

Mayor Brian Pugh
Village Board Members
Village of Croton-on-Hudson
1 Van Wyck Street
Croton-on-Hudson, NY 10520

August 28, 2020

Re: Solar Energy Project at the Hudson National Golf Club

Attn: Janine King / Village Manager

Dear Mayor Pugh:

This is an application to amend the Special Permit for the Hudson National Golf Club to allow the installation of solar panels on the site under your new Village Code Section 230.48(G) (1) "Solar Energy Systems" that sets out procedures for the approvals. In addition, the applicant, Matrix Development, LLC seeks a Special Permit for the installation of the Solar Panels as required under the same Law. The panels would be installed on a 15 acre lot to be subdivided from the Club's property that will be leased to Matrix, LLC.

We submitted the application earlier to Dan O'Connor and have had discussions with him related to this application and we now believe the application is complete for your Board's review.

Accordingly, please find enclosed initially three (3) sets of the following materials for purposes of your review with digital data in pdf format to follow:

1. Planning Board and Village Board Application,
2. Short Environmental Assessment Form dated July 20, 2020,
3. Village of Croton-on-Hudson Coastal Assessment Form,

Reports as follows:

1. Hudson National Environmental Report, Installation of 1.86 MW Photovoltaic System,
2. US EPA Gas Equivalencies Calculator,
3. Photovoltaic System Specifications, Sea Bright Solar for Hudson National Golf Course dated July 2, 2020,
4. Report entitled Sunpower Corporation, Photovoltaic Systems: Lower Levels of Glare and Reflectance Vs. Surrounding Environment dated January 10, 2020,
5. Decommissioning Plan, Solar System at Hudson National Golf Course prepared by Sea Bright Solar dated June 30, 2020,
6. Property Lease Memorandum

Set of drawings as follows:

1. Proposed Subdivision / Solar Array System prepared for Hudson National Golf Club dated April 22, 2019 revised July 7, 2020, sheet 1 of 6 sheets,
2. Overall Map, Proposed Subdivision / Solar Array System prepared for Hudson National Golf Club dated January 22, 2020 revised July 7, 2020, sheet 2 of 6 sheets,
3. Tree Plan, Solar Array System prepared for Hudson National Golf Club dated March 25, 2020 revised July 2, 2020, sheet 3 of 6 sheets,
4. Tree Schedule, Solar Array System prepared for Hudson National Golf Club dated February 25, 2020, sheet 4 of 6 sheets,

5. Erosion Control Plan, Solar Array System prepared for Hudson National Golf Club dated July 2, 2020, sheet 5 of 6 sheets,
6. Details / Notes, Solar Array System prepared for Hudson National Golf Club dated July 2, 2020 revised July 7, 2020, sheet 6 of 6 sheets,
7. Overall Map Sight Lines Proposed Subdivision / Potential Solar Panel Locations prepared for Hudson National Golf Club dated February 25, 2020, sheet 1 of 5 sheets,
8. Views Looking From Adjacent Properties at Potential Solar Panel Locations prepared for Hudson National Golf Club dated February 25, 2020, sheet 2 of 5 sheets,
9. Views Looking From Adjacent Properties at Potential Solar Panel Locations prepared for Hudson National Golf Club dated February 25, 2020, sheet 3 of 5 sheets,
10. Views Looking From Adjacent Properties at Potential Solar Panel Locations prepared for Hudson National Golf Club dated February 25, 2020, sheet 4 of 5 sheets,
11. Views Looking From Adjacent Properties at Potential Solar Panel Locations prepared for Hudson National Golf Club dated February 25, 2020, sheet 5 of 5 sheets,
12. Views Looking From Offsite Locations to Potential Solar Panel Locations prepared for Hudson National Golf Club dated April 28, 2020 revised July 7, 2020, sheet 1 of 1 sheets,
13. Slope Map prepared for Hudson National Golf Club Dated July 7, 2020,
14. Report on Conformance to the proposed Special Permit.

The Hudson National Golf Course proposes to subdivide approximately 15 acres of their site for the purpose of installing this solar array. About one-half (1/2) of the 15 acres will be used for the solar panels, borders and attendant gravel access paths.

Our firm conducted extensive visual studies to evaluate whether the solar arrays will be visible by the neighbors including a balloon test. Since the panels are only about 10 feet above grade, we noted they will not be readily visible from points on the ground. The visual profiles are included in the package.

The purpose of the project is to mitigate the use of fossil fuels and generate energy that may be used by the public. In that sense, the project itself is mitigation for the removal of trees and other minor impacts as further detailed in the attached documents.

Accordingly, the applicants, Matrix Development, LLC and Hudson National request a Special Permit under the Villages' Solar Law Section 230-48.1 "Solar Energy Systems" for a Tier 3 installation. To facilitate this application the portion of the Hudson National site that is to be used for the solar arrays will conform to the basic, underlying R-60 zoning requirements and no longer subject to the original Special Permit for the golf course.

To install the solar panels it is necessary to remove 581 trees, of which 177 trees are less than 8" inches in diameter. In the disturbance area we identified 51 dead trees that will also be removed.

In general, the panels will be installed by installing vertical posts into the ground and the only ground cover disturbance would be the gravel paths that will be used to access the site. A fence will surround the area of the panels as per code.

The ground area beneath the solar panels is to be planted with a drought resistant, dwarf fescue grass mixture. The rain runoff from the panels will to be converted to sheet flow using individual flow diffusers such that the effect will be no increase in impervious area.

We also provide a report on the conformance to the Village rules regarding Special Permits and the Supplementary regulations for the installation of the Tier 3 Solar arrays.

Energy Savings

The project sponsors indicate that the proposed solar project of 1.8 megawatts will produce approximately 2,160,000 kilowatt-hours of energy per year. Hudson National's 40% subscription to the energy plan would be approximately 864,000 kWh representing 77% of their annual usage. Therefore, this project will result in a substantially reduced carbon footprint for the golf club.

For the 60% project balance after the usage by the club, Matrix's sister company Community Power Partners would be happy to work with the Village to provide reduced energy costs. The Company is proposing also that the Village assist with co-marketing energy subscriptions for the project, and Village residents will be given the right of first refusal for a period of three (3) months before subscriptions are offered to the general public.

The applicant further estimates that the 60% balance could serve approximately 150 homes, providing each residential customer with approximately 10% in cost savings on their electricity, every year which is guaranteed for up to 25 years.

This economic benefit is similar to that which has been provided by a smaller rooftop solar project developed at the Village at the DPW building. The subscription response to that project has been strong and the owners expect it to be fully subscribed with overflow demand.

Procedure

We request that your Board accept this application for its upcoming meeting and we hope you will initiate this process, including SEQRA review by resolving to circulate to other involved agencies your Board's Notice of Intent to declare your Board as Lead Agency under SEQRA.

After your initial actions we propose to obtain Subdivision and Site Plan approval from the Village's Planning Board. We would also seek a referral from the Planning Board to your Board to grant an amended Special Permit for the Club as well as your granting a new Special permit to Matrix, LLC for the installation of the Solar Panels.


Please call if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Ralph G. Mastromonaco", followed by a long horizontal flourish.

Ralph G. Mastromonaco, PE

Cc: Matrix Development, LLC
Seabright Solar

<div style="text-align: center;">  <p>Village of Croton-on-Hudson</p> <p>Engineering Department Stanley H. Kellerhouse Municipal Building One Van Wyck Street Croton-on-Hudson, NY 10520-2501 Tel: 914-271-4783, Fax: 914-271-3790</p> </div>	<h2 style="margin: 0;"><u>Planning Board and Village Board Application</u></h2> <p style="font-size: small;">(new 9/15)</p>
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Note: Prior to submitting this application, contact Ronnie Rose, Planning Board Secretary at 914 271-4783

Application Date: _____ Application #: _____
(for Village Use Only)

Property Information:

Section: 67.15 Block: 1 Lot: 4
Property Location (street address) 40 Arrowcrest Drive, Croton-on-Hudson, NY 10520
Zoning District: RA-60 Commercial Lot: ☐ yes ☒ no Vacant Lot: ☐ yes ☒ no

Applicant Information: ☒ Owner ☐ Contractor ☐ Other: _____ and Matrix Development LLC

Name: _____ Sponsor: Scott Sabbagh, Matrix Development LLC
Company: Matrix Development, LLC and Hudson National Golf Course, Inc. 40 Arrowcrest Drive 10520
Address: 153 Mercer Street, #4, New York, NY 10012 (Matrix)
Address: _____ Tharvey@hudsonNational.org
Office #: _____ Fax #: _____ E Mail Address: ssabbagh@matrixrea.com

Property Owner: ☐ Same As Above

Last Name: Hudson National Golf Club, Inc. First Name: _____ MI: _____
Address: 40 Arrowcrest Drive, Croton-on-Hudson, NY 10520
Address: _____
Phone #: 914-271-7600
Cell #: _____ E-Mail Address: tharvey@hudsonnational.org

Application Type: (Please check those that apply)

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> Site Plan* | <input type="checkbox"/> Amended Site Plan* | <input type="checkbox"/> Minor Site Plan |
| <input type="checkbox"/> Change of Use | | |
| <input type="checkbox"/> Building Envelope Modification | | |
| <input type="checkbox"/> Wetlands Permit * | <input checked="" type="checkbox"/> Village Board Special Permit * | |
| <input checked="" type="checkbox"/> Steep Slope Permit * | <input type="checkbox"/> Village Board Special Permit Renewal * | |
| <input type="checkbox"/> Excavation & Fill Permit | ** plus amendment to the existing | |
| <input checked="" type="checkbox"/> Preliminary Subdivision | Special Permit for the golf course | |
| <input checked="" type="checkbox"/> Final Subdivision | | |

**note: Public Hearing required for these permits*

NOTE: The Planning Board also reviews applications (e.g., special permits, accessory apartments, zoning amendments, etc.) that have been referred to them by the Village Board for a recommendation. No public hearing before the Planning Board is required for referral applications.

INSTRUCTIONS: Please submit eight (8) paper copies (Nine copies if a special permit from the Village Board is also required) of supporting materials to the Planning Board Secretary and one (1) pdf file of all application materials to rrose@crotononhudson-ny.gov

I, certify that the above information is accurate, and I am the property owner or authorized by the owner to file this application on their behalf and that I will indemnify and hold the Village harmless against any damage or injury that may be caused by or arise out of any entry onto the property in connection with the processing of the application, during construction or performance of the work or within one year after the completion of the work.

Applicant certifies that he is authorized by the Owner of subject premises to conduct the project described above.

Ralph G. Mastromonaco, PE, PC (Agent for Applicant)

7/20/2020

Applicant's Name (please print)

Signature of Applicant or Agent

Date

FOR VILLAGE USE ONLY:

Fee: _____ Paid on: _____ Rec'd by: _____
TAXES PAID: _____ LEASE AGREEMENT (If applicable) _____
HEARD BY THE VILLAGE BOARD ON: _____ (date) HEARD BY THE PLANNING BOARD ON: _____ (date)
PUBLIC HEARING HELD ON: _____ (date) PUBLIC HEARING HELD ON: _____ (date)
APPROVED: _____ DENIED: _____ APPROVED: _____ DENIED: _____

Short Environmental Assessment Form

Part 1 - Project Information

Instructions for Completing

Part 1 – Project Information. The applicant or project sponsor is responsible for the completion of Part 1. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification. Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information.

Complete all items in Part 1. You may also provide any additional information which you believe will be needed by or useful to the lead agency; attach additional pages as necessary to supplement any item.

Part 1 – Project and Sponsor Information			
Name of Action or Project: Proposed Subdivision / Solar Array System for Hudson National Golf Club, Inc.			
Project Location (describe, and attach a location map): 40 Arrowcrest Drive, Croton-on-Hudson, NY 10520 (67.15-1-4)			
Brief Description of Proposed Action: Project is to amend the Golf Club Special Permit to subdivide 15+ acre parcel from the 280+ acre golf club and grant an additional Special Permit for the Tier 3 Solar Arrays from the <u>Village Board of Trustees</u> Subdivision Approval, Site Plan Approval, steep slope permit, tree removal permit and stormwater permits are requested from the <u>Planning Board</u>			
Name of Applicant or Sponsor: Matrix Development, LLC and Hudson National Golf Club, Inc		Telephone: 732-693-7843 E-Mail: ssabbagh@matrimea.com tharvey@hudsonnatial.org	
Address: 40 Arrowcrest Drive			
City/PO: Croton-on-Hudson		State: NY	Zip Code: 10012
1. Does the proposed action only involve the legislative adoption of a plan, local law, ordinance, administrative rule, or regulation? If Yes, attach a narrative description of the intent of the proposed action and the environmental resources that may be affected in the municipality and proceed to Part 2. If no, continue to question 2.		NO <input checked="" type="checkbox"/>	YES <input type="checkbox"/>
2. Does the proposed action require a permit, approval or funding from any other government Agency? If Yes, list agency(s) name and permit or approval: WCDH Subdivision Plat Approval / NYSERDA Funding		NO <input checked="" type="checkbox"/>	YES <input type="checkbox"/>
3. a. Total acreage of the site of the proposed action?		<u>15.244</u> acres	
b. Total acreage to be physically disturbed?		<u>7.34</u> acres	
c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor?		<u>280+/-</u> acres	
4. Check all land uses that occur on, are adjoining or near the proposed action:			
5. <input type="checkbox"/> Urban <input type="checkbox"/> Rural (non-agriculture) <input type="checkbox"/> Industrial <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Residential (suburban)			
<input checked="" type="checkbox"/> Forest <input type="checkbox"/> Agriculture <input type="checkbox"/> Aquatic <input checked="" type="checkbox"/> Other(Specify): Golf Course			
<input type="checkbox"/> Parkland			

5. Is the proposed action, a. A permitted use under the zoning regulations? b. Consistent with the adopted comprehensive plan?	NO <input type="checkbox"/> <input type="checkbox"/>	YES <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	N/A <input type="checkbox"/> <input type="checkbox"/>
6. Is the proposed action consistent with the predominant character of the existing built or natural landscape?	NO <input type="checkbox"/>	YES <input checked="" type="checkbox"/>	
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area? If Yes, identify: _____	NO <input checked="" type="checkbox"/>	YES <input type="checkbox"/>	
8. a. Will the proposed action result in a substantial increase in traffic above present levels? b. Are public transportation services available at or near the site of the proposed action? c. Are any pedestrian accommodations or bicycle routes available on or near the site of the proposed action?	NO <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	YES <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
9. Does the proposed action meet or exceed the state energy code requirements? If the proposed action will exceed requirements, describe design features and technologies: _____ _____	NO <input type="checkbox"/>	YES <input checked="" type="checkbox"/>	
10. Will the proposed action connect to an existing public/private water supply? If No, describe method for providing potable water: No potable water required _____	NO <input checked="" type="checkbox"/>	YES <input type="checkbox"/>	
11. Will the proposed action connect to existing wastewater utilities? If No, describe method for providing wastewater treatment: No wastewater proposed _____	NO <input checked="" type="checkbox"/>	YES <input type="checkbox"/>	
12. a. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on the National or State Register of Historic Places, or that has been determined by the Commissioner of the NYS Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places? b. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory?	NO <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	YES <input type="checkbox"/> <input type="checkbox"/>	
13. a. Does any portion of the site of the proposed action, or lands adjoining the proposed action, contain wetlands or other waterbodies regulated by a federal, state or local agency? b. Would the proposed action physically alter, or encroach into, any existing wetland or waterbody? If Yes, identify the wetland or waterbody and extent of alterations in square feet or acres: _____ _____ _____	NO <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	YES <input type="checkbox"/> <input type="checkbox"/>	

14. Identify the typical habitat types that occur on, or are likely to be found on the project site. Check all that apply: <input type="checkbox"/> Shoreline <input type="checkbox"/> Forest <input type="checkbox"/> Agricultural/grasslands <input type="checkbox"/> Early mid-successional <input type="checkbox"/> Wetland <input type="checkbox"/> Urban <input checked="" type="checkbox"/> Suburban		
15. Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered? Some species noted in the Hudson River not on site	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16. Is the project site located in the 100-year flood plan?	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17. Will the proposed action create storm water discharge, either from point or non-point sources? If Yes,	NO	YES
a. Will storm water discharges flow to adjacent properties?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Will storm water discharges be directed to established conveyance systems (runoff and storm drains)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If Yes, briefly describe: A Stormwater Plan is provided _____ _____		
18. Does the proposed action include construction or other activities that would result in the impoundment of water or other liquids (e.g., retention pond, waste lagoon, dam)? If Yes, explain the purpose and size of the impoundment: _____ _____	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
19. Has the site of the proposed action or an adjoining property been the location of an active or closed solid waste management facility? If Yes, describe: _____ _____	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20. Has the site of the proposed action or an adjoining property been the subject of remediation (ongoing or completed) for hazardous waste? If Yes, describe: _____ _____	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE Applicant/sponsor/name: <u>Ralph G. Mastromonaco, PE, PC</u> Date: <u>7/20/2020</u> Signature: _____ Title: <u>Agent</u>		

Village of Croton-on-Hudson

COASTAL ASSESSMENT FORM

A. INSTRUCTIONS (Please print or type all answers)

1. *Applicants, or in the case of direct actions (city, town, village) agencies, shall complete this CAF for proposed actions which are subject to the consistency review law. This assessment is intended to supplement other information used by a (city, town, village) agency in making a determination of consistency.*
2. *Before answering the questions in Section C, the preparer of this form should review the policies and explanations of policy contained in the Local Waterfront Revitalization Program (LWRP), a copy of which is on file in the (city, town, village) clerk's office. A proposed action should be evaluated as to its significant beneficial and adverse effects upon the coastal area.*
3. *If any question in Section C on this form is answered "yes", then the proposed action may affect the achievement of the LWRP policy standards and conditions contained in the consistency review law. Thus, the action should be analyzed in more detail and, if necessary, modified prior to making a determination that it is consistent to the maximum extent practicable with the LWRP policy standards and conditions. If an action cannot be certified as consistent with the LWRP policy standards and conditions, it shall not be undertaken.*

B. DESCRIPTION OF SITE AND PROPOSED ACTION:

1. Type of (city, town, village) agency action (check appropriate response):

- a) Directly undertaken (e.g. capital construction, planning activity, agency regulation, land transaction) None
- b) Financial assistance (e.g. grant, loan, subsidy) Funding from NYSERDA
- c) Permit, approval, license, certification Special Permit, Land use permits
- d) Agency undertaking action Board of Trustees and Planning Board

2. Describe nature and extent of action:

Project is to amend the Golf Club Special Permit to subdivide a 15+ acre parcel from the 280+ acre golf club and grant an additional Special Permit for the Tier 3 Solar Array project from the Village Board of Trustees. Subdivision approval, steep slope permit, tree removal permit and stormwater permits are requested from the Village Planning Board.

Hudson National Golf Club

3. Location of actions: 40 Arrowcrest Drive, Croton-on-Hudson, NY 10520 (67.15-1-4)
(street or site description)

4. Size of site: 280 +/- Acres

5. Present land use: Private Golf Club

6. Present zoning classification: RA-60, Single Family Residential

7. List and describe any unique or unusual land forms within or contiguous to the project site (i.e. bluffs, dunes, swales, ground depressions, other geological formations):

PROJECT IS LOCATED IN A WOODED HILLSIDE OVERLOOKING
THE HUDSON VALLEY

8. Percent of site which contains slopes of 15% or greater: 33% OF THE 15+/- ACRE PROPOSED
PARCEL THOUGH THE ACTUAL DISTURBANCE IS LIMITED
BY THE NATURE OF THE PANEL INSTALLATION

9. List and describe streams, lakes, ponds or wetlands existing within or contiguous to the project area. Give name and size of each if available:

- a) Name: Local Wetland nearby but Project does not require a Wetland Permit
- b) Size (in acres): Several Acres

10. If an application for the proposed action has been filed with the (city, town, village) agency, the following information shall be provided:

- a) Name of applicant: Matrix Development, LLC and Hudson National Golf Course
- b) Mailing address: 153 Mercer Street #4, New York, NY 10012
- c) Telephone number: (area code) (732) 693-7843 (Seabright Solar)
- d) Application number, if any: _____

11. Will the action be directly undertaken, require funding or approval by a state or federal agency? NO _____ YES X

If yes, which state or federal agency? NYS ERDA

12. If the proposed action is a law, or planning or zoning document, SKIP Section "C" and go to Section "E".

C. COASTAL ASSESSMENT:

	<u>YES</u>	<u>NO</u>	<u>N/A</u>
1. Will the proposed action be located in, or contiguous to, or have a potentially adverse effect upon any of the resource areas identified on the coastal area map:	_____	<u>X</u>	_____
a) Significant fish or wildlife habitats?	_____	<u>X</u>	_____
b) Scenic resources of local or statewide significance?	_____	<u>X</u>	_____
c) Natural protective features in an erosion hazard area?	_____	<u>X</u>	_____

If the answer to any question above is "yes", please explain in Section D any measures which will be undertaken to mitigate any adverse effects.

YES NO N/A

2. Will the proposed action have a significant effect upon:

- | | | | |
|--|-------------------|----------------------|-------------------|
| a) Commercial or recreational use of fish and wildlife resources? | <u> </u> | <u> X </u> | <u> </u> |
| b) Scenic quality of the coastal environment? | <u> </u> | <u> X </u> | <u> </u> |
| c) Development of future or existing water dependent uses? | <u> </u> | <u> X </u> | <u> </u> |
| d) Operation of the State's major ports? | <u> </u> | <u> X </u> | <u> </u> |
| e) Land or water uses within a small harbor area? | <u> </u> | <u> X </u> | <u> </u> |
| f) Stability of the shoreline? | <u> </u> | <u> X </u> | <u> </u> |
| g) Surface or groundwater quality? | <u> </u> | <u> X </u> | <u> </u> |
| h) Existing or potential public recreation opportunities? | <u> </u> | <u> X </u> | <u> </u> |
| i) Structures, sites or districts of historic, archeological or cultural significance to the (city, town, village), State or nation? | <u> </u> | <u> X </u> | <u> </u> |

3. Will the proposed action involve or result in any of the following:

- | | | | |
|--|----------------------|----------------------|-------------------|
| a) Physical alteration of land along the shoreline, land under water or coastal waters? | <u> </u> | <u> X </u> | <u> </u> |
| b) Physical alteration of two (2) acres or more of land located elsewhere in the coastal area? | <u> </u> | <u> X </u> | <u> </u> |
| c) Expansion of existing public services or infrastructure in undeveloped or low density areas of the coastal area? | <u> </u> | <u> X </u> | <u> </u> |
| d) Energy facility not subject to Article VII or VIII of the Public Service Law? | <u> X </u> | <u> </u> | <u> </u> |
| e) Mining, excavation, filling or dredging in coastal waters? | <u> </u> | <u> X </u> | <u> </u> |
| f) Reduction of existing or potential public access to or along the shore? | <u> </u> | <u> X </u> | <u> </u> |
| g) Sale or change in use of publicly-owned lands located on shoreline or under water? | <u> </u> | <u> X </u> | <u> </u> |
| h) Development within a designated flood or erosion hazard area? | <u> </u> | <u> X </u> | <u> </u> |
| i) Development on a beach, dune, barrier island or other natural feature that provides protection against flooding or erosion? | <u> </u> | <u> X </u> | <u> </u> |
| j) Construction or reconstruction of erosion protective structures? | <u> </u> | <u> X </u> | <u> </u> |
| k) Diminished surface or groundwater quality? | <u> </u> | <u> X </u> | <u> </u> |
| l) Removal of ground cover from the site? | <u> X </u> | <u> </u> | <u> </u> |

4. Project	<u>YES</u>	<u>NO</u>	<u>N/A</u>
a) If project is to be located adjacent to shore:			
1. Will water-related recreation be provided?	_____	_____	<u>X</u>
2. Will public access to the foreshore be provided?	_____	_____	<u>X</u>
3. Does the project require a waterfront site?	_____	_____	<u>X</u>
4. Does it supplant a recreational or maritime use?	_____	_____	<u>X</u>
5. Do essential public services and facilities presently exist at or near the site?	_____	_____	<u>X</u>
6. Is it located in a flood prone area?	_____	_____	<u>X</u>
7. Is it located in an area of high erosion?	_____	_____	<u>X</u>
b) If the project site is publicly owned:			
1. Will the project protect, maintain and/or increase the level and industrial facilities into coastal facilities?	_____	_____	<u>X</u>
2. If located in the foreshore, will access to those and adjacent lands be provided?	_____	_____	<u>X</u>
3. Will it involve the siting and construction of major energy facilities?	_____	_____	<u>X</u>
4. Will it involve the discharge of effluent from major steam electric generating and industrial facilities into coastal facilities?	_____	_____	<u>X</u>
c) Is the project site presently used by the community neighborhood as an open space or recreation area?	_____	<u>X</u>	_____
d) Does the present site offer or include scenic views or vistas known to be important to the community?	_____	<u>X</u>	_____
e) Is the project site presently used for commercial fishing or fish processing?	_____	<u>X</u>	_____
f) Will the surface area of any waterways or wetland area be increased or decreased by the proposals?	_____	<u>X</u>	_____
g) Does any mature forest (over 100 years old) or other locally important vegetation exist on this site which will be removed by the project?	_____	<u>X</u>	_____
h) Will the project involve any waste discharges into coastal waters?	_____	<u>X</u>	_____
i) Does the project involve surface or subsurface liquid waste disposal?	_____	<u>X</u>	_____
j) Does the project involve transport, storage, treatment or disposal of solid waste or hazardous materials?	_____	<u>X</u>	_____
k) Does the project involve shipment or storage of petroleum products?	_____	<u>X</u>	_____

4. Project (continued)

	<u>YES</u>	<u>NO</u>	<u>N/A</u>
l) Does the project involve discharge of toxic hazardous substances or other pollutants into coastal waters?	_____	<u>X</u>	_____
m) Does the project involve or change existing ice management practices?	_____	<u>X</u>	_____
n) Will the project affect any area designated as a tidal or freshwater wetland?	_____	<u>X</u>	_____
o) Will the project alter drainage flow, patterns or surface water runoff on or from the site?	<u>X</u>	_____	_____
p) Will best management practices be utilized to control storm water runoff into coastal waters?	<u>X</u>	_____	_____
q) Will the project utilize or affect the quality or quantity of sole source or surface water supplies?	_____	<u>X</u>	_____
r) Will the project cause emissions which exceed federal or state air quality standards or generate significant amounts of nitrates or sulfates?	_____	<u>X</u>	_____

D. REMARKS OR ADDITIONAL INFORMATION.

For questions answered "yes" in Section C, explain methods you will undertake to reduce adverse effects. Review the LWRP to see if the project is consistent with each policy. List policies the project is not consistent with and explain all mitigating actions.

(Add any additional sheets necessary to complete this form)

REMARKS

(3.d.) THE PROJECT WILL CAPTURE SOLAR ENERGY AND WILL NOT REQUIRE A MAJOR TRANSMISSION FACILITY NOR A MAJOR STEAM ELECTRIC GENERATOR AND IS NOT SUBJECT TO PUBLIC SERVICE LAW ARTICLES VII AND VIII.

(3.1.) THE PROJECT WILL REPLANT ALL GROUND COVER THAT IS REMOVED.

(4.o) THE PROJECT WILL REMOVE TREES BUT WILL ONLY DISTURB GROUND COVER MINIMALLY

(4.p.) THERE WILL BE A TEMPORARY ALTERATION OF DRAINAGE DURING CONSTRUCTION BY THE USE OF EROSION CONTROL AND SEDIMENT BASINS

E. SUBMISSION REQUIREMENTS.

The final version of this form shall be sent to the Department of State (*New York State Dept. of State, Coastal Management Program, 162 Washington Avenue, Albany, NY 12231*) if any question in Section C is answered “yes” and either of the following conditions is met.

- Section B.1 (a) or B.1 (b) is checked **OR**
- Section B.1 (c) and B.11 is answered “yes”

=====

If assistance or further information is needed to complete this form, please contact the Village Engineer at (914) 271-4783.

Preparer's Name: Ralph G. Mastromonaco, PE, PC

Title: Consultant

Agency: Ralph G. Mastromonaco, PE, PC, 13 Dove Court, Croton-on-Hudson, NY 10520

Telephone No.: (914) 271-4762 E-mail: hardycross@aol.com

Date: 7/20/2020

TERMS OF LEASE AGREEMENT by and between

MATRIX DEVELOPMENT, LLC

153 Mercer Street
New York, New York 10012
("MD")

And

HUDSON NATIONAL GOLF CLUB

40 Arrowcrest Drive
Croton-on-Hudson, New York, 10520
("HNGC")

THE PARTIES

MATRIX DEVELOPMENT, LLC., Matrix Development, LLC or its assigns ("MD") is a Limited Liability Company of the State of Connecticut which is in the business of developing and constructing Solar photovoltaic (PV) projects.

HUDSON NATIONAL GOLF CLUB. Hudson National Golf Club ("HNGC") of 40 Arrowcrest Drive, Croton-on-Hudson, New York.

PREMISES. HNGC owns and occupies premises at 40 Arrowcrest, Croton-On-Hudson, New York. The leased premises comprise approximately 15 acres accessible from Prickly Pear Hill Rd that will be subdivided from the larger property and will continue to be owned by HNGC. .

PROJECT. A ground mount community solar project of approximately 2 Megawatts on a portion of land owned or controlled by HNGC

LEASE TERMS

Commencement Date: of June 27th 2019

Initial Term: 25 years

Renewal Options: 4 - five year renewal options

Project: Hudson National Golf Course
Scope: Supplementary and Special Permit Regulations
Date: July 23, 2020

The enclosed references the appropriate rules regarding the Special Permit and Solar Energy Law of the Village of Croton-on-Hudson.

Chapter 230. Zoning Article VII. Supplementary Regulations

§ 230-48.1. Solar energy systems. [Added 8-12-2019 by |_.|_. NO. 8-2019]

Tier 3 Systems

(1) Applications for the installation of Tier 3 solar energy systems shall be reviewed by the Building Inspector or Village Engineer for completeness and then referred with comments to the Board of Trustees, which will then refer the application to the Planning Board. Applicants shall be advised of the completeness of their application or any deficiencies that must be addressed prior to substantive review.

(2) Special use permit application requirements. For a special permit application, the site plan application is to be used as supplemented by the following provisions:

(a) If the property of the proposed project is to be leased, legal consent of all parties, specifying the use(s) of the land for the duration of the project, including easements and other agreements, shall be submitted.

Response:

The applicant has provided a memorandum of the proposed lease agreement.

(b) Plans showing the layout of the solar energy system signed by a professional engineer or registered architect.

Response:

The site plans for the solar system have been provided as required.

(c) A one- or three-line electrical diagram detailing the solar energy system layout, solar collector installation, associated components, and electrical interconnection methods, with all National Electrical Code compliant disconnects and over current devices.

Response:

The electrical diagrams are included as a part of the Site Plan application.

(d) A preliminary equipment specification sheet that documents all proposed solar panels, significant components, mounting systems, and inverters that are to be installed. A final equipment specification sheet shall be submitted prior to the issuance of building permit.

Response:

The preliminary equipment specifications are submitted as a part of Site Plan approvals and the final equipment plans will be provided as a part of the building permit phase.

(e) Property operation and maintenance plan. Such plan shall describe continuing photovoltaic maintenance and property upkeep, such as mowing and trimming.

Response:

The O&M plans are submitted as a part of this Site Plan application.

(f) Any application under this section shall meet any substantive provisions contained in the site plan Respondent and special permit sections of this Code as, in the judgment of the Planning Board, are applicable to the system being proposed.

Response:

The Site Plan application is provided with attention to the requirements of the Special Permit.

(g) The Planning Board or Board of Trustees may impose conditions on its approval of any special use Respondent permit under this section in order to enforce the standards referred to in this section or in order to discharge its obligations under the State Environmental Quality Review Act (SEQRA).

Response:

The requirements of SEQRA will be addressed during the approval process with the Village.

(h) Decommissioning plan. A decommissioning plan generally in a form to be provided by the Village and signed by the owner and/or operator of the solar energy system shall be submitted by the applicant as part of the special permit application, addressing the following:

Response:

The applicant has provided the decommissioning plan as a part of the Special Permit application.

[1] The cost of removing the solar energy system.

Response:

The estimated cost of decommissioning is provided as a part of this application in an enclosed document.

[2] The time required to decommission and remove the solar energy system and any ancillary structures.

Response:

The time schedule to decommission the solar systems are enclosed.

[3] The time required to repair any damage caused to the property by the installation and removal of the solar energy system.

Response:

The time schedule to decommission the systems are enclosed.

[4] A tree restoration plan, restoring the decommissioned area to a condition similar to the condition that existed prior to the installation. Recognizing that mature plantings cannot be easily relocated, the Planning Board may exercise discretion in determining the number, caliper, type and location of plantings in reviewing any such plan, but all plantings shall be native noninvasive species.

Response:

The tree restoration as a part of the decommissioning is addressed within the Site Plan application.

(3) Special use permit standards.

(a) Height and setback. Large-scale solar energy systems shall adhere to the height and setback requirements of the underlying zoning district.

Response:

The Site Plan indicates that the proposed structures conform to the height and yard setbacks in the R60 district.

(b) Lot size. Large-scale energy systems shall be located on lots with a minimum lot size of four acres.

Response:

The site as subdivided will be about 15 acres.

(c) Lot coverage.

[1] The following components of a Tier 3 solar energy system shall be considered included in the calculations for lot coverage requirements:

[a] Foundation systems, typically consisting of driven piles or monopoles or helical screws with or without small concrete collars.

Response:

The coverage computations include the foundation systems.

[b] All mechanical equipment of the solar energy system, including any pad-mounted structure for batteries, switchboard, transformers, or storage cells.

Response:

The coverage calculations include the equipment pads.

[c] Paved access roads servicing the solar energy system.

Response:

There are no paved roads for this application.

[2] Lot coverage of the solar energy system, as defined above, shall not exceed the maximum lot coverage requirement of the underlying zoning district.

Response:

The lot coverage computations indicate conformance with the lot coverage maximums.

(d) Fencing. All mechanical equipment, including any structure for storage batteries, shall be enclosed by a fence, as required by NEC, with a self-locking gate to prevent unauthorized access. Warning signs with the owner or operator's contact information shall be placed on the entrance and perimeter of the fencing. The type and height of fencing shall be determined as part of the site plan and special permit review. The fencing and the system may be further screened by any landscaping needed to avoid adverse aesthetic impacts.

Response:

The site is to be fenced along the site perimeter and details of such are shown on the Site Plans.

(e) Lighting. Lighting of the solar energy systems shall be limited to that minimally required for safety and operational purposes and shall be reasonably shielded and downcast from abutting properties.

Response:

There is no lighting proposed for the site.

(f) Tree cutting. Tree removal shall be subject to the permit requirements of Chapter 208.

Response:

The site trees have been located and quantified on the Site Plans in accordance with Chapter 208.

(g) Underground requirements. All on-site utility lines shall be placed underground to the extent feasible and as permitted by the serving utility, with the exception of the main service connection at the utility company right-of-way and any new interconnection equipment, including without limitation any poles, with new easements and right-of-way.

Response:

The utility lines are to be placed underground with the exception, as permitted, to connect to the local Con Edison utility poles on Prickly Pear Hill Road.

(h) Vehicular paths. Vehicular paths within the site shall be designed to minimize the extent of impervious materials and soil compaction.

Response:

The access paths are to be pervious with the possibility that some steeper areas will be stabilized with Item 4 granular material.

(i) Signage.

[1] No signage or graphic content shall be displayed on the solar energy systems except the manufacturer's name, equipment specification information, safety information, and twenty-four-hour emergency contact information.

Response:

There is no commercial signage on the site other than the above-noted message and information.

[2] As required by the National Electric Code (NEC), disconnect and other emergency shutoff information shall be clearly displayed on a light-reflective surface. A clearly visible warning sign concerning voltage shall be placed at the base of all pad-mounted transformers and substations.

Response:

The required signage will be so noted.

(j) Glare. All solar panels shall have antireflective coating(s).

Response:

The applicant has provided information on the antiglare coatings in the Site Plan application and plans.

(k) Screening and visibility.

[1] Solar energy systems smaller than 10 acres shall have views minimized from adjacent properties to the extent reasonably practicable using architectural features, earth berms, landscaping, or other screening methods that will harmonize with the character of the property and surrounding area.

Response:

Though the subdivided site is 15+/- acres, the cumulative surface area of the solar panels is about 2.4 acres and the area used by the arrays will be about 7.3 acres including access paths and borders. A complete visibility analysis was conducted. This consisted of a balloon test and transect profiles at numerous vantage point. The panels are only about 10 feet tall and we found that there is only a limited area along the north bound lane of Route 9 where there is a possibility that they panels will be seen. There will be a change in the visual nature of the site due to the cutting of trees which is unavoidable.

[2] Solar energy systems larger than 10 acres shall be required to:

[a] Conduct a visual assessment of the visual impacts of the solar energy system on public roadways and adjacent properties. At a minimum, a line-of-sight profile analysis shall be provided. Depending upon the scope and potential significance of the visual impacts, additional impact analyses, including, for example, a digital view shed report, may be required to be submitted by the applicant.

Response:

As noted above, numerous visibility analyses were taken of the sight and the only impact noted would be the view of a cleared area on the western portion of the hillside. There does not appear to be any impacts to neighbors given the low profile of the solar arrays.

[b] Submit a screening and landscaping plan to show adequate measures to screen through landscaping, grading, or other means so that views of solar panels and solar energy equipment shall be minimized as reasonably practical from public roadways and adjacent properties to the extent feasible. The screening and landscaping plan shall specify the locations, elevations, height, plant species, and/or materials that will comprise the structures, landscaping, and/or grading used to screen and/or mitigate any adverse aesthetic effects of the system, following the applicable rules and standards established by the Village.

Response:

The visual analyses indicates that the existing forested area separating the solar arrays from all neighbors provides a visual barrier such that additional plantings may not be necessary.

(I) Conditions. The following shall be conditions of all special permits issued for Tier 3 solar energy systems.

[1] Ownership changes. If the owner or operator of the solar energy system changes or the owner of the property changes, the special use permit shall remain in effect, provided that the successor owner or operator assumes in writing all of the obligations of the special use permit, site plan approval, and decommissioning plan. A new owner or operator of the solar energy system shall notify the Zoning Enforcement Officer of such change in ownership or operator within 30 days of the ownership change.

Response:

The conditions on ownership is recognized by the applicant and can be a condition of the Special Permit.

[2] Solar energy systems that have been abandoned as reasonably determined by the Building Inspector for a period of one year shall be removed at the owner's and/or operator's expense in accordance with the decommissioning plan.

Response:

The conditions on ownership is recognized by the applicant and can be a condition of the Special Permit.

[3] Lien. In the event of default of the owner or operator in the performance of removal of a solar energy system and/or complying with the requirements of the decommissioning plan, after proper notice, the Village shall be entitled to arrange for removal or decommissioning and restoration of the property in accordance with the decommissioning plan, and the cost of same incurred by the Village shall constitute a lien on the owner's real property.

Response:

The conditions on ownership is recognized by the applicant and can be a condition of the Special Permit.

H. Safety.

(1) Solar energy systems and solar energy equipment shall be certified under the applicable electrical and/or building codes as required.

Response:

The conditions on certification is recognized by the applicant and can be a condition of the Special Permit.

(2) Solar energy systems shall be maintained in good working order and in accordance with industry standards. Site access shall be maintained, including snow removal at a level acceptable to the local fire department and, if the Tier 3 solar energy system is located in an ambulance district, the local ambulance corps.

Response:

The conditions on working order is recognized by the applicant and can be a condition of the Special Permit.

(3) If storage batteries are included as part of the solar energy system, they shall meet the requirements of any applicable fire prevention and building code when in use and, when no longer used, shall be disposed of in accordance with the laws and regulations of the Village and any applicable federal, state, or county laws or regulations.

Response:

No batteries or other power storage is proposed on the Site.

Submitted by:

A handwritten signature in black ink, appearing to read "Ralph G. Mastromonaco", followed by a long horizontal flourish.

Ralph G. Mastromonaco

HUDSON NATIONAL ENVIRONMENTAL REPORT

INSTALLATION OF A 1.86 MW PHOTOVOLTAIC SYSTEM

Report compiled by:

Sea Bright Solar LLC

23 Cindy Lane, Building 1

Ocean Township, NJ 07712

Work Performed At:

Hudson National Golf Course

Ave

Croton-on-Hudson, NY

This environmental offset is a summary of the ecological benefits of the additional of a 1.86MW photovoltaic (solar electric) system over an average 25-yr Useful life.

- ✱ The solar electric system will require the removal of about 581 live trees of which only 404 are greater than 8" in diameter
- ✱ Over the first 25-yr expected minimum operational lifespan of this solar electric system, the environmental benefits are projected to be as noted based on the input of an approximate annual production of 1,400,000 kwh's of solar electricity.

The Report relies on our inputs of the projected kwh projection into the U.S. Environmental Protection Agency (EPA) Greenhouse Gas equivalencies Calculator <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

- ✱ The solar system is estimated to offset the carbons required to generate electricity
 - 287 homes annually
 - 7,175 homes over the 25-yr operation of the solar system
- ✱ The solar system is estimated to sequester the same amount of carbons as
 - Approximately 70,000 tree saplings over the 25-yr lifetime.
 - 2,200 acres of forest annually over the 25-yr lifetime

**Renewable Energy Systems
Design & Installation
(732) 450-8852
www.seabrightsolar.com
info@seabrightsolar.com**



Equivalency Results [How are they calculated?](#)

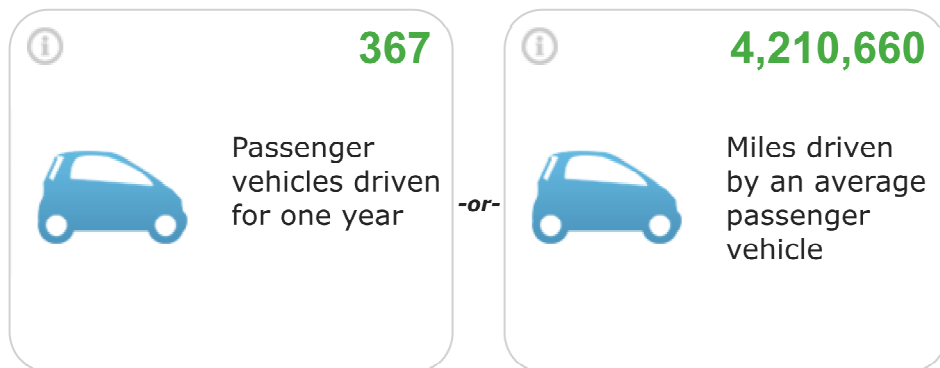
The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:

1,871

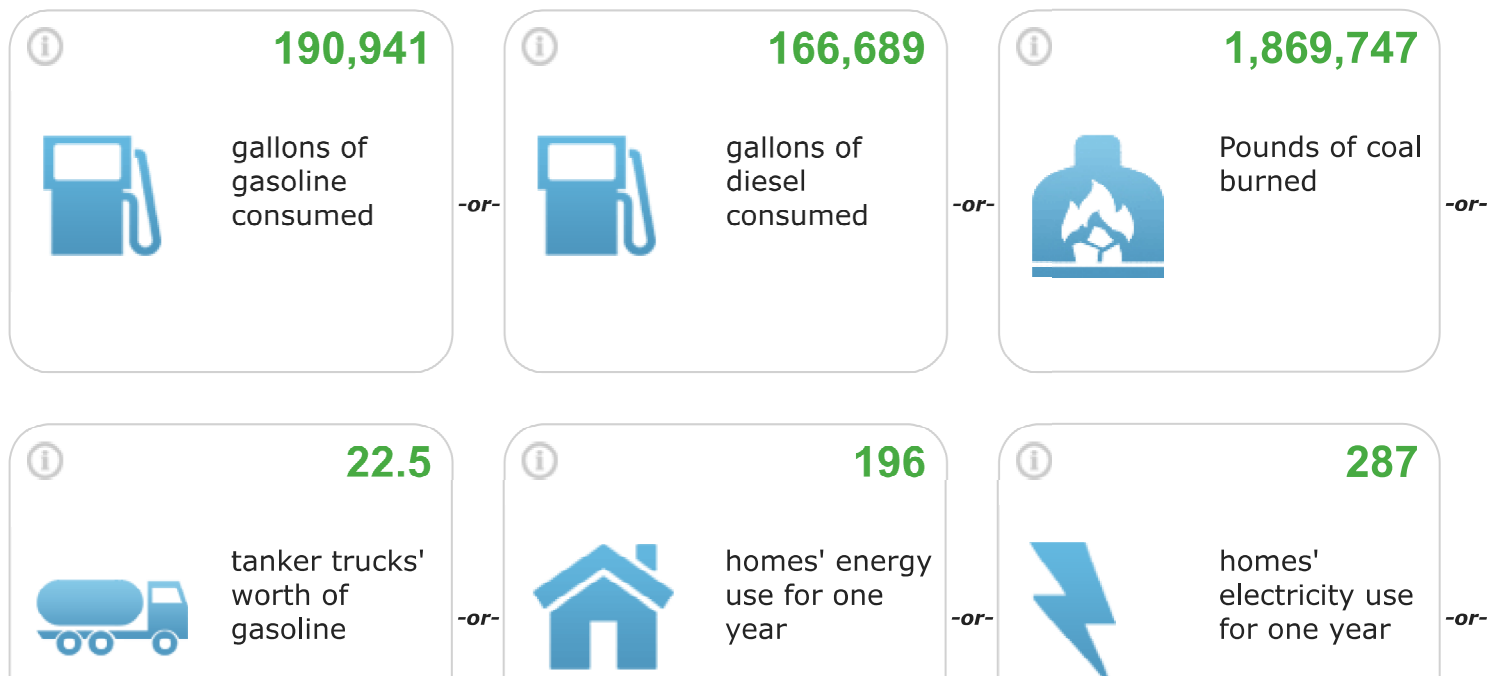
Tons

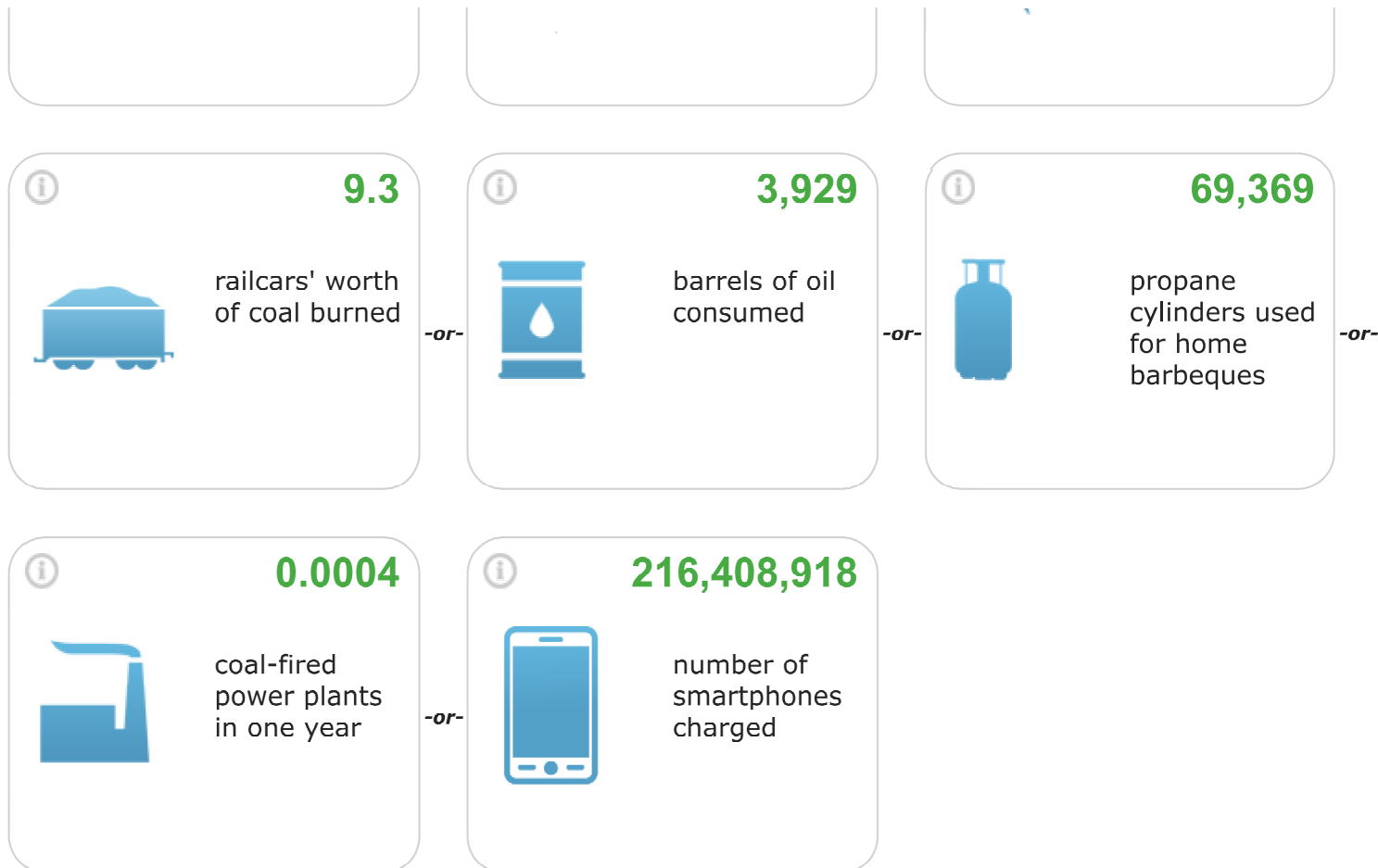


Greenhouse gas emissions from



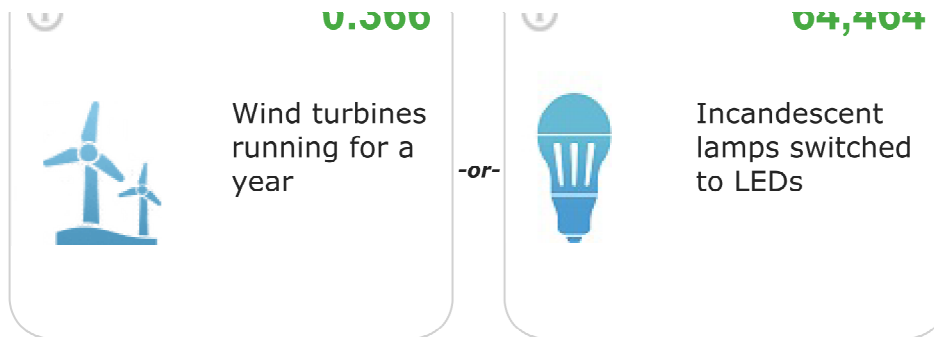
CO₂ emissions from





Greenhouse gas emissions avoided by





Carbon sequestered by



PHOTOVOLTAIC SYSTEM Specifications



Hudson National Golf Course
40 Arrowcrest Drive
Croton-on-Hudson, NY 10520

System Specifications

Type: Photovoltaic

Panels:

Manufacturer: SunPower
Model: SPR-P19-395-COM
Number of Modules: 4728
Size of Individual Modules: 395 DC watts
System Rated Capacity (at STC): $4728 \times 395 = 1,867,560$ watts
Location: Groundmount
Tracking: Fixed
Module Tilt: 30 degrees
Orientation: ? degrees
Warranty: 25 years manufacturer's

Inverters:

Manufacturer: SMA
Models: Sunny Tripower 30kW
AC Output Voltage: 3Ph 480/277V
Peak Efficiency: 98.8%
Location: Mounted to groundmount
Warranty: 10 years manufacturer's
Monitoring System: SunPower PVS5X

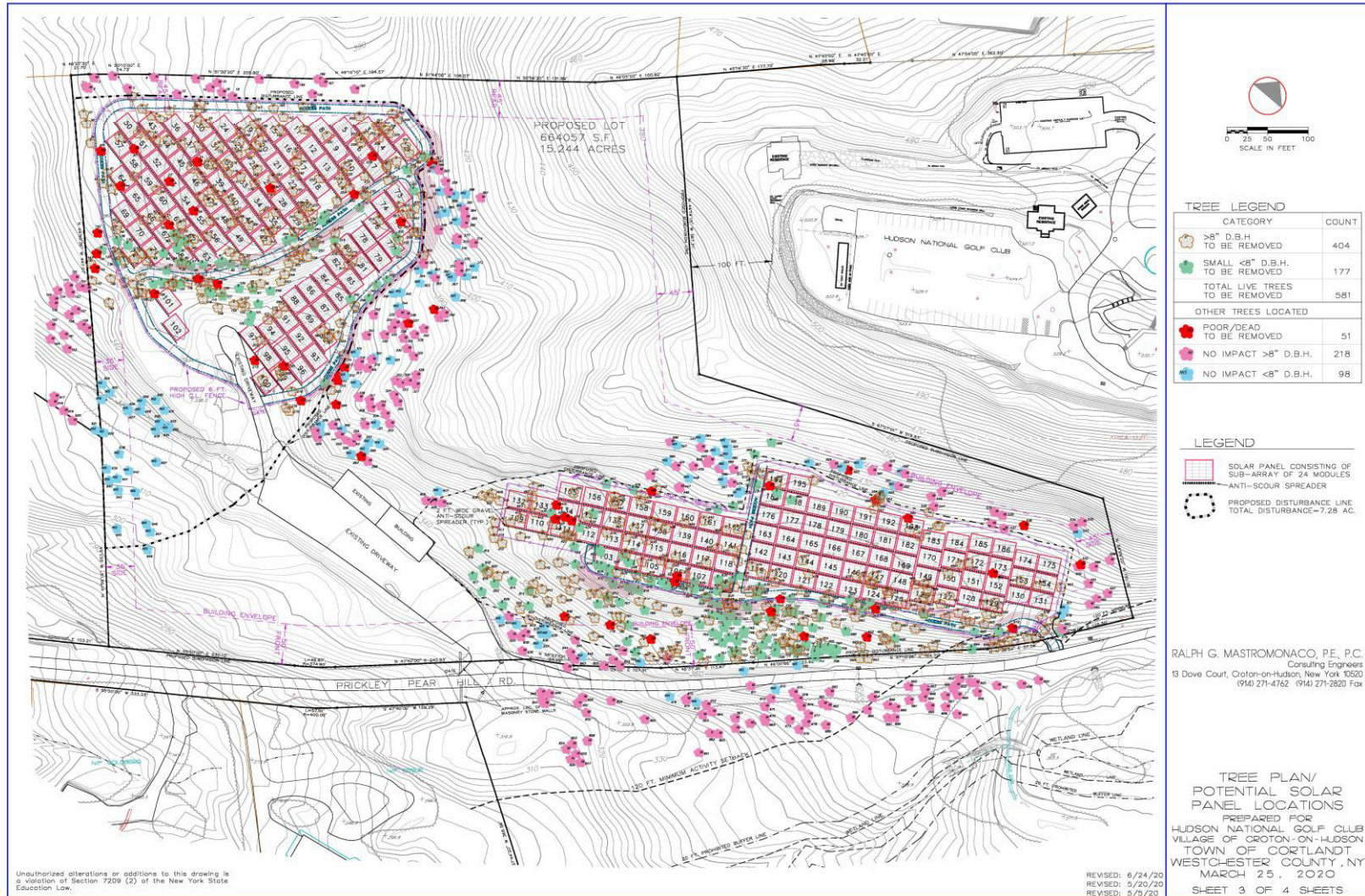
Racking:

Manufacturer: Solar Foundations USA
Warranty: 25 years manufacturer's limited product warranty

Transformer:

Manufacturer: Dongan
Model: 1000KVA 4.16kV wye to wye 480V 3 Phase

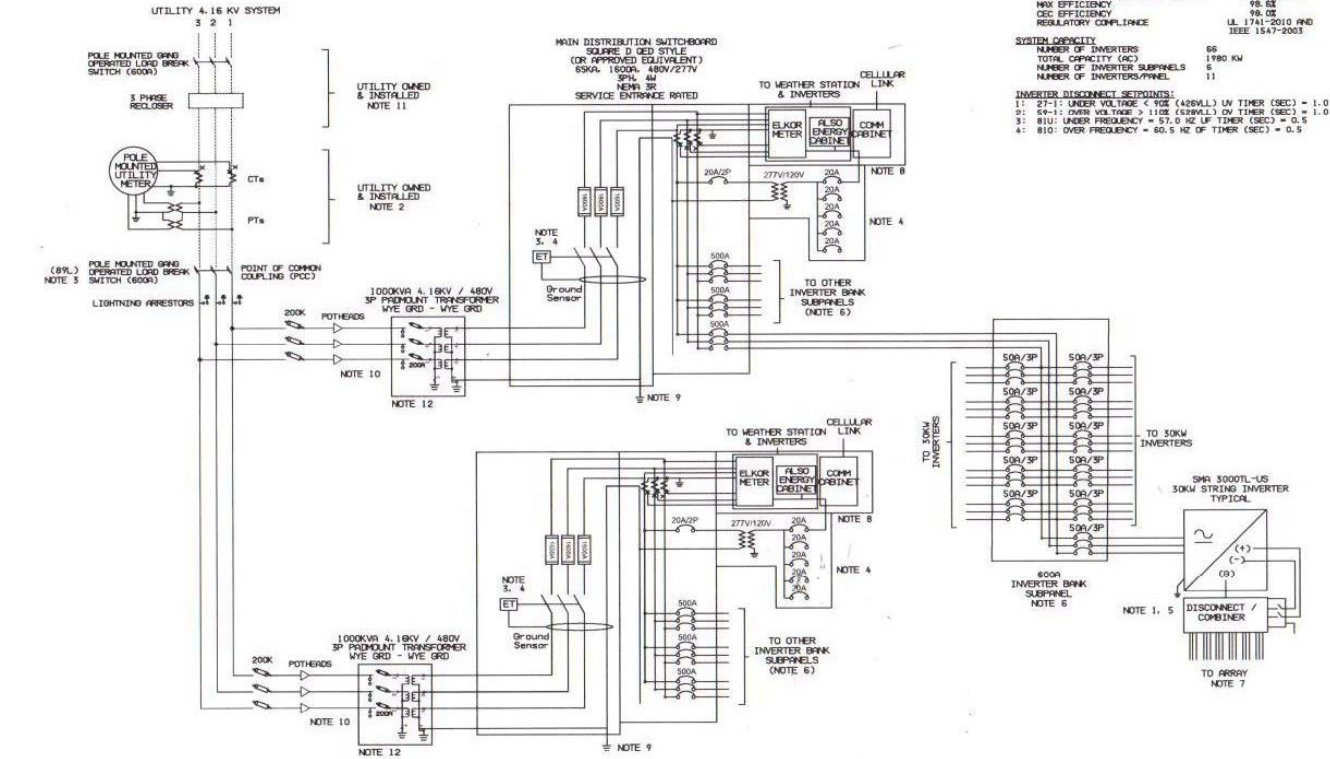
Schematic



Revised: 5/22/18
Printed: 7/2/2020

Schematic

HUDSON NATIONAL GOLF COURSE 1980KW PV INSTALLATION



- GROUNDING NOTES:**
- THE INVERTERS WILL AUTOMATICALLY DE-ENERGIZE THE OUTPUTS IF THE UTILITY GRID IS REMOVED AND WILL NOT RE-ENERGIZE FOR 5 MINUTES AFTER ACCEPTABLE UTILITY VOLTAGE LEVELS ARE ESTABLISHED.
 - CUSTOMER TO SUPPLY RISER POLE AND ASSOCIATED HARDWARE OTHER THAN METERING CLUSTER.
 - 80% STORAGE TO INCLUDE "PHOTOVOLTAIC SYSTEM AC DISCONNECT SWITCH (80%)". DISCONNECTING MEANS SHALL BE INSTALLED AT A READILY ACCESSIBLE LOCATION. MAIN PV DISCONNECT WILL BE A 1000 AMP OPERATED SKY SWITCH WITH A PARALOX OPTION.
 - LIGHTS AND 120V GFI OUTLETS TO BE INCLUDED IN SWITCHBOARD.
 - INVERTER GROUNDING PER MANUFACTURER RECOMMENDATIONS. WIRES TO INVERTERS WILL BE #4, 1000. WIRE SIZE TO BE DETERMINED BASED ON FINAL PANEL LAYOUT FOR VOLTAGE DROP CONSIDERATIONS.
 - ALL SUBPANELS TO HAVE 11 INVERTERS.
 - PV PANELS TO BE SUNPOWER SPR-P17-350-CON, 7740 TOTAL PANELS (2,709 MADC).
 - WEATHER STATION AND PV CUSTOMER METER TO BE MOUNTED IN NEAR 3R PANEL NEAR SWITCHBOARD. POWER TO BE SUPPLIED FROM MAIN POWER ZONE.
 - THE GROUND GRID WILL BE CONSTRUCTED OF 4/0 BARE CONDUCTOR WITH A MAXIMUM RESISTANCE TO GROUND OF 5 OHMS.
 - SKV CABLE TO BE #4-10S WITH 150% INSULATION LEVEL IN SCHEDULE 80 CONDUIT.
 - CON ED TO INSTALL UTILITY OWNED RECLOSER AND TWO COMMUNICATION TO RECLOSER.
 - TRANSFORMERS TO BE 1000V WYE-GRD / WYE-GRD, 5 LEADED CORE, DOE EFFICIENCY RATING, 5-7532, Z/A-B AND DESIGNED FOR STEP UP OPERATION.

300W TRIPPOW STRING INVERTER

NOMINAL APPARENT POWER AC: 30kW
 RATED OUTPUT POWER AC: 30 KVA
 MAX. CONTINUOUS CURRENT: 36.0A RMS
 ELECTRICAL SERVICE COMPATIBILITY: 480V WYE 1 N
 MAX. EFFICIENCY: 98.6%
 REGULATION COMPLIANCE: UL 1741-2010 AND IEEE 1547-2003

SYSTEM CAPACITY

NUMBER OF INVERTERS: 66
 TOTAL CAPACITY (AC): 1980 KW
 NUMBER OF INVERTER SUBPANELS: 6
 NUMBER OF INVERTERS/PANEL: 11

INVERTER DISCONNECT SETPOINTS

- 1: 27-1: UNDER VOLTAGE < 105 (426VLL) UN TIMER (SEC) = 1.0
- 2: 50-1: OVER VOLTAGE > 1105 (526VLL) ON TIMER (SEC) = 1.0
- 3: 810: UNDER FREQUENCY = 57.0 HZ UP TIMER (SEC) = 0.5
- 4: 810: OVER FREQUENCY = 60.5 HZ OF TIMER (SEC) = 0.5

It is a violation of NY State law for any person to alter any document that bears the seal of a professional engineer, unless the person is acting under the direction of a licensed professional engineer.

This interconnection diagram is a preliminary engineering document not in final form, but is being transmitted to the utility for review, comments and interpretations.



MICHAEL D. RUPPERT, PE
 NY LICENSE # 077982

Rev	Description	Date



JEM ENGINEERING SERVICES, LLC
 400 MARKET INDUSTRIAL PARK
 SUITE 32
 WAPPINGERS FALLS, NY 12590

CUSTOMER
 MATRIX DEVELOPMENT, LLC
 153 MERCER ST #4
 NEW YORK, NY 10012

PROJECT NAME & ADDRESS
 HUDSON NATIONAL GOLF COURSE
 40 ARROWCREST DRIVE
 CROTON-ON-HUDSON, NY 10520

THREE LINE

PROJECT NO. HNCG-17a	DRAWING NO. E101
DATE 11/2/17	

ANSI B

Specifications SunPower Solar Modules



SUNPOWER®



SunPower® P-Series: P19-400-COM

SunPower Performance Series Commercial Panel

SunPower® Performance Series panels wrap front contact cells with 30+ years of SunPower materials and manufacturing expertise. The weakest points of Conventional Panel design are eliminated to deliver superior power, reliability, value and savings.¹



High Power

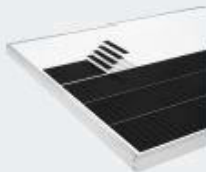
Enhanced active area increases power and savings while designing out fragile ribbons and solder bonds on the cells.



High Performance and Lifetime Savings

Up to 32% more energy in the same space over 25 year.² Outperforms conventional panels in partial shade thanks to unique parallel circuitry. Proprietary bussing design limits power loss, maximizing production during morning and evening row-to-row shading or soiling.

Engineered for Performance



Designed for Reliability

- Robust and flexible cell connection technology. Outstanding reliability.
- Conductive adhesive, proven in the aerospace industry
- Redundant cell to cell connections

Proven Performance



- Named as a Top Performer in all DNV/GL reliability tests
- 15% more power and reduced panel temperature due to unique electrical bussing



High Reliability, Backed with Confidence

Performance Series is the most deployed shingled solar panel in the world,³ with proven results. Innovative shingled design eliminates many of the reliability challenges of traditional front contact panels. SunPower stands behind its panels with its industry-leading Complete Confidence Warranty.



25 Year Combined Warranty Protects your investment



sunpower.com

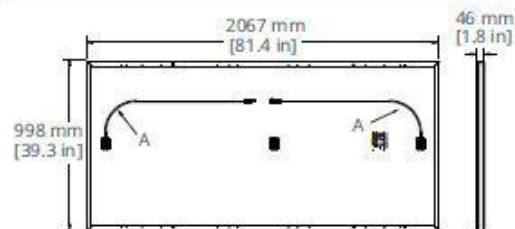
Specifications SunPower Solar Modules

P-Series: P19-400-COM SunPower® Performance Series Commercial Panel

Electrical Data					
Model	SPR-P19-400-COM	SPR-P19-395-COM	SPR-P19-390-COM	SPR-P19-385-COM	SPR-P19-380-COM
Nominal Power (P _{nom}) ⁴	400 W	395 W	390 W	385 W	380 W
Power Tolerance	+5/-0%	+5/-0%	+5/-0%	+5/-0%	+5/-0%
Efficiency	19.4%	19.1%	18.9%	18.7%	18.4%
Rated Voltage (V _{mpp})	43.4 V	43.2 V	43.1 V	42.8 V	42.6 V
Rated Current (I _{mpp})	9.22 A	9.14 A	9.05 A	8.99 A	8.92 A
Open-Circuit Voltage (V _{oc})	52.7 V	52.5 V	52.3 V	52.0 V	51.8 V
Short-Circuit Current (I _{sc})	9.80 A	9.72 A	9.63 A	9.58 A	9.49 A
Power Temp. Coef.	-0.36% / °C				
Voltage Temp. Coef.	-0.29% / °C				
Current Temp. Coef.	0.05% / °C				
Maximum System Voltage	1500 V UL				
Maximum Series Fuse	15 A				

Tests And Certifications (Preliminary)	
Standard Tests ⁵	UL1703 (Type 2 Fire Rating)
Quality Certs	ISO 9001:2008, ISO 14001:2004
EHS Compliance	OHSAS 18001:2007, Recycling Scheme
Ammonia Test	IEC 62716
Desert Test	10.1109/PVSC.2013.6744437
Salt Spray Test	IEC 61701 (maximum severity)
PID Test	Potential-Induced Degradation free: 1500 V
Available Listings	UL, CEC, FSEC

Operating Condition And Mechanical Data	
Temperature	-40° F to +185° F (-40° C to +85° C)
Impact Resistance	1 inch (25 mm) diameter hail at 52 mph (23 m/s)
Appearance	Class A
Solar Cells	Monocrystalline PERC
Tempered Glass	High-transmission tempered anti-reflective
Junction Box	IP-67, TE (PV45)
Weight	51 lbs (23.1 kg)
Max. Load	Wind: 50 psf, 2400 Pa, 245 kg/m ² front & back Snow: 112 psf, 5400 Pa, 550 kg/m ² front
Frame	Class 2 silver anodized



FRAME PROFILE



(A) Portrait Cable: 1000 mm +/- 15 mm (39.4 in +/- 0.6 in)

(B) Long Side: 32 mm (1.3 in)

Short Side: 24 mm (0.9 in)

REFERENCES:

- 1 Independent Shade Study by CPV Laboratory.
- 2 SunPower 405 W compared to a Conventional Panel on same sized arrays (310 W, 15.8% efficient, approx. 1.6 m²), 0.6%/yr degradation (Leidos technical review 2017).
- 3 Osborne, "SunPower supplying P-Series modules to a 125MW NextEra project." PV-Tech.org, March 2017."
- 4 Measured at Standard Test Conditions (STC): irradiance of 1000 W/m², AM 1.5, and cell temperature 25° C.
- 5 Type 2 fire rating per UL1703:2013, Class C fire rating per UL1703:2002 and IEC 61730.

See www.sunpower.com/company and www.sunpower.com/solar-resources for more reference information.
Specifications included in this datasheet are subject to change without notice.

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Read safety and installation instructions before using this product.

SUNPOWER®

1-800-SUNPOWER

527713 Rev C / LTR_US

sunpower.com

Specifications Inverters

SUNNY TRIPOWER 12000TL-US / 15000TL-US /
20000TL-US / 24000TL-US / 30000TL-US



Design flexibility

- 1000 V DC or 600 V DC
- Two independent DC inputs
- 15° to 90° mounting angle range
- Detachable DC Connection Unit

System efficiency

- 98.0% CEC, 98.6% Peak
- 1000 V DC increases system efficiency
- OptiTrac Global Peak MPPT

Enhanced safety

- Integrated DC AFCI
- Floating system with all-pole sensitive ground fault protection
- Reverse polarity indicator in combination with Connection Unit

Future-proof

- Complete grid management feature set
- Integrated Speedwire, WebConnect, ModBus interface
- Bi-directional Ethernet communications
- Utility-interactive controls for active and reactive power

SUNNY TRIPOWER 12000TL-US / 15000TL-US / 20000TL-US / 24000TL-US / 30000TL-US

The ultimate solution for decentralized PV plants, now up to 30 kilowatts

The world's best-selling three-phase PV inverter, the SMA Sunny Tripower TL-US, is raising the bar for decentralized commercial PV systems. This three-phase, transformerless inverter is UL listed for up to 1000 V DC maximum system voltage and has a peak efficiency above 98 percent, while OptiTrac Global Peak minimizes the effects of shade for maximum energy production. The Sunny Tripower delivers a future-proof solution with full grid management functionality, cutting edge communications and advanced monitoring. The Sunny Tripower is also equipped with all-pole ground fault protection and integrated AFCI for a safe, reliable solution. It offers unmatched flexibility with a wide input voltage range and two independent MPP trackers. Suitable for both 600 V DC and 1,000 V DC applications, the Sunny Tripower allows for flexible design and a lower levelized cost of energy.

www.SMA-America.com

Specifications Inverters

Technical data	Sunny Tripower 12000TL-US	Sunny Tripower 15000TL-US	Sunny Tripower 20000TL-US	Sunny Tripower 24000TL-US	Sunny Tripower 30000TL-US
Input (DC)					
Max. array power	18000 W _p STC	22500 W _p STC	30000 W _p STC	36000 W _p STC	45000 W _p STC
Max. DC voltage	*1000 V			1000 V	
Rated MPPT voltage range	300 V...800 V	300 V...800 V	380 V...800 V	450 V...800 V	500 V...800 V
MPPT operating voltage range	150 V...1000 V				
Min. DC voltage / start voltage	150 V / 188 V				
Number of MPPT tracker inputs	2				
Max. operating input current / per MPPT tracker	66 A / 33 A				
Max. short circuit current per MPPT / string input	53 A / 53 A				
Output (AC)					
AC nominal power	12000 W	15000 W	20000 W	24000 W	30000 W
Max. AC apparent power	12000 VA	15000 VA	20000 VA	24000 VA	30000 VA
Output phases / line connections	3 / 3-N-PE				3 / 3-N-PE, 3-PE
Nominal AC voltage	480 / 277 V WYE				480 / 277 V WYE, 480 V Delta
AC voltage range	244 V...305 V				
Rated AC grid frequency	60 Hz				
AC grid frequency / range	50 Hz, 60 Hz / -6 Hz...+5 Hz				
Max. output current	14.4 A	18 A	24 A	29 A	36.2 A
Power factor at rated power / adjustable displacement	1 / 0.0 leading...0.0 lagging				
Harmonics	< 3%				
Efficiency					
Max. efficiency / CEC efficiency	98.2% / 97.5%	98.2% / 97.5%	98.5% / 97.5%	98.5% / 98.0%	98.6% / 98.0%
Protection devices					
DC reverse polarity protection	●				
Ground fault monitoring / grid monitoring	●				
All-pole sensitive residual current monitoring unit	●				
DC AFCI compliant to UL 1699B	●				
AC short circuit protection	●				
Protection class / overvoltage category	I / IV				
General data					
Dimensions (W / H / D) in mm (in)	665 / 650 / 265 (26.2 / 25.6 / 10.4)				
Packing dimensions (W / H / D) in mm (in)	780 / 790 / 380 (30.7 / 31.1 / 15.0)				
Weight	55 kg (121 lbs)				
Packing weight	61 kg (134.5 lbs)				
Operating temperature range	-25°C...+60°C				
Noise emission (typical) / internal consumption at night	51 dB(A) / 1 W				
Topology	Transformerless				
Cooling concept / electronics protection rating	OptiCool / NEMA 3R				
Features					
Display / LED indicators (Status / Fault / Communication)	- / ●				
Interface: RS485 / Speedwire, WebConnect	○ / ●				
Data interface: SMA Modbus / SunSpec Modbus	● / ●				
Mounting angle range	1.5°...90°				
Warranty: 10 / 15 / 20 years	● / ○ / ○				
Certifications and approvals	UL 1741, UL 1741SA, CA Rule 21, UL 1998, UL 1699B, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1				
NOTE: US inverters ship with gray lids. Data at nominal conditions, August 2017. *Suitable for 600 V DC max. systems					
● Standard features ○ Optional features - Not available					
Type designation	STP 12000TL-US-10	STP 15000TL-US-10	STP 20000TL-US-10	STP 24000TL-US-10	STP 30000TL-US-10

Accessories



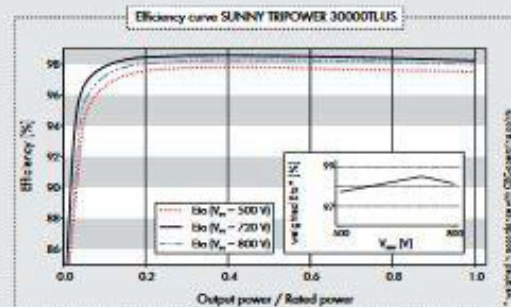
RS485 Interface
DIN-485C6-US-10



Connection Unit
CU 1000-US-11



SMA Cluster Controller
CUCON-10





1. TECHNICAL SALES SUMMARY 007.02.19

PHOTOVOLTAIC SYSTEMS: LOWER LEVELS OF GLARE AND REFLECTANCE VS. SURROUNDING ENVIRONMENT

Source paper Title (s):	Photovoltaic Systems: Lower levels of Glare vs. General Surrounding Environment
SPWR Technology:	AR Glass and Light Trapping Technology
SPWR Advantage:	Using a higher percentage of available light
Technical Contact:	Lydia Seymour
Intended Exposure (Internal/External)	Level 1 (L1): Consumer, Dealer Level 2 (L2): Marketing, Sales Level 3 (L3): Sales Analysts, UPP Bids

Possible Glare & Reflectance in PV Systems

Abstract

During the recent surge in residential and commercial photovoltaic opportunities, many PV suppliers and installers have fielded questions concerning glare and reflectance levels for PV systems. These questions range from the possible glare and reflectance effect on neighbors, to the glare and reflectance effect on air traffic. This document explains why PV systems are less reflective than typical surrounding buildings or reflective surfaces.

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Executive Summary

Random glare and reflectance which can be observed from the air are a key consideration for sites like airports. PV systems with antireflective glass demonstrate decisively lower glare and reflectance levels from the glare and reflectance generated by standard window glass and other common reflective surfaces such as bodies of water. SunPower has multiple large projects installed near airports or on air force bases¹. Each of these large projects has passed FAA or Air Force standards and all projects have been determined as “No Hazard to Air Navigation.” It is suggested that customers and installers discuss any possible concerns about glare and reflectance with neighbors near the planned PV system installation.

1. Explanation of Reflectance and PV glass

Efficient solar power generation requires absorbing as much light as possible while reflecting as little light as possible, so standard solar panels produce less glare and reflectance than standard window glass. This is pointed out very well in US patent # 6359212² which explains the differences in the *refraction* and *reflection* of solar panel glass versus standard window glass. Solar panels use “high-transmission, low-iron” glass, which absorbs more light, producing smaller amounts of glare and reflectance than normal glass. In order to further explain these differences, basic scientific terms used when discussing beams of light impacting surfaces and transitioning from the air to enter a surface.

1.1 Reflection, Refraction and Angles-of-incidence.

The imaginary line at 90⁰ to a given reflective surface is called the **Normal**. The original beam of light is called the **incident** beam, and the angle at which it strikes the surface is called the **incident angle**. The quantity of reflected light is called the **reflectance**, and the angle at which it leaves the surface is the **angle of reflectance**. With transparent surfaces, the amount of light which bends slightly as it goes *through* the surface is called the **refracted beam** OR **transmittance**. These basic concepts of **reflection** (return of light *from* a surface) and **refraction** (bending and transmission of light *through* a surface) are

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pointed out in the first two figures on the next page. Both have a **normal**, an **incident beam** and an **incident angle**;

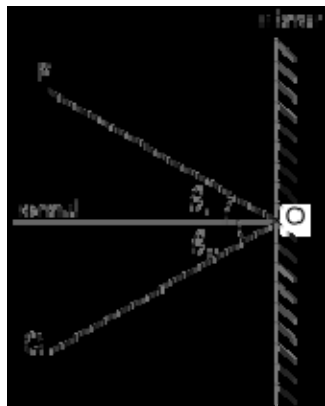


Figure 1-1: **REFLECTION**

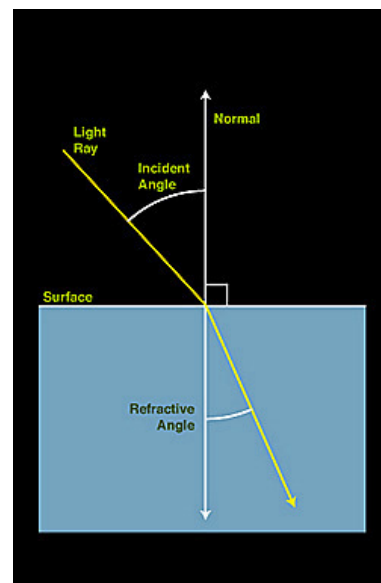


Figure 1-2: **REFRACTION**

Since our main discussion concerns types of glass and sunlight, we will further our explanation using **glass** as the example and speaking in terms of **reflected energy percentages**:

1.2 Incident light and Reflected Energy percentages.

When a beam of light falls on a piece of glass, some of the light is reflected from the glass surface, some of the light passes through the glass (transmitted), and some (very little) is absorbed by the glass.

- The measure of the proportion of light reflected from the surface is called **reflectance (reflection)**.
- The measure of the proportion transmitted is the **transmittance** (This is where the term **high light-transmission** glass comes from because the glass is formulated to allow more light to pass through its surface than would pass through a standard glass surface).
- The measure of the proportion absorbed is the **absorptance (absorption)** (this amount is very small for clear glass – much, much smaller proportionately, than the other two components)).
- Each quantity is expressed as a fraction of the total quantity of light in the beam. If the intensity of the beam is represented by the numerical 1, reflectance by R , absorptance by A and transmittance by T , intensity may be expressed as follows: $R + A + T = 1$, where glass is

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the **glazing material** pointed out in figure 2-2 below. (Figure 2-1 is a rough depiction of the percentages of light for each component of the equation).

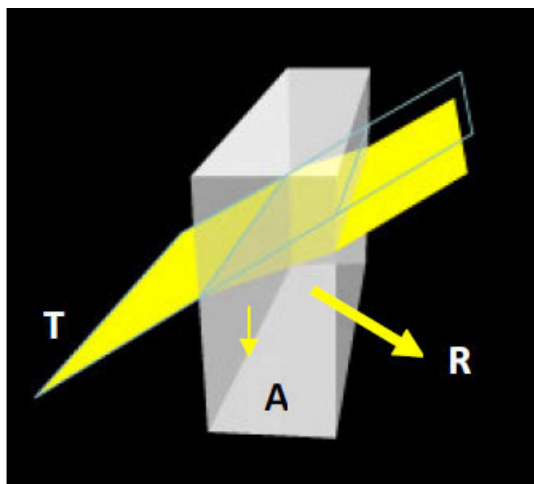


Figure 2-1 Depiction of resultant percentages for incident components

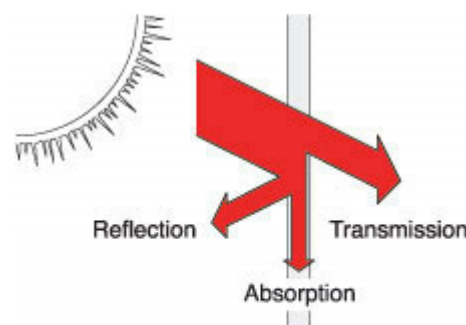


Figure 2-2. Solar radiation through a glazing material is either reflected, transmitted or absorbed

The reflection/refraction behavior of a medium is directly related to its *index of refraction*. The lower the index of refraction for a medium, the less light it reflects because the medium is *allowing more of the incident beam* to pass directly through (in our case, directly through the glass to the solar cells).

Common Reflective Surface	n
Steel	2.500
Snow (fresh, flaky)	1.980
Standard Glass	1.517
Plexiglas	1.500
Plastic	1.460
Smooth Water	1.333
Solar Glass (high transmission, low iron)	1.329
Solar Glass (with AR coating)	1.250

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Figure 2.3: Common Reflective Surfaces and Index of Refraction, “n” (the value “n” may vary by reference source, but the hierarchy of “n” values from one material to another will remain the same).

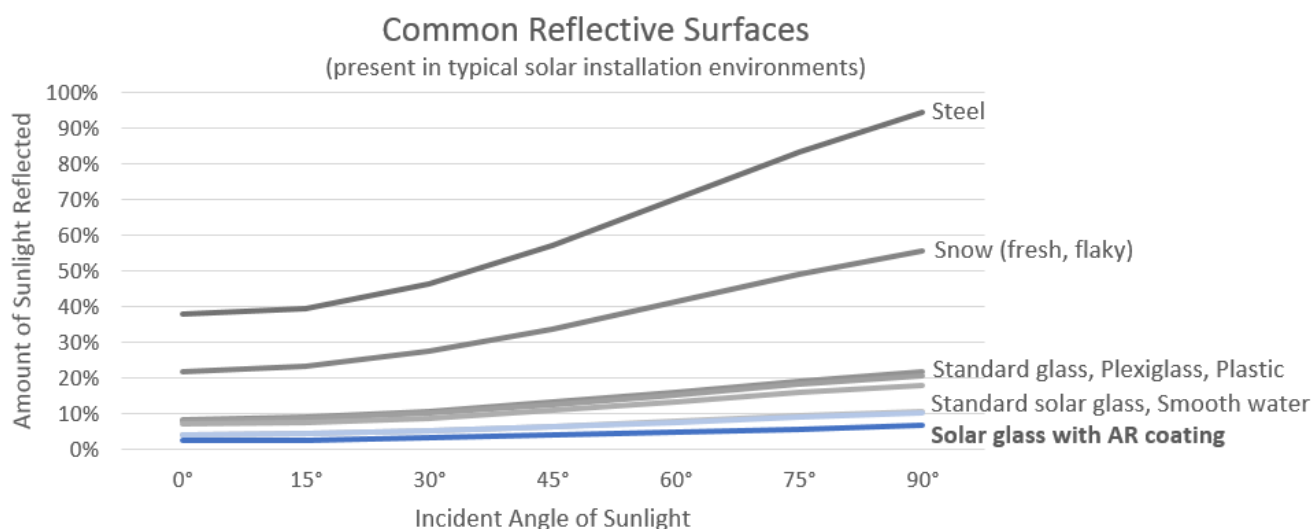


Figure 2.4: Common Reflective Surfaces and reflectance percentages.

In the below it is shown the reflected energy percentages of sunlight, off of some common residential and commercial surfaces. The legend and the graph lists the items from top to bottom in order of the highest percentage of reflected energy; E.g. – ‘Steel’ reflects more energy than ‘Snow’. ‘Snow’ reflects more energy than ‘standard glass’, etc. It should be noted from the graph and the table below that the reflected energy percentage of Solar Glass is far below that of standard glass and more on the level of smooth water.

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Common Reflective Surface	Incident angle of Sun						
	0°	15°	30°	45°	60°	75°	90°
Steel	38%	39%	46%	57%	70%	83%	94%
Snow (fresh, flaky)	22%	23%	27%	34%	41%	49%	56%
Standard Glass	8%	9%	11%	13%	16%	19%	22%
Plexiglas	8%	9%	10%	12%	15%	18%	21%
Plastic	7%	7%	9%	11%	13%	16%	18%
Smooth Water	4%	4%	5%	6%	8%	9%	10%
Solar Glass (high transmission, low iron)	4%	4%	5%	6%	8%	9%	10%
Solar Glass (with AR coating)	2%	3%	3%	4%	5%	6%	7%

Figure 2.5: Common Reflective Surfaces and Reflectance percentage values.

1.3 AR Coating

Panel reflectivity can be varied for each time step to account for the position of the sun relative to the array. Smooth glass and light textured glass with and without anti-reflection coating, along with deeply textured glass were analyzed to derive accurate functions for computing reflectivity based on sun incidence angle.

PV Glass Cover Type	Fit Function Defined over $0^\circ \leq \theta \leq 60^\circ$	Fit Function Defined over $60^\circ < \theta < 90^\circ$
Smooth Glass without Anti-Reflection Coating	$y = 1.1977E-5 x^2 - 9.5728E-4 x + 4.410E-2$	$y = 6.2952E-5 e^{0.1019x}$
Smooth Glass with Anti-Reflection Coating	$y = 1.473E-5 x^2 - 9.6416E-4 x + 3.2395E-2$	$y = 4.7464E-5 e^{0.1051x}$
Light Textured Glass without Anti-Reflection Coating	$y = 1.5272E-5 x^2 - 1.1304E-3 x + 4.305E-2$	$y = 7.3804E-5 e^{0.0994x}$
Light Textured Glass with Anti-Reflection Coating	$y = 1.4188E-5 x^2 - 1.0326E-3 x + 3.9016E-2$	$y = 7.0179E-5 e^{0.0994x}$
Deeply Textured Glass	$y = 6.8750E-6 x^2 - 6.5250E-4 x + 2.10E-2$	$y = 4.1793E-5 e^{0.0834x}$

Figure 2.6: Reflectance fit functions for PV cover types³

³ Forge Solar Solar Glare Hazard Analysis Tool (SGHAT) Technical Reference Manual

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SunPower uses “light textured” glass with AR coating on all modules. Below is also a more comprehensive angle-dependent reflectance data for SunPower commercial glass that shows it is the “light textured” case.

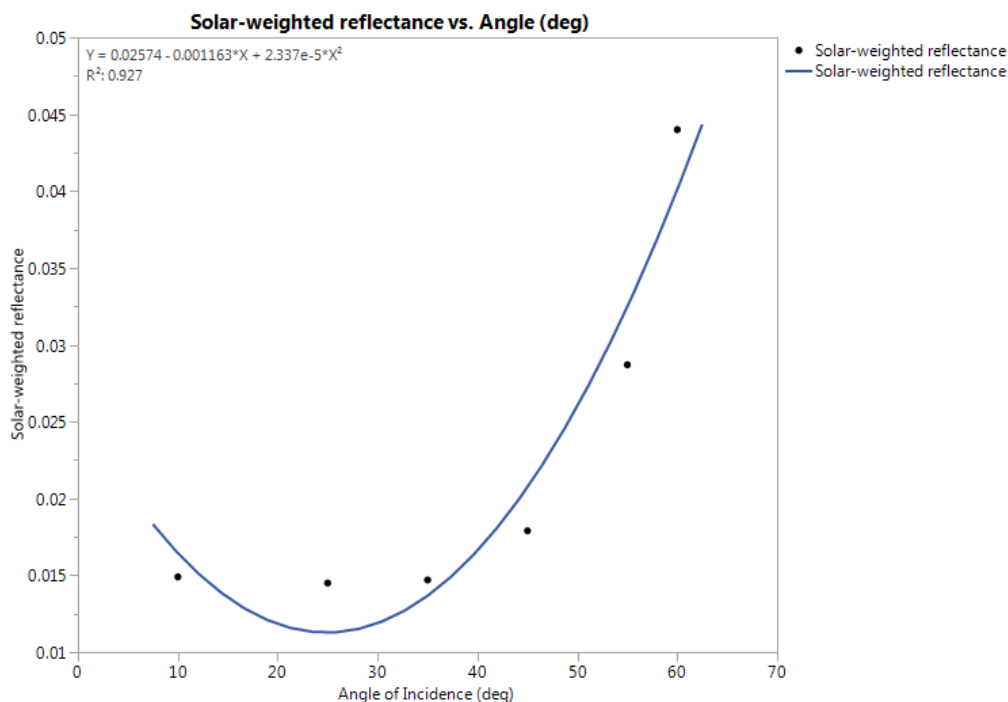


Figure 2.7: SunPower Commercial Glass Reflectance Data

1.4 “Stippled glass” and “light trapping”

In addition to the superior refractive/reflective properties of solar glass versus standard glass, many PV suppliers use **stippled** solar glass for their panels. Stippled glass is also used with high powered telescopes and with powerful beacons and flashlights. The basic concept behind stippling is for the surfaces of the glass to be “textured” with small types of indentations. As a result, stippling allows more light energy to be channeled/transmitted through the glass while diffusing (weakening) the reflected light energy. **“Light trapping”** is also used by more high-quality PV suppliers. “Light trapping” is the practice of using additional techniques like mirrors and natural surface textures to “trap” light within the layers of the solar cell, allowing even less light to escape by reflection. These concepts are why a reflection off a SunPower solar panel will look hazy and less-defined than the same reflection from standard glass. This occurs because the stippled and light trapping

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SunPower glass and cell are transmitting a larger percentage of light to the solar cell while breaking-up the intensity of the reflected energy.

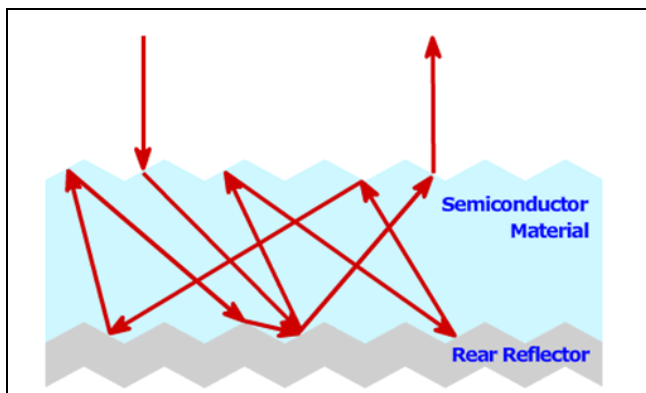


Figure: 3.1: Light Trapping: More light energy is absorbed by the cell with each ensuing reflection of the initial light beam.

Try this basic optical experiment where ever a reflection comparison can be safely made between a high-efficiency/high-quality PV panel and a large window or plate of glass.

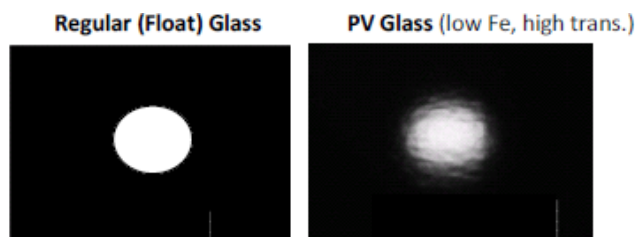


Figure 3.2: Reflection Characteristic example

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2. “No Hazard to Air Navigation”

SunPower has received FAA No Hazard status due to the low levels of glare and reflectance exhibited by its panels. See Appendix A for the list of projects installed in the US Air Force Bases and Appendix B for the reference FAA approval letters. The statement “No Hazard to Air Navigation” is the FAA status consistently applied to the large system arrays and power-plants which are continuously being erected on and around airports and Air Force bases.

3. Conclusion:

In support of the executive summary, the studies, data and physics behind the charts and graphs demonstrate that **solar glass has significantly less glare and reflectance than standard glass**. In addition, SunPower’s solar glass is **stippled** and has a **light-trapping**, photon-absorbent solar cell attached to its back side, contributing additional factors which result in even less light energy being reflected.

4. References:

- 4.1 Center for Sustainable Building Research. College of Design · University of Minnesota. All rights reserved. JDP activity by the University of Minnesota and Lawrence Berkeley National Laboratory.
- 4.2 H. K. Pulker, Coatings on glass, (1999), 2ed, Elsevier, Amsterdam.
- 4.3 C. G. Granqvist, Materials Science for Solar Energy Conversion Systems, (1991), Pergamon, G B.
- 4.4 D. Chen, Anti-reflection (AR) coatings made by sol-gel processes: A review, Solar Energy Materials and Solar Cells, 68, (2000), 313-336.
- 4.5 P. Nostell, A. Roos, B. Karlsson, Antireflection of glazings for solar energy applications, Solar Energy Materials and Solar Cells, 54, (1998), 23-233.
- 4.6 M. Fukawa, T. Ikeda, T. Yonedaans K. Sato, Antireflective coatings y single layer with refractive index of 1.3, Proceedings of the 3rd International Conference on Coatings on Glass (ICCG), (2000), 257-264.
- 4.7 J. Karlsson and A. Roos, Modelling the angular behavior of the total solar energy transmittance of windows, Solar Energy, 69, 4, (2000).
- 4.8 J. Karlsson, B. Karlsson and A. Roos, A simple model for assessing the energy efficiency of windows, In Press, Energy and Buildings
- 4.9 Saint Gobain; SG Solar Eclipse for Airport Zones

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APPENDIX A

US Air Force bases with PV systems, links:

- Nellis Air Force base <http://www.nellis.af.mil/news/story.asp?id=123079933>
- Luke Air Force base <http://www.bloomberg.com/news/2010-08-10/sunpower-gets-order-to-install-solar-panels-at-air-force-base-in-arizona.html>

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APPENDIX B

COPY of FAA letter for Fed-Ex Oakland, CA project:



Federal Aviation Administration

Aeronautical Study

Western Pacific Regional Office

No. 2005-AWP-363-OE

PO Box 92007-AWP-520

Los Angeles, CA 90009-2007

Issued Date: 1/30/2005

BEN COLCOL - PROJECT MANAGER

FEDERAL EXPRESS CORPORATION

2601 MAIN STREET

IRVINE, CA 92614

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has completed an aeronautical study under the provisions of 49 U.S.C., Section 44718 and, if applicable, Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure Type: ROOF-MOUNTED SOLAR PANEL ENERGY SYSTEM

Location: OAKLAND, CA

Latitude: 37-43-13.3 NAD 83

Longitude: 122-13-0.4

Heights: 54 feet above ground level (AGL)

44 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

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Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking and/or lighting are accomplished on a voluntary basis, we recommend it be installed and maintained in accordance with FAA Advisory Circular 70/7460-1 70/7460-1K.

This determination expires on 7/30/2006 unless:

- (a) extended, revised or terminated by the issuing office.
- (b) the construction is subject to the licensing authority of

the Federal Communications Commission (FCC) and an application for a construction permit has been filed , as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE POSTMARKED OR DELIVERED TO THIS OFFICE AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

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A copy of this determination will be forwarded to the Federal Communications Commission if the structure is subject to their licensing authority.

If we can be of further assistance, please contact our office at (310)725-6557. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2005-AWP-363-OE.

Signature Control No: 408559-342482 (DNE)

Karen L Mcdonald

Specialist

Attachment(s)

Case Description Map

ROOF-MOUNTED SOLAR MODULES

Case Description for ASN 2005-AWP-363-OE

Map for ASN 2005-AWP-363-OE



Federal Aviation Administration
Air Traffic Airspace Branch, ASW-520
2601 Meacham Blvd.
Fort Worth, TX 76137-0520

Aeronautical Study No.
2008-AWP-6779-OE

Issued Date: 12/01/2008

Yasu Hirayama
Koyo USA DeepSeawater
73-4460 Queen Kaahumanu Hwy
Suite 124
Kailua-Kona, HI 96740

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Building / Koyo USA DeepSeawater
Location:	Kailua-Kona, HI
Latitude:	19-43-03.00N NAD 83
Longitude:	156-02-15.00W
Heights:	33 feet above ground level (AGL) 110 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking and/or lighting are accomplished on a voluntary basis, we recommend it be installed and maintained in accordance with FAA Advisory circular 70/7460-1 K Change 2.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

A copy of this determination will be forwarded to the Federal Communications Commission if the structure is subject to their licensing authority.

If we can be of further assistance, please contact our office at (310) 725-6557. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2008-AWP-6779-OE.

Signature Control No: 606276-103732980

(DNE)

Karen McDonald

Specialist

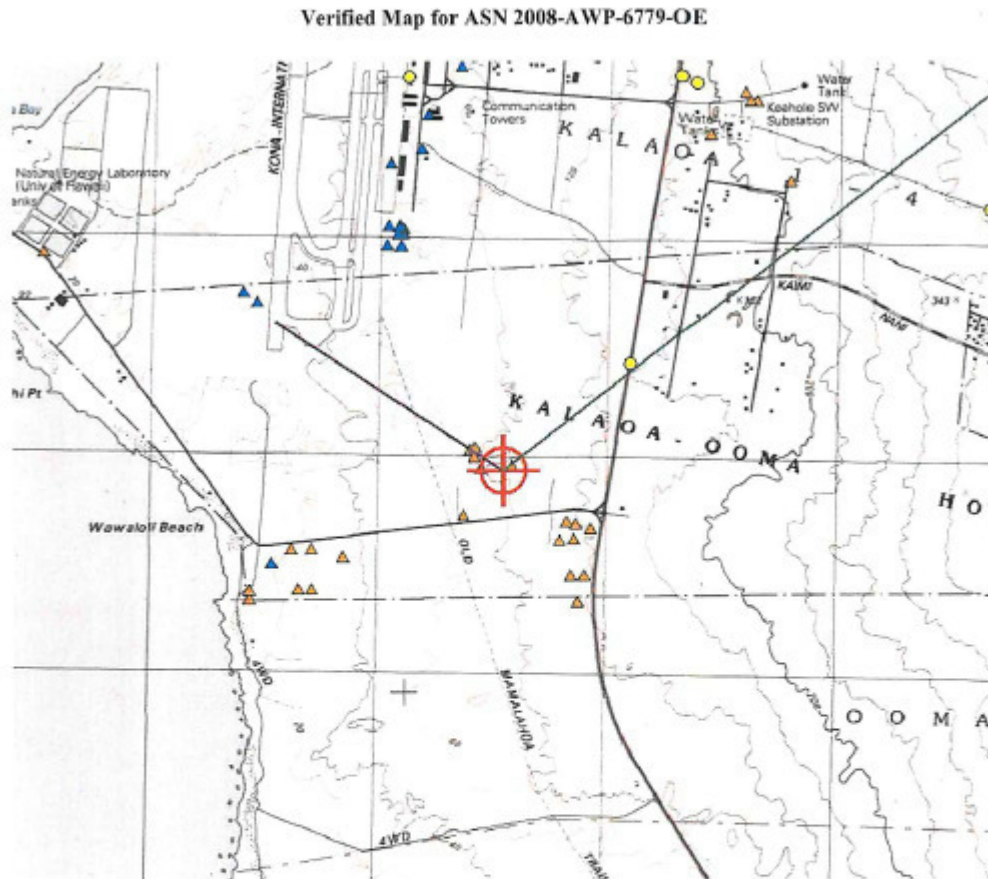
Attachment(s)

Case Description

Map(s)

Case Description for ASN 2008-AWP-6779-OE

Installation of photovoltaic solar panels on two roof structures totaling 690kw. Attached flat to surface.



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DECOMMISSIONING PLAN

SOLAR ARRAY SYSTEM AT

**Hudson National Golf Course
40 Arrowcrest Drive
Croton-on-Hudson, NY 10520**

Prepared For:

**Matrix Development, LLC
153 Mercer Street #4
New York, NY 10012**

Prepared By:

**Sea Bright Solar, LLC
23 Cindy Lane BLDG #1
Ocean, NJ 07712**

June 30th, 2020

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1 Executive Summary

Decommissioning will occur as a result of any of the following conditions:

- The land lease expires or is terminated; or
- The solar energy system (SES) does not produce power for a period of 12 consecutive months.

The site activity impacts will be similar to the construction phase, but in reverse sequence. Decommissioning of electrical devices, equipment and wiring/cabling will be conducted in accordance with local, municipal, state, and federal standards and guidelines. Electrical decommissioning will include obtaining the required permits and following procedures before de-energizing, isolating, and disconnecting electrical devices, equipment and wiring/cabling.

The procedures will include the following:

- The creation of temporary work areas. In order to provide sufficient area for the laydown of the disassembled panels and racking and loading onto trucks, gravel will be placed on a clear, level area that is accessible.
- Equipment will include, at a minimum:
 - The use of telehandlers to remove the panels, racking, inverters, and transformers.
 - The use of trucks for removal of panels, racking, inverters, and transformers.
- Driveways will be removed unless the property owners want them left in place. The gravel will be removed and replaced with clean soil for reuse by the landowner for agricultural or other purposes.

Erosion and sediment control measures, similar to those used during construction will be implemented and maintained by the trained contractor.

2 Decommissioning

2.1 Dismantling PV Modules, Racks and Supports

Modules will be disconnected, removed from the racks, packaged and transported to a designated location for resale, recycling or disposal. If the modules are not to be reused in a different location, the glass and silicon will be reclaimed and the aluminum frames will be recycled. Any disposal or recycling will be done in accordance with local by-laws and requirements. The connecting underground cables and the junction boxes will be de-energized, disconnected and removed.

The steel lattice racks supporting the modules will be unbolted and disassembled using standard hand tools, possibly assisted by a telehandlers. The vertical steel posts supporting the racks and steel support posts (driven or screwed) will be completely removed by mechanical equipment and transported off-site for salvage (driven piles) or reuse (screw piles).

Any demolition debris that is not salvageable will be transported by truck to an approved offsite disposal area. Other salvageable equipment and/or material will be removed from the site for resale, scrap value or disposal depending on market conditions.

2.2 Dismantling Electrical Equipment and Foundations

Decommissioning of electrical devices, equipment, and wiring/cabling will be in accordance with local, municipal, provincial and federal agency standards and guidelines. Electrical decommissioning will include obtaining the required permits, and following before de-energizing, and disconnecting electrical devices, equipment and wiring/cabling.

Decommissioning will require dismantling and removal of the electrical equipment, including inverters, transformers, underground cables and overhead lines, the prefabricated inverter enclosures and substation electrical building. The equipment will be disconnected and transported off-site by truck. The concrete foundations and support pads may be broken up by mechanical equipment (backhoe-hydraulic hammer/shovel, jackhammer), loaded onto dump trucks and removed from the site, at the request of the property owners; and smaller pre-cast concrete support pads may be removed intact by cranes and loaded onto trucks for reuse or be broken up and hauled away by dump trucks.

Prior to removal of the transformers, the oil will be pumped into a separate industry approved disposal container and sealed to prevent any spill during storage and/or transportation. Equipment and material may be salvaged for resale or scrap value depending on the market conditions.

2.3 Dismantling Driveways

The gravel may be removed or left in place at the property owner's request. If removed, the gravel will be placed in dump trucks to haul the aggregate to a recycling facility or approved disposal facility. The underlying subsoil, if exhibiting significant compaction will then be aerated using a tractor with disk attachment to restore the soil structure and aerate the soil. Clean topsoil would be replaced over this area, from where it may have been temporarily stored elsewhere on-site by dump truck, to match the surrounding grade. Depending upon the time of year and the planned use of the land, the area will be returned to its pre-construction condition.

2.4 Other Components

Unless retained for other purposes, and at the request of the property owners, removal of other facility components from the site will be completed, including but not limited to surface drains, culverts, and fencing. Anything deemed usable shall be recovered and reused. Other remaining components will be considered as waste and managed according to federal, provincial and municipal requirements. For safety and security, the security fence will be the final component dismantled and removed from the site.

2.5 Department of Agriculture and Markets

The NYS Department of Agriculture and Markets requires that above ground structures be removed if the use of the solar arrays is discontinued. Areas previously used for agricultural production, according to recommendations by the landowner, the Soil and Water Conservation District, and the Department of Agriculture and Markets be restored.

Concrete piers, footers or other supports must be removed to a depth of 48-inches below the soil surface. Underground electric lines must be abandoned in place. Access roads in agricultural areas must be removed, unless otherwise specified by the landowner.

3 Erosion and Sediment Control Plan

3.1 Erosion and Sediment Control Measures

Temporary erosion and sediment control measures to be used during decommissioning construction generally include the following:

- Stabilized construction access.
- Dust control.
- Temporary soil stockpiles.
- Silt fencing.
- Temporary seeding.

Once decommissioning is completed, disturbed areas shall be final seeded within 14 days after completion of the land disturbing activities. Final site stabilization is achieved when soil-disturbing activities have been completed and a uniform, perennial vegetative cover with a density of 80 percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on the disturbed unpaved areas and areas not covered by permanent structures.

3.2 Pollution Prevention Controls

Good housekeeping practices are designed to maintain a clean and orderly work environment. Good housekeeping measures shall be maintained throughout the construction process by those parties involved with the direct care and development of the site. The following measures shall be implemented to control the possible exposure of harmful substances and materials to stormwater runoff:

1. Soil stockpile locations shall be located away from storm drainage, water bodies or watercourses and surrounded with adequate erosion and sediment control measures. Soil stockpile locations shall be exposed no longer than 14 days before seeding.
2. Equipment maintenance areas shall be protected from stormwater flows and shall be supplied with appropriate waste receptacles for spent chemicals, solvents, oils, greases, gasoline, and any pollutants that might contaminate the surrounding habitat or water supply. Equipment wash-down zones shall be within areas draining to sediment control devices.
3. The use of detergents for large-scale (e.g., vehicles, buildings, pavement surfaces) washing is prohibited.
4. Material storage locations and facilities (e.g., covered storage areas, storage sheds) shall be on-site and shall be stored according to the manufacturer's standards in a dedicated staging area. Chemicals, paints, solvents, fertilizers, and other toxic material shall be

stored in waterproof containers. Runoff containing such materials shall be collected, removed from the site, treated and disposed of at an approved solid waste or chemical disposal facility.

5. Hazardous spills shall be immediately contained to prevent pollutants from entering the surrounding habitat or water supply. Spill Kits shall be provided on site and shall be displayed in a prominent location for ease of access and use. Spills greater than 5 gallons shall be reported to the NYSDEC Response Unit at 1-800-457-7362. In addition, a record of the incidents or notifications shall be documented and attached to the SWPPP.
6. Portable sanitary waste facilities shall be provided on site for workers and shall be properly maintained.
7. Dumpsters or debris containers shall be on site and shall be of adequate size to manage respective materials. Regular collection and disposal of wastes must occur as required.
8. Non-stormwater components of site discharge shall be clean water. Water used for construction, which discharges from the site, must originate from a public water supply or approved private well. Water used for construction that does not originate from an approved public supply must not discharge from the site.
9. Discharges from dewatering activities, including discharges from dewatering trenches and excavations, shall be managed by appropriate control measures.

3.3 Inspections and Maintenance

3.3.1 Trained Contractor Requirements

The trained contractor must inspect the erosion and sediment control practices and pollution-prevention measures to verify that they are being maintained in effective operating condition. The inspections will be performed daily in the active work area. If deficiencies are identified, the contractor will begin implementing corrective actions within one business day and must complete the corrective actions by the end of the day.

3.3.2 Qualified Inspector Requirements

The owner/operator must have a Qualified Inspector conduct site inspections to verify the stability and effectiveness of protective measures and practices employed during construction. The site inspections will be conducted at least once every seven days.

Inspection reports must identify and document the maintenance of the erosion and sediment control measures. If deficiencies are identified, the contractor will begin implementing corrective actions within one business day and must complete the corrective actions by the end of the day.

4 Waste Disposal

As discussed above, the waste generated by the installation, operation and decommissioning of The Project is minimal, and there are no toxic residues. Any wastes generated will be disposed of according to standards of the day with the emphasis of recycling materials whenever possible.

5 Restoration of Land

5.1 General

The agricultural use of the areas will be restored by:

- Site cleanup.
- Any excavation and/or trenching caused by the removal of building or equipment foundations, rack supports and underground electrical cables will be backfilled with the appropriate material and leveled to match the ground surface.
- Driveways will be removed completely, filled with suitable sub-grade material and leveled. Topsoil will be placed on these areas to restore agricultural capability.
- Any compacted ground will be tilled, mixed with suitable sub-grade materials and leveled.

5.2 Department of Agriculture and Markets

The NYS Department of Agriculture and Markets has the following restoration requirements:

- All agricultural areas temporarily disturbed by construction must be decompacted to a depth of 18 inches with a deep ripper or heavy-duty chisel plow. Soil compaction results must be no more than 250 pounds per square inch (PSI) as measured with a soil penetrometer. In areas where the topsoil was stripped, soil decompaction must be conducted prior to topsoil replacement. Following decompaction, remove all rocks 4 inches and larger in size, from the surface of the subsoil prior to replacement of the topsoil. Replace the topsoil to original depth and reestablish original contours where possible.
- Remove all rocks 4 inches and larger from the surface of the topsoil. Subsoil decompaction and topsoil replacement must be avoided after October 1. All parties involved must be cognizant that areas restored after October 1st may not obtain sufficient growth to prevent erosion over the winter months. If areas are to be restored after October 1st, necessary provision must be made to restore and/or reseed any eroded or poorly germinated areas in the springtime, to establish proper growth.
- Regrade all access roads to allow for farm equipment crossing and to restore original surface drainage patterns, or other drainage pattern incorporated into the design.
- Seed all restored agricultural areas with the seed mix specified by the landowner, in order to maintain consistency with the surrounding areas.
- Repair all surface or subsurface drainage structures damaged during construction as close to preconstruction conditions as possible, unless said structures are to be removed as

part of the project design. Correct any surface or subsurface drainage problems resulting from construction of the solar energy project with the appropriate mitigation as determined by the Environmental Monitor, Soil and Water Conservation District and the Landowner.

- On affected farmland, postpone any restoration practices until favorable (workable, relatively dry) topsoil/subsoil conditions exist. Restoration must not be conducted while soils are in a wet or plastic state of consistency. Stockpiled topsoil must not be regraded and subsoil must not be decompacted until plasticity, as determined by the Atterberg field test, is adequately reduced. No project restoration activities shall occur in agricultural fields between the months of October through May unless favorable soil moisture conditions exist.
- Following restoration, remove all construction debris from the site.

6 Emergency Response and Communications Plans

Prior to initiating any decommissioning activities, Matrix Development, LLC will notify the local authorities, the public, and relevant government agencies of their intent to decommission The Project. Copies of a detailed emergency response plan, developed in conjunction with the local emergency services, will be distributed to the local municipality prior to the commencement of operations. A plan specific to The Project will be developed during the construction phase of this project and will be applicable to both the operations and decommissioning phases of The Project.

During decommissioning, Matrix Development, LLC will coordinate with the local authority, the public and others as required to provide them with information about the ongoing activities. Besides regular direct/indirect communication, a sign will be posted at the gate of the facility which will include Matrix Development, LLC's contact information (telephone number, e-mail and mailing address) should the public have any questions, inquiries or complaints. Inquiries will be directed to Matrix Development, LLC's primary contact person who will respond to the inquiry accordingly. Inquiries will be logged electronically with the following information: date of question, inquiry or complaint, name, phone number, email address of the individual, response, date of response, and any follow-up issues.

7 Permit and Approvals

Decommissioning activities are expected to disturb more than one or more acres of land. Therefore, coverage under the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (General Permit) latest revision will be required prior to commencement of decommissioning. Erosion and sediment control inspections will be

It is anticipated that the decommissioning will require a Building or Demolition permit obtained from Town of Croton-on-Hudson.