

**Article XXIII**  
**Large-Scale Ground-Mounted Solar Photovoltaic Installation**

Adopted: January 14, 2011

Amendments Adopted: July 10, 2017

Amendments Adopted: April 8, 2019

**§171-126 – Large-Scale Ground-Mounted Solar Photovoltaic Installation**

<b>1.0 Purpose</b>
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The purpose of this ordinance is to promote the creation of new large-scale ground-mounted solar photovoltaic installations by providing standards for the placement, design, construction, operation, monitoring, modification and removal of such installations that address public safety, minimize impacts on scenic, natural and historic resources and to provide adequate financial assurance for the eventual decommissioning of such installations.

The provisions set forth in this section shall apply to the construction, operation, and/or repair of large-scale ground-mounted solar photovoltaic installations.

Large-Scale Ground-Mounted Solar Photovoltaic Installations shall be subject to a special permit and site plan review as specified in sections 171.28 and 171.29, of the Town of Palmer Zoning Ordinance, Chapter 145 the Town of Palmer Stormwater Management Ordinance, Large Development Projects, and in accordance with the additional requirements specified herein.

Small-Scale Ground-Mounted and Roof Mounted Solar Photovoltaic Installations shall not be erected, constructed, installed or modified without first obtaining a building permit from the Palmer Building Inspector.

All small-scale ground mounted systems shall meet the minimum setbacks of the applicable zoning district, shall be installed either in the side yard or rear yard and shall be subject to the requirements of Chapter 144, Town of Palmer Stormwater Management Ordinance, Small Development Projects.

All Large-Scale Roof Mounted and Solar Parking Canopy systems shall be subject to site plan review as specified in section 171.29 of the Town of Palmer Ordinance the requirements of Chapter 145, Town of Palmer Stormwater Management Ordinance, Large Development Projects.

Solar Parking Canopies shall meet, at a minimum, all dimensional requirements as shown in 171-35 – Table of Dimensional and Density Regulations. Roof-mounted shall be within the perimeter of a building’s roof outline.

**1.1 Applicability**

This section applies to large-scale ground-mounted solar photovoltaic installations constructed after the effective date of this section. This section also pertains to physical modifications that materially alter the type, configuration, or size of these installations or

related equipment throughout the useful life of the system or where alterations may impact abutters.

## 2.0 Definitions

**Large-Scale Ground-Mounted Solar Photovoltaic Installation:** A solar photovoltaic system that is structurally mounted on the ground (not roof-mounted) having a minimum nameplate capacity of 250 kW DC, including all appurtenant fencing, access driveways, drainage infrastructure, electronics and any surrounding shade management areas.

**Small-Scale Ground-Mounted Solar Photovoltaic Installation:** A solar photovoltaic system that is structurally mounted on the ground (not roof-mounted) and has less than a minimum nameplate capacity of 250 kW DC.

**Roof-Mounted Solar Photovoltaic Installation:** A solar photovoltaic system that is structurally mounted to the roof of a building.

**Large-Scale Ground Mounted Solar Dual-Use System:** An Agricultural Solar Tariff Generation Unit

**Agricultural Solar Tariff Generation Unit:** Also known as Agrivoltaics is co-developing the same area of land for both solar photovoltaic power as well as for agriculture. A Solar Tariff Generation Unit located on Land in Agricultural Use or Prime Agricultural Farmland that allows the continued use of the land for agriculture meeting the requirements of 225 CMR 20.00.

**On-Site Solar Photovoltaic Installation:** A solar photovoltaic installation that is constructed at a location where other uses of the underlying property occur.

**Rated Nameplate Capacity:** The maximum rated output of electric power production of the Photovoltaic system in Direct Current (DC).

**Solar Photovoltaic Array:** an arrangement of solar photovoltaic panels.

**Solar Parking Canopy:** An elevated structure that hosts solar panels installed over parking lots or other hardscape areas. Also may be called solar carport installation.

**Ancillary Use:** A use which is customarily incidental, subordinate to, and supporting of the principal use of a lot or structure and is located on the same parcel or contiguous parcels as the principal structure or use. In conjunction with Article XXIII, Section 171.126, Section 3.0, Large-Scale Photovoltaic Installations may be rooftop installations or solar parking canopy installations over parking lots or other hardscaped areas.

**Project Area:** The project area shall consist of that area of land used for the installation of the solar panels, utility poles, appurtenant structures, fencing, entrance and interior access ways, drainage infrastructure, electronics, and any surrounding shade management areas.

## **3.0 General Siting Standards**

### **3.1 Lot and Siting Requirements**

1. Large-Scale Ground-Mounted Solar Photovoltaic Installations shall be permitted on parcels larger than 5 acres located within the Rural Residential district and within the General Business district on parcels larger than 30 acres and have a minimum lot frontage of 250'. Installations within the Industrial A, B, and Urban Renewal Industrial Park District and within the Highway Business and General Business districts shall be, roof-mounted, parking canopy or ground-mounted as ancillary use to an allowable use, only.
2. Large-Scale Ground-Mounted Solar Photovoltaic Installations shall be prohibited on any parcels located in the "Sending Overlay Zone" as shown on the Transfer of Development Rights map, dated September 12, 2006.
3. Large-Scale Ground-Mounted Solar Photovoltaic Installations are prohibited to cover areas identified as having land areas containing Prime Farmland Soils and/or Farmland Soils of Statewide Importance by the Natural Resources Conservation Service. Parcels having areas with these soil-types may be covered by a Large-Scale Ground-Mounted Solar Dual-Use System, only.
4. Large-Scale Ground Mounted Solar Dual-Use System All development on Prime Farmland shall adhere to the construction performance standards outlined in the SMART program. A certification from a professional engineer that the construction of the Solar Tariff Generation Unit complies with the Solar Massachusetts Renewable Target Program (225 CMR 20.00), Guideline Regarding the Definition of Agricultural Solar Tariff Generation Units, dated April 26, 2018 as updated and amended, shall be required.
5. Project generation size shall not exceed 5MW AC. The solar array shall be constructed with the most efficient and environmentally safe panel technology available on the market.
6. Large-Scale Ground-Mounted Solar Photovoltaic Installations shall not be accessed through a common driveway.

### **3.2 Site Control**

The project proponent shall submit documentation of actual or prospective access and control of the project site sufficient to allow for construction and operation of the proposed solar photovoltaic installation.

### **3.3 Setbacks**

1. For large-scale, ground-mounted solar photovoltaic installations the project area shall have a minimum front yard setback of 250 feet and be setback a minimum of 100 feet from all other property lines. The 100 foot setback may be waived or reduced in all districts when abutting railroad tracks or the Massachusetts Turnpike upon Planning Board approval where site conditions allow for a reduced setback without a negative impact on screening.

2. Location of the entrance road and all utility poles shall be centered within the lot's frontage so as to meet the minimum 100' side-yard setbacks.

### **3.4 Vegetated Buffer and Landscaping**

1. Unless reduced per section 3.3.1, a minimum 100' vegetated buffer shall encompass the project area. This area shall meet all applicable requirements of section 171-93, B. (c) General Landscaping for Business abutting residential areas. This buffer shall not be managed, maintained, trimmed or be subject to selective removal for purposes of additional solar gain. Driveways and utility structures may run through the front yard buffer as needed for project access, only as depicted on the approved site plan.

2. Landscaping shall be provided and maintained in accordance with the site plan approved by the Planning Board.

3. Every abutting property shall be visually screened from the Project Area through any one or combination of the following: location, distance, plantings, existing vegetation and fencing (not to exceed 6 feet in height)"

4. If shown to be a more effective screen, a solid brick, stone, wood or black metal fence, or a planted earthen berm may be approved by the Planning Board. These additional methods may not be the dominant form of project screening.

### **3.5 Balanced Site**

No earth material shall be removed from the site. All cuts and fills of earth material shall be balanced.

### **3.6 Open Space Requirement:**

1. For all projects, a minimum area equal to the total project area must remain as natural open space for the life of the project. This land must be on the same lot and contiguous in area. This area shall be clearly depicted on the site plan.
2. Watercourses, lakes, ponds, wetlands and slopes greater than 25% may not be included in open space calculations.
3. The vegetated buffer may be included in the open space calculation

## **4.0 Permit Process, Requirements & Enforcement**

### **4.1 Site Plan and Special Permit Review**

Ground-mounted large scale solar photovoltaic installations with 250 kW or larger of rated nameplate capacity shall undergo site plan and special permit review by the Planning Board prior to construction, installation or modification as provided in this section.

### **4.2 Required Documents**

Pursuant to the site plan review process, the project proponent shall meet the requirements of 171.28, 171.29 as well as provide the following documents:

- (a) A site plan prepared, stamped and signed by a Professional Engineer licensed to practice in Massachusetts showing the following:
  - i. Property lines and physical features, including but not limited to rock outcroppings, ledge, soil types, stonewalls, historic features, wooded areas and major trees (caliper 12” or greater) and roads, for the project site;
  - ii. Proposed changes to the landscape of the site, grading, vegetation clearing and planting, exterior lighting, screening vegetation or structures;
  - iii. Blueprints or drawings of the solar photovoltaic installation signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts showing the proposed layout of the system and any potential shading from nearby structures
  - iv. One or three line electrical diagram detailing the solar photovoltaic installation, associated components, and electrical interconnection methods, with all National Electrical Code compliant disconnects and overcurrent devices;
  - v. Documentation of the major system components to be used, including the PV panels, mounting system, inverter, and storage systems;
  - vi. Name, address, and contact information for proposed system installer;
  - vii. Name, address, phone number and signature of the project proponent, as well as all co-proponents or property owners, if any;
  - viii. The name, contact information and signature of any agents representing the project proponent; and
- (b) Documentation of actual or prospective access and control of the project site;
- (c) An operation and maintenance plan (see also Section 5.7);
- (d) Zoning district designation for the parcel(s) of land comprising the project site;
- (e) Proof of liability insurance;
- (f) Description of financial surety that satisfies Section 6.3
- (g) Landscape Plan prepared by a Certified Landscape Architect.
- (h) Landscape Maintenance Plan detailing the process by which plants and materials are to be maintained and replaced, when necessary.
- (i) Visual Impact Analysis to include, at a minimum, a Visual Envelope Map and/or other methods to satisfy section 5.8.
- (j) A Screening Plan that assures the facility is shielded to the greatest extent possible from public view.
- (k) Any portion of section 4.2 may be waived, if in the opinion of the Planning Board the materials submitted are sufficient for the Board to make a decision.
- (l) All material modifications to a solar photovoltaic installation made after final approval shall require approval by the Planning Board.

<b>5.0 Design Standards</b>
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**5.1 Projects shall, to the greatest extent feasible, be designed to**

- a. Minimize the number of removed trees 12” caliper or larger, the length of removed stone walls, the area of wetland vegetation displaced.
- b. Locate all Utility Poles and Connections in the least invasive location.
- c. Maximize pedestrian and vehicular safety when on the site and entering and



Such designated land shall remain in substantially its natural condition without alteration, including unauthorized (by SPGA) forestry/tree cutting, until such time as the installation is decommissioned. This area is in addition to the open space requirement as described in section 3.6 of this chapter and shall be clearly depicted on the site plan.

3. **Habitat Restoration Within the Project Area:**  
To mitigate for loss of wildlife habitat, plans shall identify areas that create a wildflower meadow habitat within and immediately around the solar array and a successional forest habitat in the surrounding areas managed to prevent shading, until such time as the installation is decommissioned.
4. **Mitigation for loss of stone walls and/or historic features:**  
The removal of stonewalls, historic foundations or other historic land features shall be avoided. If the project area includes the removal of such features, an alternate plan shall be submitted for Planning Board review. If removal of such features is proven to be unavoidable, mitigation shall be required. Mitigation may include replication on site or off site, or may be in the form of a monetary contribution, in the amount equal to the value of replication, towards the local Conservation Trust Fund.
5. **Control of Vegetation:**  
Herbicides or pesticides may not be used to control vegetation or animals at a Ground-Mounted Solar photovoltaic Installation.
6. A diversity of plant species shall be used and be a combination of species native to New England. Use of exotic plants, as identified by the most recent copy of the “Massachusetts Prohibited Plant List” maintained by the Massachusetts Department of Agricultural Resources, shall be prohibited. The establishment of invasive species due to project land disturbance shall be eliminated from the site.
7. Wildflower meadow mix shall have an emphasis on supporting pollinator species. A list of plant species shall be provided to the Planning Board for approval. Recommended resources for planting lists and pollinator habitat management are as follows:
  - a. Massachusetts Department of Agriculture Pollinator Protection Plan  
<https://www.mass.gov/files/documents/2017/06/zw/pollinator-plan.pdf>
  - b. Stockbridge School of Agriculture: Pollinator Gardens, UMass with Mass State Grange  
<https://stockbridge.cns.umass.edu/pollinator-gardens-umass-mass-state-grange>
  - c. “Pollinator Habitat by Design”  
<https://stockbridge.cns.umass.edu/sites/stockbridge.cns.umass.edu/files/Pollinator%20Habitat%20by%20Design.pdf>
  - d. Or other appropriate design standards

## **5.6 Drainage and Erosion Control**

1. Proposed stormwater management proposals shall conform to the c. 145 the Town of Palmer’s Stormwater Management Ordinance. In addition, surface water shall be collected at intervals so that it will not obstruct the flow of vehicular or pedestrian

traffic, and will not create puddles in the paved areas.

2. Plans shall be submitted to prevent the pollution of surface or groundwater, erosion of soil during and after construction; excessive runoff, excessive raising or lowering of the water table; and the flooding of other properties. A detailed erosion and sediment control plan will be required for each development. This plan shall include overall perimeter erosion control barrier (ecb) to define the limit of work, and an internal ecb to intercept flow and prevent long surface runs of stormwater.
3. Regardless of results of the hydrological stormwater model showing the contrary, solar developments shall incorporate stormwater management features to collect and manage surface runoff. At a minimum, perimeter water quality swales shall be designed to intercept stormwater from leaving the project area and direct it to a management and treatment facility (detention/retention basin). The stormwater management and treatment facility shall be sized to accommodate a 50-year design storm event.
4. To ensure proper containment and stabilization of the site during the construction phase, the following design techniques and Stormwater BMPs shall be considered:
  - a. Utilize infiltration trenches, water bar/log bars, sediment basins, and natural vegetative cover
  - b. Phasing of land disturbance and site grading to minimize soil exposure and mobilization
  - c. Provide temporary land stabilization measures for all disturbed surfaces such as mulching until permanent vegetated cover is established.
  - d. Utilize temporary sedimentation basins as appropriate
5. Stormwater generated from the project area shall be prohibited from entering the public way and/or leave the site. Design plans and mitigation measures, such as a reverse grade at entry/access roads, shall be incorporated to ensure this. These design standards and best management practices shall be reviewed for construction and final design phases, and may exceed, upon recommendation of the Planning Board's technical reviewer, those outlined in the MA Department of Environmental Protection Stormwater Management, Volume Two: Stormwater Technical Handbook, as updated or amended.
6. During times of construction and post-construction where stormwater generated from the project area enters the public way, the developer shall be responsible for direct costs incurred by the town, including but not limited to stormwater related clean up, sanding, salting, street sweeping or other necessary management when required for the protection of public health and safety.

## **5.7 Operation & Maintenance Plan**

1. The project proponent shall submit a plan for the operation and maintenance of the large-scale ground-mounted solar photovoltaic installation. This Plan shall address how the owner or operator will maintain the facility in good condition and shall



include, but not be limited to landscape management, painting, structural repairs, and integrity of security measures. Site access shall be maintained to a level acceptable to the local Fire Chief and Emergency Medical Services. The owner or operator shall be responsible for the cost of maintaining the solar photovoltaic installation and any access road(s), unless accepted as a public way.

2. Outdoor storage of materials, equipment and debris is prohibited unless previously approved under site plan review.

## **5.8 Visual Impacts and Glare**

1. In addition to the required Visual Envelope Map in section 4.2., further analysis of visual impacts shall be required on parcels that, in the opinion of the Planning Board, reveal points of concern where arrays can be reasonably seen. Tools to assess the visual impacts may consist of renderings, line-of-sight studies and/or two or three dimensional visualizations ie. Photomontage, videomontage, animation produced through Spatial Information Systems (SIS) and Geographic Information Systems (GIS).
2. The design of the installation shall consider and incorporate human-design landscape features to the greatest extent, including contextual landscape amenities that complement the physical features of the site and abutting property. Whenever reasonable, structures should be screened from view by vegetation and/or joined or clustered to avoid adverse visual impacts and be architecturally compatible with each other. Vegetation shall be varieties native to New England and a mix of deciduous and evergreen species. Planting of the vegetative screening shall be completed prior to final approval of the installation by the Town's Electrical Inspector and Building Inspector.
  - (a) The solar energy system, including all accessories and appurtenant structures shall be designed to minimize visual impacts, including preserving natural vegetation to the maximum extent possible, blending in equipment with the surroundings and adding vegetative buffers to provide an effective visual barrier from adjacent roads and screen abutting residential properties, regardless of development status. Siting shall be such that the view of the solar energy system from locations off site shall be minimal.
  - (b) Reasonable efforts shall be made to design solar energy systems to prevent reflected solar radiation or glare from becoming a public nuisance or hazard to adjacent buildings, roadways, or properties. Such efforts may include, but not be limited to, deliberate placement and arrangement, anti-reflective materials, solar glare modeling, and screening in addition to required landscaping.

## **5.9 Appurtenant Structures**

All appurtenant structures to large-scale, ground-mounted solar photovoltaic installations shall be subject to reasonable regulations concerning the bulk and height of structures, lot area, setbacks, open space, parking and building coverage requirements. All such appurtenant structures, including but not limited to, equipment shelters, storage facilities, transformers, and substations, shall be

architecturally compatible with each other. Whenever reasonable, structures should be blocked from view by vegetation and/or joined or clustered to avoid adverse visual impacts.

### **5.9.1 Hazardous Materials**

Hazardous materials stored, used, or generated on site shall not exceed the amount for a very small quantity generator of hazardous waste as defined by the DEP pursuant to MassDEP regulations 310 CMR 30.000, and shall meet all requirements of the DEP, including storage of hazardous materials in a building with an impervious floor that is not adjacent to any floor drains to prevent discharge to the outdoor environment. If any hazardous materials, including, but not limited to, lithium ion (storage batteries), are used within the solar electric equipment, then impervious containment areas capable of controlling and containing any release of hazardous materials to the environment and to prevent potential contamination of groundwater are required. A list of any hazardous materials proposed to be located on the site and a plan to prevent their release shall be provided to the Planning Board and Fire Department.

### **5.9.2 Noise**

Noise generated by large-scale ground-mounted solar energy systems and associated equipment and machinery shall conform, at a minimum, to applicable state and local noise regulations, including the DEP's Division of Air Quality noise regulations, 310 CMR 7.10.

## **6.0 Additional Provisions**

### **6.1 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 Planning Board. If the owner or operator of the large-scale, ground-mounted solar photovoltaic installation fails to remove the installation in accordance with the requirements of this section within 150 days of abandonment or the proposed date of decommissioning, the town may enter the property and physically remove the installation.

### **6.2 Removal Requirements**

Any large-scale, ground-mounted solar photovoltaic installation, which has reached the end of its useful life or has been abandoned consistent with Section 6.1 of this ordinance, shall be removed. The owner or operator shall physically remove the installation no more than 150 days after the date of discontinued operations. The owner or operator shall notify the Planning Board by certified mail of the proposed date of discontinued operations and plans for removal. Decommissioning shall consist of:

- (a) Physical removal of all large-scale ground-mounted solar photovoltaic installations, structures, equipment, security barriers and transmission lines from the site.
- (b) Disposal of all solid and hazardous waste in accordance with local, state, and federal waste disposal regulations.

- (c) Stabilization or re-vegetation of the site as necessary to minimize erosion. The Planning Board may allow the owner or operator to leave landscaping in order to minimize erosion and disruption to vegetation.

**6.3 Financial Surety**

Proponents of large-scale, ground-mounted solar photovoltaic projects shall provide a form of surety, either through escrow account, bond or otherwise, to cover the cost of removal in the event the town must remove the installation and remediate the landscape, in an amount and form determined to be reasonable by the Planning Board, but in no event to exceed more than 125 percent of the cost of removal and compliance with the additional requirements set forth herein, as determined by the project proponent. Such surety will not be required for municipally- or state-owned facilities. The project proponent shall submit a fully inclusive estimate of the costs associated with removal, prepared by a qualified engineer. The amount shall include a mechanism for calculating increased removal costs due to inflation.

**6.4 Compliance with Laws, Ordinances and Regulations**

The construction and operation of all large-scale solar photovoltaic installations shall be consistent with all applicable local, state and federal requirements, including but not limited to all applicable safety, construction, electrical, and communications requirements. All buildings and fixtures forming part of a solar photovoltaic installation shall be constructed in accordance with the State Building Code.

**6.5 Building Permit and Building Inspection**

No large scale solar photovoltaic installation shall be constructed, installed or modified as provided in this section without first obtaining a building permit.

**6.6 Utility Notification**

No large-scale, ground-mounted solar photovoltaic installation shall be constructed until evidence has been given to the Planning Board that the utility company that operates the electrical grid where the installation is to be located has been informed of the solar photovoltaic installation owner or operator’s intent to install an interconnected customer-owned generator. Off-grid systems shall be exempt from this requirement.

**6.7 Emergency Services**

The large-scale solar photovoltaic installation owner or operator shall provide a copy of the project summary, electrical schematic, and site plan to the local fire chief. Upon request the owner or operator shall cooperate with local emergency services in developing an emergency response plan. All means of shutting down the solar photovoltaic installation shall be clearly marked. The owner or operator shall identify a responsible person for public inquiries throughout the life of the installation.

