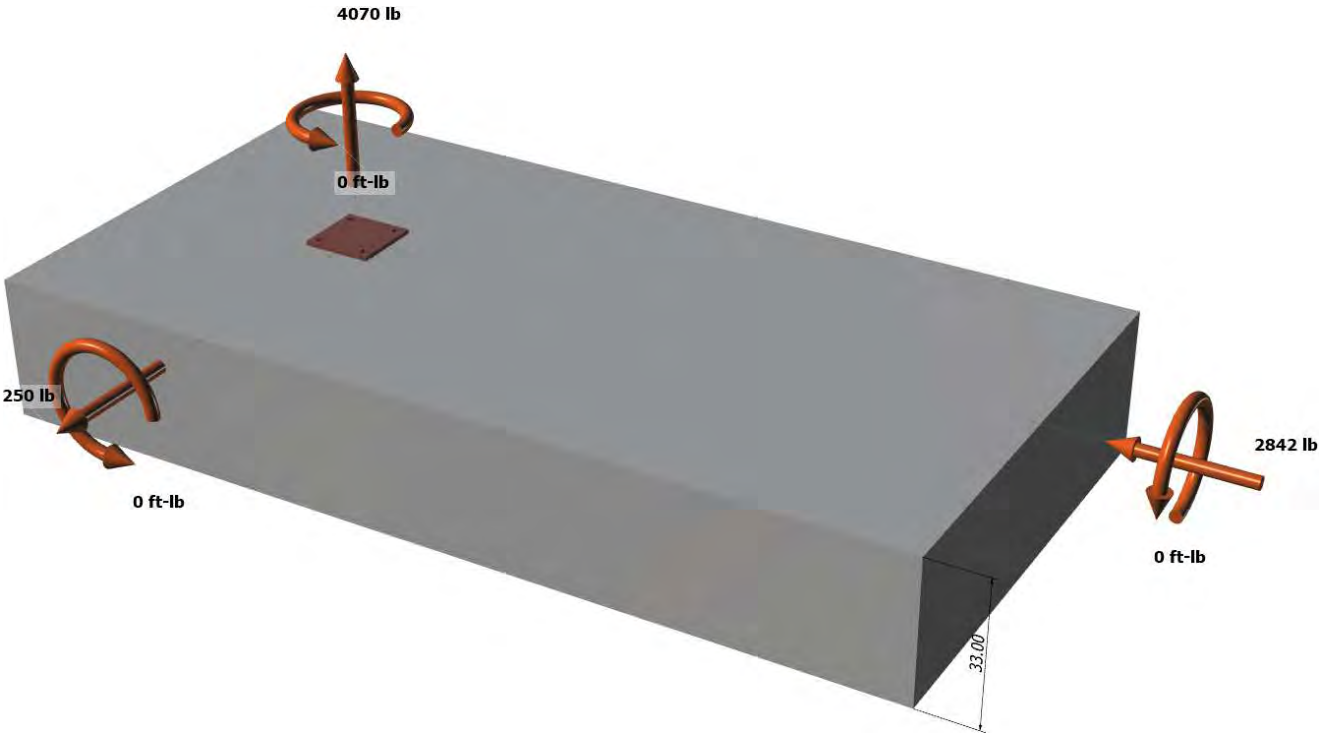
Recommended Anchor
Anchor Name: SET-3G - SET-3G w/ 3/8"Ø F1554 Gr. 36
Code Report: ICC-ES ESR-4057

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

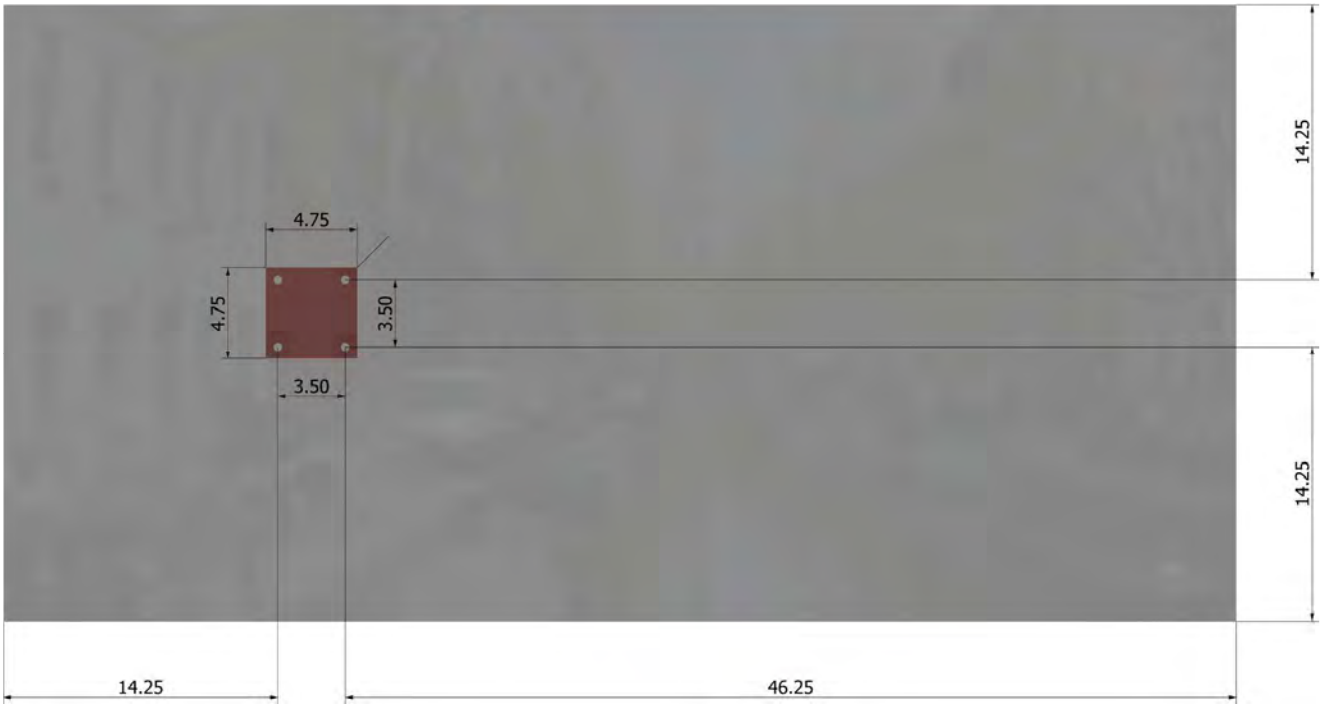
Strength level loads:

N_{ua} [lb]: 4070
V_{uax} [lb]: 250
V_{uay} [lb]: -2842
M_{ux} [ft-lb]: 0
M_{uy} [ft-lb]: 0
M_{uz} [ft-lb]: 0

<Figure 1>



<Figure 2>

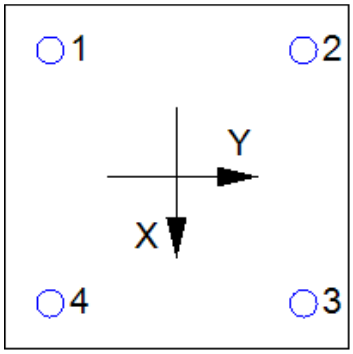


3. Resulting Anchor Forces

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	1017.5	62.5	-710.5	713.2
2	1017.5	62.5	-710.5	713.2
3	1017.5	62.5	-710.5	713.2
4	1017.5	62.5	-710.5	713.2
Sum	4070.0	250.0	-2842.0	2853.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 4070
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} (in^2)	A_{Nco} (in^2)	$c_{a,min}$ (in)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
240.25	144.00	14.25	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} (in^2)	A_{Na0} (in^2)	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	14.25	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	17.75	24294

$\phi V_{cbgx} = \phi\,(A_{Vc} / A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (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)
1181.48	1417.78	1.000	0.861	1.000	1.000	24294	0.70	12195

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	17.75	24294

$\phi V_{cbgy} = \phi\,(A_{Vc} / A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (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)
852.00	1417.78	1.000	0.861	1.000	1.000	24294	0.70	8794

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	14.25	17475

$\phi V_{cbgx} = \phi\,(2)(A_{Vc} / A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (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)
684.00	913.78	1.000	1.000	1.000	1.000	17475	0.70	18313

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	14.25	17475

$\phi V_{cbgy} = \phi\,(2)(A_{Vc} / A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (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)
836.30	913.78	1.000	1.000	1.000	1.000	17475	0.70	22391

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. R17.6)

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	1018	3394	0.30	Pass
Concrete breakout	4070	7374	0.55	Pass
Adhesive	**4070**	**6176**	**0.66**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	**713**	**1765**	**0.40**	**Pass (Governs)**
T Concrete breakout x+	250	12195	0.02	Pass
T Concrete breakout y-	2842	8794	0.32	Pass
|| Concrete breakout y-	125	18313	0.01	Pass
|| Concrete breakout x-	1421	22391	0.06	Pass
Concrete breakout, combined	-	-	0.32	Pass
Pryout	2853	15722	0.18	Pass

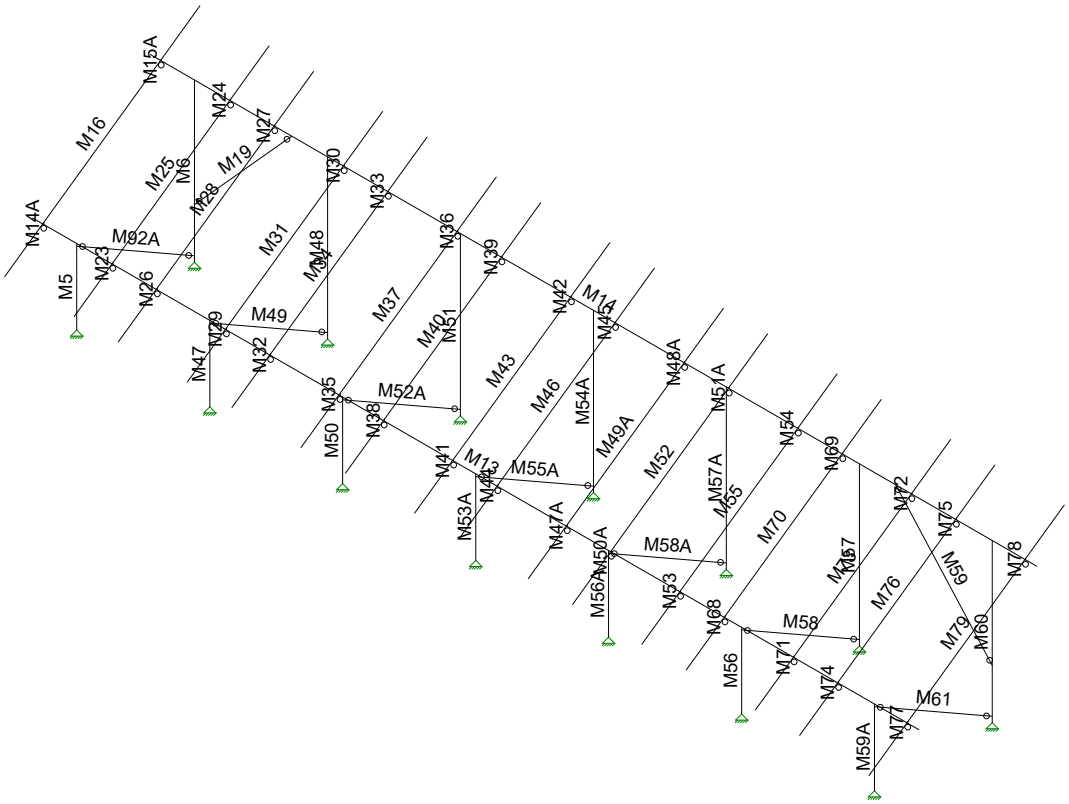
Interaction check	$(N_{ua}/\phi N_{ua})^{5/3}$	$(V_{ua}/\phi V_{ua})^{5/3}$	Combined Ratio	Permissible	Status
Sec. R17.6	0.50	0.22	72.0%	1.0	Pass

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.



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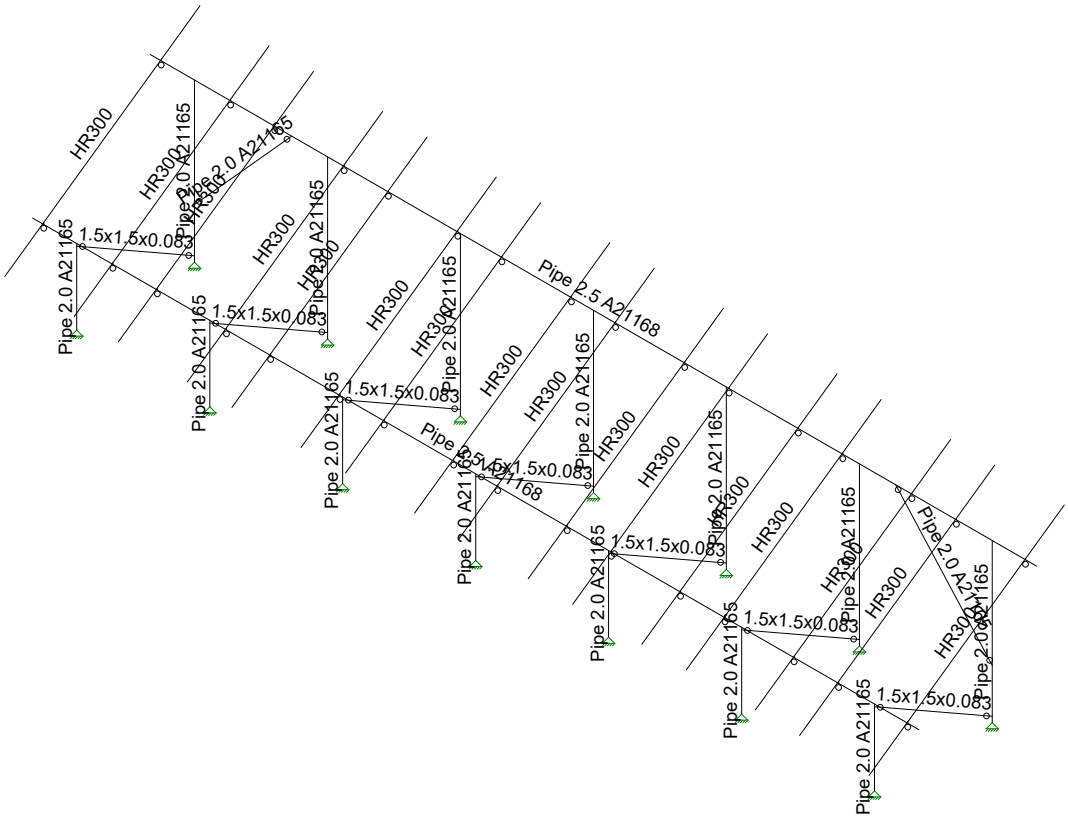
STB	Roof Mount	June 25, 2020 at 9:57 AM
U2716-0217-201		Sunmodo Sunturf A7.r3d



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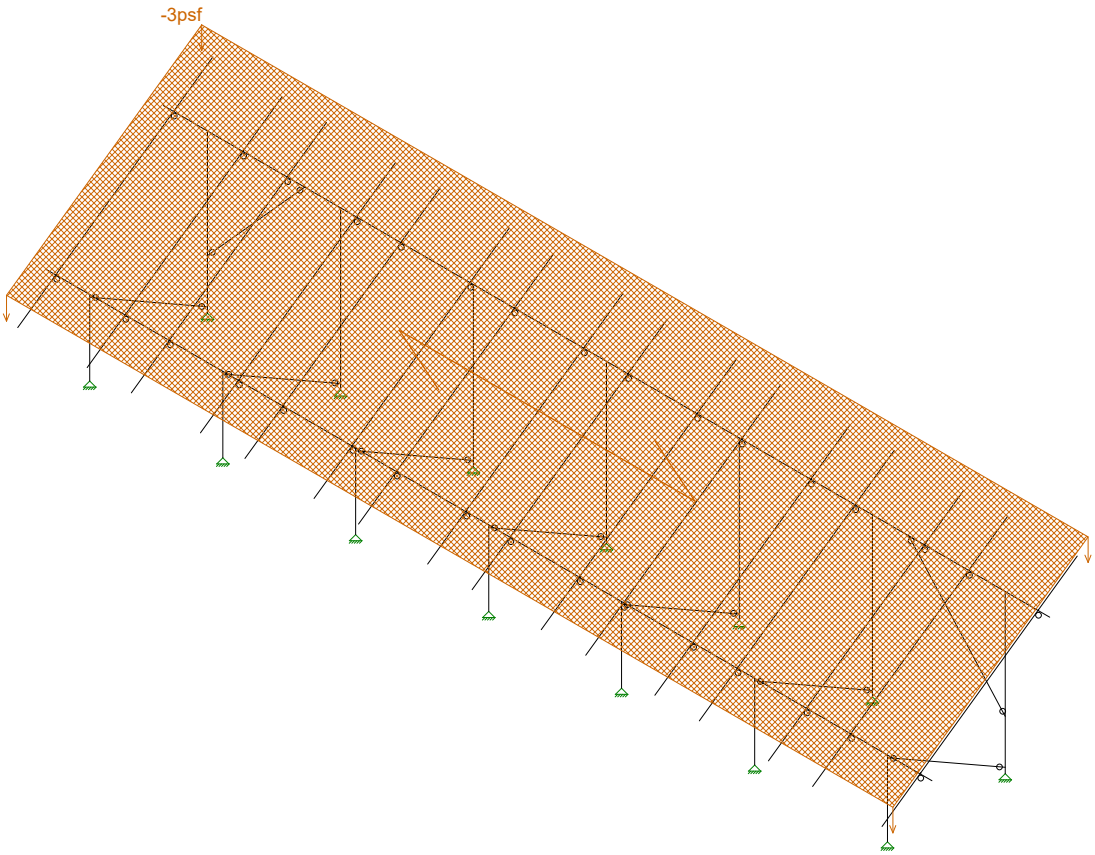

Loads: BLC 2, Solar Panel Weight

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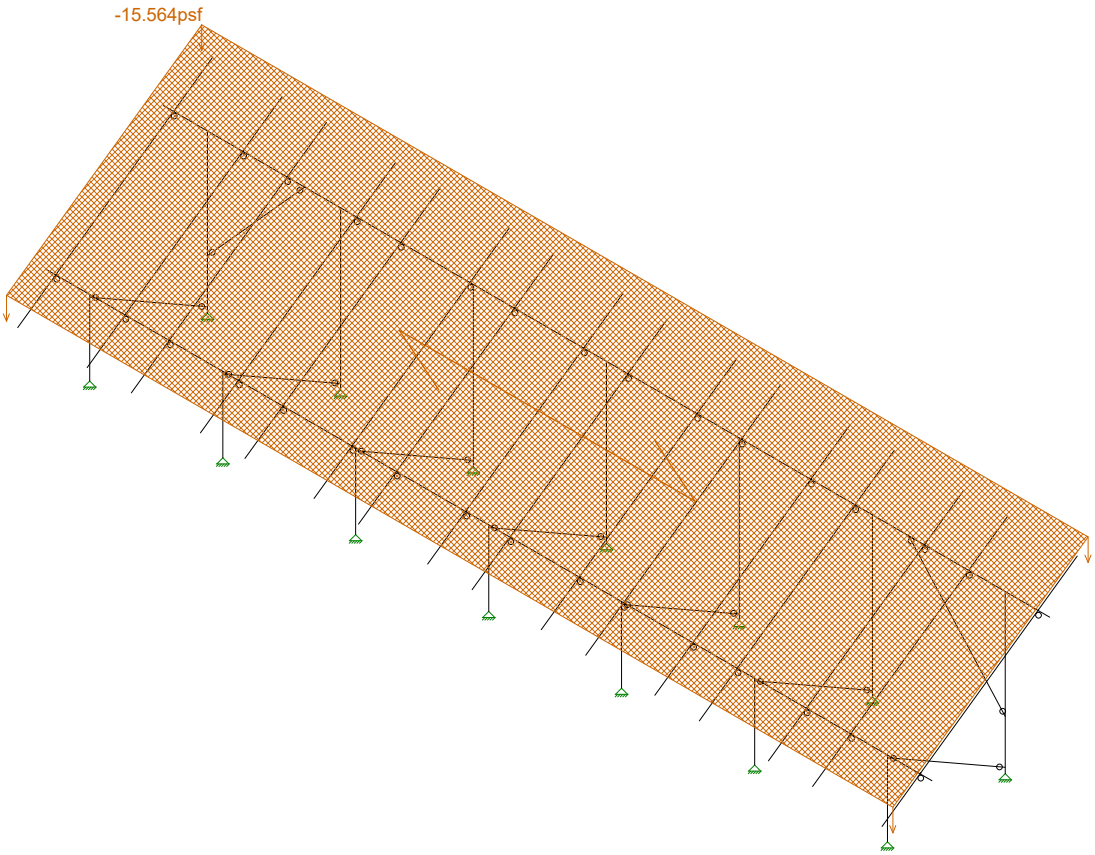

Loads: BLC 3, Roof Live/Snow

Vector Structural Engineeri...		SK - 6
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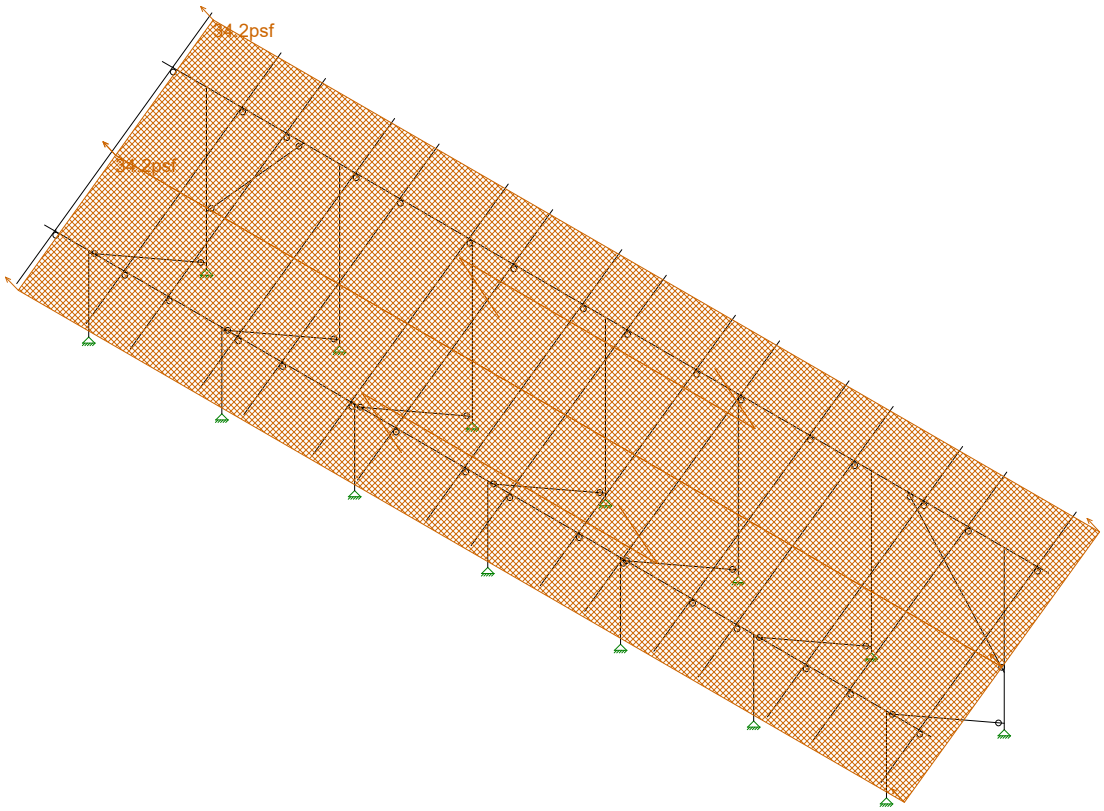

Loads: BLC 4, Wind 1

Vector Structural Engineeri...		SK - 7
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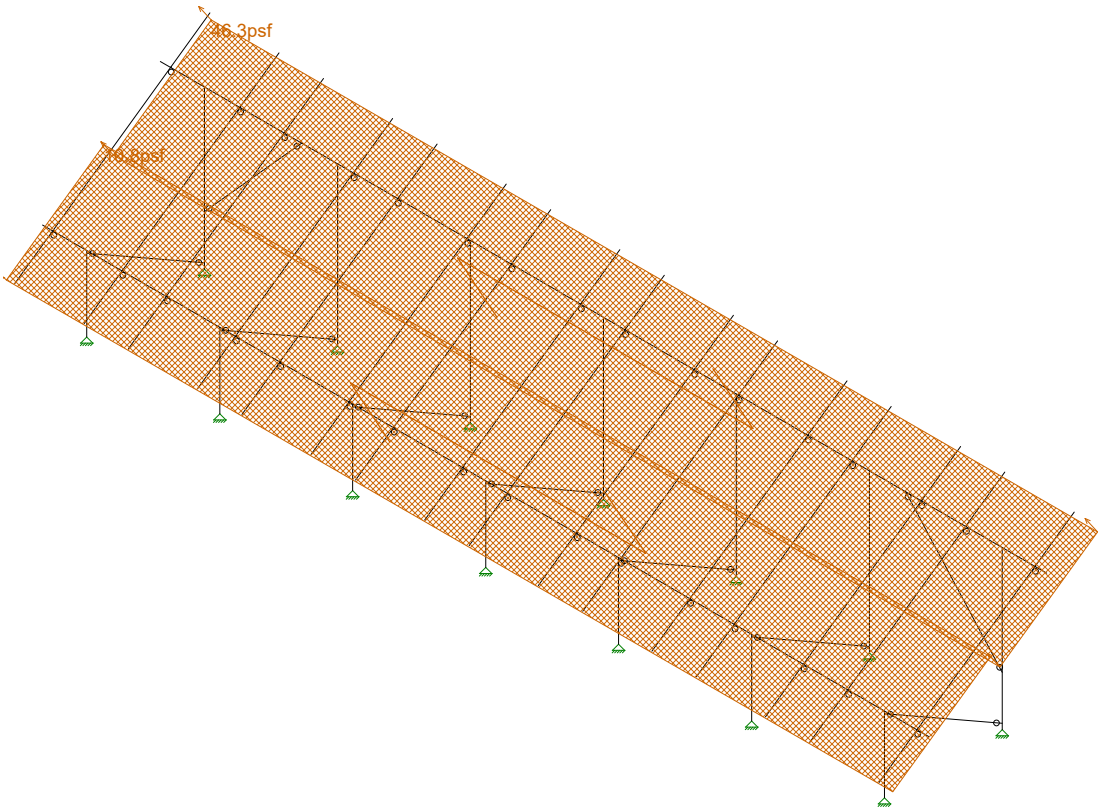
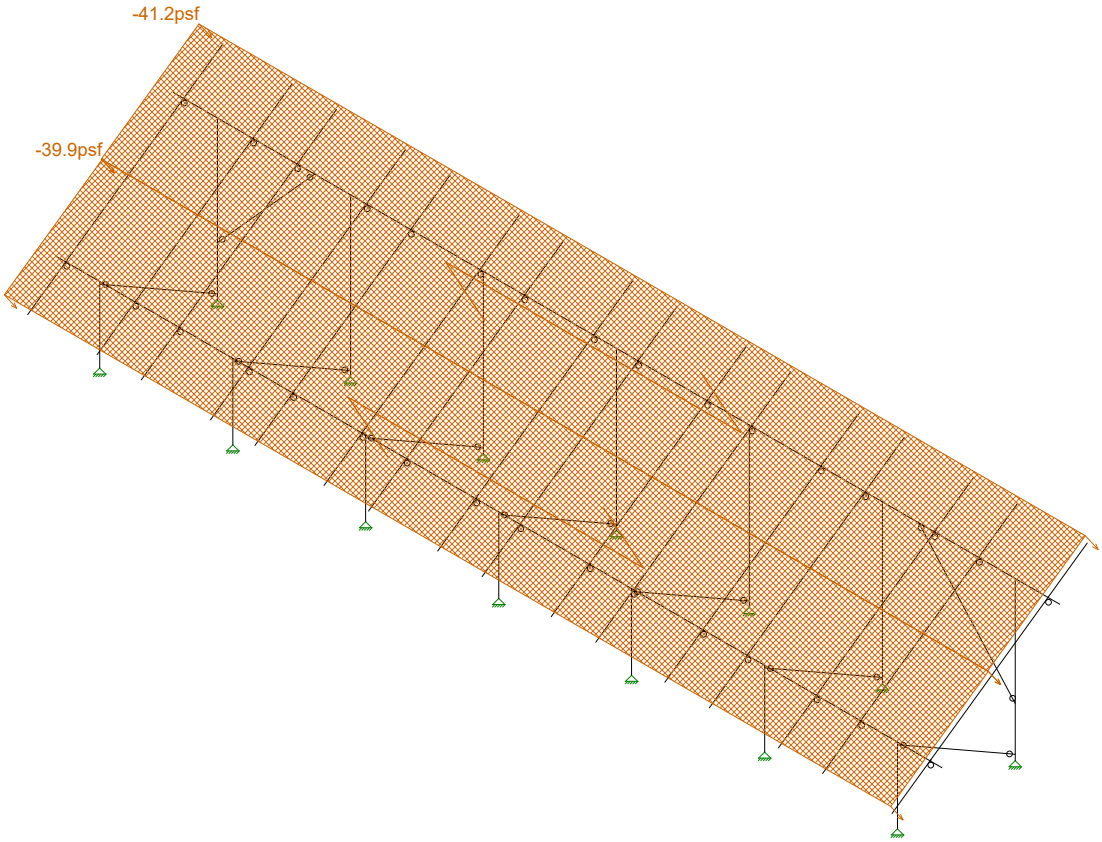
U2716-0217-201		Sunmodo Sunturf A7.r3d



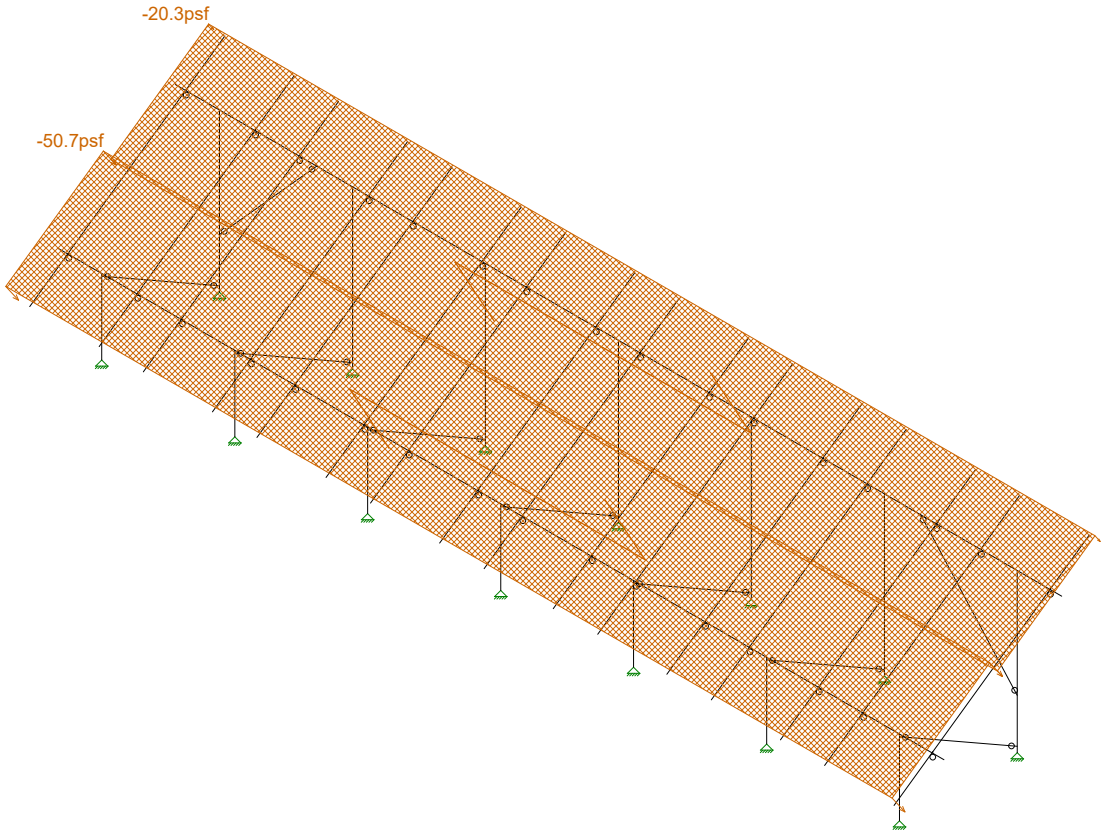
Loads: BLC 5, Wind 2

Vector Structural Engineeri...		SK - 8
STB	Roof Mount	June 25, 2020 at 9:58 AM
U2716-0217-201		Sunmodo Sunturf A7.r3d



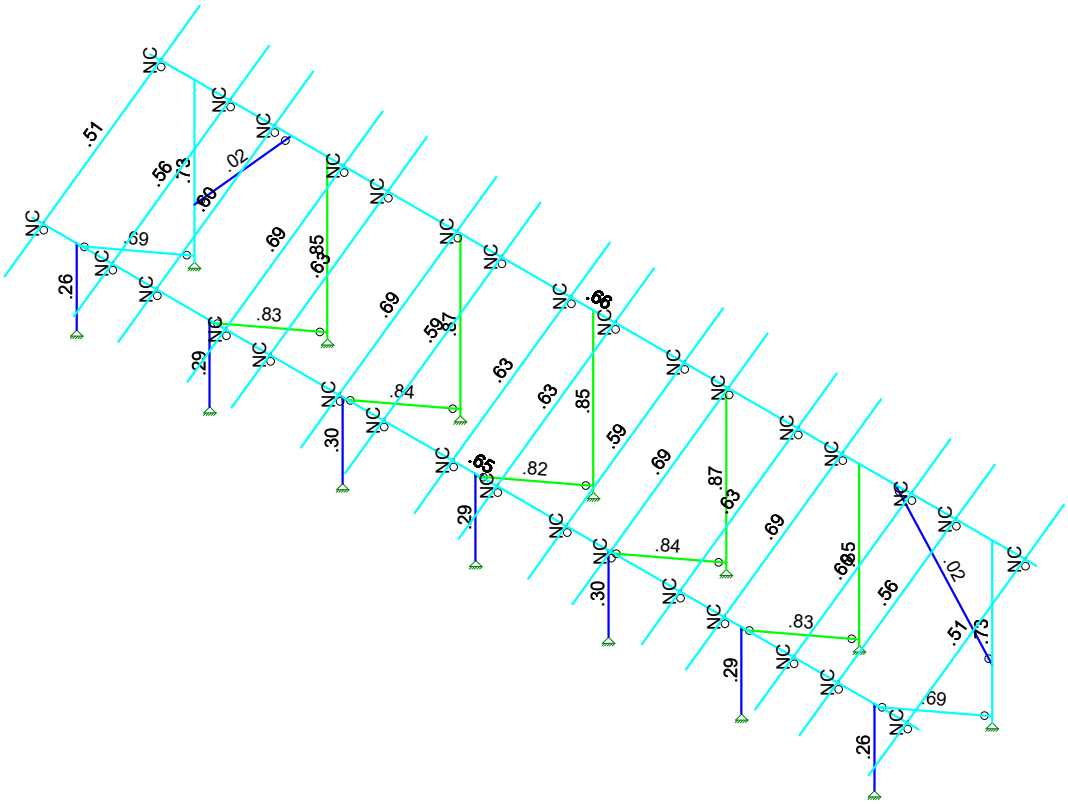
Loads: BLC 6, Wind 3

Vector Structural Engineeri...		SK - 9
STB	Roof Mount	June 25, 2020 at 9:58 AM
U2716-0217-201		Sunmodo Sunturf A7.r3d



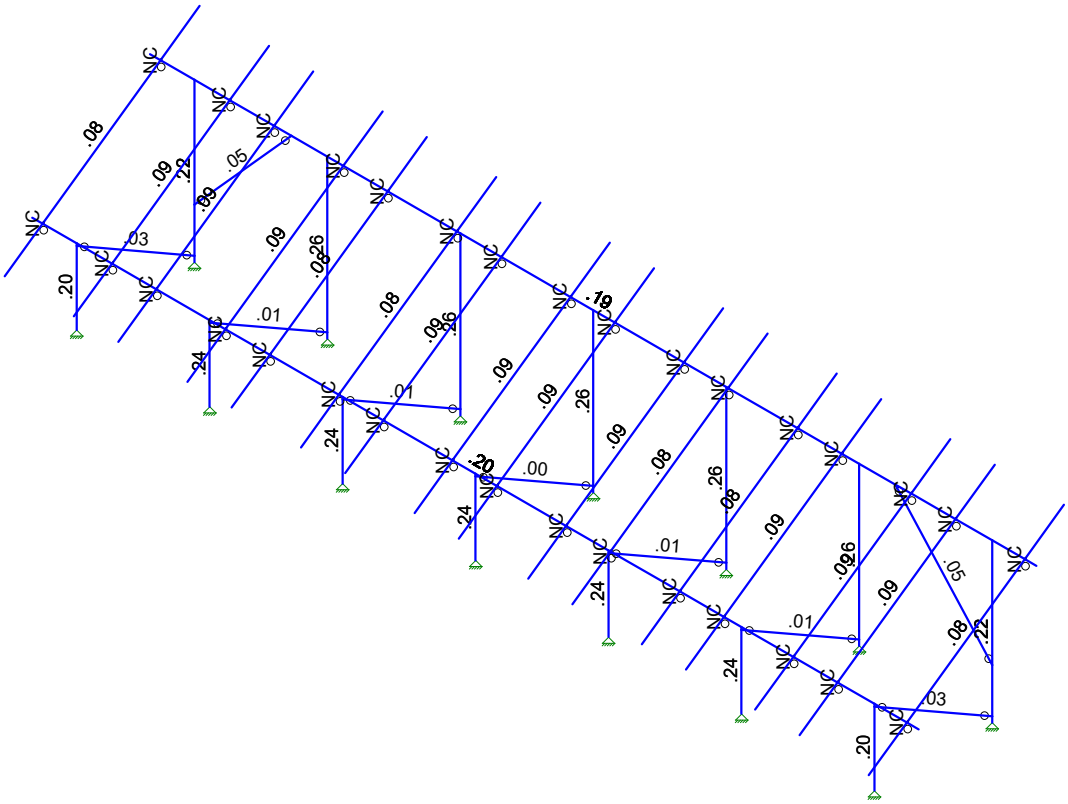
Loads: BLC 7, Wind 4

Vector Structural Engineeri...		SK - 10
STB	Roof Mount	June 25, 2020 at 9:58 AM
U2716-0217-201		Sunmodo Sunturf A7.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Vector Structural Engineeri...		SK - 1
STB	Roof Mount	June 25, 2020 at 9:57 AM
U2716-0217-201		Sunmodo Sunturf A7.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Vector Structural Engineeri...		SK - 2
STB	Roof Mount	June 25, 2020 at 9:57 AM
U2716-0217-201		Sunmodo Sunturf A7.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 S100-12: 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
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

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[k/ft^3]	Yield[psi]	Ry	Fu[psi]	Rt
1	A992	29000	11154	.3	.65	.49	50000	1.1	65000	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36000	1.5	58000	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	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	.49	35000	1.6	60000	1.2
7	A1085	29000	11154	.3	.65	.49	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	.173	Table B.4-1	1	19000	16000	13000	12000	141
2	6061-T6	10100	3787.5	.33	1.3	.173	Table B.4-2	1	38000	35000	35000	24000	141
3	6063-T5	10100	3787.5	.33	1.3	.173	Table B.4-2	1	22000	16000	16000	13000	141
4	6063-T6	10100	3787.5	.33	1.3	.173	Table B.4-2	1	30000	25000	25000	19000	141
5	5052-H34	10200	3787.5	.33	1.3	.173	Table B.4-1	1	34000	26000	24000	20000	141
6	6061-T6 W	10100	3787.5	.33	1.3	.173	Table B.4-1	1	24000	15000	15000	15000	141
7	6005-T5	10100	3787.5	.33	1.3	.173	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	HR300	Beam	Rectangular Tubes	6005-T5	Typical	.74	.253	.727	.578
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	-19

Member Area Loads (BLC 4 : Wind 1)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N119B	N120B	N200	Perp	B-C	34.2
2	N119B	N196	N199	N120B	Perp	B-C	34.2

Member Area Loads (BLC 5 : Wind 2)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N119B	N120B	N200	Perp	B-C	46.3
2	N119B	N196	N199	N120B	Perp	B-C	10.8

Member Area Loads (BLC 6 : Wind 3)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N119B	N120B	N200	Perp	B-C	-41.2
2	N119B	N196	N199	N120B	Perp	B-C	-39.9

Member Area Loads (BLC 7 : Wind 4)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N119B	N120B	N200	Perp	B-C	-20.3
2	N119B	N196	N199	N120B	Perp	B-C	-50.7

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	
3	Roof Live/Snow	RLL							1	
4	Wind 1	OL1							2	
5	Wind 2	OL2							2	
6	Wind 3	OL3							2	
7	Wind 4	OL4							2	
8	BLC 2 Transient Area ...	None						40		
9	BLC 3 Transient Area ...	None						40		
10	BLC 4 Transient Area ...	None						160		
11	BLC 5 Transient Area ...	None						160		
12	BLC 6 Transient Area ...	None						160		
13	BLC 7 Transient Area ...	None						160		

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	ASD Loads		Y																					
2	1.0 D		Y		DL	1																		
3	1.0 D + 1.0 S		Y		DL	1	RLL	1																
4	1.0 D + 0.6 W1		Y		DL	1	RLL		OL1	.6														
5	1.0 D + 0.6 W2		Y		DL	1	RLL		OL2	.6														
6	1.0 D + 0.6 W3		Y		DL	1	RLL		OL3	.6														
7	1.0 D + 0.6 W4		Y		DL	1	RLL		OL4	.6														
8	1.0 D + 0.45 W1 + 0....		Y		DL	1	RLL	.75	OL1	.45														
9	1.0 D + 0.45 W2 + 0....		Y		DL	1	RLL	.75	OL2	.45														
10	1.0 D + 0.45 W3 + 0....		Y		DL	1	RLL	.75	OL3	.45														
11	1.0 D + 0.45 W4 + 0....		Y		DL	1	RLL	.75	OL4	.45														
12	0.6 D + 0.6 W1		Y		DL	.6	RLL		OL1	.6														
13	0.6 D + 0.6 W2		Y		DL	.6	RLL		OL2	.6														
14	0.6 D + 0.6 W3		Y		DL	.6	RLL		OL3	.6														
15	0.6 D + 0.6 W4		Y		DL	.6	RLL		OL4	.6														
16			Y																					
17	LRFD Loads		Y																					
18	1.4 D	Yes	Y		DL	1.4	RLL																	
19	1.2 D + 1.6 S + 0.5 W1	Yes	Y		DL	1.2	RLL	1.6	OL1	.5														
20	1.2 D + 1.6 S + 0.5 W2	Yes	Y		DL	1.2	RLL	1.6	OL2	.5														
21	1.2 D + 1.6 S + 0.5 W3	Yes	Y		DL	1.2	RLL	1.6	OL3	.5														
22	1.2 D + 1.6 S + 0.5 W4	Yes	Y		DL	1.2	RLL	1.6	OL4	.5														
23	1.2 D + 1.0 W1	Yes	Y		DL	1.2	RLL		OL1	1														
24	1.2 D + 1.0 W2	Yes	Y		DL	1.2	RLL		OL2	1														
25	1.2 D + 1.0 W3	Yes	Y		DL	1.2	RLL		OL3	1														
26	1.2 D + 1.0 W4	Yes	Y		DL	1.2	RLL		OL4	1														
27	0.9 D + 1.0 W1	Yes	Y		DL	.9	RLL		OL1	1														
28	0.9 D + 1.0 W2	Yes	Y		DL	.9	RLL		OL2	1														
29	0.9 D + 1.0 W3	Yes	Y		DL	.9	RLL		OL3	1														
30	0.9 D + 1.0 W4	Yes	Y		DL	.9	RLL		OL4	1														

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb...	LC	MZ [lb-ft]	LC
1	N2	max	19.035	22	2083.601	20	108.226	23	0	30	0	30	0	30
2		min	-5.665	27	-497.039	29	-124.09	25	0	18	0	18	0	18
3	N1	max	78.249	21	4208.443	25	2329.61	25	0	30	0	30	0	30
4		min	-96.949	28	-3440.658	28	-1973....	23	0	18	0	18	0	18
5	N115	max	8.12	28	4855.355	25	2816.5..	25	0	30	0	30	0	30
6		min	-7.148	25	-3866.321	28	-2369....	23	0	18	0	18	0	18
7	N116	max	-.255	27	2521.5	20	121.05	23	0	30	0	30	0	30
8		min	-11.48	20	-604.461	29	-140.8...	25	0	18	0	18	0	18
9	N99	max	6.955	29	4856.657	25	2816.9..	25	0	30	0	30	0	30
10		min	-8.228	28	-3867.853	28	-2370....	23	0	18	0	18	0	18
11	N100	max	11.547	20	2521.427	20	121.057	23	0	30	0	30	0	30
12		min	.303	27	-604.821	29	-140.8...	25	0	18	0	18	0	18
13	N105A	max	2.119	21	4962.562	25	2840.9..	25	0	30	0	30	0	30
14		min	-.821	28	-4069.656	28	-2404....	23	0	18	0	18	0	18
15	N106A	max	11.298	22	2509.335	20	127.141	23	0	30	0	30	0	30
16		min	-7.09	27	-645.032	29	-146.1...	25	0	18	0	18	0	18
17	N111A	max	.015	19	4866.028	25	2769.1..	25	0	30	0	30	0	30
18		min	-.091	21	-3946.616	28	-2336....	23	0	18	0	18	0	18
19	N112A	max	.143	21	2467.889	20	123.332	23	0	30	0	30	0	30
20		min	-.009	28	-559.776	29	-142.6...	25	0	18	0	18	0	18
21	N117A	max	.638	28	4962.889	25	2841.1..	25	0	30	0	30	0	30

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb...	LC	MZ [lb-ft]	LC
22		min	-2.29	21	-4070.017	28	-2404....	23	0	18	0	18	0	18
23	N118A	max	7.067	27	2509.369	20	127.143	23	0	30	0	30	0	30
24		min	-11.085	22	-645.189	29	-146.1...	25	0	18	0	18	0	18
25	N123	max	97.482	28	4207.927	25	2329.9...	25	0	30	0	30	0	30
26		min	-78.722	21	-3440.605	28	-1973....	23	0	18	0	18	0	18
27	N124	max	5.468	27	2081.545	20	108.227	23	0	30	0	30	0	30
28		min	-18.886	22	-496.09	29	-124.1...	25	0	18	0	18	0	18
29	Totals:	max	0	29	35674.048	21	17779....	29						
30		min	0	24	-18459.82	27	-1499...	27						

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...	.428	52.516	25	.345	52.516		25	16635.531	23232.186	1397.505	1397.505	2....	H1-1b
2	M6	Pipe 2.0 A2...	1.230	3.56	25	.382	0		25	5780.675	23232.186	1397.505	1397.505	1....	H1-1a
3	M13	Pipe 2.5 A2...	1.013	606....	26	.341	133....		25	14032.946	28358.413	2081.747	2081.747	1	H1-1b
4	M14	Pipe 2.5 A2...	.957	126....	21	.286	133....		25	14032.946	28358.413	2081.747	2081.747	1	H1-1b
5	M19	Pipe 2.0 A2...	.031	104....	21	.093	104....		25	6821.523	23232.186	1397.505	1397.505	1....	H1-1b*
6	M92A	1.5x1.5x0.083	1.154	50.973	25	.049	0	y	25	2479.016	14085.15	624.421	624.421	1....	H1-1a
7	M56	Pipe 2.0 A2...	.485	52.516	25	.408	52.516		25	16635.531	23232.186	1397.505	1397.505	1....	H1-1b
8	M57	Pipe 2.0 A2...	1.437	3.56	25	.454	0		25	5780.675	23232.186	1397.505	1397.505	1....	H1-1a
9	M58	1.5x1.5x0.083	1.389	50.973	25	.010	0	y	20	2479.016	14085.15	624.421	624.421	1....	H1-1a
10	M59	Pipe 2.0 A2...	.031	104....	21	.093	0		25	6843.259	23232.186	1397.505	1397.505	1....	H1-1b*
11	M47	Pipe 2.0 A2...	.485	52.516	25	.408	52.516		25	16635.531	23232.186	1397.505	1397.505	1....	H1-1b
12	M48	Pipe 2.0 A2...	1.437	3.56	25	.454	0		25	5780.675	23232.186	1397.505	1397.505	1....	H1-1a
13	M49	1.5x1.5x0.083	1.389	50.973	25	.010	97.868	y	20	2479.016	14085.15	624.421	624.421	1....	H1-1a
14	M50	Pipe 2.0 A2...	.502	52.516	25	.410	52.516		25	16635.531	23232.186	1397.505	1397.505	1....	H1-1b
15	M51	Pipe 2.0 A2...	1.460	3.56	25	.458	0		25	5780.675	23232.186	1397.505	1397.505	1....	H1-1a
16	M52A	1.5x1.5x0.083	1.398	50.973	25	.008	0	y	25	2479.016	14085.15	624.421	624.421	1....	H1-1a
17	M53A	Pipe 2.0 A2...	.490	52.516	25	.399	52.516		25	16635.531	23232.186	1397.505	1397.505	1....	H1-1b
18	M54A	Pipe 2.0 A2...	1.429	3.56	25	.446	0		25	5780.675	23232.186	1397.505	1397.505	1....	H1-1a
19	M55A	1.5x1.5x0.083	1.364	50.973	25	.002	97.868	y	18	2479.016	14085.15	624.421	624.421	1....	H1-1a
20	M56A	Pipe 2.0 A2...	.502	52.516	25	.410	52.516		25	16635.531	23232.186	1397.505	1397.505	1....	H1-1b
21	M57A	Pipe 2.0 A2...	1.460	3.56	25	.458	0		25	5780.675	23232.186	1397.505	1397.505	1....	H1-1a
22	M58A	1.5x1.5x0.083	1.398	50.973	25	.007	0	y	25	2479.016	14085.15	624.421	624.421	1....	H1-1a
23	M59A	Pipe 2.0 A2...	.428	52.516	25	.345	52.516		25	16635.531	23232.186	1397.505	1397.505	2....	H1-1b
24	M60	Pipe 2.0 A2...	1.230	3.56	25	.382	0		25	5780.675	23232.186	1397.505	1397.505	1....	H1-1a
25	M61	1.5x1.5x0.083	1.154	50.973	25	.049	97.868	y	25	2479.016	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	M16	HR300	.792	137.9...	28	.125	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
2	M25	HR300	.937	137.9...	28	.134	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
3	M28	HR300	.883	86	25	.134	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
4	M31	HR300	1.156	137.9...	28	.141	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
5	M34	HR300	.938	86	25	.127	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
6	M37	HR300	1.153	137.9...	28	.127	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
7	M40	HR300	.856	86	25	.134	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
8	M43	HR300	.931	86	25	.137	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
9	M46	HR300	.931	86	25	.137	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
10	M49A	HR300	.856	86	25	.134	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
11	M52	HR300	1.154	137.9...	28	.127	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
12	M55	HR300	.938	86	25	.127	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
13	M70	HR300	1.156	137.9...	28	.141	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
14	M73	HR300	.883	86	25	.134	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	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
15	M76	HR300	.935	137.9...	28	.134	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1
16	M79	HR300	.791	137.9...	28	.125	35.833	y	26	3465.417	14429....	560.361	934.132	5656.689	2605.145	1....	H.1-1