



# Limited Development of Regional Impact (DRI) Scoping Application

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August 19, 2016

Proposed Project

LSDP 15, LLC Solar Development  
280 & 0 Old Falmouth Road  
Map 100, Lots 7 & 8  
Marstons Mills, Massachusetts

Applicant

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Project Engineer

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August 19, 2016

**Hand Delivery**

Jonathon Idman  
Cape Cod Commission  
P. O. Box 226  
3225 Main Street  
Barnstable, MA 02630

**Re: Limited DRI Scoping Application  
280 & 0 Old Falmouth Road  
Map 100, Lots 7 & 8  
Marstons Mills, Massachusetts**

[LEC File #: MAI15-418.01]

Dear Mr. Idman:

On behalf of the Applicant, LSDP 15, LLC, LEC Environmental Consultants, Inc. (LEC) is submitting this Scoping Application for Limited Development of Regional Impact (DRI) Review to the Cape Cod Commission (CCC) for a proposed ground-mounted solar photovoltaic installation located on the above-referenced subject parcels in Marstons Mills (Barnstable). The solar installation exceeds a DRI review threshold for an Outdoor Use with a Total Project Area greater than 40,000 square feet; Section 3(f)(iii) of the CCC’s *Enabling Regulations*. The proposed project is located within the Town of Barnstable’s Ground-Mounted Solar Photovoltaic Overlay District (GMSPOD) and the as-of-right installation requires local Site Plan Review. Proposed project details are depicted on the *LSDP 15, LLC Solar Development* plans, prepared by Meridian Associates, Inc., dated August 15, 2016.

The Applicant, LEC, and Meridian Associates, Inc. (Project Engineers), met with CCC Staff on June 3, 2016, to discuss the project in advance of formal submission. Based on follow-up conversations with CCC Regulatory Staff and completing the “Limited DRI Review – Scoping Checklist”, the Applicant is respectfully requesting scoping relief from specific issues areas in accordance with Section 5 of the *Enabling Regulations*. The following issue areas under the Regional Policy Plan (RPP) appear to be outside of the scope of review: *Land Use, Economic Development, Coastal Resources, Marine Resources, Wetlands, Transportation, Waste Management, Energy, Affordable Housing, and Heritage Preservation and Community Character*.

Pertinent RPP issue areas appear to be limited to *Water Resources, Wildlife & Plant Habitat, and Open Space and Recreation*. The project has been designed to comply with applicable RPP Minimum Performance Standards (MPS) for these issue areas.

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The Applicant and Representatives strongly believe that the project has been carefully designed to protect the pertinent interests of the RPP and that the probable benefits of the renewable energy project are far greater than any probable detriment.

Should you have any questions or require additional information, please do not hesitate to contact me at 508-746-9491 or [bmadden@lecenvironmental.com](mailto:bmadden@lecenvironmental.com).

Sincerely,

**LEC Environmental Consultants, Inc.**

A handwritten signature in black ink that reads "Brian Madden".

Brian Madden  
Wildlife Scientist

cc: LSDP 15, LLC  
Meridian Associates, Inc.

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**Limited DRI Application**

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Scoping Application**

280 & 0 Old Falmouth Road  
Assessor's Map 100, Lots 7 & 8  
Marstons Mills, Massachusetts

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## 1. Existing Conditions

The 36.34± acre project site is composed of two subject parcels, located north of Old Falmouth Road between Cotuit Road (Rte. 149) and Flint Street (Appendices A & B). The site is located northwest of a capped landfill (Marstons Mills transfer station) and a ground-mounted solar photovoltaic system. Forested uplands surround the site, while residential development occurs to the north, west, and southwest across Old Falmouth Road.

The Cape Resources Demo and Stump Dump was privately owned and operated on-site from approximately 1977 to 1997 as a construction and demolition (C&D) debris landfill. A yard waste recycling facility currently occupies the majority of the project site. Brush, stumps, logs, leaves, and grass clippings are stockpiled throughout the site for processing and ultimate reuse. Four primary stormwater management areas are currently utilized within the southern portion of Lot 8, depicted as “Temporary Basins” on Sheets 2 & 4 of the *LSDP 15, LLC Solar Development* plans, prepared by Meridian Associates, Inc., dated August 15, 2016 (Appendix R). Two maintenance buildings/garages, a bituminous concrete pad, and an administrative building are also present proximate to Old Falmouth Road. An on-site septic system services the administrative building, while a dirt parking lot abuts to the south.

Native upland vegetation dominates the western and northwestern portions of the project site. A Bordering Vegetated Wetland (BVW) associated with a remnant drainage ditch also occurs northwest of the yard waste recycling facility. The BVW boundary was approved under a Determination of Applicability issued by the Barnstable Conservation Commission on May 16, 2016 (Appendix J).

A more in depth description of on-site habitat cover types (wildlife and plant habitat) is provided within the Natural Resources Inventory (Appendix L).

### Floodplain Designation

According to the July 16, 2014, Federal Emergency Management Agency Flood Insurance Rate Map for Barnstable County (25001C0542J), the entire project site is located within Zone X, *Areas determined to be outside the 0.2% annual chance flood* (Appendix D).

### Natural Heritage and Endangered Species Program Designation

According to the 13<sup>th</sup> edition of the *Massachusetts Natural Heritage Atlas* (effective October 1, 2008), the northwesterly portion of the project site occurs within an Estimated Habitat of Rare Species (EH 31) and Priority Habitat of Rare Species (PH 1375) (Appendix B). The Natural

Heritage and Endangered Species Program (NHESP) has indicated that the Water-Willow Stem Borer (*Papaipema sulphurata*) has been found within the vicinity of the site (Appendix K). No proposed work activity occurs with Priority/Estimated Habitat or potential habitat for the Water-Willow Stem Borer. As currently proposed, the project does not require NHESP review.

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## 2. Proposed Project

The Applicant is proposing a 4.5± MW (AC) ground-mounted solar photovoltaic installation as depicted on the *LSDP 15, LLC Solar Development* plans, prepared by Meridian Associates, Inc., dated August 15, 2016 (*Site Plans*, Appendix R). The installation includes an upgraded gravel access road, perimeter fencing with gates, electrical equipment (inverters and transformers on concrete pad), new utility poles, and a stormwater management system. The project site is located within the Town of Barnstable's Ground-Mounted Solar Photovoltaic Overlay District (GMSPOD, Appendix E). Considering that the project is consistent with the Barnstable Zoning Ordinance and other applicable state and federal regulations, the as-of-right solar photovoltaic installation will be regulated and approved by the Building Commissioner through Site Plan Review.

The proposed solar footprint has been designed to overlap with the existing yard waste recycling facility and is therefore considered to be redevelopment. The overall Limit of Work totals 882,902± sf (20.27± acres). Only 66,810± sf (1.53± acres) of disturbance encroaches into the westerly abutting forested upland.

The proposed site regrading and associated stormwater management system have been designed to incorporate existing drainage patterns to effectively manage runoff. Selective grade changes are balanced on-site to avoid the importing or exporting of soil material. Existing topsoil within the westerly forest's limit of work will be stockpiled, screened, and spread over the solar footprint after the initial clearing and grading. All disturbed/regraded areas will be reseeded with the Solar Farm Seed Mix available from Ernst Conservation (or equivalent). Erosion controls (e.g., FilterMitt™) will be installed to contain work activities and protect areas beyond the Limit of Work from sedimentation/erosion.

The proposed solar panels will be situated along linear arrays extending east-west, while maintaining approximately 14± foot spacing between rows and an elevated, southerly-facing angle, approximately 2-7± feet off the finished grade. The panels will be supported by a screw or post system which minimizes impact on the existing topography. Typical details are represented

on Sheet 17. No exterior lighting is proposed. A small concrete equipment pad to contain inverters and transformers is located immediately northwest of the site entrance. An underground electric line will extend from the concrete equipment pad to new utility poles abutting the site entrance. A proposed overhead wire will connect to the existing electric line/poles along Old Falmouth Road.

The proposed solar array and stormwater infiltration basins will be encircled by a 7-foot high chain-link fence with 24-foot wide access gates. At a minimum, the southerly portion of the fence extending parallel to Old Falmouth Road will be composed of black painted/coated chain-link fencing. The proposed fence will tie into the existing stockade fence located within the southwestern corner of the project site. A 15-20 foot wide gravel access road will extend around the perimeter of the solar installation in accordance with emergency services requirements. The existing site entrance will be utilized during and post-construction and the proposed access road will largely follow existing roads.

Proposed stormwater management is described in more detail within the *Stormwater Analysis & Calculations*, prepared by Meridian Associates, Inc., dated August 15, 2016 (Appendix N). In summary, the proposed system has been designed to handle the 2, 10, and 100-year storm events and avoid increases to peak rates and volumes of stormwater runoff post-construction. An *Operation and Maintenance Program* (incorporated within Appendix N) will be implemented for the stormwater management features.

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### **3. Land Use**

The Town of Barnstable has an approved Land Use Vision Map (LUVV). While the project site is not mapped as an Economic Center or Industrial and Service Trade Area, it is located within Barnstable's Ground-Mounted Solar Photovoltaic Overlay District (GMSPOD). Furthermore, the proposed project is redevelopment with the solar footprint specifically consolidated to overlap with the existing yard waste recycling facility (active use area).

As proposed, the solar installation does not present a threat to the resources and/or characteristics intended to be protected and maintained by its land use category (Resource Protection Area). The proposed project does not occur within the 100-foot Buffer Zone to on-site protectable wetlands or a NHESP-mapped Estimated/Priority Habitat.

The project proposes to connect to existing infrastructure (electric lines/poles) along Old Falmouth Road and therefore complies with MPS LU2.1 (Connections to Existing Infrastructure).

The proposed project is not on or adjacent to agricultural lands (LU3: Rural Lands). According to the USDA NRCS Web Soil Survey (Appendix C), the westerly portion of the project site contains Merrimac sandy loam (MeA) soils that are well-suited to cultivated crops, hay, and pasture. As mentioned above, existing topsoil within the westerly forest's limit of work will be stockpiled, screened, and spread over the footprint after the initial clearing and grading. Remaining on-site soils are part of the Carver series (CcA, CcB, and CdD) and Pipestone loamy coarse sand (PeA) that are poorly suited to cultivated crops, hay, and pasture.

In summary, the proposed project does not impact the Land Use Goals of the RPP and standards thereunder. The Applicant proposes to scope out Land Use from DRI review.

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#### **4. Economic Development**

While the project site is not mapped as an Economic Center or Industrial and Service Trade Area per Barnstable's LUVVM, the solar footprint is located within Barnstable's Ground-Mounted Solar Photovoltaic Overlay District (GMSPOD) and the project constitutes redevelopment. The proposed project is not located on or near agricultural, waterfront or recreational lands; therefore, MPS ED1.4 (Resource-based Economic Areas) does not apply.

The proposed project does not involve gaming and MPS ED2.1 (Gaming) does not apply.

The project will continue to help meet Cape Cod's continuing demand for electricity by introducing additional clean, renewable energy into the market, thus meeting MPS ED4.1 (Demonstrated Need and Public Benefit). The Applicant has reached out to municipalities on the Cape and other municipal entities (e.g., public schools and hospitals) to help reduce their energy expenses through the offering of Net Metering Credits (NMC's). The model utilizes a fixed discount off the face value of the NMC's, which will automatically save the municipality or entity the amount of that discount. The project size is projected to be 4.5± MW AC, which is expected to generate 5,294,363± kWh in the first year. The NMC's generated over the life of the project will generate savings to municipalities (or municipal entities) over \$5.5 million, over a term of 25 years, assuming a 3% average annual increase in rates during this period.

In keeping with Best Development Practice ED3.1, the solar facility will employ local contractors, subcontractors, suppliers, and professional service providers during the planning, construction and operational phases of the project.

In summary, the proposed project does not impact the Economic Development Goals of the RPP and standards thereunder. The Applicant proposes to scope out Economic Development from DRI review.

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## 5. Water Resources

The project site is located within a Wellhead Protection Area (WHPA) according to the *Cape Cod Water Resources Classification Map I* (Appendix F) and a Marine Water Recharge Area (Three Bays Greater Watershed) with an approved final US EPA TMDL as identified on the *Cape Cod Water Resources Classification Map II* (Appendix G). The project site is not located within a Potential Public Water Supply Area (PPWSA).

The following reviews compliance with the applicable Water Resources Minimum Performance Standards.

### WR1. General Aquifer Protection

- MPS WR1.1 As detailed within the *Stormwater Analysis & Calculations*, prepared by Meridian Associates, Inc., dated August 15, 2016 (Appendix N), the proposed development will not exceed 5 ppm in compliance with MPS WR1.1. The proposed stormwater infiltration basins will reduce nitrogen by 35.7%.
- MPS WR1.2 No drinking water wells are proposed. According to the *Cape Cod Water Resources Classification Map I*, the closet Public Water Supply Well is located greater than 4,000 feet from the project site. The project site is not located within a PPWSA. The Cotuit-Osterville-Marstons Mills (COMM) Water District is currently reviewing whether any private drinking water wells occur within 400 feet of the project.
- MPS WR1.3 Not applicable, no water withdrawal is proposed.
- MPS WR1.4 The proposed solar footprint has been consolidated to overlap with the existing yard waste recycling facility (developed conditions). Proposed site regrading and associated stormwater management system have been designed to incorporate existing drainage patterns to effectively manage runoff.
- MPS WR1.5 Best Management Practices (BMP's) are integrated into the turf and landscape management measures as part of the operations & maintenance plans (Appendices N & O). The selected native and drought resistant seed mix (Ernst

Solar Farm Seed Mix) will quickly establish itself within dry and/or recently disturbed sites. No irrigation, pesticides, or chemical fertilizers are proposed. Furthermore, the landscaped buffer plantings along Old Falmouth Road are native to Cape Cod. Temporary drip line irrigation may be necessary to ensure successful establishment. The operations & maintenance plans utilize BMP's for future maintenance activities.

## WR2. Drinking Water Quality and Quantity

- MPS WR2.1 As detailed within the *Stormwater Analysis & Calculations* (Appendix N), the proposed development will not exceed 5 ppm in compliance with MPS WR1.1. The proposed stormwater infiltration basins will reduce nitrogen by 35.7%.
- MPS WR2.2 The proposed transformers for the solar facility will contain a non-toxic, vegetable oil- based fluid (Envirotemp FR3 fluid) as a coolant. Envirotemp FR3 fluid is formulated from seed oils (>98.5% vegetable oil) and performance enhancing additives and colorant. While the EPA and OSHA do not classify Envirotemp FR3 as a hazardous material, the CCC determined in a prior Decision that Envirotemp FR3 was found to contain 1.5% hazardous materials as defined by the RPP. The project transformers will contain approximately 2,000± gallons of Envirotemp FR3, thus totaling approximately 30 gallons of hazardous material on the project site by percent concentration. CCC Staff have previously documented that vegetable oil is listed as a hazardous material on the Massachusetts List of Oil and Hazardous Materials (12/14/07, Effective 2/14/08) if it occurs with a reportable quantity of 55 gallons. Therefore, the Envirotemp FR3 fluid within the on-site transformers constitutes no greater than an allowable household quantity of hazardous materials. The transformers will be installed on concrete pads surrounded by a secondary containment oil curb. Thus, the project will comply with MPS WR2.2.
- MPS WR2.3 No wastewater treatment facilities are proposed. The existing septic system servicing the administrative building will be abandoned in compliance with Title V Regulations.
- MPS WR2.4 The proposed project complies with other state regulations related to the site being located within a Zone II.

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### WR3. Marine Water Embayments and Estuaries

- MPS WR3.1 The proposed project will not exceed nitrogen loading standards for the Three Bays Greater Watershed. The proposed stormwater infiltration basins will reduce nitrogen by 35.7%.
- MPS WR3.2 As represented on the Nitrogen Loading calculations prepared by Meridian Associates, Inc. (incorporated within Appendix N), the project will reduce nitrogen. Specifically, the proposed stormwater infiltration basins will reduce nitrogen by 35.7%.
- MPS WR3.3 Not applicable, approved final US EPA TMDL exists.
- MPS WR3.4 Not applicable, no increase in nitrogen loading.
- MPS WR3.5 Not applicable, no increase in nitrogen loading.
- MPS WR3.6 Not applicable, no wastewater treatment facilities are proposed. The existing septic system servicing the administrative building will be abandoned in compliance with Title V Regulations.

### WR4. Freshwater Ponds and Lakes

No wastewater treatment facilities are proposed. The existing septic system servicing the administrative building will be abandoned in compliance with Title V Regulations.

### WR5. Water Quality Improvement Areas

As a former landfill, the project is mapped as a Water Quality Impaired Area per the *Cape Cod Water Resources Classification Map I*, and consequently a Water Quality Improvement Area.

As detailed within the *Stormwater Analysis & Calculations* (Appendix N), the proposed development will not exceed 5 ppm in compliance with MPS WR5.1 and WR5.4. No wastewater treatment facilities are proposed, so MPS WR5.2 and WR5.3 do not apply. MPS WR5.5 is not applicable as no new water supply connections are proposed.

### WR6. Public and Private Wastewater Treatment Facilities

No wastewater treatment facilities are proposed; therefore, the corresponding MPS' do not apply.

### WR7. Stormwater Quality

As described within the *Stormwater Analysis & Calculations* (Appendix N), the stormwater management system has been designed utilizing Best Management Practices (BMP's) and in compliance with the Massachusetts DEP Stormwater Management Regulations. No new direct

discharges of untreated stormwater to the on-site BVW will occur (MPS WR7.1). The proposed system will not increase peak rates and volumes of stormwater runoff that will flow off-site from pre to post-development conditions during the 2, 10, and 100-year design storm events. Thus, the two proposed infiltration basins will maintain and infiltrate runoff up to the 25-year storm and greater than 80% TSS removal will be achieved. The system will provide at least 44% TSS removal prior to discharge to infiltration basins. (MPS WR7.2).

The project proposes to reduce impervious surfaces by removing the two maintenance buildings/garages, bituminous concrete pad, and administrative building. The proposed access drive will be composed of pervious gravel surface (MPS WR7.6).

Low Impact Design measures (biofiltration) has been maximized to the greatest extent practicable, including vegetated swales in between the solar panel rows (MPS WR7.2). The infiltration basins will require minimal maintenance as outlined within the *Operation & Maintenance Plan* (incorporated within Appendix N). Greater than two feet of separation occurs between the infiltration basins and actual high groundwater (MPS WR7.8).

BMP's will be implemented during construction to prevent erosion, control sediment movement, and stabilize exposed soils. A Stormwater Pollution Prevention Plan (SWPPP) will be prepared prior to the start of work that reviews detailed guidance and specifications for controlling runoff during construction, including specifications for temporary and permanent stabilization measures, material stockpiling, temporary controls, erosion and sediment control inspection and maintenance procedures, spill prevention and control, and other parameters for control of runoff during construction. The SWPPP will be provided to CCC Staff prior to the start of work.

As designed, the proposed stormwater management design complies with the MPS' listed enumerated under WR7. Stormwater Quality.

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## 6. Coastal Resources

The project site is not located along the coast, thus the Coastal Resources issue area does not apply.

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## 7. Marine Resources

The project site is not located offshore, thus the Marine Resources issue area does not apply to the project.

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## 8. Wetlands

As stated above, a Bordering Vegetated Wetland (BVW) associated with a remnant drainage ditch occurs within the northwestern portion of the project site. The BVW boundary was approved under a Determination of Applicability issued by the Barnstable Conservation Commission on May 16, 2016 (Appendix J). No proposed work occurs within 100-foot Buffer Zone to BVW. No freshwater Ponds occur within 300 feet of the project site.

Consequently, the proposed project does not impact the Wetlands Goals of the RPP and standards thereunder. The Applicant proposes to scope out Wetlands from DRI review.

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## 9. Wildlife and Plant Habitat

The project has been specifically designed to avoid and minimize impacts to wildlife and plant habitat. The original layout for the project resulted in approximately 6.3± acres of disturbance to the westerly forested upland. The Applicant subsequently consolidated and concentrated the project within existing developed conditions (yard waste recycling facility). Disturbance to the westerly naturally forested upland is currently limited to only 1.53± acres of the overall 20.27± acre Limit of Work (7.5%).

The following reviews compliance with the applicable Wildlife and Plant Habitat Minimum Performance Standards:

MPS WPH1.1 The NRI is included herein (Appendix L).

MPS WPH1.2 Vegetative clearing into the westerly forested upland has been minimized to the greatest extent practicable and no substantive alterations to the natural topography are proposed. No specimen trees have been identified within the work limits. All temporary disturbed areas will be restored with native vegetation.

MPS WPH1.3 The proposed Limit of Work minimally encroaches into the westerly abutting forested upland. Post solar installation, a minimum 173.8-264.2 foot wide undisturbed buffer will be provided within the western portion of the project site to function as a potential wildlife corridor. Remaining portions of the project overlap with the existing yard waste recycling facility. As proposed, the project

does not fragment wildlife and plant habitat. Existing edge habitat will be improved over existing conditions by managing invasive species (see below).

- MPS WPH1.4 The proposed project does not extend into an Estimated Habitat of Rare Species (EH 31) or Priority Habitat of Rare Species (PH 1375) mapped by NHESP. As such, the project does not require NHESP review. NHESP has indicated that the state-listed Water-Willow Stem Borer (*Papaipema sulphurata*) has been found within the vicinity of the site. The project site does not offer potential habitat for this species. The closest potential habitat may be limited to the wetland abutting Cotuit Road (Rt 149) and/or the shoreline of Hamblin Pond.
- MPS WPH1.5 According to MassGIS data layers, no Certified or Potential Vernal Pools occur within 350 feet of the project site. However, the aforementioned wetland abutting Cotuit Road (Rt 149) may function as potential vernal pool habitat. This wetland is located greater than 900 feet from the project footprint.
- MPS WPH1.6 As documented within the NRI, scattered patches of invasive Japanese knotweed (*Fallopia japonica*) occur along the westerly treeline edge. Furthermore, invasive garlic mustard (*Alliaria petiolata*) and Asiatic bittersweet (*Celastrus orbiculata*) occur along the southwesterly treeline edge with a patch of garlic mustard extending into the forested upland. An Invasive Species Management Plan has been prepared and included within Appendix M.

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## 10. Open Space and Recreation

The project constitutes redevelopment and largely overlaps with the yard waste recycling facility. However, 1.53± acres of disturbance extends into the westerly naturally forested upland. Considering that the area is located within a Significant Natural Resource Area (SNRA), 3.06± acres of Open Space would be required for the project (2 x 1.53).

In order to comply with Open Space MPS', the Applicant is proposing the in lieu cash mitigation Open Space option. CCC Staff has previously relayed that the per acre cash equivalent for Barnstable to be \$91,604 per acre. Consequently, the Applicant is proposing to provide \$280,308.24 for Open Space Mitigation.

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## 11. Transportation

The proposed solar project will result in very little traffic generation, especially post-installation. Based on similar project experience, approximately 15 vehicle trips have been conservatively estimated for contractors during construction, in addition to typical deliveries, which represents a decrease over existing conditions for the yard waste recycling facility.

Post-installation, maintenance site inspections will be limited to one (1) vehicle approximately 4-5 times/year.

In summary, the proposed project does not impact the Transportation Goals of the RPP and standards thereunder. The Applicant proposes to scope out Transportation from DRI review.

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## 12. Waste Management

### Hazardous Materials

No hazardous materials will be permanently introduced or stored on-site as part of the solar array installation. The solar panels do not contain any hazardous materials and they will be mounted on stationary racking systems with no movable parts. The solar installation requires no lubricants, fuel or water for operation, and generates no wastewater requiring disposal.

As described above, the proposed transformers for the solar facility will contain less than an allowable household quantity of hazardous materials derived from the Envirotemp FR3 fluid. The transformers will be installed on concrete pads surrounded by a secondary containment oil curb.

During construction, hazardous materials in the form of limited quantities of fuel (gasoline or diesel), lubricating and hydraulic oil, and coolants, will be temporary introduced on the site within the construction vehicles and equipment. Refueling protocols and spill preventive measures will be further detailed within the SWPPP to be provided to CCC Staff prior to the start work.

### Solid Waste

Minimal wood debris will be generated on-site associated with initial tree clearing to the westerly abutting forested upland (1.53± acres). Larger trees will be cut and removed off-site by the tree clearer for reuse. Smaller trees, saplings, and shrubs will be chipped on-site. Following

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screening, remaining chipped woody debris will either be used on-site to stabilize slopes or properly disposed off-site at an appropriate recycling facility.

Panel components will arrive on-site within prefabricated units for assembly. Solid construction waste will come in the form of cardboard boxes, wooden pallets, shrink/saran wrap, styrofoam and scrap insulated copper wires. All construction solid waste, particularly shipping and package materials, will be placed in separate containers for off-site recycling or proper disposal.

Post-solar installation, the project will not generate further waste.

In summary, the proposed project will not generate or store a significant quantity of hazardous waste and/or create significant amounts of solid waste during the construction. The proposed project consequently does not impact Waste Management Goals of the RPP and standards thereunder. The Applicant proposes to scope out Waste Management from DRI review.

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### **13. Energy**

Energy MPS E1.1-1.6 are only applicable to building development and MPS E1.7-1.11 apply to wind energy conversion facilities.

In summary, the proposed project does not impact the Energy Goals of the RPP and standards thereunder. The Applicant proposes to scope out Energy from DRI review.

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### **14. Affordable Housing**

No housing is proposed under this project. Future operation and maintenance of the solar facility will require fewer than the equivalent of one full-time on-site or contracted employee.

Consequently, the project falls under the ‘Other’ category for the purpose of the Affordable Housing mitigation required under MPS AH 3.1. In addition, the Project involves facilities in which a calculation of building square footage is not feasible or appropriate.

In summary, the proposed project does not impact the Affordable Housing Goals of the RPP and standards thereunder. The Applicant proposes to scope out Affordable Housing from DRI review.

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## 15. Heritage Preservation and Community Character

### HPCC1 Historic, Cultural, and Archaeological Resources

Following submission of a Project Notification Form, the Massachusetts Historical Commission (MHC) verbally confirmed to both Meridian Associates, Inc. and LEC that no inventoried or State Register-listed historic properties occur in the area of potential impact (Project # RC.60406). MHC no longer provides said confirmation in writing for projects not involving state or federal funding. MHC Staff are available for confirmation.

### HPCC2 Community Character/ Site and Building Design

The *Site Plans* depicts the general massing details of the solar array. No exterior lighting is proposed. A 7-foot high chain link fence will encircle the solar array and stormwater infiltration basins. The southerly portion of the fence extending parallel to Old Falmouth Road will be composed of black painted/coated chain-link fencing to minimize visual impacts.

Under existing conditions, portions of the site's frontage along Old Falmouth Road lack a fully vegetated buffer. Existing black locust (*Robinia pseudoacacia*), oak, pine, and black cherry trees occur between the edge of pavement and a wooden stockade fence extending along the property line. Multiflora rose (*Rosa multiflora*), Asiatic bittersweet, and arbor vitae are also intermittent. Representative photographs are included within Appendix H. Existing native vegetation abutting Old Falmouth Road and within the project site will be retained to the greatest extent practicable and supplemented with Cape Cod native eastern red cedars (*Juniperus virginiana*) and eastern white pine saplings and inkberry (*Ilex glabra*) and rosebay rhododendron (*Rhododendron maximum*) shrubs. The plantings will be installed in clusters of three as opposed to a typical hedge configuration. Areas abutting the site entrance will also be enhanced by said plantings, including a minimum of nine (9) eastern red cedar saplings. Fourteen (14) eastern white pine saplings are proposed immediately west of the infiltration basin. Arbor vitae may also complement the plantings. All plantings will be properly maintained to ensure successful establishment.

For naturally vegetated portions of the site along Old Falmouth Road, an undisturbed 50-100 foot buffer is provided from the lot line. This includes the southwesterly end of the array. Under existing conditions, the 50-100 foot buffer is composed of a well-stratified eastern white pine and oak saplings and mature tree species to provide visual screening.

The proposed project has been designed to comply with HPCC1: Historic, Cultural, and Archaeological Resources and HPCC2: Community Character/ Site and Building Design standards. As such, the proposed project does not impact the Heritage Preservation and Community Character Goals of the RPP and standards thereunder. The Applicant proposes to scope out Heritage Preservation and Community Character from DRI review.

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## **16. Environmental Benefits**

The proposed solar facility provides clean, renewable energy as an alternative to burning fossil fuels and the use of nuclear energy. The benefits of avoiding these sources of electricity include, avoiding mining, drilling, processing, transportation, and storage for these sources of energy and secondly, eliminating emissions which cause air pollution and global climate change.

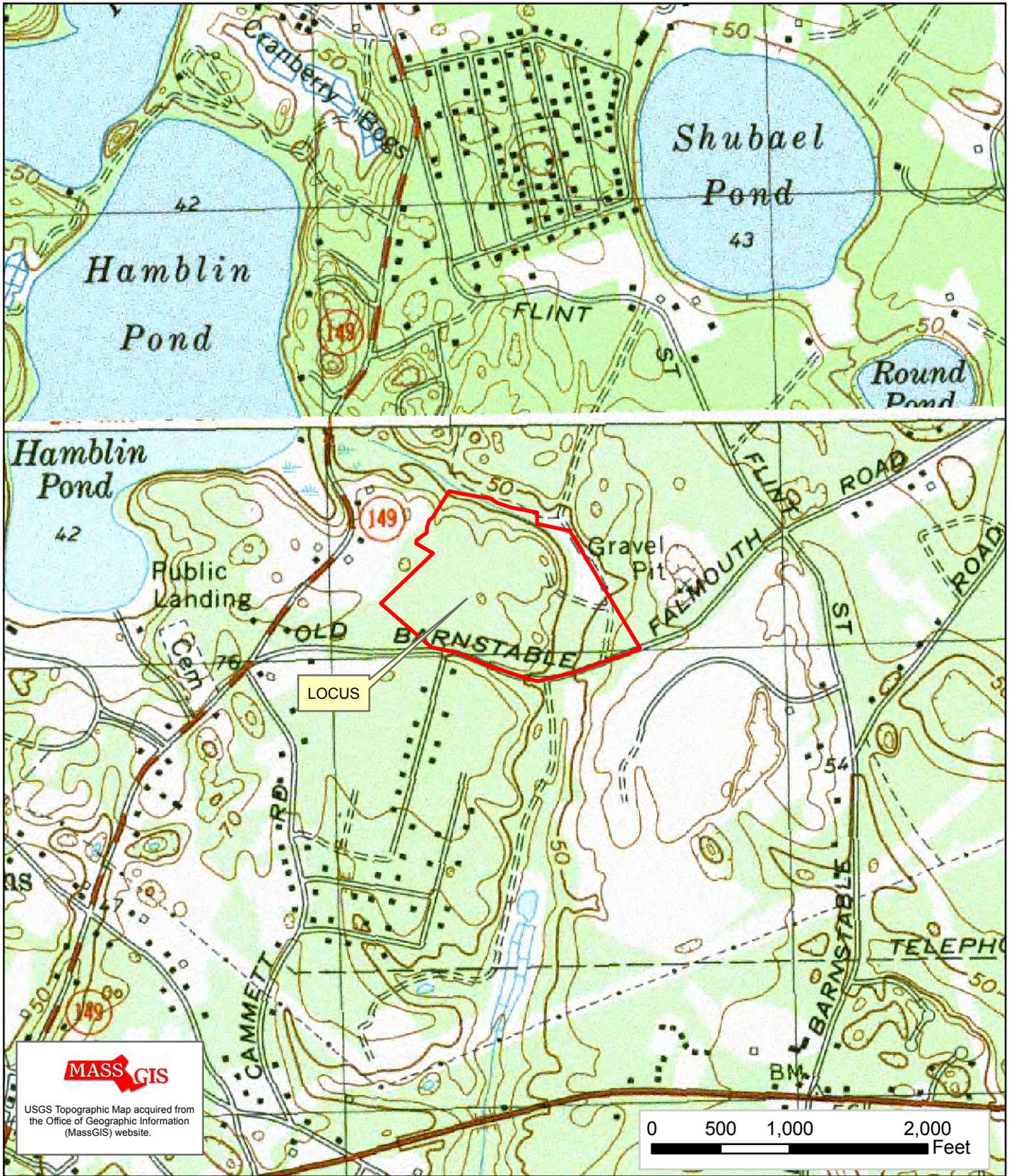
The estimated production of this project is 5,294,363± kilowatt hours per year. This project will provide enough electricity for more than 549 houses per year in the first year. Generating this amount of electricity using solar power will avoid 4,101 tons of Carbon Dioxide. This is equivalent to the emissions generated by burning 3,970,395 lbs of coal or 786 cars on the road for one year. The amount of carbon sequestered by the number of tree seedlings grown for 10 years would be 96,428 trees.

For all the reasons identified in this Application, the probable benefits of the renewable energy project are far greater than any probable detriment.

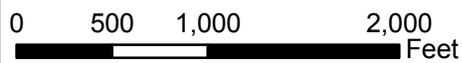
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**Appendix A**

USGS Topographic Map



**MASS GIS**  
 USGS Topographic Map acquired from  
 the Office of Geographic Information  
 (MassGIS) website.



**LEC**  
 LEC Environmental Consultants, Inc.  
 Plymouth, MA  
 508.746.9491  
 www.lecenvironmental.com

**USGS Topographic Map**  
 280 Old Falmouth Road  
 Map 010, Lots 007 & 008  
 Marstons Mills, Massachusetts

N  
  
 August 17, 2016

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**Appendix B**

Aerial Orthophoto



 Estimated Habitat of Rare Wildlife (2008)  
 Priority Habitat of Rare Species (2008)

LOCUS

OLD FALMOUTH ROAD

BOURGEOIS LANE

  
 2014 Aerial Orthophoto acquired from  
 the Office of Geographic Information  
 (MassGIS) website.

0 150 300 600  
 Feet

  
 LEC Environmental Consultants, Inc.  
 Plymouth, MA  
 508.746.9491  
 www.lecenvironmental.com

**Aerial Orthophoto**  
 280 Old Falmouth Road  
 Map 100, Lots 007 & 008  
 Marstons Mills, Massachusetts

N  
  
 August 17, 2016

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**Appendix C**

Soils Map



Map Unit Symbol	Map Unit Name
38A	Pipestone loamy coarse sand, 0 to 3 percent slopes
252D	Carver coarse sand, 15 to 35 percent slopes
254A	Merrimac fine sandy loam, 0 to 3 percent slopes
254B	Merrimac fine sandy loam, 3 to 8 percent slopes
259A	Carver loamy coarse sand, 0 to 3 percent slopes
259B	Carver loamy coarse sand, 3 to 8 percent slopes



LEC Environmental Consultants, Inc.  
 Plymouth, MA  
 508.746.9491  
 www.lecenvironmental.com

### Soils Map

280 Old Falmouth Road  
 Map 100, Lots 007 & 008  
 Marstons Mills, Massachusetts



August 17, 2016

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**Appendix D**

Flood Zone Map



LEC Environmental Consultants, Inc.

Plymouth, MA  
508.746.9491  
www.lecenvironmental.com

### FEMA Flood Insurance Rate Map

**#25001C0542J**

280 Old Falmouth Road  
Map 010, Lots 007 & 008  
Marstons Mills, Massachusetts



Effective Date:  
July 16, 2014

---

**Appendix E**

Zoning Map

# ZONING MAP

## of the TOWN OF BARNSTABLE MASSACHUSETTS

### INDEX MAP

SEPTEMBER 1, 1998  
 APPROVED SEPTEMBER 17, 1998  
 AMENDED NOVEMBER 12, 1998  
 AMENDED JULY 15, 1999  
 AMENDED OCTOBER 26, 2000  
 AMENDED FEBRUARY 1, 2001  
 AMENDED JUNE 28, 2001  
 AMENDED JULY 19, 2001  
 AMENDED AUGUST 16, 2001  
 AMENDED NOVEMBER 15, 2001  
 AMENDED SEPTEMBER 19, 2002  
 AMENDED APRIL 15, 2004  
 AMENDED SEPT. 2, 2004  
 AMENDED NOV. 18, 2004  
 AMENDED JULY 14, 2005  
 AMENDED JUNE 1, 2006  
 AMENDED MAY 3, 2007  
 AMENDED FEBRUARY 28, 2008  
 AMENDED APRIL 3, 2008  
 AMENDED JULY 16, 2009  
 AMENDED MARCH 4, 2010  
 AMENDED JUNE 17, 2010  
 AMENDED OCTOBER 7, 2010  
 AMENDED JANUARY 19, 2011  
 AMENDED SEPTEMBER 8, 2011  
 AMENDED FEBRUARY 16, 2012  
 AMENDED FEBRUARY 6, 2014  
 AMENDED MARCH 19, 2015  
 AMENDED MAY 7, 2015



TOWN OF SANDWICH

TOWN OF MASHPEE

TOWN OF YARMOUTH

Cape Cod Bay

Barnstable Harbor

Nantucket Sound

Lewis Bay

### Map Legend

	Zoning District		Centerville River North Bank Neighborhood Overlay
	Wellhead Protection Overlay District		Existing Public Well Site
	Groundwater Protection Overlay District		Proven Future Public Well Site
	Aquifer Protection Overlay District		Proposed Future Public Well Site
	Adult Use Overlay District		Paved Road
	Dock and Pier Overlay District		Unimproved Road
	Former Grade 5 School Planned Unit Development Overlay District		Railroad Track
	Medical Services Overlay District		Town Boundary Line
	Resource Protection Overlay District		Marsh Area
	Shopping Center Redevelopment Overlay District		Stream / Edge of Water
	Drive Through Restaurant Sub Zone of the Shopping Center Redevelopment Overlay Dist.		Cranberry Bog
	Senior Continuing Care Retirement Community - SCCRCOD 2008-1		
	Recreational Shellfish Area and Shellfish Relay Area Dock & Pier Overlay District		
	Ground Mounted Solar Photovoltaic Overlay District		
	Medical Marijuana Overlay District		
	Craigville Village Neighborhood Overlay		
	Long / Short Beach Neighborhood Overlay		
	Craigville Beach Neighborhood Overlay		

SEE TEXT OF ZONING ORDINANCE FOR COMPLETE INFORMATION ON BULK REGULATIONS.  
 Where a zoning district boundary is located at the edge of a water body, that zone that applies to the land shall apply to structures and uses such as piers and commercial boating operations to the extent of the territorial jurisdiction of the town.  
 Where zoning district boundaries are located along the edge of a roadway and a distance is shown from such point to another zoning boundary, such distance and points shall be from the edge of the road layout. The ultimate location of such point shall be determined by survey as the line shown on this map is considered an approximation.

### Sheet Index Grid



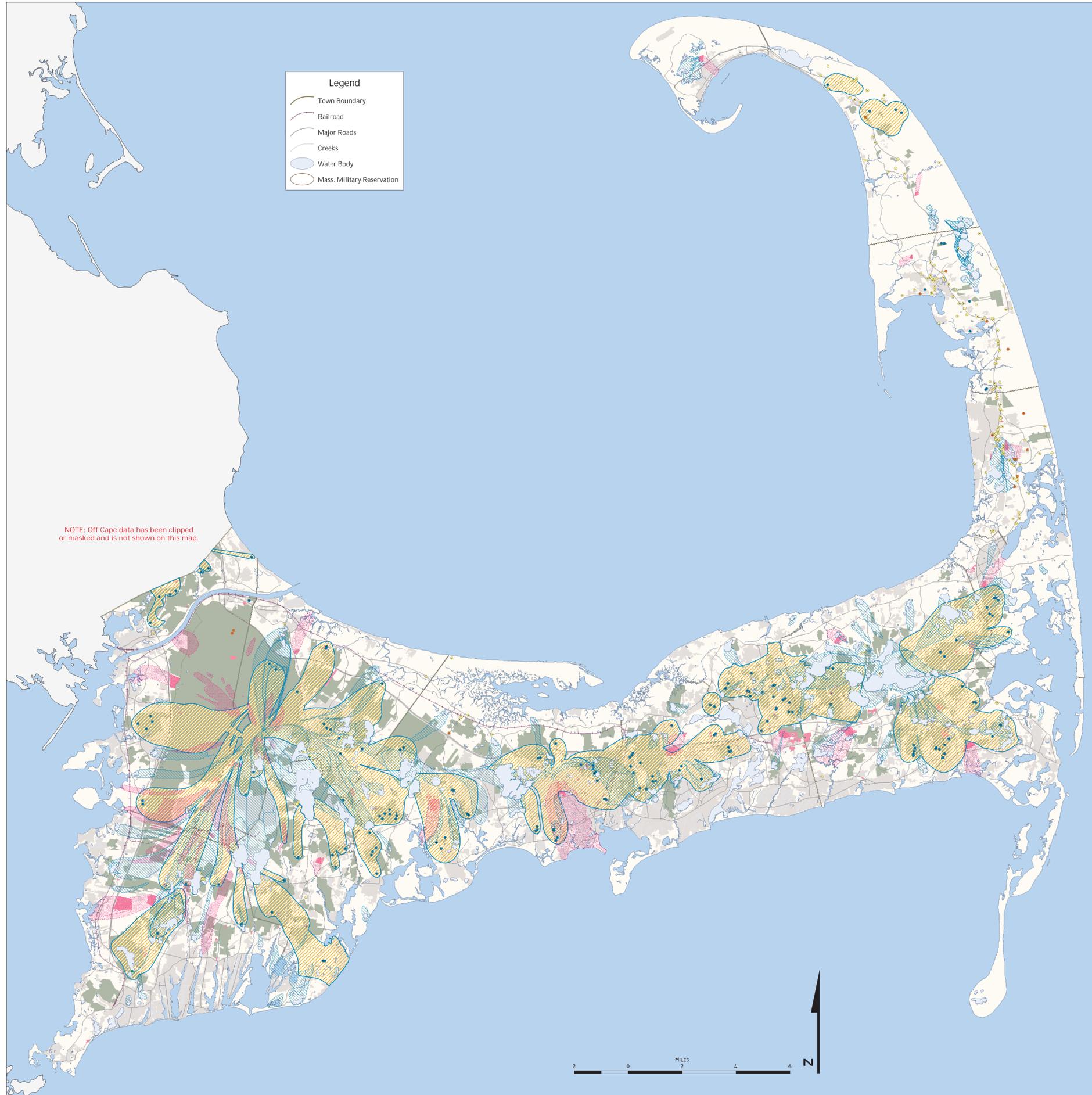
SCALE 1"=1800'  
 feet 3000 2000 1000 0 1/4 1/2 1 mile  
 1" = 0.34 miles 1:21,600

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**Appendix F**

Cape Cod Water Resources Classification Map I

# Cape Cod Water Resources Classification Map I



Regional Policy Plan (Effective January 16, 2009)  
 Amended -- Effective July 3, 2009  
 Amended -- Effective June 18, 2010

**Primary Resource Areas:**

Wellhead Protection Areas

Identified Wellhead Protection Areas: (Zones of Contribution).  
 Department of Environmental Protection and EOE MassGIS 2010,  
 Cape Cod Commission Water Resources Staff, and various private consulting firms.

**Public Supply Wells**

- Public Water Supply Well
- Small Volume Wells, Non-Transient
- Small Volume Wells, Transient
- Proposed Public Water Supply Well
- Surface Water Supply

Locations of public community surface and groundwater supply sources and public non-community supply sources. Department of Environmental Protection and EOE MassGIS 2010, and Cape Cod Commission Water Resources Staff.

Potential Water Supply Areas

Potential Public Water Supply Tracts: From the "Priority Land Acquisition Assessment Project" (PLAAP), June 1999, updated 2008. Lower Cape data from the Lower Cape Water Quality Task Force, 2001.

Freshwater Recharge Areas

Freshwater Recharge Area: Areas shown are those identified TO DATE by the USGS (see reports 2004-5014 and 2004-5181), the Massachusetts Estuaries Project, and the Cape Cod Commission Water Resources Staff, 2008.

**Water Quality Impaired Areas:**

Developed Areas

Development such as medium and high density residential, multi family residential, unsewered residential lots less than 20,000 square feet, commercial and industrial areas determined from digital parcel and assessors' data and MacConnell landuse: 1999. Created by UMass-Amherst Resource Mapping Project in cooperation with the EOE MassGIS project and the Cape Cod Commission.

Potential Plumes from Waste Sites

Potential Plumes from Waste Site Areas: Created from private consulting firms, the Air Force Center for Engineering and the Environment and the Cape Cod Commission Water Resources Staff.

Waste Site Areas

Areas that include landfills, septage, and wastewater treatment plant discharge sites determined from digital parcel and assessors' data and digital MacConnell land use: 1999. Created by the UMass-Amherst Resource Mapping Project in cooperation with the EOE MassGIS project and the Cape Cod Commission.

**Water Quality Improvement Areas:**

Water Quality Impaired Areas that are located in Primary Resource Areas.

This Map was produced by the Cape Cod Commission's Geographic Information System Department for the Regional Policy Plan update, effective January 16, 2009, with any amendments listed below:  
 Data amendments effective July 3, 2009 including DEP Zone IIs, DEP Public Supply Wells, and the Cape Cod Commission PLAAP.  
 Data amendments effective June 18, 2010 including Wellhead Protection Areas and DEP Public Supply Wells.

The Cape Cod Commission is a division of Barnstable County. Corrections are welcome at the Cape Cod Commission office or contact [gis@capecodcommission.org](mailto:gis@capecodcommission.org).

This map is illustrative and all depicted boundaries are approximate. It is intended for planning purposes only - - not site specific purposes.



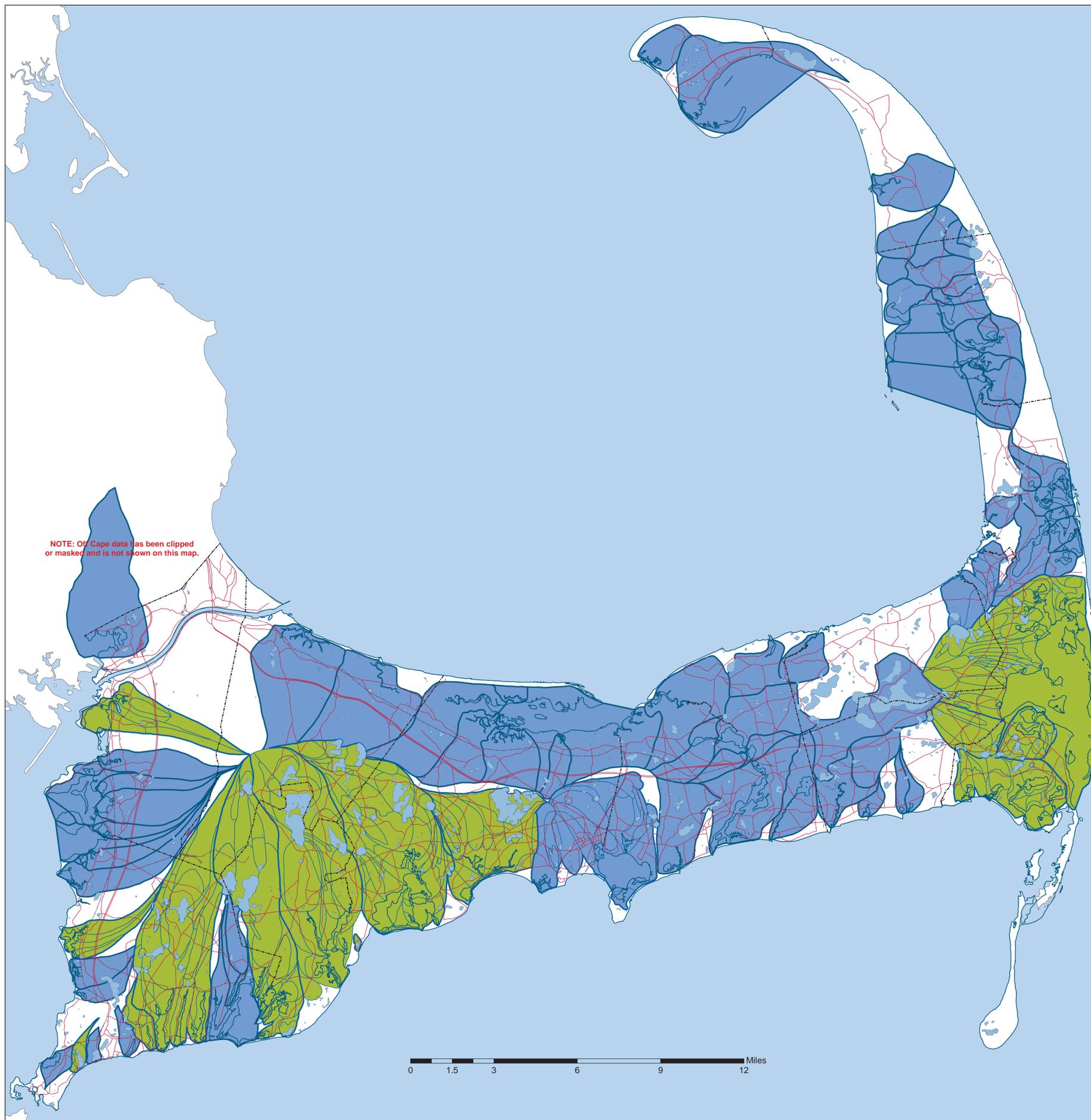
CAPE COD  
 COMMISSION

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**Appendix G**

Cape Cod Water Resources Classification Map II

# Cape Cod Water Resources Classification Map II



**Regional Policy Plan (Effective January 16, 2009)  
Amended -- Effective July 3, 2009  
Cape Cod Water Resources  
Classification Map II**

**Marine Water Recharge Areas**

- Preliminary Estuaries to be refined under Mass. Estuaries Project
- Final US EPA TMDL approved

**Explanation and Data Sources:**

Marine Water Recharge Areas: Watersheds and sub watershed delineations were obtained from Massachusetts Estuary Project (MEP) Technical reports, "Chapter 3, Delineation of Watersheds" for each separate watershed. <http://www.oceanscience.net/estuaries>

MEP Watersheds were based upon Groundwater Modeling by the USGS Scientific Investigation Reports 2004-5014 and 2004-5181.

Preliminary Marine Water Recharge Areas: Delineated by Cape Cod Commission Water Resources Staff, 1998 for the Cape Cod Coastal Embayment Project. (Technical Memorandum: Nitrogen Sensitivity and Prioritization of Cape Cod Embayments, August 1996.)

Final State Nutrient TMDLs: <http://www.mass.gov/dep/water/resources/tmdls.htm#cape>

Final EPA TMDLs: <http://www.epa.gov/region1/eco/tmdl/approved.html#ma/>

Non - digital data was automated by the Cape Cod Commission GIS staff using the ARC/INFO GIS software.

This Map was produced by the Cape Cod Commission's Geographic Information System Department for the Regional Policy Plan update, effective January 16, 2009, with any amendments listed below:

The Cape Cod Commission is a division of Barnstable County. Corrections are welcome at the Cape Cod Commission office or contact [gis@capecodcommission.org](mailto:gis@capecodcommission.org).

This map is illustrative and all depicted boundaries are approximate. It is intended for planning purposes only - - not site specific purposes.



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**Appendix H**

Photographs



Photograph 1: Easterly view across project footprint/existing yard waste recycling facility, capped landfill w/ ground-mounted solar photovoltaic system in background (6/13/16).



Photograph 2: Northeasterly view across project footprint/existing yard waste recycling facility (6/13/16).



Photograph 3: Westerly view of abutting forested upland; 1.57± acres of proposed disturbance (6/13/16).



Photograph 4: Northeasterly view of site frontage along Old Falmouth Road across from Starlight Dr, proposed 50-100 foot undisturbed naturally vegetated buffer (6/17/16).



Photograph 5: Northwesterly view of site frontage across from #179 Old Falmouth Road, proposed 50-foot (min) undisturbed naturally vegetated buffer (6/17/16).



Photograph 6: Easterly view of site frontage across from #179 Old Falmouth Road, proposed 50-foot (min) undisturbed naturally vegetated buffer (6/17/16).



Photograph 7: Easterly view of southerly site frontage; existing buffer vegetation to be enhanced and supplemented (6/17/16).



Photograph 8: Westerly view of existing/proposed site entrance; buffer vegetation to be enhanced and supplemented (6/17/16).



Photograph 9: Northwestern view of site frontage, southeastern portion; east of entrance (6/17/16).

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**Appendix I**

Permit List

Municipal

- 1) Site Plan Review—an as-of-right use within Ground Mounted Solar Photovoltaic Overlay District (filed 8/18/16)
- 2) Building Permit – Building Department (to be filed)

State

- 3) Massachusetts Department of Environmental Protection; Bureau of Waste Prevention – Solid Waste Management; BWP SW 37 Post-Closure Use – Minor (Filed)

Federal

- 4) NPDES Construction General Permit (to be filed)

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**Appendix J**

Determination of Applicability





## WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40  
and § 237-1 to § 237-14 Town of Barnstable Code

DA- 16032



### B. Determination (cont.)

The following Determination(s) is/are applicable to the proposed site and/or project relative to the Wetlands Protection Act and regulations:

Positive Determination

Note: No work within the jurisdiction of the Wetlands Protection Act may proceed until a final Order of Conditions (issued following submittal of a Notice of Intent or Abbreviated Notice of Intent) or Order of Resource Area Delineation (issued following submittal of Simplified Review ANRAD) has been received from the issuing authority (i.e., Conservation Commission or the Department of Environmental Protection).

- 1. The area described on the referenced plan(s) is an area subject to protection under the Act. Removing, filling, dredging, or altering of the area requires the filing of a Notice of Intent.
- 2a. The boundary delineations of the following resource areas described on the referenced plan(s) are confirmed as accurate. Therefore, the resource area boundaries confirmed in this Determination are binding as to all decisions rendered pursuant to the Wetlands Protection Act and its regulations regarding such boundaries for as long as this Determination is valid.

April 27, 2016 Site Plan (2 sheets) stamped, by Kevin Danahy, P.L.S.

- 2b. The boundaries of resource areas listed below are not confirmed by this Determination, regardless of whether such boundaries are contained on the plans attached to this Determination or to the Request for Determination.

- 3. The work described on referenced plan(s) and document(s) is within an area subject to protection under the Act and will remove, fill, dredge, or alter that area. Therefore, said work requires the filing of a Notice of Intent.
- 4. The work described on referenced plan(s) and document(s) is within the Buffer Zone and will alter an Area subject to protection under the Act. Therefore, said work requires the filing of a Notice of Intent or ANRAD Simplified Review (if work is limited to the Buffer Zone).
- 5. The area and/or work described on referenced plan(s) and document(s) is subject to review and approval by:

Barnstable  
Name of Municipality

Pursuant to the following municipal wetland ordinance or bylaw:

§ 237-1 to § 237-14 Town of Barnstable Code  
Name

Chapter 237  
Ordinance or Bylaw Citation



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands  
**WPA Form 2 – Determination of Applicability**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40  
and § 237-1 to § 237-14 Town of Barnstable Code

DA- 16032



**B. Determination (cont.)**

6. The following area and/or work, if any, is subject to a municipal ordinance or bylaw but not subject to the Massachusetts Wetlands Protection Act:

7. If a Notice of Intent is filed for the work in the Riverfront Area described on referenced plan(s) and document(s), which includes all or part of the work described in the Request, the applicant must consider the following alternatives. (Refer to the wetland regulations at 10.58(4)c. for more information about the scope of alternatives requirements):

- Alternatives limited to the lot on which the project is located.
- Alternatives limited to the lot on which the project is located, the subdivided lots, and any adjacent lots formerly or presently owned by the same owner.
- Alternatives limited to the original parcel on which the project is located, the subdivided parcels, any adjacent parcels, and any other land which can reasonably be obtained within the municipality.
- Alternatives extend to any sites which can reasonably be obtained within the appropriate region of the state.

**Negative Determination**

Note: No further action under the Wetlands Protection Act is required by the applicant. However, if the Department is requested to issue a Superseding Determination of Applicability, work may not proceed on this project unless the Department fails to act on such request within 35 days of the date the request is post-marked for certified mail or hand delivered to the Department. Work may then proceed at the owner's risk only upon notice to the Department and to the Conservation Commission. Requirements for requests for Superseding Determinations are listed at the end of this document.

1. The area described in the Request is not an area subject to protection under the Act or the Buffer Zone.
2. The work described in the Request is within an area subject to protection under the Act, but will not remove, fill, dredge, or alter that area. Therefore, said work does not require the filing of a Notice of Intent.
3. The work described in the Request is within the Buffer Zone, as defined in the regulations, but will not alter an Area subject to protection under the Act. Therefore, said work does not require the filing of a Notice of Intent, subject to the following conditions (if any).

4. The work described in the Request is not within an Area subject to protection under the Act (including the Buffer Zone). Therefore, said work does not require the filing of a Notice of Intent, unless and until said work alters an Area subject to protection under the Act.



# WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40  
and § 237-1 to § 237-14 Town of Barnstable Code

DA- 16032

## B. Determination (cont.)

- 5. The area described in the Request is subject to protection under the Act. Since the work described therein meets the requirements for the following exemption, as specified in the Act and the regulations, no Notice of Intent is required:

Exempt Activity (site applicable statutory/regulatory provisions)

- 6. The area and/or work described in the Request is not subject to review and approval by:

Barnstable

Name of Municipality

Pursuant to a municipal wetlands ordinance or bylaw.

§ 237-1 to § 237-14 Town of Barnstable Code

Name

Chapter 237

Ordinance or Bylaw Citation

## C. Authorization

This Determination is issued to the applicant and delivered as follows:

by hand delivery on

by certified mail, return receipt requested on

**MAY 16 2016**

Date

Date

This Determination is valid for **three years** from the date of issuance (except Determinations for Vegetation Management Plans which are valid for the duration of the Plan). This Determination does not relieve the applicant from complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.

This Determination must be signed by a majority of the Barnstable Conservation Commission. A copy must be sent to the appropriate DEP Regional Office (see <http://www.mass.gov/dep/about/region.findyour.htm>) and the property owner (if different from the applicant).

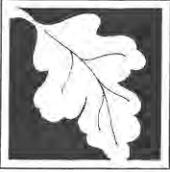
Signatures:

*John P. ...*  
*Devin ...*  
*[Signature]*  
*[Signature]*

*[Signature]*  
*Louise K. Foster*

*May 10, 2016*

Date



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

## WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40  
and § 237-1 to § 237-14 Town of Barnstable Code

DA- 16032



### D. Appeals

The applicant, owner, any person aggrieved by this Determination, any owner of land abutting the land upon which the proposed work is to be done, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate Department of Environmental Protection Regional Office (see <http://www.mass.gov/dep/about/region.findyour.htm>) to issue a Superseding Determination of Applicability. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and Fee Transmittal Form (see Request for Departmental Action Fee Transmittal Form) as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Determination. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant if he/she is not the appellant. The request shall state clearly and concisely the objections to the Determination which is being appealed. To the extent that the Determination is based on a municipal ordinance or bylaw and not on the Massachusetts Wetlands Protection Act or regulations, the Department of Environmental Protection has no appellate jurisdiction.

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**Appendix K**

NHESP Letter



Commonwealth of Massachusetts

# Division of Fisheries & Wildlife

Jack Buckley, *Director*

June 15, 2016

Brian Madden  
LEC Environmental Consultants, Inc  
12 Resnik Road  
Suite 1  
Plymouth MA 02360

RE: Project Location: 280 & 0 Old Falmouth Road  
Town: BARNSTABLE  
NHESP Tracking No.: 16-35638

To Whom It May Concern:

Thank you for contacting the Natural Heritage and Endangered Species Program of the MA Division of Fisheries & Wildlife (the "Division") for information regarding state-listed rare species in the vicinity of the above referenced site. Based on the information provided, this project site, or a portion thereof, is located **within** *Priority Habitat 1375* (PH 1375) and *Estimated Habitat 31* (EH 31) as indicated in the *Massachusetts Natural Heritage Atlas* (13<sup>th</sup> Edition). Our database indicates that the following state-listed rare species have been found in the vicinity of the site:

<u>Scientific name</u>	<u>Common Name</u>	<u>Taxonomic Group</u>	<u>State Status</u>
<i>Papaipema sulphurata</i>	Water-Willow Borer Moth	Butterflies and Moths	Threatened

The species listed above is protected under the Massachusetts Endangered Species Act (MESA) (M.G.L. c. 131A) and its implementing regulations (321 CMR 10.00). State-listed wildlife are also protected under the state's Wetlands Protection Act (WPA) (M.G.L. c. 131, s. 40) and its implementing regulations (310 CMR 10.00). Fact sheets for most state-listed rare species can be found on our website ([www.mass.gov/nhesp](http://www.mass.gov/nhesp)).

Please note that projects and activities located within Priority and/or Estimated Habitat **must be reviewed by the Division** for compliance with the state-listed rare species protection provisions of MESA (321 CMR 10.00) and/or the WPA (310 CMR 10.00).

### Wetlands Protection Act (WPA)

If the project site is within Estimated Habitat and a Notice of Intent (NOI) is required, then a copy of the NOI must be submitted to the Division so that it is received at the same time as the local conservation commission. If the Division determines that the proposed project will adversely affect the actual Resource Area habitat of state-protected wildlife, then the proposed project may not be permitted (310 CMR 10.37, 10.58(4)(b) & 10.59). In such a case, the project proponent may request a consultation with the Division to discuss potential project design modifications that would avoid adverse effects to rare wildlife habitat.

[www.mass.gov/nhesp](http://www.mass.gov/nhesp)

Division of Fisheries and Wildlife

Field Headquarters, One Rabbit Hill Road, Westborough, MA 01581 (508) 389-6300 Fax (508) 389-7890

An Agency of the Department of Fish and Game

A streamlined joint MESA/WPA review process is available. When filing a Notice of Intent (NOI), the applicant may file concurrently under the MESA on the same NOI form and qualify for a 30-day streamlined joint review. For a copy of the NOI form, please visit the MA Department of Environmental Protection's website: <http://www.mass.gov/dep/water/approvals/wpaform3.doc>.

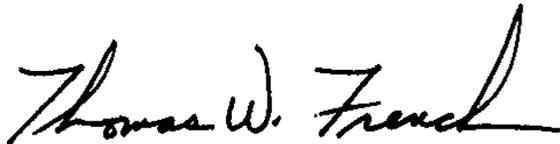
**MA Endangered Species Act (MESA)**

If the proposed project is located within Priority Habitat and is not exempt from review (see 321 CMR 10.14), then project plans, a fee, and other required materials must be sent to Natural Heritage Regulatory Review to determine whether a probable "take" under the MA Endangered Species Act would occur (321 CMR 10.18). Please note that all proposed and anticipated development must be disclosed, as MESA does not allow project segmentation (321 CMR 10.16). For a MESA filing checklist and additional information please see our website: [www.mass.gov/nhesp](http://www.mass.gov/nhesp) ("Regulatory Review" tab).

We recommend that rare species habitat concerns be addressed during the project design phase prior to submission of a formal MESA filing, as avoidance and minimization of impacts to rare species and their habitats is likely to expedite endangered species regulatory review.

This evaluation is based on the most recent information available in the Natural Heritage database, which is constantly being expanded and updated through ongoing research and inventory. If the purpose of your inquiry is to generate a species list to fulfill the federal Endangered Species Act (16 U.S.C. 1531 et seq.) information requirements for a permit, proposal, or authorization of any kind from a federal agency, we recommend that you contact the National Marine Fisheries Service at (978)281-9328 and use the U.S. Fish and Wildlife Service's Information for Planning and Conservation website (<https://ecos.fws.gov/ipac>). If you have any questions regarding this letter please contact Emily Holt, Endangered Species Review Assistant, at (508) 389-6385.

Sincerely,

A handwritten signature in black ink that reads "Thomas W. French". The signature is written in a cursive, flowing style.

Thomas W. French, Ph.D.  
Assistant Director

---

**Appendix L**

Natural Resources Inventory



August 19, 2016

Heather McElroy  
Cape Cod Commission  
P. O. Box 226  
3225 Main Street  
Barnstable, MA 02630

**Re: Natural Resources Inventory  
280 & 0 Old Falmouth Road  
Map 100, Parcels 7 & 8  
Marstons Mills, Massachusetts**

[LEC File #: MAI\15-418.01]

Dear Mrs. McElroy:

LEC Environmental Consultants, Inc., (LEC) has prepared this Natural Resources Inventory (NRI) Report for the proposed solar development located on the above-referenced project site in Marstons Mills. The proposed project consists of a ground-mounted solar photovoltaic installation on the 36.34± acre project site as depicted on the *LSDP 15, LLC Solar Development* plans, prepared by Meridian Associates, Inc., dated August 15, 2016. The proposed solar field has been specifically consolidated to overlap within an existing yard waste recycling facility to avoid and minimize impacts to natural plant and wildlife habitat. Only a small amount of work activity extends into the westerly abutting forested upland habitat (1.53± acres). The proposed project avoids impacts to the 100-foot Buffer Zone to Bordering Vegetated Wetlands (BVW) and does not extend into mapped state-listed rare species habitat (Priority/Estimated Habitat).

This NRI Report has been prepared in accordance with the *Development of Regional Impact Guidelines for Natural Resources Inventory (Plant and Wildlife Habitat Assessment), Technical Bulletin 92-002*, issued by the Cape Cod Commission (revised 4/24/03), specifically documenting existing habitat cover types and wildlife habitat within and proximate to the proposed limits of forested upland clearing associated with the project. In evaluating existing wildlife habitat, LEC identified the existing dominant vegetative communities, topography, hydrology, and soil characteristics to ascertain potential species utilization, thus complementing direct wildlife observations. The following also provides a development impact analysis and reviews proposed mitigating measures designed to protect and enhance wildlife and plant habitat.

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## Methodology

On February 4, 2016, LEC conducted a preliminary site evaluation to document existing site conditions. NRI site evaluations were conducted on June 13, 2016 between 5:00pm-8:00pm and June 17, 2016 between 5:15am-9:45am to maximize wildlife habitat observations and target times when certain species are typically more active (e.g., within one hour of sunset and sunrise). The NRI site evaluations were conducted under mostly sunny skies with temperatures approximately 65-75°F.

NRI site evaluations were completed utilizing the guidelines set forth in the *Development of Regional Impact Guidelines for Natural Resources Inventory (Plant and Wildlife Habitat Assessment)*, Technical Bulletin 92-002, issued by the Cape Cod Commission (revised 4/24/03) and principles of the *Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands* (March 2006). Please note that the *Massachusetts Wildlife Habitat Protection Guidance* document published by the MA Department of Environmental Protection is primarily intended to evaluate proposed Wetland Resource Area impacts associated with a project. However, parallels can be drawn to identify important wildlife habitat functions such as food, shelter, migratory and overwintering or breeding areas for the site as a whole. LEC personnel proficient in ecology, botany, soil science, and wildlife biology traversed the properties during each site evaluation.

Pertinent reference materials were also reviewed in conjunction with the site evaluations, including, but not limited to, USGS Topographic Maps, FEMA Floodplain Maps, Soil Survey Maps for Barnstable County, USDA Natural Resources Conservation Service (NRCS) Web Soil Survey, Mass GIS Orthophotos and data layers, 13<sup>th</sup> edition of the *Massachusetts Natural Heritage Atlas*, NHESP BioMap2, Barnstable's *Habitat of Potential Regional or Statewide Importance* map, ACEC maps, APCC Cape Cod Critical Habitats data layers, *Cape Cod Significant Natural Resources Map*, as well as additional reference materials and documents compiled to date for the site and portions thereof.

During the site evaluations, LEC personnel traversed the Limits of Work within and abutting the westerly forested upland on foot taking note of the general habitat cover types present while documenting any unique habitat features, actual wildlife habitat utilization, and evidence of the presence of wildlife, including avian vocalizations and wildlife signs (calls/sounds, tracks, scat, burrows, browse marks, nests, feathers, bone fragments, etc.). It is important to note that temporal evaluations such as this cannot comprehensively document all species utilizing the site. Representative photographs are included within the Limited DRI Application.

## Existing Conditions

The 36.34± acre project site is composed of two subject parcels, located north of Old Falmouth Road between Cotuit Road (Rte. 149) and Flint Street. The site is located northwest of a capped landfill



(Marstons Mills transfer station) and a ground-mounted solar photovoltaic system. Forested uplands surround the site, while residential development occurs to the north and southwest across Old Falmouth Road.

A yard waste recycling facility occupies the majority of the project site. Brush, stumps, logs, leaves and grass clippings are stockpiled throughout the site for processing and ultimate reuse. Four primary stormwater management areas are currently utilized within the southern portion of Parcel 8. Two maintenance buildings/garages, a bituminous concrete pad, and an administrative building are also present proximate to Old Falmouth Road. An on-site septic system services the administrative building, while a dirt parking lot abuts to the south.

#### Natural Heritage and Endangered Species Program Designation

According to the 13<sup>th</sup> edition of the *Massachusetts Natural Heritage Atlas* (effective October 1, 2008), the northwesterly portion of the project site occurs within an Estimated Habitat of Rare Species (EH 31) and Priority Habitat of Rare Species (PH 1375). In response to a MESA Information Request, the Natural Heritage and Endangered Species Program (NHESP) issued a letter on June 15, 2016, stating that the state-listed Water-Willow Stem Borer (*Papaipema sulphurata*) has been found within the vicinity of the site. As stated on the NHESP Fact Sheet, *the Water-willow Stem Borer inhabits shallow portions of coastal plain wetlands (swamps, edge of streams and pond, abandoned cranberry bogs, etc.) where water-willow (Decodon verticillatus) grows*. No potential habitat conditions for this species exist on-site. The closest potential habitat may be limited to the wetland abutting Cotuit Road (Rt 149) and/or the shoreline of Hamblin Pond located greater than 900 and 1,200 feet from the project footprint, respectively.

As no proposed work activity occurs with Priority/Estimated Habitat, the project does not require NHESP review.

#### BioMap2

*BioMap2*, developed by NHESP and The Nature Conservancy's Massachusetts Program to protect the state's biodiversity, identifies two complementary spatial layers related to plant and wildlife habitat. "Core Habitat" *identifies key areas that are critical for the long-term persistence of rare species and other Species of Special Concern, as well as a wide diversity of natural communities and intact ecosystems across the Commonwealth*. "Critical Natural Landscape" *identifies larger natural Landscape Blocks that are minimally impacted by development. If protected, these areas will provide habitat for wide-ranging native species, maintain connectivity among habitats, and enhance ecological resilience to natural and anthropogenic disturbances in a rapidly changing world. Areas delineated as Critical Natural Landscape also include buffering upland around wetland, coastal, and aquatic Core Habitats to help ensure their long-term integrity*.



According to Barnstable’s *BioMap2* (2012), the project footprint is not located within a “Core Habitat” and/or “Critical Natural Landscape”.

Habitat of Potential Regional or Statewide Importance

According to the “Habitat of Potential Regional or Statewide Importance” map for Barnstable, the project site is not mapped as an “Important Wildlife Habitat” by the MA DEP Conservation Assessment and Prioritization Systems (CAP) program, an ecosystem-based approach for assessing the ecological integrity of lands and waters and subsequently identifying and prioritizing land for habitat and biodiversity conservation.

Area of Critical Environmental Concern

The project site does not lie within an Area of Critical Environmental Concern (ACEC).

APCC Critical Habitats

The Association to Preserve Cape Cod’s (APCC) Critical Wildlife and Plant Habitat polygons do not extend onto the project site.

District of Critical Planning Concern

The project site occurs within the Barnstable-wide District of Critical Planning Concern (DCPC) designated in September 2001 to manage residential growth and encourage affordable housing in town. Aside from this and the Cape-wide Fertilizer Management DCPC, the project site is not located within a separate, specialized DCPC.

Cape Cod Significant Natural Resource Areas

The project site is located within a Significant Natural Resource Area (SNRA), as mapped by the Cape Cod Commission’s Regional Policy Plan (effective January 16, 2009 and amended July 3, 2009), likely as being mapped as rare species habitat, containing wetlands, and located within a Wellhead Protection Area (WHPA).

**On-site Habitat Cover Types**

Forested Upland

Forested upland dominates the western and northwestern portions of the project site, consisting of a moderately dense canopy of black oak (*Quercus velutina*), white oak (*Quercus alba*), pitch pine (*Pinus rigida*), eastern white pine (*Pinus strobus*), red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), and black cherry (*Prunus serotina*) trees. The understory is primarily dominated by saplings from the canopy along with scattered patches of black huckleberry (*Gaylussacia baccata*) and individual highbush blueberry (*Vaccinium corymbosum*), nannyberry (*Viburnum lentago*), and eastern serviceberry

(*Amelanchier canadensis*) shrubs. Common greenbrier (*Smilax rotundifolia*) and cat brier (*Smilax glauca*) entanglements occur sporadically. Teaberry (*Gaultheria procumbens*), wild sarsaparilla (*Aralia nudicaulis*), starflower (*Trientalis borealis*), Canada mayflower (*Maianthemum canadense*), lowbush blueberry (*Vaccinium angustifolium*), bracken fern (*Pteridium aquilinum*) and seedlings from the overstory and shrub layer occupy portions of the groundcover.

An existing access road abuts the southwesterly treeline, while various stockpiled vegetative debris lines the remaining westerly treeline edge within the project footprint. Sporadic invasive garlic mustard (*Alliaria petiolata*) and Asiatic bittersweet (*Celastrus orbiculata*) were observed along the westerly shoulder to the perimeter access road. An approximately 20' x 40' L-shaped garlic mustard patch also exists 25± feet into the forested upland. LEC also observed three distinct patches of invasive Japanese knotweed (*Fallopia japonica*) along the westerly treeline edge, ranging from 25± sf to 250± sf in size.

### Wetlands

A Bordering Vegetated Wetland (BVW) associated with a remnant drainage ditch occurs within the northwestern portion of the project site. It is unknown whether the ditch was historically connected to Hamblin Pond located greater than 1,200 linear feet from the project site. Under existing conditions, small pockets of the on-site ditch appear to hold 0-1" of standing water during the spring hydroperiod; however the ditch lacks any evidence of substantive flow. Wetland vegetation consisting of sweet pepperbush (*Clethra alnifolia*) and winterberry (*Ilex verticillata*) occur consistently throughout the ditch with sporadic cinnamon fern (*Osmunda cinnamomea*) and jewelweed (*Impatiens capensis*). The BVW boundary was approved under a Determination of Applicability issued by the Barnstable Conservation Commission on May 16, 2016.

### **Direct Wildlife Signs and Observations**

Wildlife species observed to utilize the westerly forested habitat edge primarily consisted of avian species, including blue jay (*Cyanocitta cristata*), northern cardinal (*Cardinalis cardinalis*), mourning dove (*Zenaidura macroura*), tree swallow (*Tachycineta bicolor*), house wren (*Troglodytes aedon*), American robin (*Turdus migratorius*), American goldfinch (*Carduelis tristis*), gray catbird (*Dumetella carolinensis*), American crow (*Corvus brachyrhynchos*), eastern towhee (*Pipilo erythrophthalmus*), tufted titmouse (*Baeolophus bicolor*), black-capped chickadee (*Poecile atricapillus*), song sparrow (*Melospiza melodia*), downy woodpecker (*Picoides pubescens*), spotted sandpiper (*Actitis macularius*), and Baltimore oriole (*Icterus galbula*) were also observed on-site.

Gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), eastern cottontail (*Sylvilagus floridanus*), and deer mice (*Peromyscus* spp.) were observed within or abutting the project footprint. White-tailed deer (*Odocoileus virginianus*) scat and tracks were encountered and a remnant eastern



coyote (*Canis latrans*) or red fox (*Vulpes vulpes*) den was documented within the forested upland west of the project footprint.

No amphibians or reptiles were found on-site by overturning decomposing logs. No turtle shells or predated turtle nests have been observed on-site.

## **Development Impact**

The proposed solar footprint has been designed to overlap with the existing yard waste recycling facility (active use area) to the greatest extent feasible. The overall Limit of Work totals 882,902± sf (20.27± acres), while only 1.53± acres of disturbance encroaches into the westerly abutting forested upland. No important habitat features or specimen trees were identified within the work limits. Existing edge habitat will be improved over existing conditions by managing invasive species (see below). A minimum 173.8-264.2 foot wide undisturbed forested buffer will be provided within the western portion of the project site to function as a potential wildlife corridor. As such, the project does not fragment wildlife and plant habitat. The project footprint has been specifically designed to avoid work activities within the 100-foot Buffer Zone to BVW and NHESP-mapped Estimated/Priority Habitat. Furthermore, no Certified or Potential Vernal Pools occur within 350 feet of the project site according to MassGIS data layers.

Proposed site regrading has been minimized to work with existing topographic features. The proposed stormwater management system has been designed in compliance with DEP Stormwater Regulations. All temporary disturbed/regraded areas will be reseeded with the Solar Farm Seed Mix available from Ernst Conservation (or equivalent). Erosion controls (e.g., FilterMitt™) will be installed to contain work activities and protect areas beyond the Limit of Work from sedimentation/erosion.

## **Mitigation**

### *Invasive Species Management*

The Applicant is proposing to implement an Invasive Species Management Plan in accordance with *Technical Bulletin 01-001, Development of Regional Impact Guidelines for Invasive Species Management Plan*, issued by the Cape Cod Commission (revised 7/7/05). The Plan proposes to manage Japanese knotweed, garlic mustard, and Asiatic bittersweet observed within the project footprint. A copy of the Invasive Species Management Plan along with a map and photographs is included within the Limited DRI Application.

### *Open Space*

The Applicant is proposing to provide Open Space mitigation for the proposed 1.53± acres of disturbance into the westerly naturally forested upland. Considering that the area is located within a SNRA, 3.06± acres of Open Space are required for the project (2 x 1.53). In order to comply with Open Space RPP



standards, the Applicant is proposing the in lieu cash mitigation Open Space option. CCC Staff has previously relayed that the per acre cash equivalent for Barnstable to be \$91,604 per acre. Consequently, the Applicant is proposing to provide \$280,308.24 for Open Space Mitigation.

### Summary

LEC has prepared this NRI Report for the proposed solar array located off Old Falmouth Road in Marstons Mills (Barnstable) in accordance with the *Development of Regional Impact Guidelines for Natural Resources Inventory (Plant and Wildlife Habitat Assessment), Technical Bulletin 92-002*, issued by the Cape Cod Commission (revised 4/24/03). The proposed solar field has been specifically consolidated to overlap within an existing yard waste recycling facility to avoid and minimize impacts to natural wildlife and plant habitat. No work occurs within NHESP-mapped state-listed rare species habitat or Buffer Zone to wetlands. The Applicant is proposing to implement an Invasive Species Management Plan to improve edge habitat conditions and provide in lieu cash mitigation for Open Space in compliance with RPP standards.

LEC is pleased to submit this Natural Resources Inventory Report. Should you have any questions or require additional information, please do not hesitate to contact Brian Madden at 508-746-9491 or [bmadden@lecenvironmental.com](mailto:bmadden@lecenvironmental.com).

Sincerely,

**LEC Environmental Consultants, Inc.**

Brian T. Madden  
Wildlife Scientist

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**Appendix M**

Invasive Species Management Plan



LEC Environmental Consultants, Inc.  
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LSDP 15, LLC Solar Project  
0 & 280 Old Falmouth Rd  
Marstons Mills, MA  
8-9-16

## Invasive Species Management Plan

### Existing Conditions

Small patches of Japanese Knotweed (*Fallopia japonica*) occur sporadically along the westerly forested upland edge within the Limit of Work, ranging from 25± sf to 250± sf in size.

Garlic Mustard (*Alliaria petiolata*) and Asiatic Bittersweet (*Celastrus orbiculata*) occur intermittently along the southwesterly treeline edge abutting an existing access road. An approximately 20' x 40' L-shaped Garlic Mustard patch also exists 25± feet into the forested upland.

Invasive species locations are depicted on the attached Invasive Species Management Map, prepared by LEC, dated August 9, 2016.

If unmanaged, these invasive species could proliferate throughout the proposed solar footprint.

### Proposed Initial Management

Utilizing Best Management Practices, all Japanese Knotweed stalks, Garlic Mustard plants, and Asiatic Bittersweet vines along with underlying soil material that may contain roots, propagules, and/or seed stock will be dug up, bagged, and brought to an approved facility (e.g., solid waste digester) for proper disposal.

### Monitoring

Site evaluations will be conducted following the first and second growing seasons (post-work commencement) to document the presence and/or absence of invasive species within the solar footprint (refer to Cape Cod Commission's Invasive Species List). If small concentrations of invasive species are documented, the vegetative material may be removed by hand and properly disposed of off-site (e.g., collected and left to dry out before disposal, placement within at a landfill, etc. or bagged and brought to a solid waste digester). If larger concentrations are documented, the Cape Cod Commission Staff would be contacted to discuss recommended chemical treatments (e.g., cut-stump treatment using 20 – 25% A.I. Glyphosate or 12.5% A.I. Triclopyr). The quantity and type of herbicide to be utilized would be reviewed with CCC Staff. Any herbicide would be applied by a certified applicator.



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## Invasive Species Management Map

0 & 280 Old Falmouth Road  
Marstons Mills, Massachusetts



August 9, 2016



Photograph 1: Westerly forested upland edge containing scattered patches of Japanese Knotweed (6/13/16).



Photograph 2: Largest Japanese Knotweed path along westerly forested upland edge (6/13/16).



Photograph 3: Scattered Garlic Mustard along southwesterly treeline edge (6/13/16).



Photograph 4: Garlic Mustard patch located within southwesterly forested upland (6/13/16).

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**Appendix N**

*Stormwater Analysis & Calculations*, prepared by Meridian Associates, Inc.,  
dated August 15, 2016

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**Appendix O**

Solar Operation & Maintenance Plan

The table below provides a sample operations and maintenance (O&M) scope of services for typically done for solar PV projects.

Typical O&M Services for Solar PV Systems	
Services	Scope
Monitoring System	Operator will provide labor, hardware and software to monitor System in order to respond and take action to maximize System performance.
Notifications	Operator will promptly notify Operator Representative per the Communication Plan of System (a) faults, (b) performance 10% below expected performance, (c) observed performance warnings or trends which may indicate developing performance problems.
Reports	Operator will provide reports containing the information as agreed by the Parties.
General Requests for System Information	System Owner may make reasonable requests and Operator will provide additional System information.
Licenses and Operating Permits	Operator will obtain and maintain required licenses and permits to operate and maintain the System.
Field Inspection	<p>Operator will perform a minimum of one (1) field inspection per Contract Year. The field inspection will include:</p> <ul style="list-style-type: none"> <li>▪ PV Panel Condition <ul style="list-style-type: none"> <li>○ Inspect for cleanliness, cracked/chipped/scratched/ shattered panels, fading/dicoloration, burn marks, seal condition, frame damage or rust</li> </ul> </li> <li>▪ PV Mounting Structure <ul style="list-style-type: none"> <li>○ Inspect mounts and mounting structures (loose panels, loose rack,/clips missing hardware, rusted bolts, flashing issues, ballast condition, rack anchor condition)</li> </ul> </li> <li>▪ PV Array Ventilation <ul style="list-style-type: none"> <li>○ Inspect conditions under panels, remove of any large debris or pests; visual check to ensure maximum ventilation under panels</li> </ul> </li> <li>▪ PV System Foundations <ul style="list-style-type: none"> <li>○ Ground mount arrays (visual inspection of grounds and vegetation, identify issues related to mud, water pooling, soil erosion)</li> </ul> </li> <li>▪ Balance of System <ul style="list-style-type: none"> <li>○ Inspect conduit runs (separated/cracked conduits, misaligned wire runs)</li> <li>○ Inspect panel interconnectivity and string lines (wire/cable wear, wire fading, chewed wire due to pests, identify loose/detached wires)</li> <li>○ Inspect junction/combiner enclosure(s) condition (seals, rust, damage, locks)</li> <li>○ Inspect electrical equipment enclosure(s) (seals, rust, damage, door condition, locks, equipment pad(s))</li> </ul> </li> <li>▪ Inverter(s) <ul style="list-style-type: none"> <li>○ Inspect inverter structure(s) and enclosure(s) (seals, rust, damage, door condition, switch/handle condition, locks)</li> <li>○ Inspect inverter equipment pad(s) (cracks, base damage, soil erosion)</li> </ul> </li> <li>▪ Data Acquisition System (DAS) <ul style="list-style-type: none"> <li>○ Weather stations condition (alignment of irradiance sensor, condition of wind and temperature meters)</li> <li>○ DAS device condition (screen, seals, rust, damage)</li> <li>○ Shading Conditions</li> <li>○ Visual inspection to identify any shading issues, preventive care if shading caused by nearby vegetation)</li> </ul> </li> <li>▪ Vegetation/Pest Conditions <ul style="list-style-type: none"> <li>○ Vegetation management (inspection for vegetation issues, removal of any weeds, vines, tree branches or other plants/trees blocking panels/system, grass mowing and control)</li> </ul> </li> </ul>

### Typical O&M Services for Solar PV Systems

Services	Scope
	<ul style="list-style-type: none"> <li>○ Pest Control (insects, bird nests, squirrels, spider nests, etc.)</li> <li>▪ System Security               <ul style="list-style-type: none"> <li>○ Visually inspect fence line or confinement structures for wear, damage, breach, vandalism, or other problems</li> <li>○ Visually inspect any electronic surveillance equipment (cameras, alarms, etc) and identify if operating</li> <li>○ Check condition of any locks, chains or other protection measures preventing unauthorized access to the system</li> </ul> </li> </ul>
Maintenance	Operator will perform all maintenance activities in accordance with the equipment manufacturer recommendations.
System Cleaning	Operator will monitor System and if required recommend System cleaning in accordance with the equipment manufacturer recommendations and industry standards; Operator and System Owner will agree to timing of cleaning to minimize disruption to Site Owner and System Output.
Troubleshooting and Repair of System	Operator will promptly perform troubleshooting and repair of System in order to maximize System performance.
Troubleshooting and Repair of Site	Operator will promptly perform troubleshooting and repair of Site caused by System design, installation or maintenance in order to maximize System performance.
Warranty	Operator will perform all activities required to process all Equipment warranties.
Reporting	<p>A.1.1 System Event Report After an automated System event notification, the Operator will provide a brief report via email to the System Owner explaining the event, activities, and resolution of the System event.</p> <p>A.1.2 System Performance Report Quarterly Reports will be provided to System Owner.</p> <p>A.1.3 Field Inspection / Maintenance Report Upon completion of inspection, troubleshooting and maintenance activities, a report will be provided to the System Owner providing evidence of activities related to the site visit, repairs and maintenance performed on the System.</p>
Services and Maintenance	Preventative maintenance will be carried out two (2) to four (4) times per year, depending on the site and weather conditions.
Additional Responsibilities (General)	<ol style="list-style-type: none"> <li>1. Vegetation control to maintain optimal performance of PV system and visual perception of the site</li> <li>2. Mowing of grassy areas as necessary and applicable</li> <li>3. Topping up of gravel areas with matching gravel as necessary</li> <li>4. Pruning of trees/bushes on property, or overhang property that cause shading of the PV panels or potential damage to fencing/equipment</li> <li>5. Check fence/gate security; Operator to carry out repair/replacement of fence and security systems as appropriate</li> <li>6. Visually inspect all terminations for corrosion/tightness</li> <li>7. Re-torque all power terminations/connections associated with the system, e.g., DC combiner boxes, DC and AC disconnects, surge arrestors, inverters, PV modules, transformers, etc.</li> <li>8. Test surge arrestor operation</li> <li>9. Test ground continuity, lightning protection and overall system safety, and correct any unsafe or abnormal issues</li> <li>10. Check mechanical and structural integrity of the system, and correct any issues where deviation from Final Acceptance has occurred</li> </ol>
String Level Testing	<ol style="list-style-type: none"> <li>1. Perform testing to measure the open circuit voltage (Voc) and operating current of each string in the system</li> <li>2. Analyze and document any anomalies that effect system performance and</li> </ol>

### Typical O&M Services for Solar PV Systems

Services	Scope
	<p>propose correct actions if necessary</p> <ol style="list-style-type: none"> <li>3. Perform string level IV Curve tracing with a minimum of 400 w/m<sup>2</sup> irradiance</li> <li>4. Analyze and document any anomalies that effect system performance and propose correct actions if necessary</li> </ol>
Additional Responsibilities (PV Modules)	<ol style="list-style-type: none"> <li>1. As applicable and necessary, clean solar panels once or twice per year or as needed, depending on deposits on panels</li> <li>2. High pressure sprays may be used; Operator to provide own water and electrical supply</li> <li>3. Snow/ice on panels should not be cleared</li> </ol>
Additional Responsibilities (Inverters & Associated Equipment)	<ol style="list-style-type: none"> <li>1. Check housing for dust/water ingress</li> <li>2. Conduct preventative maintenance in accordance with manufacturer specifications</li> <li>3. Clean and vacuum enclosure, vents and heat sink / remove any identifiable debris and clean any accumulation of dust</li> <li>4. Change air filters according to manufacturer specifications (filters are billed at cost, installation is included in O&amp;M fees)</li> <li>5. Check fuses and switchboards (visually inspect for signs of corrosion/burning of components)</li> <li>6. Check wiring (visually inspect for breaks, deterioration or signs of corrosion/burning, check cable wire protection)</li> </ol>
Additional Responsibilities (Transformer)	<ol style="list-style-type: none"> <li>1. Operator will be responsible for attending site to check the terminations, etc. for the main transformer</li> <li>2. Any alarms raised by the public or the DAS should be immediately forwarded directly to Operator for action</li> </ol>
Additional Responsibilities (DAS & Weather Station)	<ol style="list-style-type: none"> <li>1. Visually inspect and clean weather station as appropriate</li> <li>2. Check calibration of weather station procedures</li> </ol>
Additional Responsibilities (Operation of System)	<ol style="list-style-type: none"> <li>1. Sub-array zones are to be monitored and their power production tracked the monitoring system shall detect any power discrepancies in the sub-array zone. For example, permanent partial shading or blown string fuses shall be indicated on the sub-array monitoring system.</li> <li>2. The monitoring system shall have built-in algorithms to detect the standard trends of one sub-array against another, and when this trend is broken, depending on the magnitude, will trigger an alarm. Detection of individual module problems is not a requirement.</li> <li>3. Detection and alarms notification of critical failures of the equipment or outside issues such as ground faults and fluctuations on the electrical grid shall be captured and reported.</li> <li>4. Attend site to carry out a diagnosis of any alarm raised by software/monitoring system or <b>'phone call from Lessee or member of the public indicating that there is, or may soon be, a problem at the site</b></li> <li>5. Within twenty-four 24 hours of arrival on site, the fault shall have been diagnosed and a replacement part ordered if required. Once the new part has been delivered, it shall be installed and the system re-commissioned within seventy-two (72) hours.</li> <li>6. If no new part is required, the system shall be repaired and re-commissioned within seventy-two (72) hours of fault diagnosis.</li> <li>7. Once the system is fully re-commissioned and operational, a full report shall be written by the Operator, showing, as a minimum:             <ol style="list-style-type: none"> <li>a. Date/time fault reported</li> <li>b. Method of reporting fault (type of system, or personnel details)</li> <li>c. Nature of fault reported</li> <li>d. Nature of fault diagnosed and repaired</li> </ol> </li> </ol>

Typical O&M Services for Solar PV Systems

Services	Scope
	<ul style="list-style-type: none"><li>e. Times of arrival at, and departure from, site</li><li>f. Replacement equipment required</li><li>g. Time to repair on site (start/finish times)</li></ul>

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**Appendix P**

System Components



*Solar Mounting Systems*

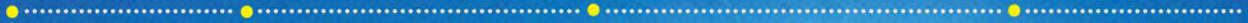
# GROUND MOUNT

DESIGN

ENGINEERING

MANUFACTURING

INSTALLATION



[www.rbisolar.com](http://www.rbisolar.com)

**RBI Solar designs, engineers, manufactures and installs solar mounting systems. This single-source responsibility is focused on delivering value throughout the solar value chain.**

## **Features & Benefits**

- Custom engineered to specific site conditions
- High strength steel with corrosion protection
- Designed to minimize field installation labor
  - Reduced number of posts compared to traditional racking
  - Follows contours to mitigate civil/site work
  - Same hardware throughout
  - Optional pre-assembly
- Design and engineering at every step of the way
  - In-house engineers
  - Stamped drawings including foundation
- Pile driving test available
- Flexible to mount any module type
- Nationwide installation
- Various foundation options
- UL 2703 classification available
- Procurement and manufacturing:
  - Leverage with national and international facilities
  - Material certification available
  - ARRA compliant; "Made in the USA" certification available



## RBI Solar Background

Family owned and operated, we pride ourselves in 80+ years of experience in commercial design-build specialty structures. RBI Solar's unique design capabilities and multiple manufacturing facilities help us develop the most economical, reliable and robust solutions for any structural solar mounting challenge. We are committed to taking single point responsibility for the entire project starting from the initial design to complete installation of solar modules.

## Engineered Foundation Options

Our engineers consider many factors when determining the most reliable and cost-effective foundation solution for our projects. Incorporating and analyzing data from available certified geotechnical reports, on-site pile testing, wind tunnel testing, and all applicable codes and loading considerations, our team can provide various foundation options:

- Driven post
- Concrete pier
- Dual post
- Screw piles
- Pre-cast or cast-in-place concrete ballast
- Spread footings

## Installation Services

With experience of completing multiple solar racking jobs for commercial, institutional and utility customers, RBI Solar is the most trusted name when it comes to solar racking installation. Our highly trained project managers and installation crews work with your on-site engineers to install custom engineered solar racking systems. Racking installation is essential for meeting project time and budget goals. Advantages of using RBI Solar for installation include:

- Company owned post driving equipment
- Highly skilled construction crews that specialize in solar racking
- Dedicated project managers

## Technical Specifications

Description of product	Fixed tilt racking
Efficient designs	GM-I, GM-T and GM-B
Module configuration	Landscape or portrait ; designed to accommodate any module type
Tilt angle	0° to 45°
Array height	Project specific design
Ground cover ratio	Project specific design
Installation options	Posts, racking and module mounting
Geographical range	Nationwide
Grounding	Continuously bonded racking; tested by ETL to UL2703 standards (GM-I & GM-T)
Wire management	Built-in wire management options
Design criteria	Engineered to meet applicable structural codes
Warranty	20-year limited warranty



## SINGLE SOURCE PROVIDER



### DESIGN

System classified to UL 2703, with in-house designers and engineers. Our focus is to deliver the most effective and efficient racking solution based upon the array layout and site conditions.

### ENGINEERING

Our in-house engineers, licensed and registered in all states, provide structural calculations applying RBI proprietary wind tunnel analysis and focus on delivering appropriate racking and foundation design based on existing soil conditions.

### MANUFACTURING

Multiple state-of-the-art manufacturing facilities, along with a vertically integrated procurement and manufacturing protocol, ensures overall quality of product with reduced lead times for material.

### INSTALLATION

Single source responsibility, with in-house project management and installation crews. This approach reduces duplication of efforts throughout the enterprise, focused on delivering projects on time and within budget.

**GROUND MOUNT • ROOF MOUNT • SPECIALTY STRUCTURES • LANDFILL**

**Racking questions? We are here to answer.  
Contact us at [info@rbisolar.com](mailto:info@rbisolar.com) or call (513)242-2051**



# MAXPOWER CS6X-310 | 315 | 320P

The high quality and reliability of Canadian Solar's modules is ensured by 15 years of experience in module manufacturing, well-engineered module design, stringent BOM quality testing, an automated manufacturing process and 100% EL testing.

## KEY FEATURES



Excellent module efficiency of up to 16.68 %



Outstanding low irradiance performance: 96.0 %



Positive power tolerance of up to 5 W



High PTC rating of up to 91.97%



IP67 junction box for long-term weather endurance



Heavy snow load up to 5400 Pa, wind load up to 2400 Pa



Salt mist, ammonia and blowing sand resistance, apply to seaside, farm and desert environments\*



linear power output warranty



product warranty on materials and workmanship

## MANAGEMENT SYSTEM CERTIFICATES\*

ISO 9001:2008 / Quality management system

ISO/TS 16949:2009 / The automotive industry quality management system

ISO 14001:2004 / Standards for environmental management system

OHSAS 18001:2007 / International standards for occupational health & safety

## PRODUCT CERTIFICATES\*

IEC 61215 / IEC 61730: VDE / MCS / CE / SII / CEC AU / INMETRO

UL 1703 / IEC 61215 performance: CEC listed (US)

UL 1703: CSA / IEC 61701 ED2: VDE / IEC 62716: VDE / IEC 60068-2-68: SGS

Take-e-way / UNI 9177 Reaction to Fire: Class 1



\* As there are different certification requirements in different markets, please contact your local Canadian Solar sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

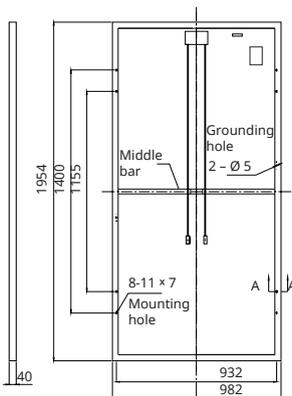
**CANADIAN SOLAR INC.** is committed to providing high quality solar products, solar system solutions and services to customers around the world. As a leading manufacturer of solar modules and PV project developer with over 14 GW of premium quality modules deployed around the world since 2001, Canadian Solar Inc. (NASDAQ: CSIQ) is one of the most bankable solar companies worldwide.

## CANADIAN SOLAR INC.

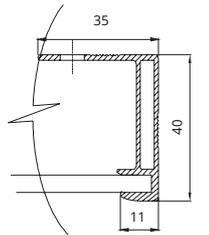
545 Speedvale Avenue West, Guelph, Ontario N1K 1E6, Canada, [www.canadiansolar.com](http://www.canadiansolar.com), [support@canadiansolar.com](mailto:support@canadiansolar.com)

## ENGINEERING DRAWING (mm)

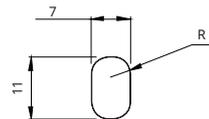
### Rear View



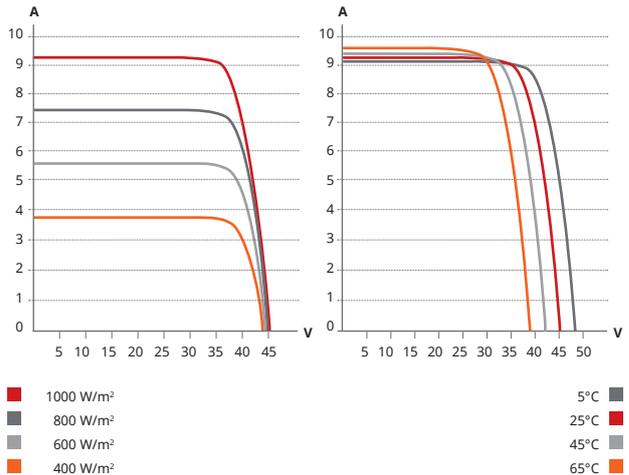
### Frame Cross Section A-A



### Mounting Hole



## CS6X-320P / I-V CURVES



## ELECTRICAL DATA / STC\*

CS6X	310P	315P	320P
Nominal Max. Power (Pmax)	310 W	315 W	320 W
Opt. Operating Voltage (Vmp)	36.4 V	36.6 V	36.8 V
Opt. Operating Current (Imp)	8.52 A	8.61 A	8.69 A
Open Circuit Voltage (Voc)	44.9 V	45.1 V	45.3 V
Short Circuit Current (Isc)	9.08 A	9.18 A	9.26 A
Module Efficiency	16.16 %	16.42 %	16.68 %
Operating Temperature	-40°C ~ +85°C		
Max. System Voltage	1000 V (IEC) or 1000 V (UL)		
Module Fire Performance	TYPE 1 (UL 1703) or CLASS C (IEC 61730)		
Max. Series Fuse Rating	15 A		
Application Classification	Class A		
Power Tolerance	0 ~ + 5 W		

\* Under Standard Test Conditions (STC) of irradiance of 1000 W/m<sup>2</sup>, spectrum AM 1.5 and cell temperature of 25°C.

## ELECTRICAL DATA / NOCT\*

CS6X	310P	315P	320P
Nominal Max. Power (Pmax)	225 W	228 W	232 W
Opt. Operating Voltage (Vmp)	33.2 V	33.4 V	33.6 V
Opt. Operating Current (Imp)	6.77 A	6.84 A	6.91 A
Open Circuit Voltage (Voc)	41.3 V	41.5 V	41.6 V
Short Circuit Current (Isc)	7.36 A	7.44 A	7.50 A

\* Under Nominal Operating Cell Temperature (NOCT), irradiance of 800 W/m<sup>2</sup>, spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

## PERFORMANCE AT LOW IRRADIANCE

Industry leading performance at low irradiance, average relative efficiency of 96.0 % from an irradiance of 1000 W/m<sup>2</sup> to 200 W/m<sup>2</sup> (AM 1.5, 25°C).

The specification and key features described in this datasheet may deviate slightly and are not guaranteed. Due to on-going innovation, research and product enhancement, Canadian Solar Inc. reserves the right to make any adjustment to the information described herein at any time without notice. Please always obtain the most recent version of the datasheet which shall be duly incorporated into the binding contract made by the parties governing all transactions related to the purchase and sale of the products described herein.

Caution: For professional use only. The installation and handling of PV modules requires professional skills and should only be performed by qualified professionals. Please read the safety and installation instructions before using the modules.

## MECHANICAL DATA

Specification	Data
Cell Type	Poly-crystalline, 6 inch
Cell Arrangement	72 (6×12)
Dimensions	1954×982×40 mm (76.9×38.7×1.57 in)
Weight	22 kg (48.5 lbs)
Front Cover	3.2 mm tempered glass
Frame Material	Anodized aluminium alloy
J-Box	IP67, 3 diodes
Cable	4 mm <sup>2</sup> (IEC) or 4 mm <sup>2</sup> & 12 AWG 1000V (UL), 1150 mm (45.3 in)
Connectors	Friends PV2a (IEC), Friends PV2b (IEC / UL)
Standard	26 pieces, 620 kg (1366.9 lbs)
Packaging	(quantity & weight per pallet)
Module Pieces per Container	624 pieces (40' HQ)

## TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.41 % / °C
Temperature Coefficient (Voc)	-0.31 % / °C
Temperature Coefficient (Isc)	0.053 % / °C
Nominal Operating Cell Temperature	45±2 °C

## PARTNER SECTION



Scan this QR-code to discover solar projects built with this module



# HEC-US<sup>PLUS</sup> 420VAC

## TECHNICAL CHARACTERISTICS

		420VAC - MPPT Window 594V-900V					
		FRAME 2		FRAME 3		FRAME 4	
NUMBER OF MODULES		5	6	7	8	9	10
REFERENCE		FS1051CU	FS1271CU	FS1480CU	FS1690CU	FS1901CU	FS2110CU
OUTPUT	AC Output Power(kVA/kW) @50°C	1050	1270	1480	1690	1900	2110
	AC Output Power(kVA/kW) @25°C	1160	1400	1630	1860	2100	2330
	Max. Power (kW@PF=0.9, @50°C)	940	1140	1330	1520	1710	1900
	Max. AC Output Current (A) @25°C	1600	1920	2240	2560	2880	3200
	Operating Grid Voltage(VAC)	420Vac ±10%					
	Operating Grid Frequency	60Hz					
INPUT	Current Harmonic Distortion (THDi)	< 3% per IEEE519					
	Power Factor (cosine phi) <sup>[1]</sup>	0.00 leading ... 0.00 lagging adjustable/ Reactive Power injection at night					
	Power Curtailment (kVA)	0..100%/0.1% Steps					
	MPPT Voltage Window (VDC) <sup>[2]</sup>	594V-900V					
	MPPT window @full power (VDC) <sup>[2]</sup>	616V-820V @50°C / 680V-820V @25°C					
	Maximum DC Voltage	1000V					
EFFICIENCY & AUXILIARY SUPPLY	Minimum Start Voltage	700V - User configurable					
	Max. DC continuous current (A)	1750	2100	2450	2800	3150	3500
	Max. DC short circuit current (A)	2275	2730	3185	3640	4095	4550
	Max. Efficiency / CEC (η)	98.6% / 98.0%					
	Euroeta (η)	98.3%		98.4%			
	Max. Standby Consumption (Pnight)	< approx. 40W/per module					
CABINET	Control Power Supply	120V / 208VAC-1kVA power supply available for external equipment					
	Max. Power Consumption	2300W	2760W	3220W	3680W	4140W	4600W
	Dimensions [WxDxH] [inches]	153.5"x40.12"x94.5"		192.9"x40.12"x94.5"		232.3"x40.12"x94.5"	
	Dimensions [WxDxH] [mm]	3900x1050x2400		4900x1050x2400		5900x1050x2400	
	Weight (lbs)	7804	8487	10119	10802	12434	13117
	Weight (kg)	3540	3850	4590	4900	5640	5950
ENVIRONMENT	Air Flow	Bottom intake. Exhaust top vent (Front or Rear option)					
	Type of ventilation	Forced air cooling					
	Degree of protection	NEMA 3R					
	Permissible Ambient Temperature	-22°F to +122°F / -30°C <sup>[3]</sup> to +50°C, >50°C / Active Power derating (>50°C/122°F)					
	Relative Humidity	4% to 100%. Active heating and humidity control					
	Max. Altitude (above sea level)	1000m; >1000m power derating 1% Sn (kVA) per 100m					
CONTROL INTERFACE	Noise level <sup>[4]</sup>	< 70 dBA					
	Interface	Alphanumeric Display (inside cabinet) / Optional Freesun App display or Web display					
	Communication Protocol	RS232 / RS485 / USB / Ethernet, (Modbus RTU, Modbus TCP/IP)					
	Power Plant Controller	Optional					
	Keyed ON/OFF switch	Standard					
	PROTECTIONS	Ground Fault Protection	Floating PV array. Isolation Monitoring per MPP NEC2014 Grounded PV Array: GFDI protection Optional PV Array transfer kit: GFDI and Isolation monitoring device				
Humidity control		Active Heating					
General AC Protection & Disconn.		Circuit Breaker					
General DC Protection & Disconn.		External Disconnecting Unit Cabinet (FSDK)					
Module AC Protection & Disconn.		AC contactor & fuses					
Module DC Protection & Disconn.		DC contactor & DC fuses					
CERTIFICATIONS	Overvoltage Protection	AC and DC protection (type 2)					
	Safety	UL 1741; CSA 22.2 No.1071-01					
	Utility interconnect	IEEE 1547 with Utility interactive Control functions					

- NOTES [1] Consult P-Q charts available:  $Q(\text{kVar}) = (S(\text{kVA})^2 - P(\text{kW})^2)$   
 [2] Values at 100°Vac nom and  $\cos \Phi = 1$ . Consult Power Electronics for derating curves.  
 [3] Heating kit option required below -20°C.  
 [4] Sound pressure level at a distance of 1m from the rear part.

# SUNNY CENTRAL 2200-US

SC 2200-US-10



## Economic

- Highest power density
- Market leading efficiency
- Provides ancillary services with Q-on-Demand
- Reduce installation and transportation costs with up to four inverters in a standard shipping container on a flat-bed truck

## Robust

- Proven and intelligent precision air-cooling technology
- Durably built for outdoor installation in harsh environmental conditions
- Robust and redundant fiber optic communication network configurations

## Flexible

- Operation up to 1,000 V DC
- Highest DC:AC design ratio in the industry
- Nominal power operation from -25°C to 50°C

## Highly integrated

- Area for customer SCADA equipment
- Integrated zone monitoring
- LOTO DC and AC disconnects
- On-board 120V AC Power Outlet

## SUNNY CENTRAL 2200-US

The new Sunny Central: maximum power density and integration

The Sunny Central 2200-US inverter (2,200 kVA for 1,000 V DC at 25°C) minimizes the total installed cost while maximizing the energy production of the photovoltaic power plant. Integrated control power, convenience power, network switch and optional NEC 2014 compliant DC recombiner and disconnect dramatically increase the speed to energization. The new Sunny Central can connect to virtually any grid in the harshest conditions. It is suitable for global outdoor installation with its proven OptiCool™ precision air cooling technology ensuring smooth operation even under extreme environmental conditions.

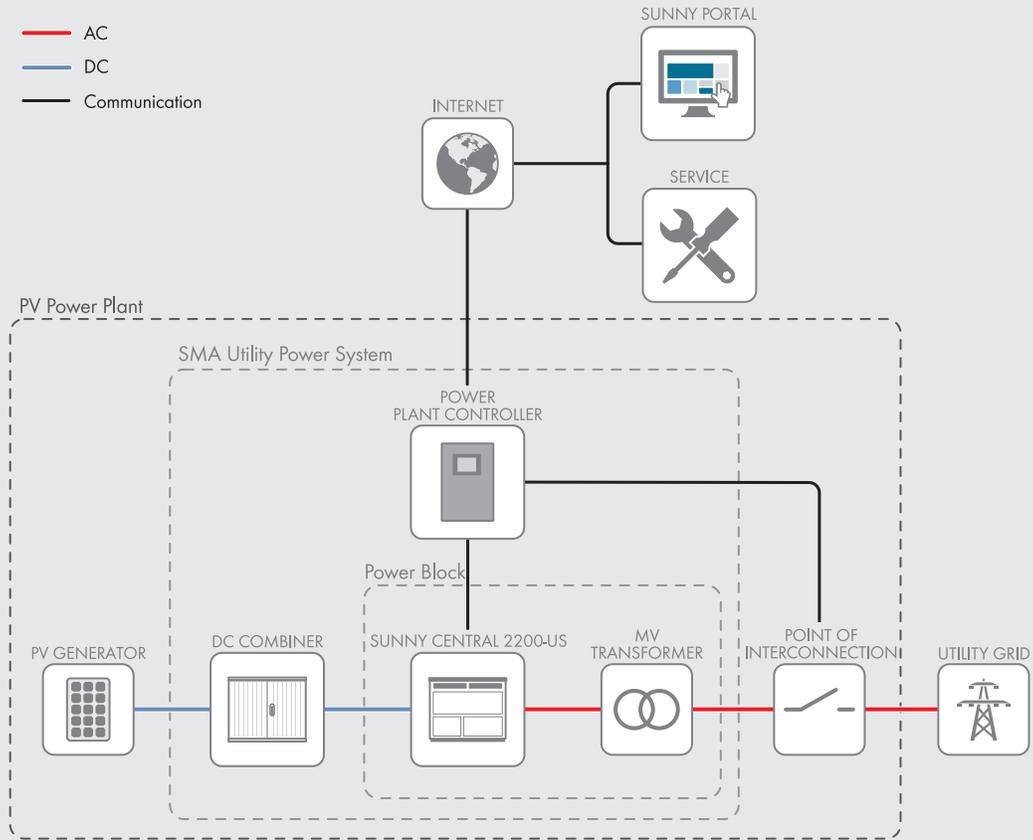
**SUNNY CENTRAL 2200-US**



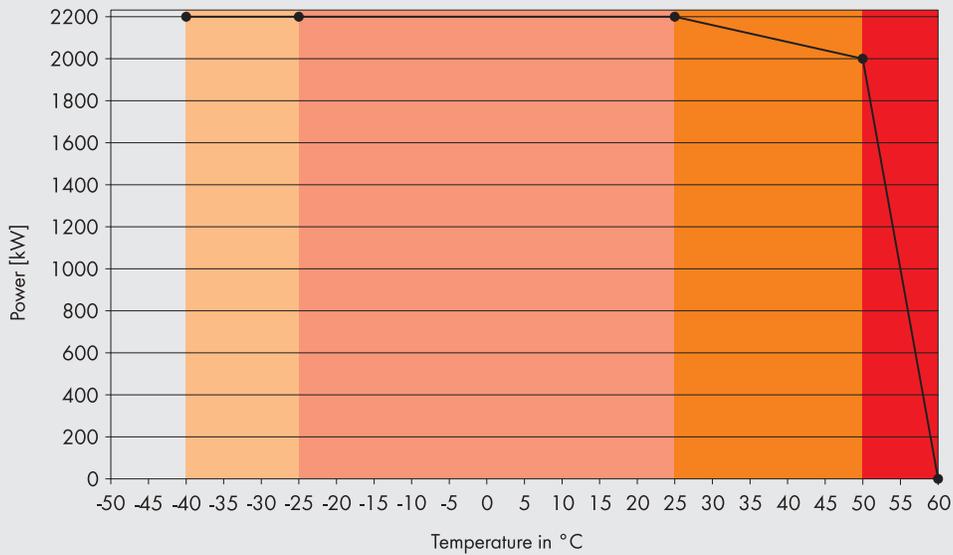
- 1) Preliminary values
- 2) At unity power factor
- 3) Ungrounded systems available with 24 inputs only
- 4) CEC efficiency includes all control power
- 5) Power derated above 50 °C, 0 kVA above 60 °C

Technical Data	SC 2200-US
<b>Input (DC)</b>	
MPP voltage range $V_{DC}^2$	570 V to 950 V
Max. open circuit and operating voltage $V_{DC,max}$	1,000 V
Max operating DC current $I_{DC,max}$ (@ 25 °C / @ 50 °C)	4,110 A / 3,960 A
Number of DC inputs (24/28/32) <sup>3</sup>	● / ○ / ○
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm <sup>4</sup>
Integrated zone monitoring (shunt resistors)	○
Available DC fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A
<b>Output (AC)</b>	
Nominal AC power (@ 25 °C / @ 40 °C / @ 50 °C)	2,200 kVA / 2,080 kVA / 2,000 kVA
Nominal AC power at $\cos \phi = 0.9$ (@ 25 °C / @ 40 °C / @ 50 °C) <sup>5</sup>	1,980 kW / 1,872 kW / 1,800 kW
Max AC output current (@ 25 °C / @ 40 °C / @ 50 °C)	3,300 A / 3,120 A / 3,000 A
Nominal AC current $I_{AC,nom}$	3,300 A
Max. total harmonic distortion	< 3% at nominal power
Nominal AC voltage / nominal AC voltage range (line-to-line)	385 V / 347 V to 424 V
AC power frequency	50 Hz, 60 Hz
Power factor at rated power / displacement power factor adjustable	1 / 0.8 leading to 0.8 lagging
<b>Efficiency <sup>1</sup></b>	
Max. efficiency / European weighted efficiency / CEC weighted efficiency <sup>4</sup>	98.6% / 98.3% / 98.0%
<b>Protection and Disconnection Devices</b>	
Input-side disconnection point	DC load-break switch
Output-side disconnection point	AC circuit breaker
DC overvoltage protection	Surge arrester, type II
Ground-fault monitoring / remote ground-fault monitoring	○ / ○
Insulation monitoring	○
Degree of protection (as per IEC 60529)	IP54
Degree of protection (as per NEMA)	3R
<b>General Data</b>	
Dimensions (W / H / D)	2,780 mm / 2,318 mm / 1,588 mm (109.4 inch / 91.3 inch / 62.5 inch)
Weight	< 4,000 kg (8,819 lb)
Max. self-consumption (operation) / self-consumption (stand-by)	< 8,100 W / < 300 W
Internal control power supply	Integrated 8.4 kVA transformer
Operating temperature range <sup>5</sup>	-25 °C to 60 °C / -13 °F to 140 °F
Extended operating temperature range	○ (-40 °C to 60 °C / -40 °F to 140 °F)
Temperature range (stand-by)	-40 °C to 60 °C / -40 °F to 140 °F
Temperature range (storage)	-40 °C to 70 °C / -40 °F to 158 °F
Max. permissible value for relative humidity (condensing)	0% to 95% (non-condensing) and up to 100% (condensing) for max. 2 months per year
Maximum operating altitude above MSL 2000m (6562 ft) / 4000m (13123 ft)	● / ○ (with power reduction)
Fresh air consumption	3,826 cfm / 6,500 m <sup>3</sup> /h
<b>Features</b>	
DC connection	Terminal lug on each input with NEMA lug hole pattern
AC connection	With busbar system (three busbars, one per line conductor)
Communication	Ethernet, Ethernet/IP, Modbus TCP/IP
Enclosure / roof color	RAL 9016 / RAL 7004
Display	HMI touchscreen (10.1")
Convenience power supply transformer	○ (2.5 kVA)
Certificates and approvals	UL 1741, UL 1998, UL 840 Category IV, EMC FCC Part 15 Class A, IEEE 1547, BDEW and CE
● Standard feature ○ Optional feature	
Type designation	SC-2200-US-10

## PLANT DIAGRAM



Power\* vs. Temperature SC 2200-US



- Extended operating range
- Derating to nominal power
- Maximum power range
- Derating above rated operating temperature

\* Power produced across full MPPT range

SC2200-DUS145118 All products and services described as well as technical data are subject to change, even for reasons of country-specific deviations, at any time without notice. SMA assumes no liability for errors or omissions. For current information, see www.SMA-Solar.com.

# Envirotemp<sup>TM</sup> FR3<sup>TM</sup> fluid Formulated for performance.



**Envirottemp<sup>™</sup> FR3<sup>™</sup> fluid.**  
**Trusted worldwide**  
**a million times over.** .....





With over one million installations across six continents and validated in over 250 tests, Cargill’s Envirotemp™ FR3™ natural ester fluid is trusted by our customers to deliver cost-effective solutions that help improve transformer performance reliably and safely.

Our team of dielectric experts is active in the standards community globally and has extensive knowledge of not only dielectric fluid properties but also fluid performance in

application. And they have transformer design experience, too. This means our customers adopting FR3 natural ester technology have comprehensive dielectric fluids support from initial planning stages through best practices implementation and beyond.

Backed by Cargill’s global supply chain network, our customers can rely on us to deliver the best solution for their application - when they need it, anywhere in the world.



**With FR3 fluid, our customers can:**

- Gain cost efficiencies either on initial cost or total cost of ownership without sacrificing reliability.
- Extend transformer insulation and asset life.
- Optimize load capacity.
- Significantly improve fire safety.
- Enhance their environmental footprint and sustainable supply chain initiatives.

# Improve performance with life extension and loading flexibility.

## Protect insulation life to extend asset life.

Insulation paper is one of the primary factors that determines the life of a transformer. FR3™ fluid's unique chemistry absorbs free water and essentially wicks it away from the insulation paper. FR3 fluid has 10 times the water saturation level of mineral oil. This results in extending the insulation life 5-8 times longer than mineral oil.



Insulation aging study comparing thermally upgraded paper using FR3 fluid vs. mineral oil.

- Save significantly on replacement costs by extending the asset life with FR3 fluid.
- Reduce the risk of failure to improve reliability of the transformer.
- Reduce processing maintenance costs, since FR3 fluid does not sludge like mineral oil.

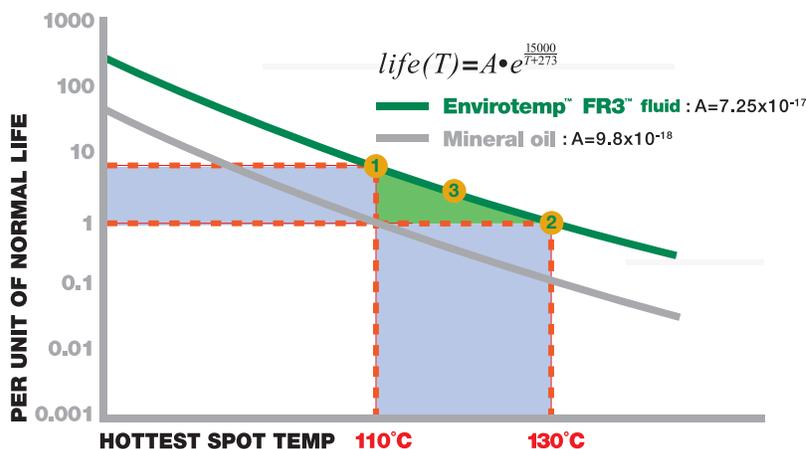
With FR3™ fluid’s unique capabilities to extend insulation life and increase load capacity, organizations now have the flexibility to optimize their transformer fleet loading profiles in order to gain cost savings without sacrificing reliability.

### Leverage higher thermal capability with FR3 fluid.

Historically, standards were written to accommodate a 95°C or 110°C hot spot for cellulose and Thermally Upgraded Kraft (TUK), respectively. However, published high temperature insulation system standards - IEC (60076-14) and IEEE (C157.154) – accommodate a 15°C or 20°C increase in hot spot without sacrificing the life or reliability of the transformer, when immersed in natural ester fluid.

Paper	Dielectric Fluid	Thermal Class	Hot spot	IEEE AWR	IEC AWR
TUK	Mineral Oil	120	110°C	65C	75K
TUK	Natural Ester	140	130°C	85C	95K

TUK life curves



- OPTION 1:** Extend asset life at current 110° hotspot.
- OPTION 2:** Increase load capability up to 20% with 130°C hotspot.
- OPTION 3:** Incrementally extend asset life and increase load capability with 120°C hotspot.

IEC 60076-14 Part 14: Liquid-immersed power transformers using high-temperature insulation materials. Edition 1.0 September 2013.

IEEE C57.154 Standard for the Design, Testing, and Application of Liquid-Immersed Distribution, Power, and Regulating Transformers Using High-Temperature Insulation Systems and Operating at Elevated Temperature. Published October 30, 2012.

# Improve fire safety.

## Add more sustainability to your sustainable supply chain.

### Reduce costs while increasing fire safety.

FR3™ fluid has the highest fire point of any dielectric fluid (360°C compared to 160°C for mineral oil) making it the ideal choice for densely populated areas where transformers are positioned indoors, underground or in close proximity to buildings and other equipment. FR3 fluid is a K-class, less flammable fluid as certified by Underwriters Laboratory and approved by FM Global.

- Reduce clearance to buildings which saves precious real estate, particularly in space-constrained areas.
- Retrofill older transformers with FR3 fluid instead of replacing or moving them to help comply with current fire code regulations.
- For power transformers, potentially eliminate the need for expensive fire walls and deluge systems (and their ongoing maintenance costs).

### “Being green” also benefits your bottom line.

FR3 fluid not only has best-in-class environmental properties, but with its enhanced thermal capabilities enabling smaller transformer designs, your supply chain just got a whole lot more sustainable.

- Smaller, more efficient transformer designs:
  1. Use less fluid and construction materials.
  2. Are typically lighter which could make installations easier for work crews and could reduce transportation costs.

## Envirotemp™ FR3™ fluid properties: standard acceptance values and typical values

PROPERTY	Standard test methods		ASTM D6871	IEC 62770	Envirotemp FR3 fluid
	ASTM	ISO/IEC	As-received new fluid property requirements	Unused new fluid property requirements	TYPICAL
<b>Physical</b>					
Color	D1500	ISO 2211	≤1.0		0.5
Flash Point PMCC (°C)	D93	ISO 2719		≥250	255
Flash Point COC (°C)	D92	ISO 2592	≥275		320-330
Fire Point (°C)	D92	ISO 2592	≥300	>300	350-360
Pour Point (°C)	D97	ISO 3016	<-10	≤-10	-18 - -23
Density at 20°C (g/cm³)		ISO 3675			0.92
Relative Density (Specific Gravity) 15°C	D1298		≤0.96	≤0.96	0.92
Viscosity (mm²/sec)	D445	ISO 3104			
			≤15	≤15	7.7 - 8.3
			≤50	≤50	32 - 34
			≤500		190
Visual Examination	D1524	IEC 61099 9.2	bright and clear	clear, free from sediment and suspended matter	clear, light green
Biodegradation		OECD 301	readily biodegradable	readily biodegradable	ultimately biodegradable
<b>Electrical</b>					
Dielectric Breakdown (kV)	D877		≥30		47
Dielectric Breakdown (kV)					
	1mm gap	D1816	≥20		28
	2mm gap	D1816	≥35		48-75
	2.5mm gap			≥35	73
Gassing Tendency (mm/min)	D2300	IEC 60156	≤0		-79
Dissipation Factor					
	25°C (%)	D924	≤0.20		0.010 - 0.15
	90°C (tan δ)			≤0.05	0.02
	100°C (%)	D924	≤4.0		0.41 - 3.85
<b>Chemical</b>					
Corrosive Sulfur	D1275	IEC 62697	non-corrosive	non-corrosive	non-corrosive
Water Content (mg/kg)	D1533	IEC 60814	≤200	≤200	4 - 50
Acid Number (mg KOH/g)	D974	IEC 62021.3	≤0.06	≤0.06	0.013 - 0.042
PCB Content (mg/kg)	D4059		not detectable	free from PCBs	not detectable
Oxidation Stability (48 hrs, 120°C)		IEC 61125C			
	Total Acidity (mg KOH/g)			≤0.6	0.1
	Viscosity at 40°C (mm²/sec)	ISO 3104		≤30% increase over initial	17.1% increase
	Dissipation Factor at 90°C (tan δ)	IEC 60247		≤0.5	0.1

**NOTE:** Specifications should be written referencing only the defined ASTM or IEC industry standard acceptance values and test methods. The listed 'typical' values are average values summarized from a significant number of data points over many years; they are not to be identified as acceptance values.

ASTM D6871 Standard Specification for Natural (Vegetable Oil) Ester Fluids Used in Electrical Apparatus

IEC 62770: Fluids for electrotechnical applications – Unused natural esters liquids for transformers and similar electrical equipment.

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- Made from a renewable source with global, reliable supply.
- Carbon neutral (according to BEES 4.0 lifecycle analysis).
- Non-toxic and non-hazardous in soil and water.
- Biodegrades in less than 28 days.
- Contains no petroleum, halogens, silicones or sulfurs.
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**Appendix Q**

Land Lease Agreement

## LAND LEASE AGREEMENT

### (Solar Renewable Energy Project)

This Land Lease Agreement (“Lease Agreement”) dated as of December 1, 2015 (“Effective Date”) between EAC Organics, Inc., a New York corporation (“Lessor”), and LSDP 15, LLC, a Delaware limited liability company (“Lessee”).

### RECITALS

The Parties enter into this Land Lease Agreement in connection with that certain real property located in Barnstable, Massachusetts, more particularly described on Exhibit A-1 attached hereto and incorporated herein by this reference (the “Leased Property”) which Leased Property is real property owned by Lessor in Barnstable, Massachusetts (the “Lessor Property”).

### ARTICLE 1 - DEFINITIONS

1.1 Abandonment. Absent notice of a proposed date of decommissioning or written notice of extenuating circumstances, the solar photovoltaic installation shall be considered abandoned when it fails to operate for more than one year without the written consent of the Barnstable Planning Board.

1.2 Active Landfill. A landfill that has an authorization to operate pursuant to 310 CMR 19.042 and for which the Massachusetts Department of Environmental Protection (the “Department” or “MassDEP”) has not approved facility closure completion pursuant to 310 CMR 19.140(6).

1.3 Assignee. As defined in Section 8.1(a).

1.4 Brownfield Site. Real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. For the purposes of qualifying as a Brownfield Site under the applicable Massachusetts Department of Energy Resources (“DOER”) regulations governing Class I Renewable Energy developments, a Brownfield Site is a disposal site that has received a release tracking number from MassDEP pursuant to 310 CMR 40.0000: Massachusetts Contingency Plan, the redevelopment or reuse of which is hindered by the presence of oil or hazardous materials, as determined by the Department, in consultation with MassDEP. For the purposes of this definition, the terms “disposal site,” “release tracking number,” “oil,” and “hazardous materials” shall have the meanings giving to such terms in 310 CMR 40.0006: Terminology, Definitions and Acronyms. No disposal site that otherwise meets the requirements of 225 CMR 14.02: Brownfield shall be excluded from consideration as a Brownfield because its cleanup is also regulated by the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§ 9601-9675, the Resource Conservation and Recovery Act, 42 U.S.C. §§ 6921 – 6939g, or any other federal program.

1.5 Closed Landfill. A landfill for which the Department has determined that the facility closure has been completed or has approved a post-closure monitoring plan pursuant to 310 CMR 19.140.

1.6 Commencement of Construction. The first date on which the Lessee enters upon the Leased Property pursuant to rights granted by this Lease Agreement to construct the Lessee Improvements with the staging of tools, materials, parts, supplies and equipment, the parking of vehicles, temporary trailers and/or facilities or the date upon which earthwork begins on the premises. This is not to include activities defined as “initial phase” activities in Section 1.26 of this lease.

poles, materials and property of every kind and character constructed, installed and/or placed on, above or below the Leased Property and/or Leased Areas by or on behalf of Lessee) that are constructed, developed or operated on the Leased Property as an integrated system to generate, via solar power, and deliver electrical power to the utility grid.

1.28 Solar Power Facilities. Solar panels, inverters, overhead and underground electrical distribution and communications lines, electric transformers, energy storage facilities, telecommunications equipment, power generation facilities to be operated in conjunction with solar installations, roads, meteorological towers and Solar measurement equipment, control buildings, maintenance yards, and related facilities and equipment that are necessary for Solar Energy Development on the Leased Property.

1.29 [Intentionally Deleted.]

1.30 Superfund Site. A site where hazardous waste is located and listed on the United States Environmental Protection Agency's National Priorities List (NPL) pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. § 9601.

1.31 Term. The term of this Lease Agreement, as set forth in Section 4.1 below.

1.32 Transmission Facilities. Substations, electric transmission lines (including poles, towers, wires, and cables), or interconnection and switching facilities that interconnect from the Leased Property to a utility transmission system or the transmission system.

## ARTICLE 2 - LEASED PROPERTY

For good and valuable consideration, the receipt of which is hereby acknowledged, Lessor hereby leases to Lessee, and Lessee leases from Lessor on the terms and conditions set forth herein, the Leased Property. The Parties agree that the Leased Property is approximately 38.1 acres being generally described in Exhibit A-1 attached hereto and incorporated herein by reference, with a more specific description and size being determined after the final engineering study is completed and the interconnection agreement is finalized with the Western Massachusetts Electric Company in a form substantially similar to that attached hereto as Exhibit A-2.

The Parties further acknowledge that the Leased Property is on a Closed Landfill site and that no liability therefor will attach or transfer to the Lessee as more fully set forth herein.

## ARTICLE 3 - USE AND OCCUPANCY OF LEASED PROPERTY

3.1 Uses. The Property leased under this Lease Agreement is leased solely for the Solar Energy Purposes (as defined in Section 3.3 below) including without limitation the construction, installation, development, ownership, operation and maintenance of the Solar Energy Project and shall not be used by Lessee for any other purposes. Nothing herein shall obligate the Lessee to construct, install or operate any Lessee Improvements on the Leased Property, provided, however in the event that the Lessee does not construct, install or operate any Lessee Improvements on the Leased Property on or before twelve (12) months from the Effective Date of this Agreement, or indicated to Lessor in writing of Lessee's intention not to construct, install or operate any Lessee Improvements on the Leased Property, Lessor shall have the right to terminate this Lease Agreement upon ten (10) days written notice to the Lessee.

3.2 Lease. Lessor leases to Lessee the Leased Property described in Exhibit A-1 (and to be further refined in a form substantially similar to that attached as Exhibit A-2) hereto upon and subject to the terms and conditions in this Lease Agreement. Lessee shall have the quiet use and enjoyment of the Leased Property in

accordance with and subject to the terms of this Lease Agreement, provided that Lessee is not in default under the terms of this Lease Agreement.

3.3 Purpose and Scope of Lease. This Lease Agreement is for the use by the Lessee of the Leased Property for Solar Energy Purposes. Lessee shall have the exclusive right to use the Leased Property for Solar Energy Purposes. "Solar Energy Purposes" means any and all uses associated with or related to converting solar energy into electrical energy, and collecting and transmitting the electrical energy so converted to the utility grid, together with any and all activities related to such uses ("Project Activities"), including, without limitation: (a) determining the feasibility of solar energy conversion and generation on the Leased Property, including studies of solar activity, sunlight, measuring solar available solar resources, studying solar irradiance, sunlight direction and other meteorological data, conducting environmental studies (which may require the extraction of soil samples), habitat and species studies, interconnection studies, conducting title examinations and surveys, and all other testing, studies or sampling required for developing maintaining and operating the Solar Energy Project on the Leased Property; and (b) constructing, installing, using, replacing, relocating, repowering, upgrading and removing from time to time, and maintaining and operating the Lessee Improvements.

The rights granted to Lessee in this Lease Agreement include, without limitation the following related rights:

- (a) the exclusive right to erect, construct, reconstruct, replace, relocate, remove, operate, maintain, upgrade and use the Lessee Improvements from time to time, on, under, over and across the Leased Property;
- (b) the exclusive right to construct, grade or regrade, maintain, and upgrade access roads and transmission lines across the Leased Property;
- (c) the exclusive right to capture, use and convert the unobstructed solar resources over and across the Leased Property; any material obstruction to the receipt of and access to sunlight throughout the Leased Property is prohibited;
- (d) the exclusive right over and across the Leased Property for any audio, visual, view, light, shadow, noise, vibration, electromagnetic or other effect of any kind or nature whatsoever resulting, directly or indirectly, from the Lessee Improvements, from the Solar Power Facilities;
- (e) the right on the Leased Property to prevent measurable diminishment in output due to obstruction of the sunlight across the Leased Property including but not limited to the right, in compliance with all applicable laws, ordinances, etc., to trim, cut down and remove all trees (whether natural or cultivated), brush, vegetation and fire and electrical hazards now or hereafter which might obstruct receipt of or access to sunlight throughout the Leased Property or interfere with or endanger the Solar Power Facilities or Lessee's operations, as reasonably determined by Lessee; and
- (f) the right of subjacent and lateral support located on the Leased Property for the operation and maintenance of the Solar Energy Project, including, without limitation, guy wires and supports located and affixed exclusively on the Leased Property.

3.4 Repair and Maintenance. Lessor shall not be required to maintain or make any repairs to the Leased Property or Lessee Improvements located on the Leased Property during the Term. Lessee is not assuming any obligation or liability arising from the Superfund status and environmental condition of, or the presence of Hazardous Materials on, in or under, the Leased Property (such responsibilities shall be referred to herein as "Lessor Environmental Responsibilities"), except to the extent attributable to the acts or omissions of Lessee, its agents, contractors, invitees, assignees, sublessees or successors, including exacerbation of environmental conditions or in the event that any of the Solar Energy Purposes may impose additional responsibilities by the United States Environmental Protection Agency (the "EPA") or MassDEP, which shall be the sole responsibility of Lessee.

Lessor shall have sole responsibility and is obligated to maintain compliance with Lessor Environmental Responsibilities.

3.5 Installation of Improvements.

(a) At any time during the Term of this Lease Agreement, prior to the construction of any Lessee Improvements upon the Leased Property, Lessee agrees to prepare commercially reasonable plans and specifications together with a detailed construction schedule (collectively, the "Plans and Specifications") for any proposed Lessee Improvements associated with the Solar Energy Project at the Leased Property. Lessee shall submit to Lessor the initial Plans and Specifications for the construction of the Lessee Improvements for Lessor's approval (which approval shall not be unreasonably conditioned, delayed or withheld). Lessor shall review and approve or disapprove the Plans and Specifications within ten (10) business days after submission by Lessee (and failure of Lessor to disapprove such Plans and Specifications in writing to Lessee within said ten business day period shall be deemed to constitute approval by Lessor).

(b) Upon Lessor's approval of the Plans and Specifications, Lessee shall, at its sole cost and expense, proceed diligently to obtain all necessary land use approvals, building permits, environmental impact reviews, and other governmental permits and approvals required for the financing, construction, installation, maintenance and operation of Lessee Improvements on the Leased Property pursuant to the Plans and Specifications (collectively, the "Approvals").

(c) Upon receipt of the Approvals, Lessee shall proceed diligently to construct the Lessee Improvements or any other aspect of the Solar Energy Project on the Leased Property in accordance with the applicable terms and conditions of this Lease Agreement. All improvements erected by Lessee shall be constructed of good materials and erected in a good and workmanlike manner. Lessee agrees to comply with and to require Lessee's contractors to comply with all Approvals and all applicable federal, state and local laws, ordinances, codes, regulations and directions relating to construction of such building and improvements, including without limitation, the employment, conditions of employment and hours of labor in connection with any construction, alteration or repair work done by or for Lessee on or about the Leased Property during the term of the Lease.

(d) Lessee hereby covenants and agrees to maintain the insurance required by Section 6 of this Lease Agreement during the course of construction of Lessee Improvements or any other aspect of the Solar Energy Project on the Leased Property. Additionally, Lessee further acknowledges and agrees to indemnify Lessor against any losses suffered by Lessor as a result of any construction or construction-related activities conducted by or on behalf of Lessee in connection with this Lease Agreement except where such loss is caused or contributed to by the negligent acts or omissions of Lessor or its agents, employees, or affiliates.

(f) Lessee shall submit copies of any applications for Approvals for Solar Energy Purposes in accordance with all applicable state statutes, rules, and regulations to Lessor and in the event that the Solar Energy Purposes may result in Lessor Environmental Responsibilities, Lessee acknowledges and agrees that it shall be solely responsible for said Lessor Environmental Responsibilities or Lessee can elect to terminate this Lease Agreement. Lessee is not responsible for any existing Lessor Environmental Responsibilities unless Lessee exacerbates existing Environmental Conditions.

**ARTICLE 4 TERM**

4.1 Term. This Lease Agreement shall be for a term of twenty (20) years commencing on the Operations Date and continuing until the 20th anniversary of the Operations Date (the "Term"). At the conclusion of the Term, provided that Lessee has not defaulted in any of its obligations under this Lease Agreement, Lessee shall have two

(2) successive five-year (5) options to extend the Lease Agreement. Such options may be exercised by written notice from Lessee to Lessor at least one hundred and fifty (150) days before the end of the Term.

4.2 Termination for Failure to Develop. Lessor may terminate this Lease Agreement without being deemed in default and without further liability to Lessee if the construction phase of the Solar Power Development, excluding the staging of tools, materials, parts, supplies and equipment, the parking of vehicles, temporary trailers and/or facilities or the date upon which earthwork begins on the Leased Property has not begun on or before 12 months from the Effective Date of this Lease Agreement.

#### ARTICLE 5 RENT, TAXES, MAINTENANCE

5.1 Rent. In consideration of the rights granted hereunder, Lessee shall pay Lessor the Rents provided herein, without notice or demand, for the use and occupancy of the Leased Property during the term of this Lease Agreement and until the sooner of (i) the expiration of the Removal Period; or (ii) Lessee's completion of removal of the Solar Power Facilities.

5.2 Lease Payments. Starting on the Commencement of Construction Date (the "Rent Commencement Date"), and continuing until the Removal Date, Lessee shall pay [REDACTED] in advance on an annual basis. For the avoidance of doubt, annual payments shall be January 1. The first rent payment due hereunder shall be paid on the Rent Commencement Date, which shall be a prorated amount for the balance of the then-current calendar year.

5.3 Taxes. From the Effective Date concluding on the Removal Date, Lessee shall be responsible for and pay, when due, all real estate taxes, assessments and fees, which may be levied or assessed against the Leased Property by reason of (i) Lessee's leasehold interest hereunder or Lessee's use of the Leased Property, (ii) the Lessee Improvements and Lessee's or Assignee's equipment located on the Leased Property; and (iii) increases in real estate taxes, assessment and fees over the 2014-2015 base year. Lessee shall remain current on the payment of all such taxes, assessments or other fees or charges of any type. Lessee and Assignees shall not be responsible for the payment of any taxes, assessments, or other fees or charges of any type, which are unrelated to the Lessee's Improvements and which may be levied against or assessed by reason of (i) the value of the unimproved Leased Property and (ii) any improvements or equipment installed on the Leased Property by Lessor or other lessees. Lessor shall remain current on the payment of all such taxes, assessments or other fees or charges of any type, which are unrelated to the Lessee's activities. Notwithstanding the obligations set forth in this paragraph, Lessee is authorized to enter into a Payment in Lieu of Taxes Agreement (PILOT) with the Town of Barnstable. In the event that Lessee enters into a PILOT Agreement with the Town, Lessee's obligations with regard to real and/or personal property taxes will be governed under such PILOT Agreement and such PILOT Agreement will be attached to this Agreement as Exhibit F.

5.4 Maintenance. In addition to its Rent and tax obligations under this Article V, Lessee shall be responsible for maintaining the Leased Property, including without limitation any Lessee Improvements and access roads, plowing, sanding, grading, maintenance of drainage, etc., in good condition and repair and in accordance with all applicable laws. Lessee is not assuming any obligation or liability arising from the Superfund Site /Brownfield Site/ Landfill Site status and environmental condition of, or the presence of Hazardous Materials on, in or under, the Leased Property as in existence on the date of this Agreement, except to the extent attributable to the acts or omissions of Lessee, its agents, contractors, invitees, assignees, or successors, in connection with their use of the Leased Property including exacerbation of environmental conditions. Lessee shall erect and maintain fencing and/or other appropriate security measures around the entire perimeter of the Leased Property so as to prohibit unauthorized access to the Leased Property.

9.3 Termination of this Lease Agreement. At Lessor's option, Lessor may terminate this Lease Agreement and, in such event, Lessee shall surrender the Leased Property to Lessor upon expiration of the Removal Period. If upon termination of this Lease Agreement Lessee fails to surrender the Leased Property upon expiration of the Removal Period, Lessor may enter upon and take possession of the Leased Property by any lawful means, and lock out, expel, or remove Lessee without being guilty in any manner of trespass, without liability for any damage or loss occasioned thereby, and without prejudice to any remedies available to Lessor for possession of the Leased Property, collection of amounts due, breach of contract, or otherwise. Any property belonging to Lessee which shall remain in the Leased Property following said termination shall be deemed to have been abandoned, and either may be disposed of in such manner as Lessor may see fit. Lessee shall be liable for any and all costs and expenses associated with the removal, storage, and/or sell of such property. In addition, Lessee agrees to pay to Lessor on demand the following: (i) any unpaid Rents and other sums due and payable under this Lease Agreement; and (ii) reasonable attorneys' fees and costs incurred in connection with the collection of amounts due under this Lease Agreement, the enforcement and termination of this Lease Agreement, expenses of restoring the Leased Property, and interest on all such amounts due in accordance with Article 5.2.

9.4 Non-Exclusive Remedies. Pursuit of any one remedy shall not preclude pursuit of any other remedy herein provided or any other remedy provided by law or equity, nor shall pursuit of any remedy herein provided constitute a forfeiture or waiver of any Rents or other sums due to Lessor hereunder or of any damages accruing to Lessor by reason of Lessee's violation of any of the terms, provisions, and covenants herein contained. Lessor's acceptance of Rents following an event of default shall not be construed as Lessor's waiver of any such event of default. Additionally, no affirmative waiver by Lessor of any event of default or any violation or breach of the terms, provisions and covenants contained in this Lease Agreement shall be deemed or construed to constitute a waiver of any other violation or default. No payment by Lessee or on behalf of Lessee or receipt by Lessor of any amount less than the amounts due by Lessee hereunder shall be deemed to be anything other than on account of the amounts due by Lessee, nor shall any endorsement or statement on any check or document accompanying any payment be deemed an accord and satisfaction.

## ARTICLE 10 REMOVAL

10.1 Removal of Lessee Improvements. Upon the expiration or termination of this Lease Agreement, Lessee shall, within the Removal Period, satisfactorily accomplish each of the following items:

Remove from the Leased Property all above-ground and below-ground Lessee Improvements, all in a manner which minimizes injury to the Leased Property, but removal of all concrete fittings, foundations, and the hauling away and disposing of, in a lawful manner, all removed concrete and other waste materials, and returning the Leased Property to as close to the original condition as existed prior to the commencement of this Lease Agreement as is reasonably practical.

Lessee shall further, during the Removal Period, comply with any decommissioning obligations required under the then-current Town zoning bylaws.

10.2 Financial Surety. Pursuant to the requirements set forth under §240-44.2(N)(3) of the Barnstable Zoning Bylaw, Lessee shall provide a form of surety, either through escrow account, bond, or otherwise, to cover the cost of removal and disposal in the event the Town must remove the solar facility and remediate the landscape, in an amount and in a form acceptable to the Town Attorney.

10.3 Survival. The removal of Lessee Improvements provided in Section 10.1 shall survive any termination of this Lease Agreement up to and through the Removal Date.

Execution Version

IN WITNESS WHEREOF, Lessor and Lessee, acting through their duly authorized representatives, have executed this Lease Agreement on the date first written above with the intent that it be effective as of the Effective Date, and certify that they have read, understand and agree to the terms and conditions of this Lease Agreement. The parties agree that facsimile signatures shall be deemed as effective as originals.

EAC ORGANICS, INC.

LSDP 15, LLC

By: \_\_\_\_\_

Name: \_\_\_\_\_

Its: \_\_\_\_\_

By: \_\_\_\_\_

Name: Marnin Lebovits

Its: Managing Member

**IN WITNESS WHEREOF**, Lessor and Lessee, acting through their duly authorized representatives, have executed this Lease Agreement on the date first written above with the intent that it be effective as of the Effective Date, and certify that they have read, understand and agree to the terms and conditions of this Lease Agreement. The parties agree that facsimile signatures shall be deemed as effective as originals.

EAC ORGANICS, INC.

LSDP 15, LLC

By: \_\_\_\_\_

By: 

Name: \_\_\_\_\_

Name: Marnin Lebovits

Its: \_\_\_\_\_

Its: Managing Member

Exhibit A-1

Initial Legal Description

Two lots commonly known as 280 Old Falmouth Road, Marston Mills, MA and identified as Lots 007 and 008 on Barnstable Assessor's Map 100.

Lot 007:

SOUTHERLY	by	Old Falmouth Road, a public way, about seven hundred seventy-four (774±) feet;
SOUTHWESTERLY	by	land now or formerly of Mary M. MacLeod, five hundred twenty-five (525) feet;
NORTHWESTERLY	by	said land now or formerly of MacLeod, five hundred seventy-five (575) feet;
NORTHWESTERLY STILL		in the same line by land now or formerly of Wolcott E. Chesley, one hundred forty-seven and 64/100 (147.64) feet; (See plan in Plan Book 164, Page 93)
SOUTHWESTERLY	by	said land now or formerly of Chesley, sixty-eight and 10/100 (68.10) feet;
NORTHWESTERLY AND WESTERLY	by	the centerline of an old road and by said land of Chesley, about two hundred eighty (280±) feet to a cement bound;
NORTHEASTERLY	by	land now or formerly of Cornelius J. and Arlene M. Fair by two courses measuring three hundred thirty-six and 07/100 (336.07) feet and seventy-nine and 26/100 (79.26) feet respectively; (See plan in Plan Book 233, Page 121)
EASTERLY	by	land of Cape Resources, Inc., being Land Court Case No. 39431A, one thousand four hundred forty-six and 90/100 (1,446.90) feet.

Containing 17 acres more or less.

Lot 008:

SOUTHERLY AND SOUTHWESTERLY WESTERLY	by	Barnstable-Falmouth Road, eight hundred twenty-one and 86/100 (821.86) feet;
		by land now or formerly of Addie F. Webster et. al., fourteen hundred forty-six and 90/100 (1446.90) feet;
NORTHEASTERLY	by	land now or formerly of Charles E. Larson et. al., three hundred thirty-five and 81/100 (335.81) feet;
NORTHWESTERLY	by	eight and 82/100 (8.82) feet;
NORTHEASTERLY	by	two hundred forty-three and 81/100 (243.81) feet, by said land now or formerly of Charles E. Larson et. al.;
EASTERLY		eighty-two (82) feet; and
NORTHEASTERLY		three hundred ten and 08/100 (310.08) feet, by said land now or formerly of Charles E. Larson et. al.,; and
EASTERLY	by	land of Owner Unknown, nine hundred fifty and 24/100 (950.24) feet.

All of said boundaries are determined by the Court to be located as shown on Plan 39431-A, dated October 24, 1974, drawn by Baxter & Nye, Inc., Surveyors, and filed in the Land Registration Office at Boston, a copy of which is filed in Barnstable County Registry of Deeds in Land Registration Book 690, Page 14, with Certificate of Title No. 84874. For title, see Certificate of Title No. 106718.

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**Appendix R**

*LSDP 15, LLC Solar Development* plans, prepared by Meridian Associates, Inc.,  
dated August 15, 2016