

ARTICLE XX ZONING BYLAW AMENDMENT: SOLAR ENERGY SYSTEMS – SMALL-SCALE GROUND-MOUNTED AND ROOF-MOUNTED BYLAW

(Two-thirds vote required)

To see if the Town will vote to amend Boxborough Zoning Bylaw Section 4003 Business/Industrial Use Table, Article IV Use Regulations, Article V Dimensional Requirements (footnotes) and adding Section 7800 Solar Energy Systems – Small-Scale Ground-Mounted and Roof-Mounted, and by adding the following language in bold italics and deleting the language indicated by strikethroughs, and further that non-substantive changes to the numbering of the Zoning Bylaw be permitted in order that it be in compliance with the numbering format of the Zoning Bylaw; or to take an action relative thereto.

4003(4): Business/ Industrial Uses

	AR	R1	B	B1	OP	TC	IC
<i>Roof-Mounted Solar Energy Systems</i>	<i>Y</i>	<i>Y</i>	<i>Y</i>	<i>Y</i>	<i>Y</i>	<i>Y</i>	<i>Y</i>
<i>Small-Scale Ground-Mounted Solar Energy System (2,250 s.f. or less)²⁰</i>	<i>Y¹⁹</i>	<i>Y¹⁹</i>	<i>Y</i>	<i>Y</i>	<i>Y</i>	<i>N</i>	<i>Y</i>

ARTICLE V DIMENSIONAL REQUIREMENTS

5000

FOOTNOTES

¹⁹ ***The Planning Board, by special permit, may reduce setbacks from lot lines for the Solar Layout of a Small-Scale Ground-Mounted Solar Energy System to those of an accessory structure, if such adjustments enhance the overall site design and still provide protection to adjacent properties.***

²⁰ ***To avoid “project segmentation” (i.e., project phasing), in determining the size of a Ground-Mounted Solar Energy System, the area calculated shall be the aggregate area (square Footage) of all such systems on contiguous parcels of land held in common ownership. Any proposed increase in area of existing arrays that would cause the Solar Energy System, in total, to meet a different size definition (i.e., increase from “Small” to “Medium” or “Medium” to “Large”) shall trigger the requirements of the larger size definition.***

7800 Solar Energy Systems – Small-Scale Ground-Mounted and Roof-Mounted

7801 Purpose

To facilitate and provide reasonable regulations for the placement, design, construction, operation, monitoring, modification, removal and recycling of Small-Scale Ground-Mounted and Roof-Mounted Solar Energy Systems that address public health, safety and welfare in accordance with Massachusetts General Law Chapter 40A, Section 3, and which minimizes impacts on scenic, rural, natural and historic community resources.

7802 Applicability

This section shall apply to all Small-Scale Ground-Mounted and Roof-Mounted Solar Energy Systems, including related buildings, structures, and equipment, and to physical modifications of such installations that substantially alter their type, configuration, or size as determined by the Planning Board.

7802.1 Site Plan Approval

Site Plan Approval may be required for Solar Energy Systems as noted below:

- (1) Roof-Mounted Solar Energy Systems do not require Site Plan Approval.**
- (2) Small-Scale Ground-Mounted Solar Energy Systems require Site Plan Approval if the proposed Solar Energy System is, a) located in an Agricultural-Residential (AR) or Residential 1 (R-1) zoning district and b) requires placement in the front or side yard due to an inability to site said Solar Energy System in the rear yard.**
- (3) Pre-existing, non-conforming Small-Scale Ground-Mounted Solar Energy Systems are not subject to Site Plan Approval unless they are substantially altered, as determined by the Planning Board. Any increase in square footage is considered a substantial alteration and shall be subject to review by the Planning Board.**
- (4) Small-Scale Ground-Mounted and / or Roof-Mounted Solar Energy Systems, included in Development and Redevelopment plans subject to Site Plan Approval under Section 8000, will be reviewed as part of the Site Plan Approval review process.**
- (5) Site Plan Approval Application Policy and Procedures - Applicants undergoing Site Plan Approval for Small-Scale Ground-Mounted and Roof-Mounted Solar Energy Systems shall refer to the following document(s) for additional information regarding application requirements:**
 - **“Site Plan Approval Provisions for Small-Scale Ground-Mounted and Roof-Mounted Solar Energy Systems”**
 - **“Minor Site Plan Approval provisions for Small-Scale Ground-Mounted Solar Energy Systems”**

7802.2 Designation of Special Permit Granting Authority

Where a special permit is required pursuant to Sections 4003(4) and 4XXX, the Planning Board shall be the Special Permit Granting Authority (SPGA) for Medium and Large-Scale Ground-Mounted Solar Energy Systems.

7803 Solar Energy System Definitions

- 7803.1** ***Ground-Mounted shall mean that installations are structurally mounted to the ground in any manner, including but not limited to ground anchored pole, rack, or rail installations, or non-ground penetrating ballasted installations; Roof-mounted installations or canopy installations above parking lots or driveways are not Ground-Mounted Solar Energy Systems.***
- 7803.2** ***Solar Collector shall mean a device, structure or a part of a device or structure for which the primary purpose is to transform solar radiant energy into thermal, mechanical, chemical, or electrical energy.***
- 7803.3** ***Solar Energy shall mean radiant energy received from the sun that can be collected in the form of heat or light by a Solar Collector.***
- 7803.4** ***Solar Energy System shall mean a device or structural design feature, whose primary purpose is to harvest energy by transforming solar energy into another form of energy or transferring heat from a Solar Collector to another medium using mechanical, electrical, or chemical***

- means such as to provide daylight for interior lighting or provide for the collection, storage and distribution of solar energy for space heating or cooling, electricity generation, or water heating.
- 7803.5 ***Solar Energy System, Ground-Mounted*** shall mean a Solar Energy System of any size that is structurally mounted to the ground in any manner, including but not limited to ground anchored pole, rack, or rail installations, or non-ground penetrating ballasted installations; not roof-mounted installations or canopy installations above parking lots or driveways.
- 7803.6 ***Solar Energy System, Roof-Mounted*** shall mean a Solar Energy System that is structurally mounted to the roof of a building or structure; may be of any size (small-, medium- or large-scale).
- 7803.7 ***Solar Energy System, Small-Scale Ground-Mounted*** shall mean a Solar Energy System with a Solar Layout of 2,250 square feet or less. Inclusive of appurtenant structures.
- 7803.8 ***Solar Layout*** shall mean the total area of the vertical projection on the ground of all Solar Collectors in the installation's most horizontal tilt position.
- 7803.9 ***Utility Provider*** shall mean the local electrical distribution company (Littleton Electric Light Department (LELD) or other).

7804 Standards and Requirements

The following provisions shall apply to all Small-Scale Ground-Mounted and Roof-Mounted Solar Energy Systems in zoning districts where they are a permitted use.

(1) Setbacks

The Solar Layout of a Small-Scale Ground-Mounted Solar Energy System and Roof-Mounted Solar Layouts of an installation along with appurtenant structures, including but not limited to: buildings, equipment shelters, storage facilities, transformers and substations shall adhere to the building setbacks for front, side and rear yard dimensional requirements of the zoning district in which it is located.

All Small-Scale Ground-Mounted Solar Energy Systems in Agricultural-Residential Districts (AR) or Residential Districts (R-1) shall be installed in the rear yard to the greatest extent practicable. Placement of such systems, or a portion of such systems, in front or side yards is allowed only upon demonstration to the Planning Board that locating the Solar Energy System solely within the rear yard is not practicable or would result in a significant reduction of the Solar Energy Systems performance. Location of some or all of the Solar Energy System within the front or side yard in Agricultural-Residential Districts (AR) or Residential Districts (R-1) shall require a Minor Site Plan Approval.

(2) Landscaping and Screening

Additional screening is not required for Small-Scale Ground-Mounted Solar Energy Systems so long as said systems are sited in the rear yard and property setbacks for the rear and side yard are maintained in a vegetated state, including existing

trees and woods, or evergreen plantings, at least three feet in height at the time of planting and which will normally at maturity reach at least five feet in height.

(3) Protection of Forest Land, Land Clearing, Habitat Impacts and Historically Significant Structures

- a) Land Clearing - Not more than one (1) acre of land shall be deforested for any one Small-Scale Ground-Mounted Solar Energy System. Clearing of natural vegetation shall be limited to what is necessary for the construction, operation and maintenance of the Solar Energy System or otherwise prescribed by applicable laws, regulations, and bylaws/ordinances.**
- b) Prohibited Locations - Small-Scale Ground-Mounted Solar Energy Systems are prohibited in locations of wetlands or aquifer districts as mapped by the Town of Boxborough, permanently protected open space as defined by the Town of Boxborough Open Space and Recreation Plan, Priority Habitat Areas and BioMap2 Core Habitat and Critical Natural Landscape as mapped by the Massachusetts Division of Fisheries and Wildlife's Natural Heritage & Endangered Species Program (NHESP) and Habitat of Potential Regional or Statewide Importance as mapped by the Department of Environmental Protection (DEP).**
- c) Historically Significant Structures – Solar Energy Systems on historically significant structures as identified by the Boxborough Historical Commission or as designated by federal, state, or local registries or databases, shall have limited or no visibility to the public and be integrated into the structure to minimize adverse visual impacts. The Planning Board and Design Review Board (in accordance with their purview under the Zoning Bylaw), reserve the right to recommend modifications to the proposed Solar Energy Systems to maintain the historical character of structures(s).**

(4) Decommissioning

Upon decommissioning of Solar Energy Systems all solar panel components shall be reused or recycled using industry best practices available at the time of decommissioning.

(5) Height Limitations

Existing zoning district height limitations apply to all Small-Scale Ground-Mounted Solar Energy Systems. If the Small-Scale Ground-Mounted Solar Energy System is accessory to a principal building or structure on a lot, then the height restriction for accessory structures would apply as defined in Section 5008 of this Bylaw. If the Small-Scale Ground-Mounted Solar Energy System is the principal structure on a lot, then the height restriction shall be a maximum of fifteen (15) feet from finished grade. An increase in height may be granted in commercial districts by special permit.

	AR	R1	B	B1	OP	TC	IC
Roof-Mounted Solar Energy Systems	Y	Y	Y	Y	Y	Y	Y
Small-Scale Ground-Mounted Solar Energy System (2,250 s.f. or less)²⁰	Y¹⁹	Y¹⁹	Y	Y	Y	N	Y

ARTICLE V DIMENSIONAL REQUIREMENTS

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FOOTNOTES

¹⁹ *The Planning Board, by special permit, may reduce setbacks from lot lines for the Solar Layout of a Small-Scale Ground-Mounted Solar Energy System to those of an accessory structure, if such adjustments enhance the overall site design and still provide protection to adjacent properties.*

²⁰ *To avoid “project segmentation” (i.e., project phasing), in determining the size of a Ground-Mounted Solar Energy System, the area calculated shall be the aggregate area (square Footage) of all such systems on contiguous parcels of land held in common ownership. Any proposed increase in area of existing arrays that would cause the Solar Energy System, in total, to meet a different size definition (i.e., increase from “Small” to “Medium” or “Medium” to “Large”) shall trigger the requirements of the larger size definition.*

ARTICLE XX ZONING BYLAW AMENDMENT: SOLAR ENERGY SYSTEMS – MEDIUM AND LARGE-SCALE GROUND-MOUNTED BYLAW

(Two-thirds vote required)

To see if the Town will vote to amend Boxborough Zoning Bylaw Section 4003 Business/Industrial Use Table, Article IV Use Regulations, Article V Dimensional Requirements (footnotes) and adding Section 7800 Solar Energy Systems – Medium and Large-Scale Ground-Mounted, and by adding the following language in bold italics and deleting the language indicated by strikethroughs, and further that non-substantive changes to the numbering of the Zoning Bylaw be permitted in order that it be in compliance with the numbering format of the Zoning Bylaw; or to take an action relative thereto.

4003(4): BUSINESS/ INDUSTRIAL USES

DISTRICTS

	AR	R1	B	B1	OP	TC	IC
<i>Medium-Scale Ground-Mounted Solar Energy System²⁰</i>	<i>N</i>	<i>SP (PB)</i>	<i>Y</i>	<i>Y</i>	<i>Y</i>	<i>N</i>	<i>Y</i>
<i>Large-Scale Ground-Mounted Solar Energy System²⁰</i>	<i>N</i>	<i>N</i>	<i>SP (PB)</i>	<i>SP (PB)</i>	<i>SP (PB)</i>	<i>N</i>	<i>SP (PB)</i>

ARTICLE IV USE REGULATIONS

4XXX Special Permits for Medium or Large-Scale Ground Mounted Solar Energy Systems

The Planning Board shall be the Special Permit Granting Authority for the issuance of special permits in the case where an applicant requests to install a Medium or Large-Scale Ground-Mounted Solar Energy System. In addition to the standards set forth in Section 7800 of this Bylaw, the Special Permit Granting Authority shall also consider each of the following factors before the issuance of a special permit:

- (1) Suitability of the site for the proposed Medium or Large-Scale Ground-Mounted Solar Energy System;***
- (2) Adequate landscaped and natural buffers are provided around the installation. Where applicable, physical buffers, such as berms and/or fences are proposed between residential and installations of Medium or Large-Scale Ground-Mounted Solar Energy System;***
- (3) The proposal, to the maximum extent possible, protects the existing tree canopy and stone walls on Massachusetts Avenue (Route 111) and along designated scenic roadways;***
- (4) The proposal retains and/or preserves unique natural, historical or cultural resources located on the site, if any;***

ARTICLE V DIMENSIONAL REQUIREMENTS

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FOOTNOTES

²⁰ To avoid “project segmentation” (i.e., project phasing), in determining the size of a Ground-Mounted Solar Energy System, the area calculated shall be the aggregate area (square footage) of all such systems on contiguous parcels of land held in common ownership. Any proposed increase in area of existing arrays that would cause the Solar Energy System, in total, to meet a different size definition (i.e., increase from “Small” to “Medium” or “Medium” to “Large”) shall trigger the requirements of the larger size definition.

7800 Solar Energy Systems – Medium and Large-Scale Ground-Mounted

7801 Purpose

To facilitate and provide reasonable regulations for the placement, design, construction, operation, monitoring, modification, removal and recycling of Medium and Large-Scale Ground-Mounted Solar Energy Systems that address public health, safety and welfare in accordance with Massachusetts General Law Chapter 40A, Section 3, and which minimizes impacts on scenic, rural, natural and historic community resources, and provides adequate financial assurance for the eventual decommissioning of such installations.

7802 Applicability

This section shall apply to all Medium and Large-Scale Ground Mounted Solar Energy Systems, including related buildings, structures, and equipment, and to physical modifications of such installations that substantially alter their type, configuration, or size as determined by the Planning Board.

7802.1 Site Plan Approval

Site Plan Approval may be required for Solar Energy Systems as noted below:

- (1) Medium and / or Large-Scale Ground-Mounted Solar Energy Systems require Site Plan Approval.*
- (2) Site Plan Approval Application Policy and Procedures - Applicants undergoing Site Plan Approval for Medium and / or Large-Scale Ground-Mounted Solar Energy Systems shall refer to the following document(s) for additional information regarding application requirements:*
 - “Site Plan Approval provisions for Medium-Scale Ground-Mounted Solar Energy Systems”*
 - “Site Plan Approval provisions for Large-Scale Ground-Mounted Solar Energy Systems”*

7802.2 Designation of Special Permit Granting Authority

Where a special permit is required pursuant to Sections 4003(4) and 4XXX, the Planning Board shall be the Special Permit Granting Authority (SPGA) for Medium and Large-Scale Ground-Mounted Solar Energy Systems.

7803 Solar Energy System Definitions

7803.1 *Agrivoltaics or Dual Use shall mean the co-developing of the same area of land for both solar photovoltaic power as well as for agriculture. The coexistence of solar panels and crops implies a sharing of light between these two types of production.*

7803.2 *Community Solar Farm shall mean a Solar Energy System, Ground-Mounted that provides electricity or bill credits to three or more unique customers serviced by the Utility Provider. The share of any one customer shall not exceed 50% of the total capacity of the Solar Energy System.*

- 7803.3 ***Ground-Mounted*** shall mean that installations are structurally mounted to the ground in any manner, including but not limited to ground anchored pole, rack, or rail installations, or non-ground penetrating ballasted installations; Roof-mounted installations or canopy installations above parking lots or driveways are not Ground-Mounted Solar Energy Systems.
- 7803.4 ***Solar Collector*** shall mean a device, structure or a part of a device or structure for which the primary purpose is to transform solar radiant energy into thermal, mechanical, chemical, or electrical energy.
- 7803.5 ***Solar Energy*** shall mean radiant energy received from the sun that can be collected in the form of heat or light by a Solar Collector.
- 7803.6 ***Solar Energy System*** shall mean a device or structural design feature, whose primary purpose is to harvest energy by transforming solar energy into another form of energy or transferring heat from a Solar Collector to another medium using mechanical, electrical, or chemical means such as to provide daylight for interior lighting or provide for the collection, storage and distribution of solar energy for space heating or cooling, electricity generation, or water heating.
- 7803.7 ***Solar Energy System, Ground-Mounted*** shall mean a Solar Energy System of any size that is structurally mounted to the ground in any manner, including but not limited to ground anchored pole, rack, or rail installations, or non-ground penetrating ballasted installations; not roof-mounted installations or canopy installations above parking lots or driveways.
- 7803.8 ***Solar Energy System, Large-Scale Ground-Mounted*** shall be considered an industrial facility use and mean a Solar Energy System with a Solar Layout that occupies 40,000 square feet or more of surface area (equivalent to a rated nameplate capacity of about 250kW DC or greater). Inclusive of appurtenant structures.
- 7803.9 ***Solar Energy System, Medium-Scale Ground-Mounted*** shall be considered an industrial facility use and mean a Solar Energy System with a Solar Layout that occupies more than 2,250 but less than 40,000 square feet of surface area (equivalent to a rated nameplate capacity of about 10 - 250 kW DC). Inclusive of appurtenant structures.
- 7803.10 ***Solar Layout*** shall mean the total area of the vertical projection on the ground of all Solar Collectors in the installation's most horizontal tilt position and shall include all spaces between the panels.
- 7803.11 ***Utility Provider*** shall mean the local electrical distribution company (Littleton Electric Light Department (LELD) or other).

7804 Standards and Requirements

The following provisions shall apply to all Medium-Scale and Large-Scale Ground-Mounted Solar Energy Systems in zoning districts where they are a permitted use.

(1) Setbacks

The Solar Layouts of Medium-Scale or Large-Scale Ground-Mounted Solar Energy Systems, along with all appurtenant structures, including but not limited to: buildings equipment shelters, storage facilities, transformers and substations shall

adhere to a one hundred (100) foot front, side and rear yard setback requirement in all zoning districts. The Planning Board may reduce setbacks from lot lines by special permit for the Solar Layout of a Medium-Scale Ground-Mounted Solar Energy System of 5,000 square feet or less if such adjustments enhance the overall site design and still provide protection to adjacent properties. In such a case, additional screening may be required to minimize adverse impacts.

Any Medium-Scale Ground-Mounted Solar Energy Systems allowed by Special Permit within residential districts shall be installed in the rear yard.

(2) Landscaping and Screening

All appurtenant structures, including but not limited to: buildings, equipment shelters, storage facilities, transformers, and substations shall be architecturally compatible with each other. All structures shall be hidden from view by vegetation or fencing and shall be in place prior to operation. Landscape plantings and/or solid fenced screening shall be provided to reduce the visual impact of Ground-Mounted Solar Energy Systems, along with all appurtenant structures, and specifically to protect nearby receptors from danger, harm, or nuisance that may result from reflective glare. Solar Energy Systems and all appurtenant structures shall have anti-reflective surfaces.

Front, side and rear yard setback areas shall be designed to reduce the visual impact of the Medium and Large-Scale Ground-Mounted Solar Energy System upon adjacent property by use of trees and shrubs and/or naturally vegetated conditions or fencing. Where naturally vegetated conditions are insufficient to reduce visual impacts year-round, landscape plantings for Medium and Large-Scale Ground-Mounted Solar Energy Systems shall consist of a densely planted screen of evergreen foliage not less than eight (8) feet in height at the time of installation. Suitable landscape plantings shall consist of native species identified by the UMass Clean Energy Extension Pollinator-Friendly Solar PV for Massachusetts initiative.

Should fencing be used, it shall be no more than seven (7) feet high, constructed of durable materials and supplemented with landscape plantings, as defined above. Berms or other methods to adequately screen the facility, depending on site specific conditions may be considered. All screening shall be maintained and replaced as necessary by the owner / operator of the Medium or Large-Scale Ground-Mounted Solar Energy System.

(3) Lighting

Lighting of Medium and Large-Scale Ground-Mounted Solar Energy Systems and appurtenant structures shall be limited to that required for safety and operational purposes, and shall be fully shielded from abutting properties. Lighting of the Medium or Large-Scale Ground-Mounted Solar Energy System shall be directed downward and shall incorporate full cut-off fixtures to reduce light pollution. Security lighting shall be controlled by motion detectors or infrared sensors with an on-time of no more than ten (10) minutes per activation. No all-night lighting will be allowed.

(4) Utility Connections

All utility connections, conduits, cables, power lines, transformers and inverters shall be placed underground, except (a) where otherwise required by the Massachusetts State Building Code, Massachusetts and/or National Electric Code, the Utility Provider or other authority having jurisdiction; (b) in adverse ground conditions such as appropriate soil conditions, shape and topography of the site, ledge or excess water; or (c) for connection to existing above ground utility lines.

- a) Wiring – Wiring within the installation’s Solar Layout shall follow industry standards and meet the requirements of the Utility Provider.*
- b) Aboveground Connections - Aboveground connections that already exist proximate to the site of the proposed facilities may be used, subject to Site Plan Approval by the Planning Board and subject to the requirements of the Utility Provider.*
- c) Electrical Transformers - Electrical transformers for utility interconnections may be located above ground, subject to Site Plan Approval by the Planning Board and subject to the requirements of the Utility Provider.*
- d) Access Roads
 - a. Where feasible all access roads and utilities shall minimize bisecting of the property and be installed along the perimeter of project.*
 - b. Access roads and associated tree clearing shall not exceed twenty-five (25) feet in width.**

(5) Noise

- a) Noise Generating Equipment - All noise-generating equipment shall be installed as far from abutting structures as practical to mitigate potential noise impacts.*
- b) Noise Studies - A pre and post-construction noise study shall be required of all Large-Scale Ground-Mounted Solar Energy System installations to demonstrate that the facility is in compliance with the Massachusetts DEP’s Noise Policy.*

(6) Signs

- a) Signs shall comply with the requirements of Section 6300 of this Bylaw.*
- b) Dimensions – Facilities located within the Agricultural / Residential Districts shall not have more than one (1) sign, with dimensions no larger than one (1) square foot in area per side shall be required to identify the owner and provide a 24-hour emergency contact phone number and may be installed with the trademarks of the installer, manufacturer, and operator of the installation.*
- c) Advertisements - Medium and Large-Scale Ground-Mounted Solar Energy Systems shall not be used for displaying any advertising except for reasonable identification of the manufacturer, owner or operator of the Solar Energy System.*
- d) Visibility - Signs should not be visible to abutters nor to passersby on the street, if it can still be visible for emergency purposes.*

(6) Stormwater Management and Conservation

Best management practices shall be used for controlling and managing stormwater run-off and drainage for Medium and Large-Scale Ground-Mounted Solar Energy Systems in compliance with all applicable federal, state and local regulations. To the largest extent possible, the ground shall remain pervious to rain water. Where necessary, adequate provision shall be made for groundwater recharge and to prevent site run-off and erosion.

Calculation of Impervious Area - Medium and Large-Scale Ground-Mounted Solar Energy Systems shall not be included in calculations for lot coverage or impervious cover so long as the Solar Collectors have planted surfaces beneath them such as pollinator habitat, dual-use solar or agrivoltaics installations. If the area beneath a Medium or Large-Scale Ground-Mounted Solar Energy System is to be paved or otherwise rendered impervious then this land area shall in fact count toward any coverage or impervious surface limit. Land required for access roads, utility connections and appurtenant structures will be included in calculations for lot coverage or impervious cover of land.

(7) Protection of Forest Land and Prime Farm Land, Land Clearing, Habitat Impacts and Historically Significant Structures

- a) Land Clearing - Not more than one (1) acre of land shall be deforested for any one Medium and/or Large-Scale Ground-Mounted Solar Energy System, and no such installation shall be placed on such land that was deforested within the prior 5 years, unless said installation is for the benefit of the Town of Boxborough, such as a Community Solar Farm. Clearing of natural vegetation shall be limited to what is necessary for the construction, operation and maintenance of the Solar Energy System or otherwise prescribed by applicable laws, regulations, and bylaws/ordinances.**
- b) Prohibited Locations – Medium and / or Large-Scale Ground-Mounted Solar Energy Systems are prohibited in locations of old growth forest, prime farmland soils as defined by the US Department of Agriculture Natural Resources Conservation Service, wetlands, aquifer districts, permanently protected open space, Priority Habitat Areas and BioMap2 Core Habitat and Critical Natural Landscape mapped by the Massachusetts Division of Fisheries and Wildlife’s Natural Heritage & Endangered Species Program (NHESP) and Habitat of Potential Regional or Statewide Importance as mapped by the Massachusetts Department of Environmental Protection (DEP).**
- c) Historically Significant Structures – Solar Energy Systems on historically significant structures as identified by the Boxborough Historical Commission or as designated by federal, state, or local registries or databases, shall have limited or no visibility to the public and be integrated into the structure to minimize adverse visual impacts. The Planning Board and Design Review Board (in accordance with their purview under the Zoning Bylaw), reserve the right to recommend modifications to the proposed Solar Energy Systems to maintain the historical character of structure(s).**

d) Preferred Locations - Siting of Solar Energy Systems is encouraged in the following locations:

- **Building Roofs**
- **Brownfield sites and previously developed sites**
- **Parking lots**

Greenfield development is discouraged. Applicants who propose greenfield installations will be required to demonstrate why the proposed site is preferable to a previously developed site. Such demonstration shall include a comparison of environmental impacts and a cost-benefit assessment.

(8) Height Limitations

- a) Existing zoning district height limitations apply for all Ground-Mounted Solar Energy Systems.**
- b) If a Ground-Mounted Solar Energy System is accessory to a principal building or structure on a lot, then the height restriction for accessory structures would apply as defined in Section 5008 of this Bylaw.**
- c) If a Ground-Mounted Solar Energy System is the principal structure on a lot, then the height restriction shall be a maximum of fifteen (15) feet from finished grade.**
- d) An increase in height may be granted in commercial districts by special permit from the Planning Board.**

(9) Decommissioning

- a) Upon decommissioning of Solar Energy Systems all solar panel components shall be reused or recycled using industry best practices available at the time of decommissioning.**
- b) Life-Cycle Analysis – At the time of Application for Site Plan Approval, the Applicant may be required, as deemed appropriate by the Planning Board, to demonstrate a life-cycle analysis of the components to ensure that there is a net environmental benefit to the proposed installation.**
- c) Surety - Proponents of Large-Scale Ground-Mounted Solar Energy Systems 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% of the cost of removal and compliance with the additional requirements set forth herein, as determined by the project proponent. 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.**

4003(4): Business/ Industrial Uses

	AR	R1	B	B1	OP	TC	IC
Medium-Scale Ground-Mounted Solar Energy System²⁰	N	SP (PB)	Y	Y	Y	N	Y

Large-Scale Ground-Mounted Solar Energy System²⁰	N	N	SP (PB)	SP (PB)	SP (PB)	N	SP (PB)
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ARTICLE IV USE REGULATIONS

4XXX Special Permits for Medium or Large-Scale Ground Mounted Solar Energy Systems

The Planning Board shall be the Special Permit Granting Authority for the issuance of special permits in the case where an applicant requests to install a Medium or Large-Scale Ground-Mounted Solar Energy System. In addition to the standards set forth in Section 7800 of this Bylaw, the Special Permit Granting Authority shall also consider each of the following factors before the issuance of a special permit:

- (1) Suitability of the site for the proposed Medium or Large-Scale Ground-Mounted Solar Energy System;**
- (2) Adequate landscaped and natural buffers are provided around the installation. Where applicable, physical buffers, such as berms and/or fences are proposed between residential and installations of Medium or Large-Scale Ground-Mounted Solar Energy System;**
- (3) The proposal, to the maximum extent possible, protects the existing tree canopy and stone walls on Massachusetts Avenue (Route 111) and along designated scenic roadways;**
- (4) The proposal retains and/or preserves unique natural, historical or cultural resources located on the site, if any;**

ARTICLE V DIMENSIONAL REQUIREMENTS

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FOOTNOTES

²⁰ **To avoid “project segmentation” (i.e., project phasing), in determining the size of a Ground-Mounted Solar Energy System, the area calculated shall be the aggregate area (square footage) of all such systems on contiguous parcels of land held in common ownership. Any proposed increase in area of existing arrays that would cause the Solar Energy System, in total, to meet a different size definition (i.e., increase from “Small” to “Medium” or “Medium” to “Large”) shall trigger the requirements of the larger size definition.**

7800 Solar Energy Systems – Medium and Large-Scale Ground-Mounted

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7802.2 Designation of Special Permit Granting Authority

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- 7803.1 Agrivoltaics or Dual Use shall mean the co-developing of the same area of land for both solar photovoltaic power as well as for agriculture. The coexistence of solar panels and crops implies a sharing of light between these two types of production.

- 7803.2 Community Solar Farm shall mean a Solar Energy System, Ground-Mounted that provides electricity or bill credits to three or more unique customers serviced by the Utility Provider. The share of any one customer shall not exceed 50% of the total capacity of the Solar Energy System.
- 7803.3 Ground-Mounted shall mean that installations are structurally mounted to the ground in any manner, including but not limited to ground anchored pole, rack, or rail installations, or non-ground penetrating ballasted installations; Roof-mounted installations or canopy installations above parking lots or driveways are not Ground-Mounted Solar Energy Systems.
- 7803.4 Solar Collector shall mean a device, structure or a part of a device or structure for which the primary purpose is to transform solar radiant energy into thermal, mechanical, chemical, or electrical energy.
- 7803.5 Solar Energy shall mean radiant energy received from the sun that can be collected in the form of heat or light by a Solar Collector.
- 7803.6 Solar Energy System shall mean a device or structural design feature, whose primary purpose is to harvest energy by transforming solar energy into another form of energy or transferring heat from a Solar Collector to another medium using mechanical, electrical, or chemical means such as to provide daylight for interior lighting or provide for the collection, storage and distribution of solar energy for space heating or cooling, electricity generation, or water heating.
- 7803.7 Solar Energy System, Ground-Mounted shall mean a Solar Energy System of any size that is structurally mounted to the ground in any manner, including but not limited to ground anchored pole, rack, or rail installations, or non-ground penetrating ballasted installations; not roof-mounted installations or canopy installations above parking lots or driveways.
- 7803.8 Solar Energy System, Large-Scale Ground-Mounted shall be considered an industrial facility use and mean a Solar Energy System with a Solar Layout that occupies 40,000 square feet or more of surface area (equivalent to a rated nameplate capacity of about 250kW DC or greater). Inclusive of appurtenant structures.
- 7803.9 Solar Energy System, Medium-Scale Ground-Mounted shall be considered an industrial facility use and mean a Solar Energy System with a Solar Layout that occupies more than 2,250 but less than 40,000 square feet of surface area (equivalent to a rated nameplate capacity of about 10 - 250 kW DC). Inclusive of appurtenant structures.
- 7803.10 Solar Layout shall mean the total area of the vertical projection on the ground of all Solar Collectors in the installation's most horizontal tilt position and shall include all spaces between the panels.

7803.11 Utility Provider shall mean the local electrical distribution company (Littleton Electric Light Department (LELD) or other).

7804 Standards and Requirements

The following provisions shall apply to all Medium-Scale and Large-Scale Ground-Mounted Solar Energy Systems in zoning districts where they are a permitted use.

(1) Setbacks

The Solar Layouts of Medium-Scale or Large-Scale Ground-Mounted Solar Energy Systems, along with all appurtenant structures, including but not limited to: buildings equipment shelters, storage facilities, transformers and substations shall adhere to a one hundred (100) foot front, side and rear yard setback requirement in all zoning districts. The Planning Board may reduce setbacks from lot lines by special permit for the Solar Layout of a Medium-Scale Ground-Mounted Solar Energy System of 5,000 square feet or less if such adjustments enhance the overall site design and still provide protection to adjacent properties. In such a case, additional screening may be required to minimize adverse impacts.

Any Medium-Scale Ground-Mounted Solar Energy Systems allowed by Special Permit within residential districts shall be installed in the rear yard.

(2) Landscaping and Screening

All appurtenant structures, including but not limited to: buildings, equipment shelters, storage facilities, transformers, and substations shall be architecturally compatible with each other. All structures shall be hidden from view by vegetation or fencing and shall be in place prior to operation. Landscape plantings and/or solid fenced screening shall be provided to reduce the visual impact of Ground-Mounted Solar Energy Systems, along with all appurtenant structures, and specifically to protect nearby receptors from danger, harm, or nuisance that may result from reflective glare. Solar Energy Systems and all appurtenant structures shall have anti-reflective surfaces.

Front, side and rear yard setback areas shall be designed to reduce the visual impact of the Medium and Large-Scale Ground-Mounted Solar Energy System upon adjacent property by use of trees and shrubs and/or naturally vegetated conditions or fencing. Where naturally vegetated conditions are insufficient to reduce visual impacts year-round, landscape plantings for Medium and Large-Scale Ground-Mounted Solar Energy Systems shall consist of a densely planted screen of evergreen foliage not less than eight (8) feet in height at the time of installation. Suitable landscape plantings shall consist of native species identified by the UMass Clean Energy Extension Pollinator-Friendly Solar PV for Massachusetts initiative.

Should fencing be used, it shall be no more than seven (7) feet high, constructed of durable materials and supplemented with landscape plantings,

as defined above. Berms or other methods to adequately screen the facility, depending on site specific conditions may be considered. All screening shall be maintained and replaced as necessary by the owner / operator of the Medium or Large-Scale Ground-Mounted Solar Energy System.

(3) Lighting

Lighting of Medium and Large-Scale Ground-Mounted Solar Energy Systems and appurtenant structures shall be limited to that required for safety and operational purposes, and shall be fully shielded from abutting properties. Lighting of the Medium or Large-Scale Ground-Mounted Solar Energy System shall be directed downward and shall incorporate full cut-off fixtures to reduce light pollution. Security lighting shall be controlled by motion detectors or infrared sensors with an on-time of no more than ten (10) minutes per activation. No all-night lighting will be allowed.

(4) Utility Connections

All utility connections, conduits, cables, power lines, transformers and inverters shall be placed underground, except (a) where otherwise required by the Massachusetts State Building Code, Massachusetts and/or National Electric Code, the Utility Provider or other authority having jurisdiction; (b) in adverse ground conditions such as appropriate soil conditions, shape and topography of the site, ledge or excess water; or (c) for connection to existing above ground utility lines.

- a) Wiring – Wiring within the installation’s Solar Layout shall follow industry standards and meet the requirements of the Utility Provider.
- b) Aboveground Connections - Aboveground connections that already exist proximate to the site of the proposed facilities may be used, subject to Site Plan Approval by the Planning Board and subject to the requirements of the Utility Provider.
- c) Electrical Transformers - Electrical transformers for utility interconnections may be located above ground, subject to Site Plan Approval by the Planning Board and subject to the requirements of the Utility Provider.
- d) Access Roads
 - a. Where feasible all access roads and utilities shall minimize bisecting of the property and be installed along the perimeter of project.
 - b. Access roads and associated tree clearing shall not exceed twenty-five (25) feet in width.

(5) Noise

- a) Noise Generating Equipment - All noise-generating equipment shall be installed as far from abutting structures as practical to mitigate potential noise impacts.

- b) Noise Studies - A pre and post-construction noise study shall be required of all Large-Scale Ground-Mounted Solar Energy System installations to demonstrate that the facility is in compliance with the Massachusetts DEP's Noise Policy.

(6) Signs

- a) Signs shall comply with the requirements of Section 6300 of this Bylaw.
- b) Dimensions – Facilities located within the Agricultural / Residential Districts shall not have more than one (1) sign, with dimensions no larger than one (1) square foot in area per side shall be required to identify the owner and provide a 24-hour emergency contact phone number and may be installed with the trademarks of the installer, manufacturer, and operator of the installation.
- c) Advertisements - Medium and Large-Scale Ground-Mounted Solar Energy Systems shall not be used for displaying any advertising except for reasonable identification of the manufacturer, owner or operator of the Solar Energy System.
- d) Visibility - Signs should not be visible to abutters nor to passersby on the street, if it can still be visible for emergency purposes.

(6) Stormwater Management and Conservation

Best management practices shall be used for controlling and managing stormwater run-off and drainage for Medium and Large-Scale Ground-Mounted Solar Energy Systems in compliance with all applicable federal, state and local regulations. To the largest extent possible, the ground shall remain pervious to rain water. Where necessary, adequate provision shall be made for groundwater recharge and to prevent site run-off and erosion.

Calculation of Impervious Area - Medium and Large-Scale Ground-Mounted Solar Energy Systems shall not be included in calculations for lot coverage or impervious cover so long as the Solar Collectors have planted surfaces beneath them such as pollinator habitat, dual-use solar or agrivoltaics installations. If the area beneath a Medium or Large-Scale Ground-Mounted Solar Energy System is to be paved or otherwise rendered impervious then this land area shall in fact count toward any coverage or impervious surface limit. Land required for access roads, utility connections and appurtenant structures will be included in calculations for lot coverage or impervious cover of land.

(7) Protection of Forest Land and Prime Farm Land, Land Clearing, Habitat Impacts and Historically Significant Structures

- a) Land Clearing - Not more than one (1) acre of land shall be deforested for any one Medium and/or Large-Scale Ground-Mounted Solar Energy System, and no such installation shall be placed on such land that was deforested within the prior 5 years, unless said installation is for the benefit of the Town of Boxborough, such as a Community Solar Farm. Clearing of natural vegetation shall be limited to what is necessary for the

construction, operation and maintenance of the Solar Energy System or otherwise prescribed by applicable laws, regulations, and bylaws/ordinances.

- b) Prohibited Locations – Medium and / or Large-Scale Ground-Mounted Solar Energy Systems are prohibited in locations of old growth forest, prime farmland soils as defined by the US Department of Agriculture Natural Resources Conservation Service, wetlands, aquifer districts, permanently protected open space, Priority Habitat Areas and *BioMap2* Core Habitat and Critical Natural Landscape mapped by the Massachusetts Division of Fisheries and Wildlife’s Natural Heritage & Endangered Species Program (NHESP) and Habitat of Potential Regional or Statewide Importance as mapped by the Massachusetts Department of Environmental Protection (DEP).
- c) Historically Significant Structures – Solar Energy Systems on historically significant structures as identified by the Boxborough Historical Commission or as designated by federal, state, or local registries or databases, shall have limited or no visibility to the public and be integrated into the structure to minimize adverse visual impacts. The Planning Board and Design Review Board (in accordance with their purview under the Zoning Bylaw), reserve the right to recommend modifications to the proposed Solar Energy Systems to maintain the historical character of structure(s).
- d) Preferred Locations - Siting of Solar Energy Systems is encouraged in the following locations:
 - Building Roofs
 - Brownfield sites and previously developed sites
 - Parking lots

Greenfield development is discouraged. Applicants who propose greenfield installations will be required to demonstrate why the proposed site is preferable to a previously developed site. Such demonstration shall include a comparison of environmental impacts and a cost-benefit assessment.

(8) Height Limitations

- a) Existing zoning district height limitations apply for all Ground-Mounted Solar Energy Systems.
- b) If a Ground-Mounted Solar Energy System is accessory to a principal building or structure on a lot, then the height restriction for accessory structures would apply as defined in Section 5008 of this Bylaw.
- c) If a Ground-Mounted Solar Energy System is the principal structure on a lot, then the height restriction shall be a maximum of fifteen (15) feet from finished grade.

d) An increase in height may be granted in commercial districts by special permit from the Planning Board.

(9) Decommissioning

a) Upon decommissioning of Solar Energy Systems all solar panel components shall be reused or recycled using industry best practices available at the time of decommissioning.

b) Life-Cycle Analysis – At the time of Application for Site Plan Approval, the Applicant may be required, as deemed appropriate by the Planning Board, to demonstrate a life-cycle analysis of the components to ensure that there is a net environmental benefit to the proposed installation.

c) Surety - Proponents of Large-Scale Ground-Mounted Solar Energy Systems 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% of the cost of removal and compliance with the additional requirements set forth herein, as determined by the project proponent. 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.

4003(4): Business/ Industrial Uses

	AR	R1	B	B1	OP	TC	IC
Medium-Scale Ground-Mounted Solar Energy System ²⁰	N	SP (PB)	Y	Y	Y	N	Y
Large-Scale Ground-Mounted Solar Energy System ²⁰	N	N	SP (PB)	SP (PB)	SP (PB)	N	SP (PB)

ARTICLE IV USE REGULATIONS

4XXX Special Permits for Medium or Large-Scale Ground Mounted Solar Energy Systems

The Planning Board shall be the Special Permit Granting Authority for the issuance of special permits in the case where an applicant requests to install a Medium or Large-Scale Ground-Mounted Solar Energy System. In addition to the standards set forth in Section 7800 of this Bylaw, the Special Permit Granting Authority shall also consider each of the following factors before the issuance of a special permit:

- (1) Suitability of the site for the proposed Medium or Large-Scale Ground-Mounted Solar Energy System;
- (2) Adequate landscaped and natural buffers are provided around the installation. Where applicable, physical buffers, such as berms and/or fences are proposed between

residential and installations of Medium or Large-Scale Ground-Mounted Solar Energy System;

(3) The proposal, to the maximum extent possible, protects the existing tree canopy and stone walls on Massachusetts Avenue (Route 111) and along designated scenic roadways;

(4) The proposal retains and/or preserves unique natural, historical or cultural resources located on the site, if any;

ARTICLE V DIMENSIONAL REQUIREMENTS

5000

FOOTNOTES

²⁰ To avoid “project segmentation” (i.e., project phasing), in determining the size of a Ground-Mounted Solar Energy System, the area calculated shall be the aggregate area (square footage) of all such systems on contiguous parcels of land held in common ownership. Any proposed increase in area of existing arrays that would cause the Solar Energy System, in total, to meet a different size definition (i.e., increase from “Small” to “Medium” or “Medium” to “Large”) shall trigger the requirements of the larger size definition.