



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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VIA ELECTRONIC MAIL

August 1, 2023

Bradley Parsons
Director of Design and Permitting
Verogy
124 LaSalle Road, 2nd Floor
West Hartford, CT 06107
bparsons@verogy.com

RE: **PETITION NO. 1550** – VCP FX Middletown, LLC d/b/a Verogy declaratory ruling, pursuant to Connecticut General Statutes §4-176 and §16-50k, for the proposed construction, maintenance and operation of a 1.5-megawatt AC roof-mounted solar photovoltaic electric generating facility located at the Fed Ex Distribution Center, 49 FedEx Drive, Middletown, Connecticut, and associated electrical interconnection.

Dear Bradley Parsons:

The Connecticut Siting Council (Council) is in receipt of your correspondence dated July 27, 2023, regarding compliance with Condition No. 2 of the Council's Declaratory Ruling issued on March 3, 2023 for the above-referenced facility. The correspondence includes the final structural design for the racking system stamped by a Professional Engineer duly licensed in the State of Connecticut, in accordance with Condition No. 2.

Therefore, the Council acknowledges that Condition No. 2 has been satisfied. This acknowledgment applies only to the condition satisfied by the July 27, 2023 correspondence.

Please be advised that deviations from the standards established by the Council in the Declaratory Ruling are enforceable under the provisions of Connecticut General Statutes §16-50u.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MB/IN/laf

Bradley Parsons
development@verogy.com
(860) 288-7215 x715
124 LaSalle Road, 2nd Floor
West Hartford, CT 06107
Verogy.com

July 27, 2023

Via Electronic Filing

Melanie Bachman, Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Petition No. 1550 - VCP FX CT, LLC Petition for Declaratory Ruling pursuant to Connecticut General Statutes §4-176 and §16-50k, for the Construction, Operation, and Maintenance of a 1.5 MW AC Roof-Mounted Solar Photovoltaic Electric Generating Facility at FedEx Distribution Center, 49 FedEx Drive, Middletown, Connecticut – PE Stamped & Signed Structural Design

Dear Ms. Bachman:

Pursuant to Condition No. 2 in the Connecticut Siting Counsel's ("CSC") Findings of Fact, Opinion, and Decision and Order ("Declaratory Ruling") (Petition No. 1550), we are hereby providing, via email, the final structural design for the racking system stamped by a Professional Engineer duly licensed in the State of Connecticut prior to commencement of construction.

If you have any questions concerning this notification, please contact me at your convenience.

Sincerely,



Bradley J. Parsons
Director of Design and Permitting



VSE Project Number: U4867.0016.231

April 12, 2023

Verogy
150 Trumbull Street
Hartford, CT 6103

REFERENCE: Fedex Middletown Building: 49 Fedex Drive, Middletown, CT 06457
Solar Array Installation

To Whom It May Concern:

Per your request, we have reviewed the rails and connections the existing structures at the above referenced site. The purpose of our review was to determine the adequacy of the proposed racking and connections to the existing building. Based upon our review, we conclude that the proposed connection method is adequate to support the proposed solar panel installation. Based on the manufacturer specifications, the Ironridge XR100 rail, and accompanying racking is adequate to span 48" between attachment points. The analysis of the existing structure is by others, including the attachment of the metal roof panels to the existing structure.

Design Parameters

Code: Connecticut State Building Code, 2022 Edition (2021 IBC)
Risk Category: II
Design wind speed, Vult: 120 mph (3-sec gust)
Wind exposure category: C
Ground snow load, Pg: 30 psf
Flat roof snow load, Pf: 30 psf

Existing Roof Structure

Roofing material: metal seam
Roof slope: 1.8°

Connection to Roof

Mounting connection: (1) S-5! E or E Mini Clamp to min. 24 ga steel roofing
Maximum mounting spacing along rails:
Zone 1 (Beyond 24' from roof edge): 48" o.c.
Zone 1 (Beyond 12' from roof edge to 24' from roof edge): 48" o.c.
Zone 2 (Within 12' of roof edge): 24" o.c.
Zone 3 (Within 12' of roof corner and within 4' of roof edge): 24" o.c.

Install (2) rails per row of panels, evenly spaced; panel length perpendicular to the rails shall not exceed 90 in
Rail cantilever shall not exceed the lesser of 50% of the connection spacing or maximum cantilever allowed by manufacturer



VSE Project Number: U4867.0016.231
Fedex Middletown Building
4/12/2023

Limitations

Installation of the solar panels must be performed in accordance with manufacturer recommendations. All work performed must be in accordance with accepted industry-wide methods and applicable safety standards. The design of the solar panels, the existing structure, and electrical engineering is the responsibility of others.

VECTOR STRUCTURAL ENGINEERING, LLC
CT Firm License: PEC 0001229



04/12/2023

Jacob Proctor, P.E.
CT License: PEN.0034373 - Expires: 01/31/2024
Project Engineer

Enclosures

JSP/wic



PROJECT: Fedex Middletown Building

Components and Cladding Wind Calculations

Label: Solar Panel Array

Note: Calculations per ASCE 7-16

SITE-SPECIFIC WIND PARAMETERS:

Basic Wind Speed [mph]: 120
 Exposure Category: C
 Risk Category: II

Notes:

ADDITIONAL INPUT & CALCULATIONS:

Height of Roof, h [ft]:	20	(Approximate)		
Comp/Cladding Location:	Gable Roofs $\theta \leq 7^\circ$			
Enclosure Classification:	Enclosed Buildings			
Zone 1' GCp:	0.90	Figure 30.3-2A (negative coeff.)	Zone 1' γ_a :	0.73
Zone 1 GCp:	1.63		Zone 1 γ_a :	0.73
Zone 2 GCp:	2.30		Zone 2 γ_a :	0.80
Zone 3 GCp:	3.20		Zone 3 γ_a :	0.80
α :	9.5	Table 26.11-1		
z_g [ft]:	900	Table 26.11-1		
K_h :	0.90	Table 26.10-1		
K_e :	1.00	Table 26.9-1		
K_{zt} :	1	Equation 26.8-1		
K_d :	0.85	Table 26.6-1		
Velocity Pressure, q_h [psf]:	28.1	Equation 26.10-1		
γ_E :	1.50	Section 29.4.4		

Fig. 29.4-8

WIND PRESSURES: Equation 29.4-7 $p = q_h (GC_p)(\gamma_E)(\gamma_a)$

Zone 1', p [psf]:	27.7	psf (1.0 W)
Zone 1, p [psf]:	50.1	psf (1.0 W)
Zone 2, p [psf]:	77.6	psf (1.0 W)
Zone 3, p [psf]:	108.0	psf (1.0 W)

(0.2h = 4 ft)
 (0.6h = 12 ft)
 (1.2h = 24 ft)



JOB NO.: U4867.0016.231
SUBJECT: CONNECTION

PROJECT: Fedex Middletown Building

Calculate Uplift Forces on Connection

	Pressure (0.6 Dead -0.6 Wind) (psf)	Max Trib. Width ¹ (ft)	Max Trib. Area ² (ft ²)	Max Uplift Force (lbs)
Zone 1'	14.8	4.0	15.0	222
Zone 1	28.2	4.0	15.0	423
Zone 2	44.8	2.0	7.5	336
Zone 3	63.0	2.0	7.5	473

Calculate Connection Capacity

Roof Connector:	S-5! E or E Mini Clamp	
Additional Connection Info:	to min. 24 ga steel roofing	
Ultimate Capacity ³ [lbs/in]:	1550	
Factor of Safety:	3	
Qty. of Connectors:	1	
Prying Coefficient:	1	
Total Capacity [lbs]:	517	

Determine Result

Maximum Demand:	473
Connection Capacity:	517

Result: **Capacity > Demand, Connection is adequate.**

Notes

1. 'Max Trib. Width' is the width along the rails tributary to the connection.
2. 'Max Trib Area' is the product of the 'Max. Trib Width' and 1/2 the panel width/height perpendicular to the rails. (2) rails per row of panels. Length of panels perpendicular to the rails shall not exceed 90".
3. Ultimate capacity values are from manufacturer testing. Metal gauge is unknown. A conservative thickness has been used. Metal gauge shall be verified in field prior to installation of solar panels. Roof deck model is unknown or has not been tested for this connector. The capacity used is based on conservative values from testing of the connector on similar roof deck model.
4. Install metal roof connector per manufacturer's written instructions with recommended fasteners when indicated.

Rail: XR100		Gable Roof Flush Mount System Span Table (inches) - Portrait or Landscape Installation																																												
		**Max Module Length: 92.5", Max Module SF: 29.5 SF																																												
		Exposure C																																												
Wind Speed (mph)	Roof Slope (deg.)	Ground Snow: 0 psf			10 psf			20 psf			30 psf			40 psf			50 psf			60 psf			70 psf*			80 psf*			90 psf*			100 psf*			110 psf*			120 psf*			Exposed Mod.			Edge Mod.		
		Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3			
90 mph	8-20	112	112	101	96	96	96	79	79	79	77	77	77	72	72	72	64	64	64	58	58	58	54	54	54	51	51	51	48	48	48	48	48	48	44	44	44	42	42	42	112	86	77	80	67	61
	21-27	110	110	110	93	93	93	79	79	79	78	78	78	72	72	72	64	64	64	59	59	59	55	55	55	52	52	52	49	49	49	48	48	48	44	44	44	43	43	43	110	96	88	88	73	68
	28-45	107	107	107	92	92	92	79	79	79	78	78	78	72	72	72	66	66	66	64	64	64	58	58	58	54	54	54	51	51	51	49	49	49	48	48	48	45	45	45	107	98	87	86	78	72

All spacing >48"

Light green = min 72" span
 Blue = min 64" span
 Orange = min 48" span
 Grey = Shaded cells indicate conditions in which UFO Mid Clamp connection capacity is exceeded. See Note 9 on page 2 for details.

* = Note: additional installation requirement for CAMO module clamp. See Note 10 on Page 3 for details.

REV 02/09/2021

Grouping of ASCE 7-16 Roof Zones (Gable)						
Roof Slope	8° - 27°			28° - 45°		
Group	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3
ASCE 7-16 Roof Zones	1 2e	2n 2r 3e	3r	1 2e 2r	2n 3r	3e

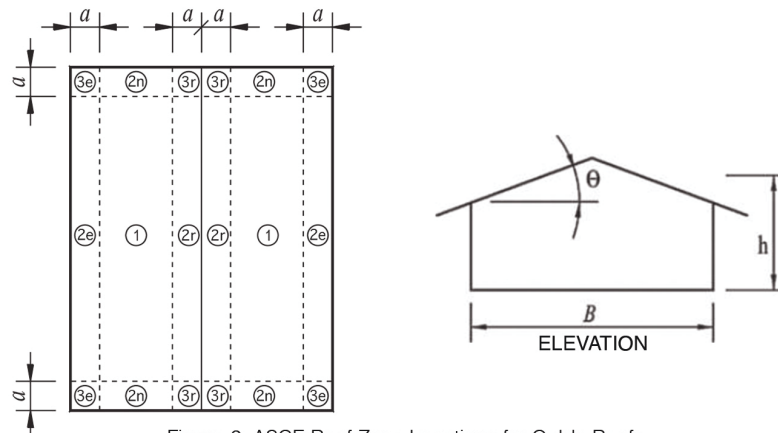


Figure 2: ASCE Roof Zone Locations for Gable Roofs

Notation (Per ASCE 7-16)

a = 10% of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m). If an overhang exists, the edge distance shall be measured from the outside edge of the overhang. The horizontal dimensions used to compute the edge distance shall not include any overhang distances.

B = Horizontal dimension of building measured normal to wind direction, in ft (m).

h = Mean roof height, in ft (m).

θ = Angle of plane of roof from horizontal, in degrees.

**Wind pressure loads used to generate the span tables for modules with maximum lengths of 86" and 92.5" are based on the wind tunnel study "Design Wind Loads for Solar Modules Mounted Parallel to the Roof of a Low-rise Building"¹, referenced in ASCE 7-16 Section 29.4.4.

1. Sarah E. Stenabaugh 2015 Design Wind Loads for Solar Modules Mounted Parallel to the Roof of a Low-rise Building, University of Western Ontario, Ph.D Program Dissertation.

PROJECT: Fedex Middletown Building

