



Memorandum

To: Connecticut Siting Council

From: Gordon Perkins, Associate/Visualization Services Leader, Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR)
Jacob Loughlin, Visualization Project Manager, EDR

Date: May 30, 2025

Reference: Visibility Analysis Memorandum
Soundview Solar Project, Town of Woodbridge, New Haven County, CT

List of Attachments

Attachment A: Viewpoint Photolog

Attachment B: Photosimulations

Introduction

On behalf of Greenskies Clean Energy, LLC (the Petitioner), Environmental Design and Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR) conducted a Visibility Assessment for the proposed Soundview Solar Project (the Project), which is to be located in the Town of Woodbridge, New Haven 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 report are intended to assist state agencies, interested stakeholders, and the public in their review of the proposed Project. The purposes of this assessment are to identify areas where the proposed photovoltaic (PV) array may be visible and illustrate the potential visual change resulting from the installation of the Project by developing photographic simulations (photosimulations) from representative viewpoints. 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 does not accurately represent areas of potential Facility 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 analyses were prepared using the following data and parameters:

- A 1-meter resolution DSM derived from the 2023 Connecticut Statewide Lidar dataset;
- A 2-mile radius study area surrounding the proposed Project fence line;

- Fifty-nine sample points representing the proposed PV panels, spaced approximately 100 feet apart in a grid pattern throughout the proposed PV array;
- A maximum height of 12 feet applied to each of the 59 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 analyses. 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 will be 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 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 representation of 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, potential PV panel visibility would occur within the Project site, along the Soundview Drive roadway corridor, and the adjacent property to the east.

Figure 1. PV Panel DSM Viewshed Analysis Results



- Viewpoint Location
- Simulation Location
- ▭ PV Array Area
- ▭ Fence
- ▭ Project Site
- ▭ Potential PV Panel Visibility



Basemap: Connecticut "2023" orthoimagery map service

Photosimulations

EDR personnel conducted field review on March 27, 2025 to document potential Project visibility and obtain photographs from public vantage points to document representative views 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 Facility components, VSR locations, 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 results in documentation of views from 9 representative viewpoints.

Field review resulted in documentation of potential Project visibility from nine representative viewpoints within the VSA. 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 Facility, three-dimensional (3D) modeling software was used to create realistic photographic simulations of the proposed Facility from Viewpoint 2 located on Forest Glen Drive, Viewpoint 4 located on Soundview Drive, and Viewpoint 8 located on Newton Road. These viewpoints were selected to illustrate PV panel visibility from a variety of viewing distances and geographic locations to represent the range of visual change that will occur with the Project in place.

The photosimulations were developed by using Autodesk 3ds Max Design® to create a simulated perspective (3D camera view) to match the location, bearing, and focal length of each 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 simulations will be accurate.

Computer models of the PV panels and 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 for each view. 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. The modeled Project was then rendered and superimposed over the existing 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 structures were rendered in a separate "shadow pass" and placed over the terrain with the proper fall-off and transparency using Photoshop®.

The photosimulations, along with existing view photographs and additional contextual information for each viewpoint are included in Attachment B.

Attachments

Attachment A
Viewpoint Photolog



Viewpoint 1 | Panorama

Panorama composition panning northeast to south



View looking east from Forest Glen Drive in the Town of Woodbridge, New Haven County

Coordinates:
41.36808°N, 73.01942°W

Elevation:
422 feet

Time & Date:
11:51 AM, March 27, 2025

Viewpoint 1 | Single Frame

Soundview Solar

Town of Woodbridge, New Haven County, Connecticut

Visibility Assessment Memorandum



Viewpoint 2 | Panorama

Panorama composition panning east to southwest



View looking southeast from Forest Glen Drive in the Town of Woodbridge, New Haven County

Coordinates:
41.36892°N, 73.01614°W

Elevation:
452 feet

Time & Date:
11:48 AM, March 27, 2025

Viewpoint 2 | Single Frame

Soundview Solar

Town of Woodbridge, New Haven County, Connecticut

Visibility Assessment Memorandum



Viewpoint 3 | Panorama

Panorama composition panning east to west



View looking south from Soundview Drive in the Town of Woodbridge, New Haven County

Coordinates:
41.36957°N, 73.01189°W

Elevation:
490 feet

Time & Date:
11:41 AM, March 27, 2025

Viewpoint 3 | Single Frame

Soundview Solar

Town of Woodbridge, New Haven County, Connecticut

Visibility Assessment Memorandum



Viewpoint 4 | Panorama

Panorama composition panning east to west



View looking south from Soundview Drive in the Town of Woodbridge, New Haven County

Coordinates:

41.36897°N, 73.01171°W

Elevation:

481 feet

Time & Date:

11:39 AM, March 27, 2025

Viewpoint 4 | Single Frame

Soundview Solar

Town of Woodbridge, New Haven County, Connecticut

Visibility Assessment Memorandum



Viewpoint 5 | Panorama

Panorama composition panning east to west



View looking south from Soundview Drive in the Town of Woodbridge, New Haven County

Coordinates:
41.36859°N, 73.01173°W

Elevation:
474 feet

Time & Date:
11:37 AM, March 27, 2025

Viewpoint 5 | Single Frame

Soundview Solar

Town of Woodbridge, New Haven County, Connecticut

Visibility Assessment Memorandum



Viewpoint 6 | Panorama

Panorama composition panning southeast to west



View looking southwest from Soundview Drive in the Town of Woodbridge, New Haven County

Coordinates:
41.36854°N, 73.01155°W

Elevation:
474 feet

Time & Date:
11:35 AM, March 27, 2025

Viewpoint 6 | Single Frame

Soundview Solar

Town of Woodbridge, New Haven County, Connecticut

Visibility Assessment Memorandum



Viewpoint 7 | Panorama

Panorama composition panning southeast to southwest



View looking southwest from Soundview Drive in the Town of Woodbridge, New Haven County

Coordinates:
41.36837°N, 73.01160°W

Elevation:
472 feet

Time & Date:
11:33 AM, March 27, 2025

Viewpoint 7 | Single Frame

Soundview Solar

Town of Woodbridge, New Haven County, Connecticut

Visibility Assessment Memorandum



Viewpoint 8 | Panorama

Panorama composition panning south to north



View looking west from Newton Road in the Town of Woodbridge, New Haven County

Coordinates:
41.36806°N, 73.00882°W

Elevation:
423 feet

Time & Date:
11:59 AM, March 27, 2025

Viewpoint 8 | Single Frame

Soundview Solar

Town of Woodbridge, New Haven County, Connecticut

Visibility Assessment Memorandum

Attachment B

Photosimulations

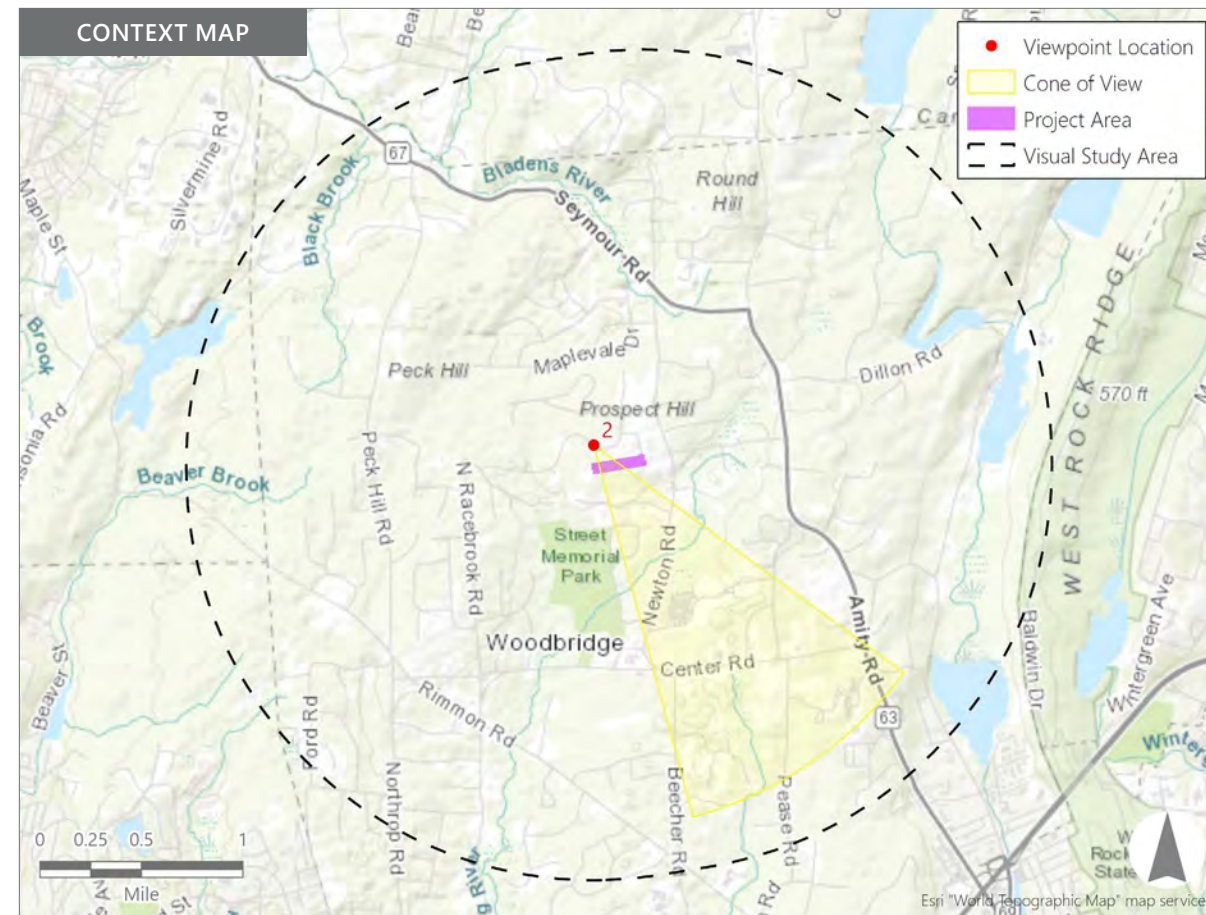


Note: The image above is a panorama composition panning clockwise from northeast (left) to southwest (right).

VIEWPOINT 2
Forest Glen Drive

LOCATION INFORMATION

Municipality:	Woodbridge
County:	New Haven
Latitude:	41.36892° N
Longitude:	73.01614° W
Project Distance*:	486 feet



PHOTOGRAPH INFORMATION

Date:	March 27, 2025
Time:	11:48 AM
Camera:	Canon EOS 5D Mark IV
Camera Resolution:	30.4 Megapixels
Lens Focal Length (35 mm sensor equivalent):	51 mm
Camera Elevation:	457 feet
Field of View:	39 degrees
Direction of View:	Southeast
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.

Soundview Solar

Town of Woodbridge, New Haven County, Connecticut

Visibility Assessment Memorandum



EXISTING VIEW

0 1 in. 2 in.

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

VIEWPOINT 2
Forest Glen Drive

Soundview Solar
Visibility Assessment Memorandum

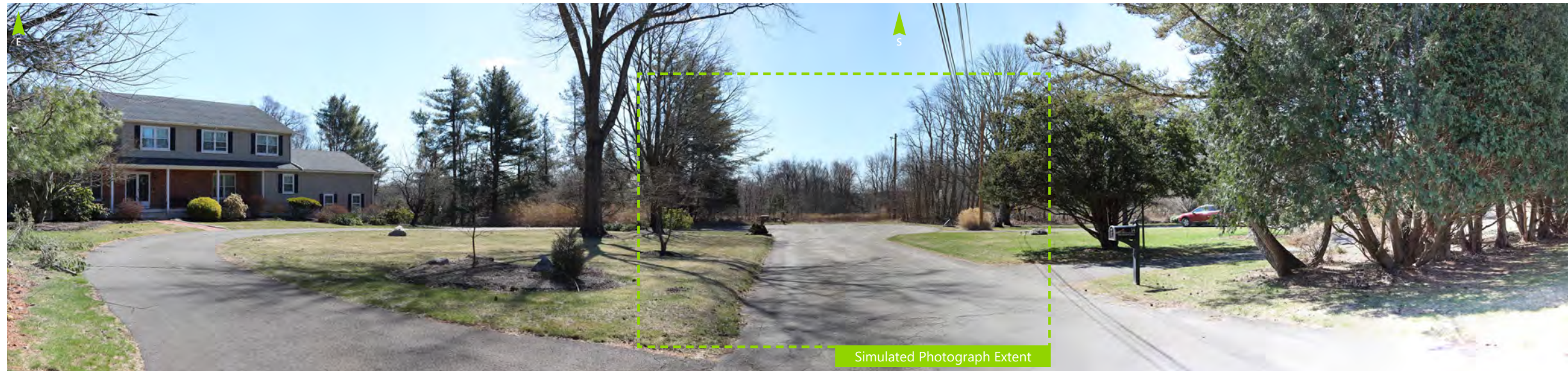
EDR

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.

PROPOSED VIEW FOLLOWING INSTALLATION



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.

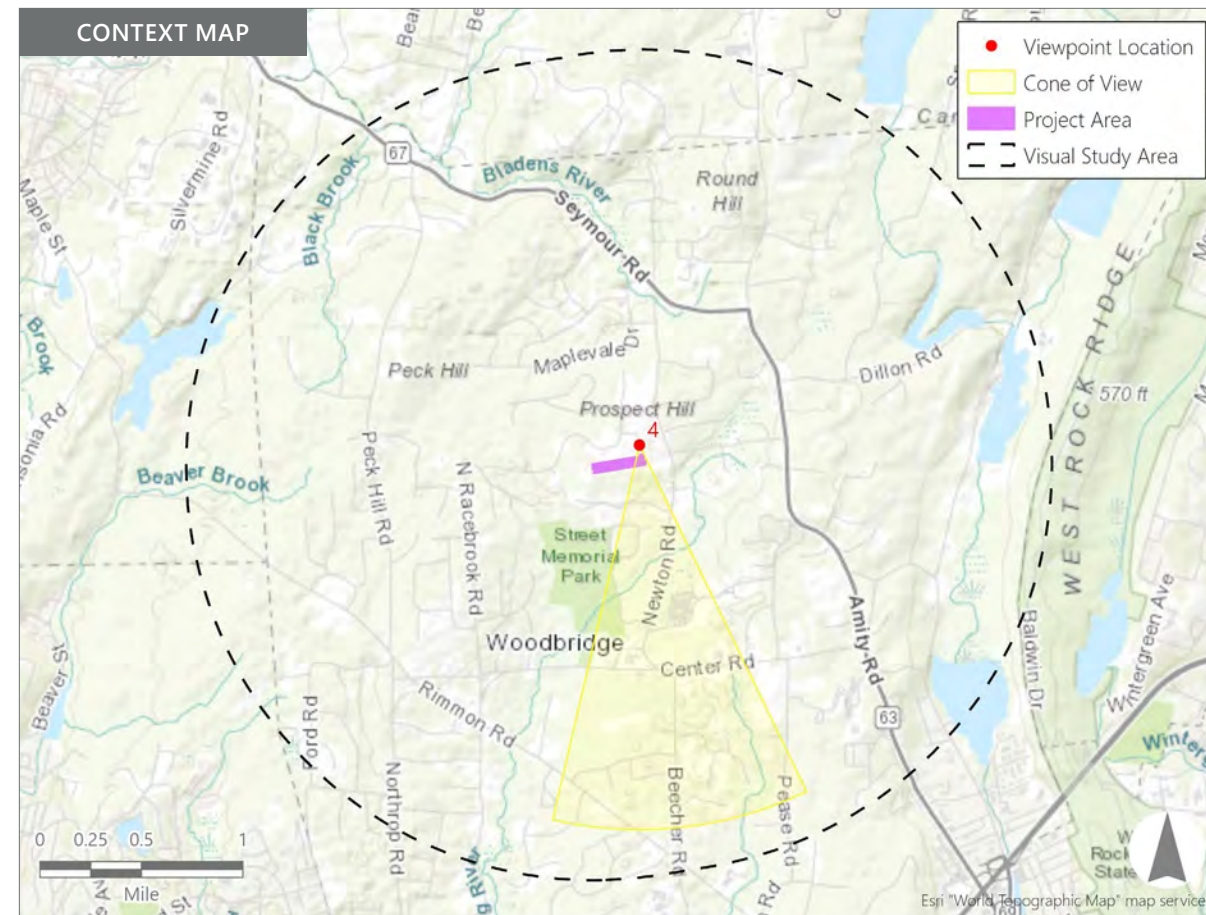


Note: The image above is a panorama composition panning clockwise from east (left) to west (right).

VIEWPOINT 4
Soundview Drive

LOCATION INFORMATION

Municipality:	Woodbridge
County:	New Haven
Latitude:	41.36897° N
Longitude:	73.01171° W
Project Distance*:	293 feet



PHOTOGRAPH INFORMATION

Date:	March 27, 2025
Time:	11:39 AM
Camera:	Canon EOS 5D Mark IV
Camera Resolution:	30.4 Megapixels
Lens Focal Length (35 mm sensor equivalent):	51 mm
Camera Elevation:	484 feet
Field of View:	39 degrees
Direction of View:	South
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.

Soundview Solar

Town of Woodbridge, New Haven County, Connecticut

Visibility Assessment Memorandum

EXISTING VIEW



VIEWPOINT 4
Soundview Drive

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.

PROPOSED VIEW FOLLOWING INSTALLATION



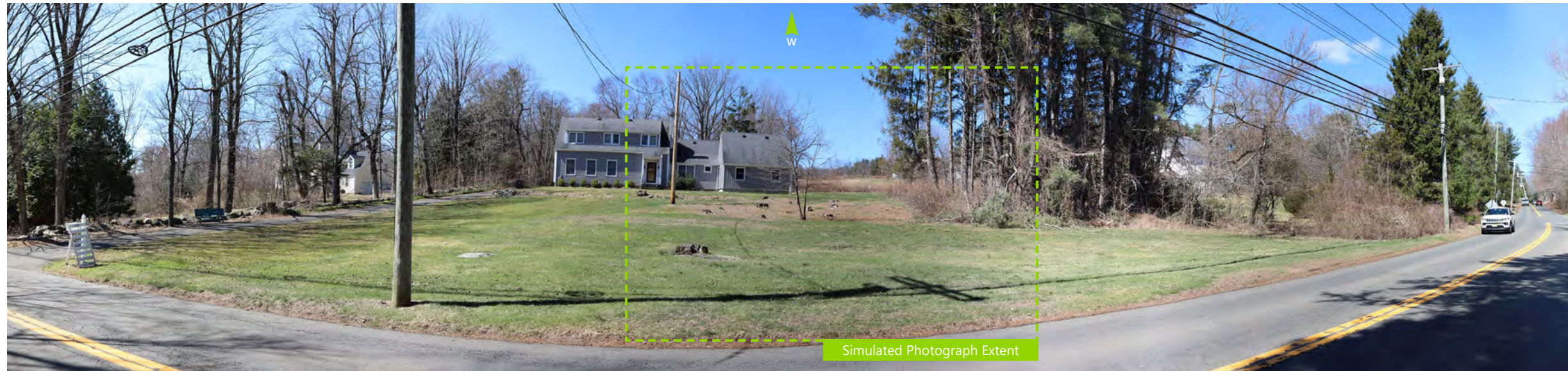
0 1 in. 2 in.
This scale is to ensure the simulation images are printed at the intended size.

VIEWPOINT 4
Soundview Drive

Soundview Solar
Visibility Assessment Memorandum



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.

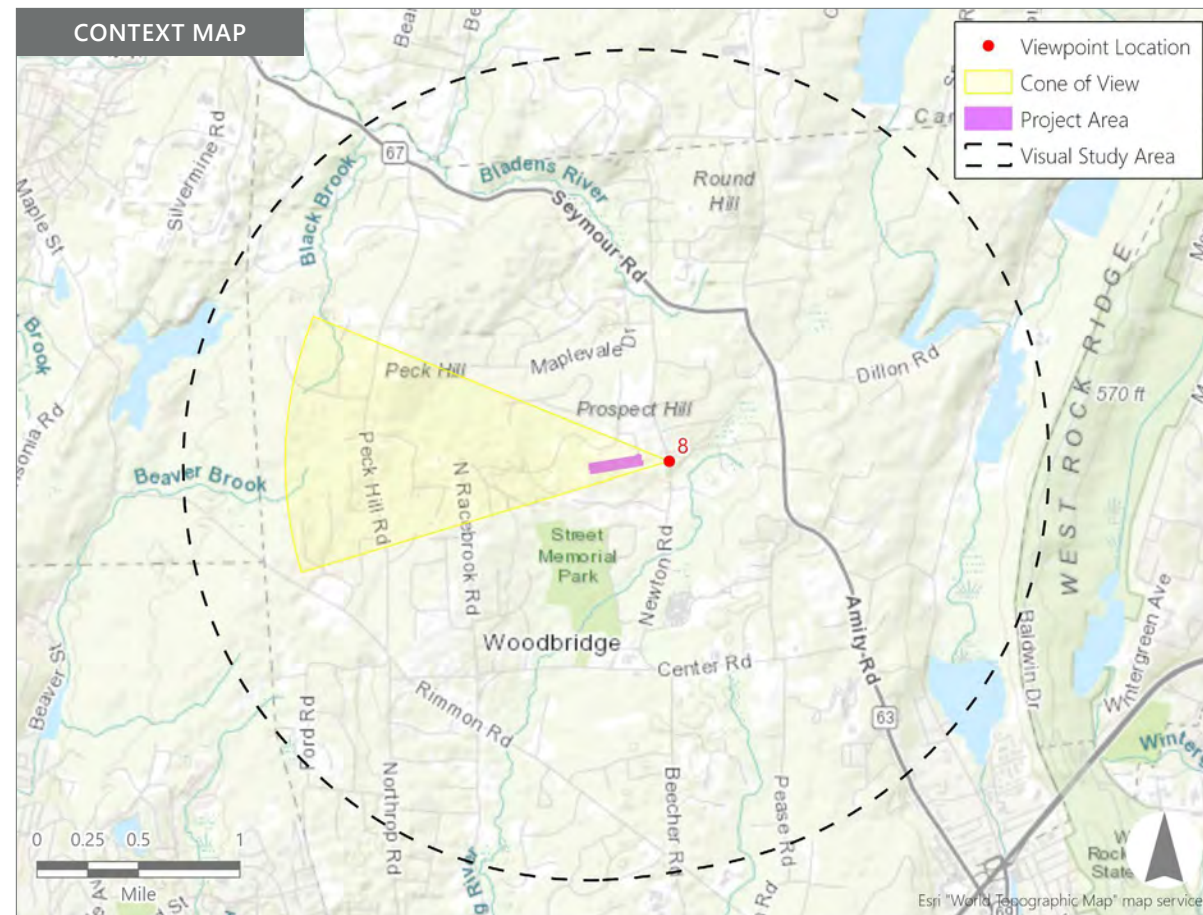


Note: The image above is a panorama composition panning clockwise from southwest (left) to northwest (right).

VIEWPOINT 8
Newton Road

LOCATION INFORMATION

Municipality:	Woodbridge
County:	New Haven
Latitude:	41.36806° N
Longitude:	73.00882° W
Project Distance*:	766 feet



PHOTOGRAPH INFORMATION

Date:	March 27, 2025
Time:	11:59 AM
Camera:	Canon EOS 5D Mark IV
Camera Resolution:	30.4 Megapixels
Lens Focal Length (35 mm sensor equivalent):	51 mm
Camera Elevation:	424 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.

Soundview Solar

Town of Woodbridge, New Haven County, Connecticut

Visibility Assessment Memorandum

EXISTING VIEW



VIEWPOINT 8
Newton Road

Soundview Solar
Visibility Assessment Memorandum



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

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.

PROPOSED VIEW FOLLOWING INSTALLATION



VIEWPOINT 8
Newton Road

Soundview Solar
Visibility Assessment Memorandum

EDR

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.