EDR

Memorandum

To:	Connecticut Siting Council
From:	Gordon Perkins, Associate/Visualization Services Leader, Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, DPC (EDR) Jacob Loughlin, Visualization Project Manager, EDR
Date:	June 6, 2025
Reference:	Visibility Assessment Memorandum Gager Hill Solar Project, Town of Scotland, Windham County, Connecticut

List of Attachments

Attachment A: Viewpoint Photolog

Attachment B: Photosimulation

Introduction

On behalf of Greenskies Clean Energy, LLC (the Petitioner), Environmental Design and Research, Landscape Architecture, Engineering & Environmental Services, DPC (EDR) conducted a Visibility Assessment for the Gager Hill Solar Project (the Project), which is proposed to be located in the Town of Scotland, Windham County, Connecticut. This Visibility Assessment was prepared in support of a Petition for Declaratory Ruling to the Connecticut Siting Council. The information included in this memorandum is intended to assist state agencies, interested stakeholders, and the public in their review of the proposed Project. The purpose of this assessment is to identify areas where the proposed photovoltaic (PV) array may be visible and to illustrate the potential visual change resulting from the installation of the Project. Areas of potential Project visibility were identified by conducting a viewshed analysis. A photographic simulation (photosimulation) was prepared to show what the Project would look like from a representative open viewpoint. The methodology employed and results of these analyses are described in the following sections.

Project Visibility

To identify areas where the proposed PV panels may be visible, a digital surface model (DSM) viewshed analysis was conducted. The DSM is a representation of topography as well as natural and built features on the land (e.g., buildings, trees, powerlines). By comparison, a digital elevation model (DEM) is a representation of a bare earth topographic surface only. Because it is based on bare earth topography only, a DEM viewshed analysis would not accurately represent areas of potential Project visibility because it does not consider the screening effects of existing vegetation or structures. Therefore, only a DSM viewshed analysis, which considers the height and location of all surface features, was conducted. The DSM viewshed analysis was prepared using the following data and parameters:

- A 2-foot resolution DSM derived from the 2023 Connecticut Statewide Lidar dataset;

- A 2-mile radius study area surrounding the proposed Project fence line;
- A total of 315 sample points representing the proposed PV panels, each spaced approximately 25 to 50 feet apart in a grid pattern throughout the proposed PV array;
- A maximum height of 12 feet applied to each of the 315 PV panel sample points;
- An assumed eye-level viewer height of 6 feet;
- ESRI ArcGIS Pro® software with the Spatial Analyst extension.

To avoid misleading results, some modifications to the DSM were made prior to conducting the viewshed analysis. Existing overhead transmission lines and roadside utility lines are generally misrepresented in the DSM as solid structures that extend from the top of these lines to the ground surface and therefore are incorrectly interpreted as solid features with the potential to screen views. In order to correct this inaccuracy, all above-ground surface features within transmission line and road corridors (defined as areas within 50 feet of transmission line and state highway centerlines, and areas within 30 feet of local road centerlines) were removed by using bare earth (DEM) elevation values within these corridors. It is important to note that this removal of surface features (such as vegetation and structures) within road and transmission corridors may also eliminate legitimate screening features which occur in these areas. This has the potential to result in an overstatement of proposed PV panel visibility within and adjacent to road and transmission line corridors. All surface features (vegetation) within the Project's limit of disturbance were also removed and replaced with bare earth elevation values to account for proposed clearing.

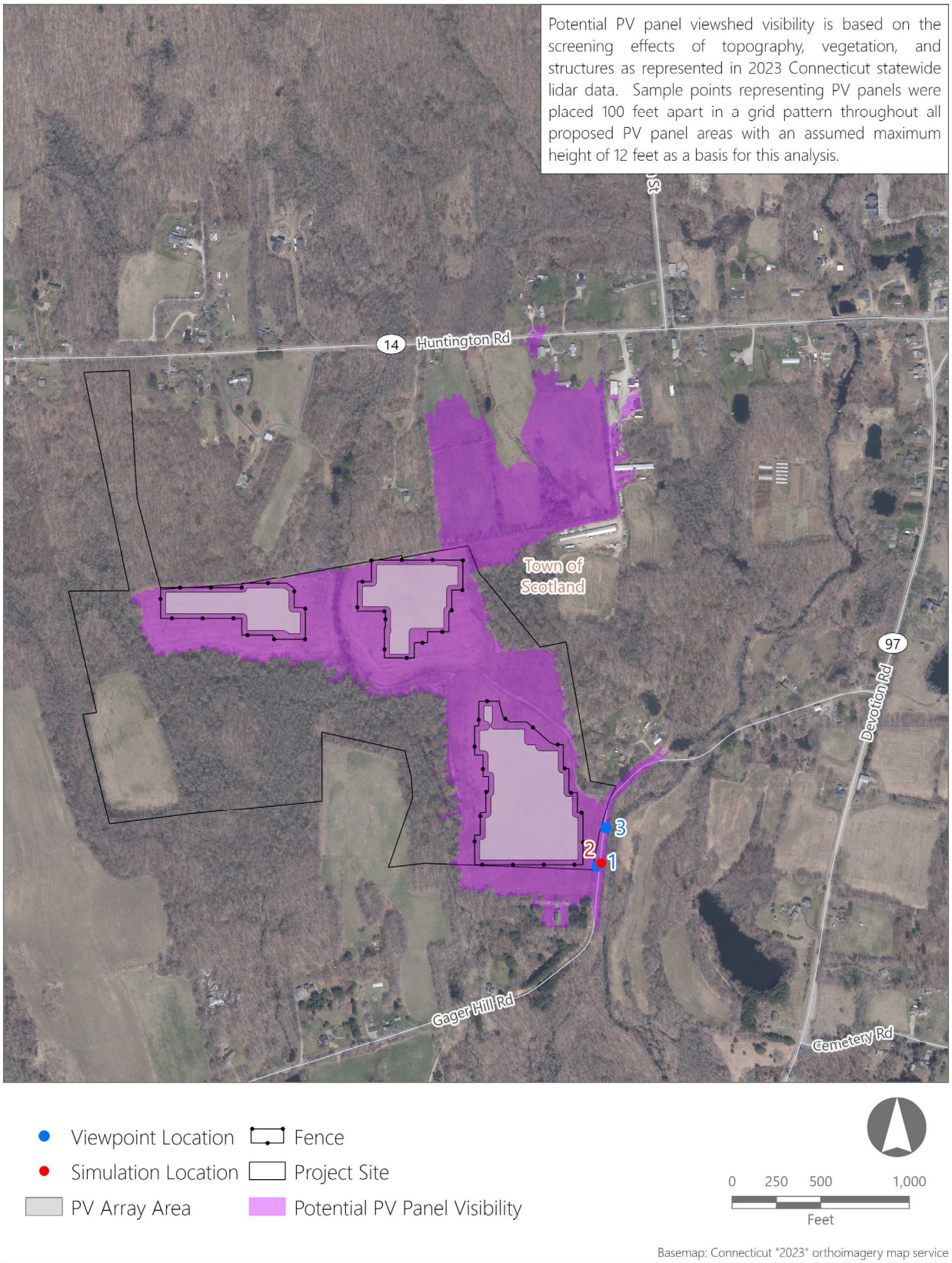
Once the viewshed analysis was complete, PV panel visibility was set to zero in locations where existing surface features exceed the bare earth elevation value by 6 feet or more, indicating the presence of vegetation or structures that exceed the assumed viewer height. This was done for two reasons: 1) in locations where trees or structures are present in the DSM, the viewshed results would reflect visibility from treetops or building roofs, which is not the intent of this analysis, and 2) to reflect the fact that the PV panels will generally be screened from view at ground-level vantage points within buildings or areas of vegetation that exceed viewer height.

Because it accounts for screening provided by topography, vegetation, and structures, DSM viewshed analysis is the best available means of predicting potential visibility of the proposed PV panels. However, because certain characteristics of the Project and the study area that may serve to limit visibility (e.g., color, atmospheric/weather conditions, distance from the viewer) are not taken into consideration in the analysis, being located in an area indicated to have potential PV panel visibility does not necessarily equate to actual Project visibility, nor does it indicate that adverse visual impacts will occur within these geographic locations. There is also the possibility of the DSM overstating screening, and therefore underestimating actual visibility, in locations where views are available through trees during the dormant season. However, even in a "leaf-off" condition, such views will typically be significantly screened by bare tree branches and trunks.

The PV panel viewshed analysis results are shown in Figure 1. As indicated in this figure, due to the abundance of forest vegetation surrounding the proposed PV panel arrays, potential PV panel visibility is largely restricted to the Project site. However, adjacent open land to the northeast and south, along with small portions of Gager Hill Road to the east and Huntington Road to the north are also indicated as being

within the Project viewshed. Areas with potential Project visibility make up less than 0.7 percent of the 2-Mile radius study area.

Figure 1. PV Panel DSM Viewshed Analysis Results



Photosimulations

EDR personnel conducted field review on April 15, 2025 to document potential Project visibility and obtain photographs from representative public vantage points for subsequent development of photosimulations. The determination of potential Project visibility was based on the proposed location and dimensions of Project components, viewshed analysis results, and other prominent landscape features within or near the Project site that served as location and scale references. To assist with viewer orientation and determination of potential Project visibility in the field, global positioning system (GPS) units were combined with live mapping in ESRI Collector®. The data contained in the Collector unit included Project components, viewshed analysis results, a topographic and aerial base map, and the current viewer location. At each viewpoint, the GPS unit was used to document the location, time, and observations regarding potential Project visibility.

Field review resulted in documentation of potential Project visibility from three representative viewpoints. At each viewpoint, multiple photographs were taken to capture the full extent of the Project and the surrounding landscape context. These photographs were taken using a digital SLR camera with a resolution of 30 megapixels and full-frame (35 mm) camera sensor. Single-frame photographs included in the photolog and used for photosimulations were obtained with a lens setting (focal length) of 50 millimeters (mm). A 50 mm focal length (35 mm camera sensor equivalent) is typically used in visual studies because it is generally agreed amongst visual professionals that it provides accurate scale and perspective between close and distant elements in a view. The location of viewpoints documented during field review is illustrated in Figure 1, and representative photographs from each viewpoint are included in Attachment A. The photographs for each viewpoint include a panorama composition illustrating the view context and single-frame photographs illustrating the most open, unobstructed view available toward the proposed Project.

To show anticipated visual changes associated with the proposed Project, three-dimensional (3D) modeling software was used to create photosimulations of the proposed Project from Viewpoint 2 located on Gager Hill Road. This viewpoint was selected because it would provide the most open, unobstructed view of the Project from a publicly accessible vantage point. The photosimulation was developed by using Autodesk 3ds Max Design® to create a simulated perspective (3D camera view) to match the location, bearing, and focal length of the existing conditions photograph. A 3D model of the lidar data (point cloud) used to generate the DSM was created to represent existing landscape features, such as roads, buildings, terrain, and vegetation. The 3D camera's orientation, location, roll, and focal length were then adjusted to match the modeled landscape features in the lidar data with the corresponding landscape features in the photograph. This ensures that any elements introduced to the model space (e.g., the PV panels system) will be shown in proper proportion, perspective, and relation to the existing landscape features in the view. Consequently, the alignment, elevations, dimensions, and locations of the proposed Project components in the simulation will be accurate.

Computer models of the PV panels/racking system and perimeter fence were prepared based on layout information and specifications provided by the Petitioner. The modeled Project components were imported into the landscape model space described above and set at the proper geographic location. The PV panels were then rotated to accurately represent their orientation as it would be on the date and time of the

photograph. With the proposed Project in place, a daylight system was created based on the date, time, and location of each photograph in order to accurately represent light reflection, highlights, color casting, and shadows. Proposed mitigation plantings were also incorporated into the simulations where they would be visible. To accomplish this, 3D models representing each of the proposed plant species were prepared to reflect their size at five to seven years of plant growth based on installation of trees ranging in height from 5 to 8 feet tall, shrubs ranging in height from 3 to 5 feet tall, and region-specific species growth rates. The five-to-seven-year range of plant growth was selected to illustrate the plantings at their established size and intended screening effectiveness. Once completed, the modeled Project and plantings were rendered and superimposed over the existing conditions photograph in Adobe Photoshop®. Using lidar data and the proposed limits of disturbance as guides, portions of the Project that would fall behind vegetation, structures, or topography were then masked out and any vegetation that is proposed to be cleared was removed from the photograph. Finally, any shadows cast on the ground by the proposed Project components and plantings were rendered in a separate "shadow pass" and placed over the terrain with the proper fall-off and transparency using Photoshop®.

The photosimulation, along with existing view photographs and additional contextual information for the selected viewpoint is included in Attachment B.

Attachments

Attachment A

Viewpoint Photolog

Viewpoint 1 | Panorama

Panorama composition panning west to northeast

Viewpoint 1 | Single Frame

View looking northwest from Gager Hill Road in the Town of Scotland, Windham County

Coordinates:
41.69001°N, 72.08932°W

Elevation:
244 feet

Date:
04/15/2025

Viewpoint 2 | Panorama

Panorama composition panning west to northeast

Viewpoint 2 | Single Frame

View looking northwest from Gager Hill Road in the Town of Scotland, Windham County

Coordinates:
41.69006°N, 72.08924°W

Elevation:
244 feet

Date:
04/15/2025

Viewpoint 3 | Panorama

Panorama composition panning southwest to north

Viewpoint 3 | Single Frame

View looking southwest from Gager Hill Road in the Town of Scotland, Windham County

Coordinates:
41.69060°N, 72.08913°W

Elevation:
245 feet

Date:
04/15/2025

Attachment B

Photosimulation

Note: *The image above is a panorama composition panning clockwise from southwest (left) to north (right).*

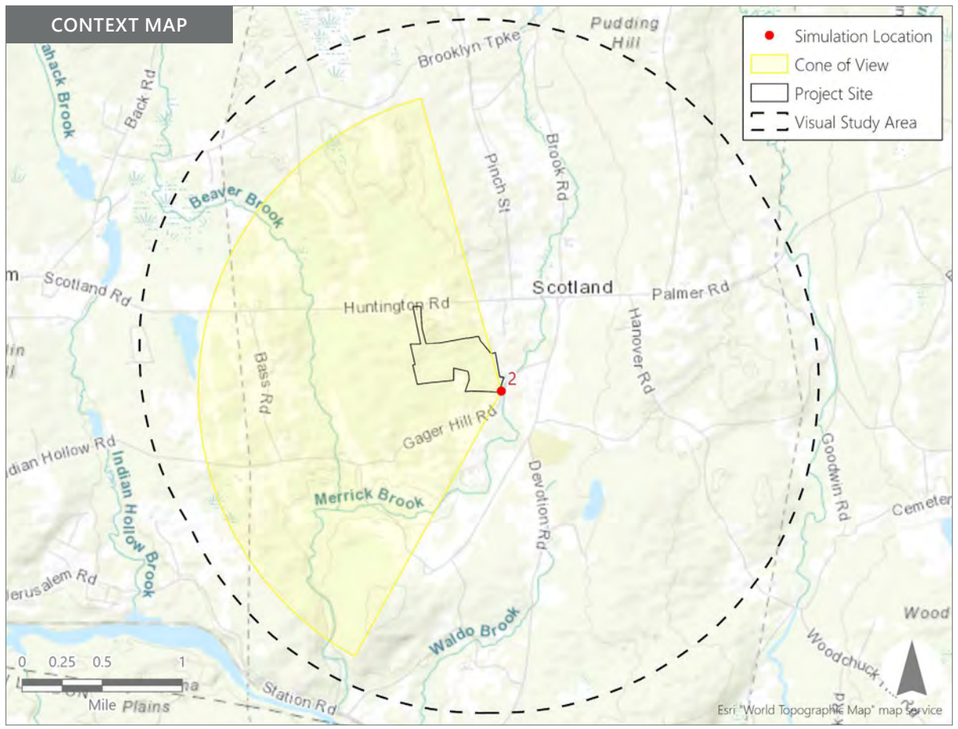
VIEWPOINT 2
Gager Hill Road

LOCATION INFORMATION

Municipality:	Scotland
County:	Windham
Latitude:	41.69006° N
Longitude:	73.08924° W
Project Distance:*	136 feet

LOCATION MAP

CONTEXT MAP



PHOTOGRAPH INFORMATION

Date:	April 15, 2025
Time:	12:54 PM
Camera:	Canon EOS 5D Mark IV
Camera Resolution:	30.4 Megapixels
Lens Focal Length (35 mm sensor equivalent):	51 mm
Camera Elevation:	249 feet
Field of View:	39 degrees
Direction of View:	West
Printed Size:	10 inches x 15 inches
*Viewing Distance**:*	21 inches

NOTES

**Distance as measured from the viewpoint to the nearest PV panels within the simulated photograph's field of view*

***The simulation is at the correct perspective when printed on an 11-by-17 sheet at full scale, and viewed approximately 21 inches from the eye of the viewer.*

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EXISTING VIEW - PANORAMA

VIEWPOINT 2

Gager Hill Road

0 1 in. 2 in.

This scale is to ensure the simulation images are printed at the intended size.

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VIEWPOINT 2
Gager Hill Road

0 1 in. 2 in.
This scale is to ensure the simulation images are printed at the intended size.

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PROPOSED VIEW 5-7 YEARS FOLLOWING INSTALLATION (MITIGATION LEAF-ON)- PANORAMA

VIEWPOINT 2
Gager Hill Road

0 1 in. 2 in.
This scale is to ensure the simulation images are printed at the intended size.

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Note: *Printed at actual size, the existing view image is 15 inches wide by 10 inches high. At this size and focal length, the existing view should be viewed from a distance 21 inches from the eye of the viewer.*

0 1 in. 2 in.

This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 2
Gager Hill Road

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PROPOSED VIEW FOLLOWING INSTALLATION (1 OF 4)

Note: *Printed at actual size, the resulting simulation image is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed from a distance 21 inches from the eye of the viewer.*

0 1 in. 2 in.

This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 2
Gager Hill Road

Note: *Printed at actual size, the resulting simulation image is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed from a distance 21 inches from the eye of the viewer.*

0 1 in. 2 in.

This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 2
Gager Hill Road

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Note: *Printed at actual size, the existing view image is 15 inches wide by 10 inches high. At this size and focal length, the existing view should be viewed from a distance 21 inches from the eye of the viewer.*

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VIEWPOINT 2
Gager Hill Road

0 1 in. 2 in.
This scale is to ensure the simulation images are printed at the intended size.

***Note:** Printed at actual size, the resulting simulation image is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed from a distance 21 inches from the eye of the viewer.*

0 1 in. 2 in.

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VIEWPOINT 2

Gager Hill Road

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Note: *Printed at actual size, the resulting simulation image is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed from a distance 21 inches from the eye of the viewer.*

0 1 in. 2 in.

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VIEWPOINT 2
Gager Hill Road

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EXISTING VIEW (3 OF 4)

Note: Printed at actual size, the existing view image is 15 inches wide by 10 inches high. At this size and focal length, the existing view should be viewed from a distance 21 inches from the eye of the viewer.

0 1 in. 2 in.

This scale is to ensure the simulation images are printed at the intended size.

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Gager Hill Road

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PROPOSED VIEW FOLLOWING INSTALLATION (3 OF 4)

0 1 in. 2 in.

This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 2

Gager Hill Road

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Note: *Printed at actual size, the resulting simulation image is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed from a distance 21 inches from the eye of the viewer.*

PROPOSED VIEW 5-7 YEARS FOLLOWING INSTALLATION (MITIGATION - LEAF ON) (3 OF 4)

0 1 in. 2 in.

This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 2

Gager Hill Road

Gager Hill Solar

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Note: *Printed at actual size, the resulting simulation image is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed from a distance 21 inches from the eye of the viewer.*

Note: *Printed at actual size, the existing view image is 15 inches wide by 10 inches high. At this size and focal length, the existing view should be viewed from a distance 21 inches from the eye of the viewer.*

0 1 in. 2 in.

This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 2

Gager Hill Road

Gager Hill Solar

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PROPOSED VIEW FOLLOWING INSTALLATION (4 OF 4)

Note: *Printed at actual size, the resulting simulation image is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed from a distance 21 inches from the eye of the viewer.*

0 1 in. 2 in.

This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 2

Gager Hill Road

Gager Hill Solar

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PROPOSED VIEW 5-7 YEARS FOLLOWING INSTALLATION (MITIGATION - LEAF ON) (4 OF 4)

Note: *Printed at actual size, the resulting simulation image is 15 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed from a distance 21 inches from the eye of the viewer.*

0 1 in. 2 in.

This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 2

Gager Hill Road

Gager Hill Solar

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