STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Petition of Chelsea Solar LLC, pursuant to 30 V.S.A. § 248, for a certificate of public good authorizing the installation and operation of the "Chelsea Solar Project," a 2.0 MW solar electric generation facility located off Willow Road in Bennington, Vermont	))))))	Case No. 17-5024-PET

PETITIONER'S RESPONSES TO
DPS' FIRST SET OF INFORMATION REQUESTS

Q.DPS:CS.1-1. Please refer to the prefiled testimony of Mark Kane, exhibit CS-MK-3. Please identify the visualization software and methods which were used in the development and creation of the visualizations presented on pages CS-10 through CS-29 of this exhibit. Please identify and list other cases in which the Vermont Public Utility Commission relied on visualizations of this type in making decisions on the aesthetics criterion under 30 V.S.A. § 248.

Response: The method used to create the simulations is described in CS-MK-2 on pages 15 to 18. The software used to develop the simulations included SketchUp Pro, AutoCAD Infrastructure Design Suite Premium, Maxwell Render and Photoshop Creative Cloud.

The visualizations presented on pages CS-10 through CS-29 were created using a combination of techniques relying on computer visual processing software. The underlying topographic model used for the visualizations was derived from contour data provided by the Petitioner which was processed into a 3D surface in Sketchup Pro. Two topographic model surfaces were created; the first representative of the existing conditions to which the existing conditions aerial photograph of the project was applied and the proposed conditions to which an aerial photograph that included the proposed site plan was applied.

The physical elements of the project were placed into the proposed conditions model using Sketchup Pro. These elements included the proposed arrays, the inverter skids, the project fence and fence poles, and power distribution poles (in each instance, set to the correct height, angle, and orientation). The position and placement of these elements was

done by importing the CAD design plans from the project engineer into the topographic surface as a reference.

Three separate vegetation models for the modelled area were developed; an existing conditions model, a proposed summer model and a proposed winter model. Using AutoCAD Infrastructure Design Suite Premium, the existing conditions model was created by randomly placing 2D tree blocks (representations of trees or shrubs, either deciduous or coniferous) in areas of vegetation as shown on the existing conditions aerial photograph. For each tree placed, an understory of shrubs was included. The tree blocks used in this process included height information which ranged based on field observation of the area. All of the blocks used in this model assumed leaf-on condition. This 2D information was then imported into SketchUp Pro where each 2D block was then converted into an appropriate 3D tree or shrub (type either coniferous or deciduous, height based on random range).

For the summer/winter vegetation models, the existing conditions vegetation model was used as a basis but areas of existing trees/shrubs within the limits of proposed clearing were removed. These clearing limits were imported into SketchUp Pro from the original CAD design plans from the project engineer. Areas of proposed mitigation plantings were added to the winter/summer model based on the design plans prepared by SE Group in CAD and as imported into SketchUp Pro. 3D tree symbols were placed in the locations indicated at heights reflective of the range we observed during site reconnaissance.

Upon the completion of the topographic surface, project elements and vegetation information, virtual cameras were placed in SketchUp Pro at the viewpoint locations and set at the height/orientation and focal lengths as indicated on the materials presented. For each of these virtual cameras, three renderings were prepared; existing conditions, proposed summer conditions and proposed winter conditions. Renderings were completed using Maxwell Render, using the appropriate SketchUp Pro data as the input. The final renderings were then brought into Photoshop Creative Cloud and adjusted for exposure (to lighten them up) and to add blue sky.

SE Group has used this same technique on one recent occasion for a project under review with the Vermont Public Utility Commission; South Forty Solar – Petition Case # 8600. This project was granted a certificate of public good.

The underlying technique of developing a 3D topographic model and placing 3D components into it for rendering is the same as when we develop photosimulations which merge simulated and existing conditions photographs together. SE Group has completed this work on numerous solar projects reviewed before the PUC including Cold River (PUC Case # 8188), Charlotte Solar (PUC Case #7844), and South Forty Solar (PUC Case # 8600). SE Group has also used this visualization technique for other types of

projects including environmental impact statements for aerial ropeway projects in Colorado and California.

Person responsible for response: Mark Kane

Q.DPS:CS.1-2. Please refer to the prefiled testimony of Mark Kane found in exhibit CS-MK-2 at page 24, Q1. Does the response to Q1 on page 24 consider the views from the project site to the North, and to the East, and does the response to Q1 consider the scenic value of views to the North and to the East?

Response: Yes. As described earlier in the testimony (CS-MK-2, pages 7 to 9), four of the five public vantage points considered in the analysis were either south or west of the Project site, looking either towards the north or to the east. For example, viewpoint "C" is south and west of the project site looking eastbound.

Person responsible for response: Mark Kane

Q.DPS:CS.1-3. Please refer to the prefiled testimony of Mark Kane at exhibit CS-MK-3. Please identify all utility poles along Hewitt Drive.

Response: Currently, there are no utility poles along Hewitt Drive, with the exception of a pole located at the intersection of Hewitt Drive and Willow Road.

Person responsible for response: Brad Wilson

Q.DPS:CS.1-4. Please refer to the prefiled testimony of Mark Kane at exhibit CS-MK-3, at page CS-03. The Site Plan provided on page CS-03 indicates that along the western boundary of the Chelsea Solar Project, after tree clearing, there approximately 110 feet of existing woodland vegetation will remain. Please admit that this remaining tree cover will not sufficiently screen the project.

Response: Denied.

a. If denied, please explain.

Response: The retained vegetation along the western boundary shown on CS-MK-3 at CS-03 **is at a minimum** 110 feet in width and increases in width from south to north. My field observations of the site suggest that the natural woodland vegetation in this area includes more than trees and a robust understory of shrubs and immature trees exists that also will contribute to the screening.

Furthermore, to ascertain whether screening is sufficient it is also appropriate to consider the likely observer. In this location the observer is travelling northward on the on-ramp to Route 7 at speeds approaching 50 mph, near a merge point for other traffic heading north. Given this situation, the woodland vegetation that will remain along the western edge of the property will be sufficient to screen the project.

I would also add that the question is somewhat irrelevant as the Project's design does not rely solely on the remaining woodland vegetation for screening as described in my prefiled report and testimony. The proposed inclusion of new plantings along the western edge was suggested by myself in an abundance of caution to assure that the Petitioner's goal of absolutely minimizing offsite visibility can be achieved.

b. If admitted, please explain why the additional mitigation tree plantings which are proposed in this area would be necessary to sufficiently screen the project.

Response: N/A

Person responsible for response: Mark Kane

Q.DPS:CS.1-5. Please refer to the prefiled testimony of Mark Kane, in exhibit CS-MK-2, at page 42. Mr. Kane's testimony states "the nature of this Project, upon its decommissioning, will allow the site to be restored to an undeveloped condition." Please describe how the Applicant will restore the Project site to its natural condition, including restoration of the forest, removal of all roads, fencing and structures, the electrical connector line, and restoring the site grading to its current natural condition.

Response: Plans for Project decommissioning are discussed in the November 27, 2017 Prefiled Testimony of Brad Wilson (page 10), the December 5, 2017 First Supplemental Testimony of Brad Wilson (page 1), and Exhibit CS-BW-8. The plans call for removal of Project equipment and infrastructure and restoration of the Project area to a natural condition. The plans do not call for restoration to current-day conditions.

Person responsible for response: Brad Wilson

Q.DPS:CS.1-6. Please refer to the prefiled testimony of Mark Kane, in exhibit CS-MK-2, at page 4. Mr. Kane identifies the project site at being situated within the designated rural conservation district. Please confirm that the Town has clearly articulated standards and goals for the rural conservation district, and that the proposed project is consistent with those standards and goals.

Response: Confirmed in part and denied in part. As I have discussed on CS-MK-3 at page 30-31, and in my original 2014 report on the project as prepared under Docket #8302 (Filed as CS-BW-45 in this proceeding) the policy goal for the rural conservation district (RCON) as articulated in both the 2010 and 2015 Town Plans describes, in general terms, the need for any development to be carefully planned to protect, in part scenic resources. When discussing how development might protect scenic resources within the RCON district, the language of the Town Plan states "*Development in this area cannot be sited in prominently visible locations on hillsides or ridgelines, shall utilize earth tone colors and low-reflective materials on exterior surfaces of all structures, and must minimize clearing of natural vegetation."* (See CS-MK-3, Page 30 and CS-BW-45, Page 18-19).

Neither the language of the 2010 nor the 2015 Town Plans which describe the RCON District, clearly articulate standards intending to preserve the scenic beauty of the area. My conclusion on this point is described in my testimony at page 41 (CS-MK-3).

Person responsible for response: Mark Kane

Q.DPS:CS.1-7. Please refer to the prefiled direct testimony of Brad Wilson, dated November 27, 2017, at pages 5 and 9. Page 5 of Mr. Wilson's direct prefiled testimony, lines 2-4, states "Solar modules are connected to a number of 'string' dc-to-ac inverters, located behind the racking row3s, throughout the array." On page 12 of the same testimony, Mr. Wilson cites Exhibit CS-BW-9, which is the project's SIS. The SIS (dated 10/14/14) indicates on page 9 that four 500 kW inverters have been assumed.

a. Please confirm whether the project proposes to use string inverters, rather than four 500 kW inverters.

Response: While string inverters are the more likely choice given current economics in the solar industry, the specific inverter architecture (string versus central) would not be determined until shortly before Project construction (after a Certificate of Public Good was issued).

b. Would the use of string inverters, rather than four 500 kW inverters studied in the SIS, change any of the analyses, results, or conclusions of the SIS? Please provide a technical justification for the answer.

Response: Assuming each inverter meets the utility's requirements for operation and protection, the specific type of inverter architecture (string or central) installed on the "customer" side of the grid interconnection and on the "low" side of a solar project's medium-voltage transformer would not alter the Project's ability to safely and reliably interconnect to the utility grid in compliance with the requirements of the SIS. The specific type/brand/model of inverter is verified with utility prior to installation,

but this typically is not done until shortly before Project construction due to constant and numerous changes to availability, capabilities, and economics within the solar equipment industry.

Person responsible for response: Brad Wilson

Q.DPS:CS.1-8. Please refer to exhibit CS-BW-9, System Impact Study. Please admit that, in the event that the Apple Hill Solar Project (adjacent to the Chelsea Solar Project) is significantly delayed or withdrawn for any reason, Chelsea Solar LLC intends to accept responsibility for funding the planned equipment and system upgrades that are designated for common use by both solar facilities and are necessary for either or both projects to be commissioned, per the joint (Apple Hill Solar / Chelsea Solar) SIS?

Response: At the time of Project construction, Chelsea Solar will fund any utility equipment and utility upgrades that are required for the Project to be interconnected.

Person responsible for response: Brad Wilson

Q.DPS:CS.1-9. Please admit that Chelsea Solar commits to following the applicable portions of the National Electrical Safety Code (NESC) and the National Electrical Code (NEC)?

Response: Admitted.

Person responsible for response: Brad Wilson