



VSE Project Number: U2620.0901.211

July 27, 2021

Green Solar Technologies  
Attention: Jake Stevenson  
6400 Laure Canyon Blvd, #400  
North Hollywood, CA 91606

**REFERENCE: Richard Frey: 1042 Southwest Woodland Avenue, Fort White, FL 32038**  
**Ground Mount Solar Array Foundation Installation**

To Whom It May Concern:

Per your request, we have reviewed the proposed ground mount solar array installation at the above referenced site. The purpose of our review was to determine the adequacy of the proposed ground screw foundations (interaction of screw with soil only, capacity of screw by others) for the ground mount solar array installation. Design of all other structural components of the ground mount system is beyond the scope of this letter and is the responsibility of others.

Based upon our review the ground screw foundations are adequate when installed as described in this letter and the plans stamped by our office.

**Design Parameters**

Code: 2020 Florida Building Code - Building, 7th Edition (2018 IBC)

Risk Category: I

Design wind speed: 111 mph (3-sec gust) per ASCE 7-16

Wind exposure category: C

**Ground Mount Geometry**

See plans stamped by our office dated: July 1, 2021

**Ground Mount Foundation**

Ground screws, designed by others. Min. (1) screw shall be tested for, and deflections limited to, the values listed below. We recommend sacrificial screws be used for the testing. We also recommend the sacrificial tests be performed prior to fabrication of the rest of the ground mount. The tests will determine the final ground screw design and/or column spacing so fabrication can be finalized.

- 1543 lbs uplift (Includes 1.5 Factor of Safety); Deflection shall be limited to 1/2"
- 958 lbs lateral (Includes 2.0 Factor of Safety); Deflection shall be limited to 1"

The following test limits and guidelines shall be employed for testing.

- The load tests must be performed by a qualified contractor
- A test is considered to have failed if deflection limits are exceeded prior to reaching test loads
- In the event of a failed test, one of the following options may be followed:
  - a. See manufacturer recommendations to increase ground screw capacity
  - b. Contact the Vector Structural Engineering, LLC to determine if the spacing between columns needs to be reduced



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Richard Frey Ground Mount

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### **Limitations**

All components of the ground mounted solar array 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. 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, racking or foundations. Please note that a representative of Vector Structural Engineering has not physically observed site conditions.

VECTOR STRUCTURAL ENGINEERING, LLC

FL Firm License: COA 26626



07/27/2021

Jacob Proctor, P.E.

FL License: 74277 - Expires: 02/28/2023

Project Engineer

**This item has been digitally signed and sealed by Jacob Proctor on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.**

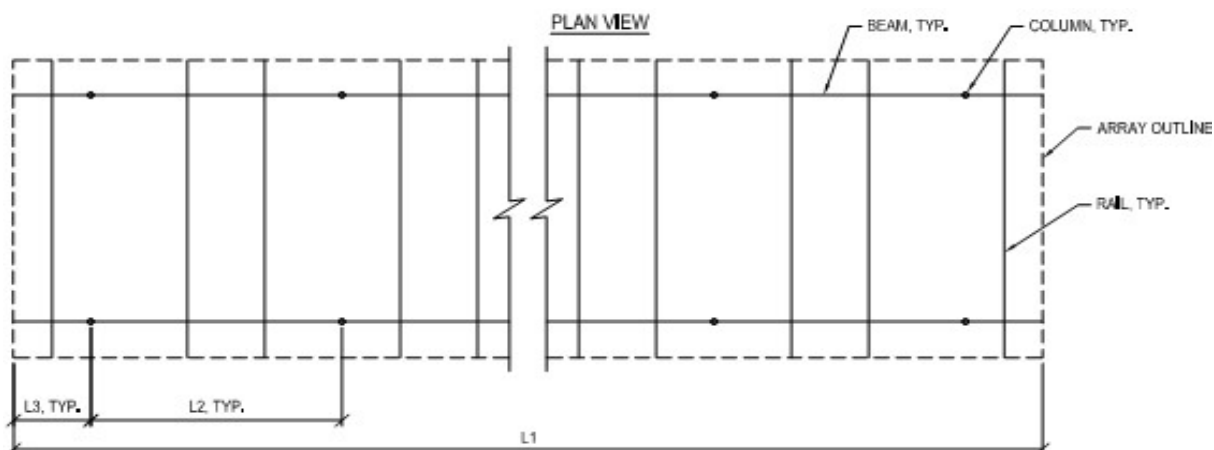
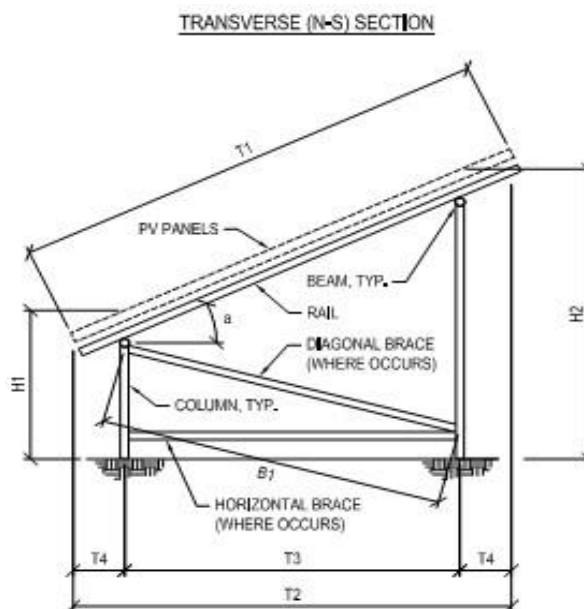
Enclosures

JSP/zrm

**PROJECT:** Richard Frey Ground Mount

## Mount Geometry

Panel Orientation:	Landscape
Panel Width (short dimension) [in]:	41
Panel Length (long dimension) [in]:	66
No. of Panels in Transverse Direction:	4
No. of Panels in Longitudinal Direction:	8
Transverse Length Along Slope (T1) [ft]:	14.0
Projected Transverse Length (T2) [ft]:	13.1
Longitudinal Length (L1) [ft]:	44.5
No. of Columns in Tranverse Direction:	2
Transverse Column Spacing (T3) [ft]:	7.5
Transverse Overhang (T4) [ft]:	2.8
No. of Columns in Longitudinal Direction:	9
Longitudinal Column Spacing (L2) [ft]:	5.3
Longitudinal Overhang (L3) [ft]:	1.3
Panel Slope from Horizontal (a) [°]:	20
Transverse Ground Slope [°]:	0
Longitudinal Ground Slope [°]:	0
Leading Edge Height [ft]:	1.9
Front Column Height (H1) [ft]:	2.9
Back Column Height (H2) [ft]:	5.6
Trailing Edge Height [ft]:	6.7
Diagonal Brace between Columns:	Yes
Approx. Diag. Brace Length (B1) [ft]:	9.0
Horizontal Brace between Columns:	No



Note: All images are for illustration purposes only, and does not necessarily match the proposed installation



**JOB NO.:** U2620.0901.211  
**SUBJECT:** DEAD LOADS

**PROJECT:** Richard Frey Ground Mount

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**DEAD LOADS**

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Panel & Rail Weight [psf]:	3.0	
Tributary Area per Column [ft <sup>2</sup> ]:	36.6	
Weight per Column [lbs]:	109.9	
Beam Weight [plf]:	3.7	
Tributary Length per Column [ft]:	5.3	
Weight per Column [lbs]:	19.2	
Brace Weight [plf]:	3.7	
Tributary Length per Column [ft]:	4.5	
Weight per Column [lbs]:	16.4	
Column Weight [plf]:	3.7	
Max. Column Height [ft]:	5.6	
Min. Column Height [ft]:	2.9	
Max. Column Weight [lbs]:	20.6	
Min. Column Weight [lbs]:	10.7	
Max. Total Weight Per Column [lbs]:	166.1	(1.0 Dead)
Min. Total Weight per Column [lbs]:	156.2	(1.0 Dead)



**JOB NO.:** U2620.0901.211  
**SUBJECT:** WIND PRESSURES

**PROJECT:** Richard Frey Ground Mount

## WIND PRESSURES

Calculations per:	ASCE 7-16	
Design Wind Speed, V [mph]:	111	
Risk Category:	I	(Table 1.5-1)
Exposure Category:	C	(Section 26.7)
Elevation [ft]:	49.3	
Ground Elevation Factor, $K_e$ :	1.00	(Table 26.9-1)
$\alpha$ :	9.5	(Table 26.11-1)
$z_g$ [ft]:	900	(Table 26.11-1)
Velocity Pressure Exposure Coefficient, $K_h$ :	0.85	(Table 26.10-1)
Topographic Factor, $K_{ht}$ :	1.0	(Section 26.8)
Wind Directionality Factor, $K_d$ :	0.85	(Table 26.6-1)
Internal Pressure Coefficient, $GC_{pi}$ :	0.00	(Figure 26.13-1)
Velocity Pressure, $q_h$ [psf]:	22.72	(Equation 26.10-1)
Gust Effect Factor, G:	0.85	(Section 26.11.4)
Panel Slope [degrees]:	20.0	
Wind Flow:	Clear	
Roof Configuration:	Monoslope	

### Wind Pressures in Transverse (N-S) Direction

Net Pressure Coefficients per Figure 27.3-4

Clear Wind Flow	$C_{NW}$	$C_{NL}$
Case 1 ( $\gamma = 0^\circ$ , Load Case A)	-1.3	-1.5
Case 2 ( $\gamma = 0^\circ$ , Load Case B)	-2.2	-0.2
Case 3 ( $\gamma = 180^\circ$ , Load Case A)	1.6	1.7
Case 4 ( $\gamma = 180^\circ$ , Load Case B)	2.1	0.7

Design Wind Pressures per Equation 27.3-2 [psf]

Clear Wind Flow	$q_h GC_{NW}$	$q_h GC_{NL}$
Case 1 ( $\gamma = 0^\circ$ , Load Case A)	-25.1	-29.0
Case 2 ( $\gamma = 0^\circ$ , Load Case B)	-42.5	-3.9
Case 3 ( $\gamma = 180^\circ$ , Load Case A)	30.9	32.8
Case 4 ( $\gamma = 180^\circ$ , Load Case B)	40.6	13.5
Case 5 ( $\gamma = 0^\circ$ , 16 psf Min. Horiz.)	-16.0	-16.0
Case 6 ( $\gamma = 180^\circ$ , 16 psf Min. Horiz.)	16.0	16.0



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**SUBJECT:** COLUMN WIND LOADS

**PROJECT:** Richard Frey Ground Mount

## **COLUMN WIND LOADS**

### Column Tributary Area

Panel Slope [degrees]:	20.0
Trib. Along Slope [ft <sup>2</sup> ]:	36.6
Projected Vert. Trib. [ft <sup>2</sup> ]:	12.5
Projected Horiz. Trib. [ft <sup>2</sup> ]:	34.4
Short Column Height (H1) [ft]:	2.9
Tall Column Height (H2) [ft]:	5.6
Diagonal Brace:	Yes
Horizontal Brace:	No

### Wind Loads from Transverse Pressures (1.0 Wind)

	Short Column			Tall Column		
	Vertical [lbs]	Horizontal [lbs]	Moment [ft-lbs]	Vertical [lbs]	Horizontal [lbs]	Moment [ft-lbs]
Case 1:	-618	0	0	-1243	-677	0
Case 2:	275	0	0	-1871	-581	0
Case 3:	604	0	0	1590	798	0
Case 4:	1063	0	0	798	677	0
Case 5:	229	0	0	-780	-401	0
Case 6:	-229	0	0	780	401	0
Max:	1063	0	0	1590	798	0
Min:	-618	0	0	-1871	-677	0



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**SUBJECT:** REACTIONS

**PROJECT:** Richard Frey Ground Mount

## COLUMN REACTIONS (ASD)

### Summary of Loads per Column

#### Dead Loads

1.0 Max. Dead:

Down  [lbs]

0.6 Min. Dead:

Down  [lbs]

#### Snow Loads

1.0 Snow:

Down  [lbs]

#### Wind Loads

0.6 Wind: *Short Col* *Long Col*

Down	<input type="text" value="638"/>	<input type="text" value="954"/>	[lbs]
Uplift	<input type="text" value="371"/>	<input type="text" value="1122"/>	[lbs]
Shear	<input type="text" value="0"/>	<input type="text" value="479"/>	[lbs]
Moment	<input type="text" value="0"/>	<input type="text" value="0"/>	[ft-lbs]

### Reactions by Load Combination per Column

Load Combination	Short Column Reactions			
	Down [lbs]	Uplift [lbs]	Shear [lbs]	Moment [lb-ft]
1.0 Dead	166	0	0	0
1.0 Dead + 1.0 Snow	166	0	0	0
1.0 Dead + 0.6 Wind	804	205	0	0
1.0 Dead + 0.75 Snow + 0.45 Wind	644	0	0	0
0.6 Dead + 0.6 Wind	732	277	0	0
<b>Maximum Design Reactions</b>	<b>804</b>	<b>277</b>	<b>0</b>	<b>0</b>

Load Combination	Tall Column Reactions			
	Down [lbs]	Uplift [lbs]	Shear [lbs]	Moment [ft-lbs]
1.0 Dead	166	0	0	0
1.0 Dead + 1.0 Snow	166	0	0	0
1.0 Dead + 0.6 Wind	1120	956	479	0
1.0 Dead + 0.75 Snow + 0.45 Wind	881	266	359	0
0.6 Dead + 0.6 Wind	1047	1029	479	0
<b>Maximum Design Reactions</b>	<b>1120</b>	<b>1029</b>	<b>479</b>	<b>0</b>