Orr&Reno

Jeremy D. Eggleton
jeggleton@orr-reno.com
Direct Dial 603.223.9122
Direct Fax 603.223.9022

June 1, 2018

Concord City Council
City Clerk's Office
City Hall
41 Green St.
Concord, NH 03301

Re: Petition Pursuant to Article 20-10 of the Concord Ordinances Proposed Zoning Amendment Regarding Maximum Lot Coverage in Solar Utility Applications

To Whom It May Concern:

As the Council may be aware, West Portsmouth Street Solar, LLC sought approval for a variance to exceed maximum lot coverage to install a utility-scale solar project on West Portsmouth Street. The land is owned by John Brochu and is used for a commercial nursery and landscaping business. The variance request was rejected by the Concord Zoning Board of Adjustment due to its interpretation of the term "Maximum Lot Coverage" in the Concord Zoning Ordinance. West Portsmouth Street Solar LLC offered numerous policy related reasons were offered as rationale to support the variance request, and West Portsmouth Street Solar, LLC is now moving to rehear the issue. To the extent that the City, or the Council, believes that the zoning question is a matter of policy, West Portsmouth Street Solar, LLC and Mr. Brochu hereby request that the Council consider amending the Zoning Ordinance to clarify that "Maximum Lot Coverage" restrictions should not act as a bar to otherwise sound, safe, solar alternative energy projects. Pursuant to Article 20-10 of the Concord Ordinances, the following request is submitted for the Council's consideration:

(1) Description of the Proposed Ordinance Amendment

At present the Zoning Ordinance definition for Maximum Lot Coverage, Ordinance §28-4-1(e) reads:

> Maximum Lot Coverage. No buildings, structures, or impervious surfaces or combination thereof shall be constructed on a lot such that the area of the lot covered by buildings, structures or impervious surfaces, when calculated as a percentage of the total area, shall exceed the percentage as specified in Section 28-4-1(h).

This request proposes to amend the Maximum Lot Coverage definition to read (amended language underlined):

> Maximum Lot Coverage. No buildings, structures, or impervious surfaces or combination thereof shall be constructed on a lot such that the area of the lot covered by buildings, structures or impervious surfaces, when calculated as a percentage of the total area, shall exceed the percentage as specified in Section 28-4-1(h). <u>For the purposes of this definition, Maximum Lot Coverage calculations shall exclude the area of the flat surface of a solar panel or panels, and shall include only the posts or piles, and any other portion of the panel support structure that actually is in contact with the ground</u>.

(2) Purpose and Intent of the Proposed Amendment

This amendment is intended to rectify an interpretation of the Concord Zoning Ordinance that places a practically insurmountable bar to commercial and utility-scale solar infrastructure in Concord, and runs contrary to the State's statutory imperative to remove regulatory impediments to alternative energy and the City of Concord's existing goals of fostering alternative energy infrastructure.

In RSA 672:1, III-a, the Legislature has indicated that one significant overarching policy of the State's zoning scheme is to foster alternative energy sources. To that end, the Legislature has required that "installation of solar, wind or other renewable energy shall not be unreasonably limited by the use of municipal zoning powers or by the unreasonable interpretation of such powers except where necessary to protect the public health, safety and welfare[.]" RSA 672:1, III-a. The proposed zoning amendment would be directly in keeping with this express and very specific mandate from the Legislature.

The proposal would also embody the City of Concord's commitment to fostering alternative energy sources. Section XII, "Energy," of the City Master Plan affirms that "[c]ommunity action is needed to prepare for energy supply and environmental changes in the years ahead." *Id.* at XII-1. The Master Plan identifies one of four major energy goals as: "Increase the use of renewable energy systems within the City of Concord." *Id.* at XII-2. The Master Plan suggests a "comprehensive review of city building codes to ensure that there are *no barriers* to the installation of renewable energy systems[.]" *Id.* at XII-20 (emphasis added). Finally, the Master Plan recommends that the City act to "[r]eview the City's building code and land use regulations for impediments to the installation of small and large scale renewable technologies, and make regulatory changes as needed." *Id.* at XII-29.

The proposed amendment would be in keeping with guidance in other states and communities that have identified Maximum Lot Coverage restrictions as a potential unforeseen hurdle to solar power development. For example, the Southern New Hampshire Planning Commission has issued a Best Practices in Regulating Solar Energy Systems guidance that recommends: "The following dimensional standards should be waived or made more flexible in

your zoning and planning regulations: building height regulations, setback requirements, and lot and impervious coverage restrictions. Exempting solar energy from these development standards can enhance solar energy deployment for land owners, businesses and residential home owners without impacts to the community[.]" *See* Exhibit A.[1]

Similarly, the American Planning Association has called "Lot Coverage" a "subtle barrier" to the facilitation of solar capacity. American Planning Association, SOLAR BRIEFING PAPERS: INTEGRATING SOLAR ENERGY INTO LOCAL DEVELOPMENT REGULATIONS at 36 (Chicago, 2013). In Massachusetts, the Commonwealth's Department of Energy Resources published a planning document as guidance for communities that are contemplating zoning changes or amendments to foster solar and alternative energy generation. *See* Exhibit B ("Model Zoning for the Regulation of Solar Energy Systems," December 2014). The Guidance notes:

> Commentary: A number of communities use "maximum lot coverage" or "maximum impervious surface" as one of their dimensional standards. While it is clear that such features as driveways or buildings would be included in any calculation of lot coverage, many other features may be more ambiguous, depending on how clearly the definition in the Zoning Bylaw/Ordinance is written. Awnings, porches, decks and similar features can often become a matter of dispute. *Regardless of the definition, it is recommended that solar energy systems with grass or another pervious surface under them be exempted from lot coverage or impervious surface calculations.* If the area is to be paved or otherwise rendered impervious then this land area should in fact count toward any coverage or impervious surface limit.

Id. at 9 (emphasis added).[2]

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[1] http://www.snhpc.org/pdf/FinalSolarResourceGuide2015.pdf (last visited May 31, 2018)

[2] Impervious surface requirements and maximum lot coverage limitations are frequently conjoined as lot coverage is presumed to create impervious surfaces that reduce stormwater absorption capacity. *See* Lauren Cook and Richard McCuen, American Society of Engineers' Journal of Hydrologic Engineering 536 (May 2013) ("Storm water management practices are generally implemented to reverse the *effects of land-cover changes* that cause increases in volumes and rates of runoff.") The researchers concluded after extensive review of the pitch and angle of panels, the nature of the pads that hold them, varying degrees of weather and ground-covering vegetation, that "[t]he addition of solar panels over a grassy field does not have much of an effect on the volume of runoff, peak discharge or the time to peak." *Id.* at 540. The key to this result was good ground cover vegetation, *i.e.*, grasses, which are proposed to be maintained by the Applicant in this case. *Id.* "If these simple measures are taken, solar farms will not have an adverse hydrological impact from excess runoff or contribute eroded soil particles to receiving streams and waterways." *Id.* at 541. As an example of the impact of distinguishing between lot coverage created by solar panels versus lot coverage created by the posts and piles upon which the panels sit, *see* Exhibit C, an illustration prepared by West Portsmouth Street Solar LLC for the ZBA's consideration. One side shows the lot coverage as viewed from the air, without setting aside the solar panels. The other shows the lot coverage considering only the posts and piles, a dramatically lesser impact. Beneath these piles and posts, a normal field-type ecosystem exists undisturbed, with flowers, plants, grasses, and animals living normally.

It bears emphasis that, until the Zoning Board of Adjustment's recent decision to classify Maximum Lot Coverage as including the surface area of solar panels, the issue was a case of first impression in Concord. The proposed amendment would begin to realize the City's commitment to updating its ordinances and regulations to foster new and alternative energy development, and would further the State's express mandate to not allow legacy regulations to bar future green energy possibilities.

(3) Effect of the proposed amendment on the City's economy, environment, municipal services, municipal facilities and neighborhoods.

The proposed amendment will achieve numerous desirable goals for the City. First, the amendment will open up more City zoning districts to the possibility of commercial solar infrastructure. This will lead to more jobs in the short term, as the construction of these facilities will be enabled by millions in investment. The proposed $12M West Portsmouth Street Solar Project is one example of such investment. Environmentally, the proposal would advance the City's goals of moving to renewable and alternative energy sources. The West Portsmouth Street Solar Project would carve out up to 10% of energy production, or 1 megawatt (MW), to be purchasable by the City of Concord.[3] Solar infrastructure does not burden municipal services or require additional municipal facilities. Once constructed, a commercial installation of solar panels silently generates exhaust free, emission free electricity with very little maintenance. Typically, a commercial solar project of 10MW might generate in excess of $175,000 annually in new property tax revenue, which is usually a manifold increase over the taxes generated by property in current use or in open space districts. The proposed amendment would potentially affect many neighborhoods and parts of the City due to the fact that it would lower the bar for the feasibility of solar energy projects.

(4) There is no specific zoning district where the proposed amendment would automatically introduce a new use.

As it stands, the City Zoning Administrator has determined that commercial solar projects are a permissible use under a Conditional Use permit in many districts. Ordinance §28-2-4 (Table of Uses) ("Essential Public Utilities and Appurtenances"). The proposed amendment does not introduce a new use where previously the use was not allowed; rather, it makes it possible to develop a previously allowed use that was practically barred by Maximum Lot Coverage restrictions.

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[3] Future projects may result in significantly greater use of Concord generated energy by the City because the West Portsmouth Street project is already contracted to supply energy to the New England power grid, for use in Connecticut.

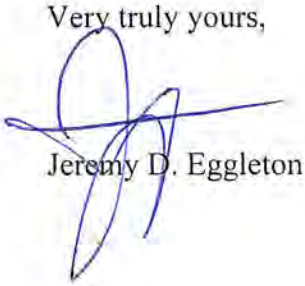
(5) Names of interested parties:

Owner:
John Brochu
Brochu Nursery and Landscaping
121 Commercial Street
Concord, NH 03301
Phone: 603-224-4350

Agent:
West Portsmouth Street Solar LLC
P.O. Box 1137
Concord, N.H. 03302-1137

Representative:
Jeremy D. Eggleton, Esq.
Orr & Reno, P.A.
P.O. Box 3550
Concord, NH 03302-3550

Very truly yours,



Jeremy D. Eggleton

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EXHIBIT A

Photo by: Blue Selenium LLC

Solar Friendly Best Planning Practices for New Hampshire Communities

A Quick Resource Guide for Planning Boards and Municipal Officials in Crafting Solar Friendly Regulations and Developing Solar Friendly Communities in New Hampshire

Prepared By

Southern New Hampshire Planning Commission

January 2015

SNHPC

Best Practices in Regulating Solar Energy Systems

Introduction/Purpose

The purpose of this Resource Guide is to help Planning Boards and Municipal Officials (1) craft Solar Friendly Land Use Regulations in their Zoning, Site Plan and Subdivision Regulations; and (2) develop municipal plans, policies, procedures and practices to encourage the deployment and use of solar energy within their communities.

Funding for this project is provided through a U.S. Department of Housing and Urban Development (HUD) Sustainable Communities Program grant awarded in FY 2013/2014 to the nine regional planning commissions in NH.

Municipalities in NH currently have very few best practices they can call upon in establishing practical land use regulations and sound plans for the deployment of solar energy within their communities.[1] The cost of Solar Photovoltaic (PV) Systems has been decreasing in the past several years and installation costs are expected to continue to decrease in the future. As a result solar energy is driving significant economic growth across the US. Every state in the country, including NH, receives as much, or more, sunlight than Germany, which currently leads the world in Solar PV installation and energy production.[2]

New Hampshire can also be a leader in solar energy and expand opportunities for solar growth in the state. Promoting solar energy through planning and land use regulations involves identifying and removing unintended barriers and enacting appropriate standards for solar development in zoning, subdivision, site plan regulations and building codes. Communities can also use their development regulations, administrative procedures and processes, and financial tools to incentivize solar energy use.

Some of the most important ways planners can influence and promote solar energy is to provide information and direct assistance to interested property owners and developers considering solar installations; advocate for including solar energy in local plans and development proposals; and crafting solar friendly regulations and administrative approval processes which reduce or avoid lengthy and costly land development reviews. In addition, municipalities can play a significant role in promoting solar energy through public-private partnerships and redevelopment projects, including mixed-use developments; brownfields development; downtown revitalization; affordable housing; and transit-oriented development – all of which offer the potential to integrate solar into the final design and construction process.

Public buildings, structures and facilities, such as city/town halls and office buildings, libraries, schools, parking garages, police and fire stations, landfills, and parks all have solar potential. Installing solar energy systems at these locations – either attached to the roof or mounted to the ground – can help

[1] The NH Office of Energy Planning is currently developing a model ordinance for municipalities in regulating residential Solar PV Energy under a DOE Rooftop Solar Challenge Grant. This Quick Resource Guide is offered in advance of and to supplement this work under the HUD Sustainability Project.

[2] American Planning Association, Planning for Solar Energy, Planning Advisory Service Report #575, page 27.

meet local energy goals, reduce local energy costs, and most importantly provide the community with a long term and sustainable environmental and economic investment in the future.

This Resource Guide consists of two tools: (1) a Checklist identifying best practices Planning Boards and Municipal Officials can use in developing solar friendly regulations; and (2) a Worksheet that Planning Boards and Planners can share with property owners and developers to implement passive solar-friendly site design techniques and principles in subdivision and site plans. The Checklist and Worksheet developed for this Resource Guide are based on a number of model ordinances and permitting guides, including the Connecticut Rooftop Solar PV Permitting Guide[3] and the American Planning Association PAS Report #575, Planning for Solar Energy.[4]

In addition to these tools, the Southern New Hampshire Planning Commission recently completed (1) a comprehensive Wind/Solar Renewable Energy Community Survey conducted among 15 municipalities located within the Southern New Hampshire Region (see link to the Summary Report and Findings at: http://www.snhpc.org/pdf/WindSolarSurvey2014.pdf); and (2) a pilot study evaluating local zoning and planning regulations with respect to wind and solar energy development in the towns of Candia and Derry, NH.

Both the renewable community energy survey and the pilot study offer suggestions for how municipalities can improve their land use and planning regulations and permitting procedures to advance and promote solar energy for the benefit of community residents.

[3] Adapted from Connecticut Rooftop Solar PV Permitting Guide, Model Zoning Ordinance, 5.1.2014.
[4] See American Planning Association, Planning for Solar Energy, Planning Advisory Service Report #575, and page 27.

A Checklist in Developing Solar Friendly Land Use Regulations

Establish Zoning Definitions	
First Step (Establish Definitions): Many zoning codes fail to identify and define the specific terms and the various types of solar energy systems currently available in the marketplace. The lack of definitions in your zoning code can create uncertainty about the legality of solar use and development in your community. Some communities choose to distinguish between solar thermal and solar photovoltaic (PV) systems, but many others use "solar energy system" or a similar broad term, to refer to any type of solar collector and its associated equipment. Thus, it is important that your Zoning Ordinance clearly define all the terms and types of solar energy systems available. This will help to avoid confusion and prevent inconsistent zoning interpretations.	
Solar Best Practice	**References**
1. Add terms and definitions of solar energy systems to your Zoning Ordinance. Recommended definitions are provided in the References column.	• **Solar Photovoltaic (PV) System**: A solar collection system consisting of one or more building systems, solar photovoltaic cells, panels or arrays and solar related equipment that rely upon solar radiation as an energy source for collection, inversion, storage and distribution of solar energy for electricity generation.[3] • **Photovoltaic (PV)**: A semiconductor based device that converts sunlight directly into electricity.[3] • **Solar Thermal System:** A solar collection system that directly heats water or other liquid using sunlight. The heated liquid is used for such purposes as space heating and cooling, domestic hot water, and heating pool water.[3] • **Roof Mounted Solar Energy System**: A solar photovoltaic or thermal energy system attached to any part or type of roof on a building or structure that generates electricity. This system also includes any solar photovoltaic-based architectural elements.[3] • **Free Standing Solar Energy System**: A pole or ground mounted solar photovoltaic or thermal energy system that generates electricity. This system also includes any solar photovoltaic-based architectural elements.[3]

	• **Community Solar**: Refers to solar photovoltaic (PV) systems where community members own shares in the solar system; can subscribe to receive the generated solar power; or can purchase the output of the solar PV system to offset their own electricity bills.[4] • **Building-Integrated Solar Photovoltaic System**: A solar energy system that consists of integrating photovoltaic modules into the building structure, such as the roof or the façade, and which does not alter the relief of the roof.[3] • **Solar Farm or Garden:** Refers to a system of solar arrays designed to capture sunlight and convert it to electricity primarily for offsite consumption and use. Some electricity may be used by an onsite building or structure.[4] • **Solar Photovoltaic (PV)-based Architectural Element:** Structural/architectural element that provides protection from weather that includes awnings, canopies, porches or sunshades and that is constructed with the primary covering consisting of solar PV modules, and may or may not include additional solar PV related equipment.[3] • **Solar Photovoltaic (PV) Related Equipment:** Items including a solar photovoltaic cell, panel or array, lines, mounting brackets, framing and foundations used for or intended to be used for collection of solar energy.[3] • **Passive Solar Energy Techniques:** Site design techniques which maximize solar heat gain, minimize heat loss, and provide thermal storage within a building. These techniques include, but are not limited to: (1) building orientation; (2) street and lot layout; (3) vegetation; (4) natural and man-made topographical features; and (5) protection of solar access within the development.[3]

Lighten Up Zoning and Planning Use Restrictions	
Second Step (Exempt Roof Top Systems from Zoning and Make Solar Energy a Permitted Use in All Zoning Districts): Municipal zoning and planning regulations can adversely impact a residential homeowner, business or a property owner's ability to install a solar energy system. Solar energy systems (both roof and free standing or ground mounted systems) are typically classified as an "accessory use" or as an "accessory structure" and are subject to the same regulations as any other accessory use or structure on the same lot in a zoning district. Often these regulations can be overly restrictive and prevent a solar energy system from being located in a way that would be the most efficient (in terms of maximizing the energy production of the system) or even prevent the system from being installed altogether. There are a number of positive approaches and best practices that can be considered, and if adopted, could help make your municipal zoning and planning regulations more solar-friendly.	
Solar Best Practice	**References**
1. Consider exempting all Roof Mounted and Building Integrated Solar Energy Systems (or those meeting certain criteria) from all zoning review and site planning regulations. 2. Consider classifying all Roof Mounted and Building Integrated Solar Energy Systems as "Mechanical Equipment" and exempt these systems from all zoning review similar to other heating, cooling and mechanical energy related equipment commonly found on buildings. 3. Consider treating all Free Standing or Ground Mounted Solar Energy Systems which can be defined as an accessory use or as an accessory structure subordinate to the principle structure or use on the same lot as "Permitted by Right" subject to certain standards in all Zoning Districts. 4. Consider treating all Free Standing or Ground Mounted Solar Energy Systems as a "Permitted Use" in all Commercial, Office and Industrial Zoning Districts and as a Conditional Use in Residential Districts under RSA 674:21. A Conditional Use Permit ensures that the Planning Board and the public have an adequate opportunity for review and comment.	• Roof mounted and building integrated solar energy systems – PV and Thermal – that are attached to or are built as part of the building or roof - should be exempt from all zoning and site plan review. • Mechanical heating, cooling and energy systems are already regulated under your municipality's building and electric codes and are required to have building and electric permits for installation. In many communities, mechanical equipment is "exempt" from zoning requirements, including building height and site planning regulations. • Many communities classify solar energy systems as an accessory use or as an accessory structure (similar to a tool shed or garage). Some communities' exempt small accessory structures under 1,000 square feet in size from all zoning, planning and building codes, except for certain standards such as building setbacks. • A Free Standing or Ground Mounted Solar Energy System which is the principal or primary use on a lot (such as a solar farm or garden) typically contains a large number of solar panels organized as solar arrays. Many communities allow these free standing solar systems as a "Permitted Use" in all Commercial, Office and Industrial Zoning Districts, subject to existing district requirements. These systems can also be "Permitted by Right" in certain residential districts (such as Mixed Use or Rural Districts) or allowed as a "Conditional Use" in all Residential Districts under RSA 674:21.

5. Mitigate land use impacts for Solar Energy Systems. At most, some planning concerns include: compatibility with adjacent residential areas; building setbacks and lot coverage; visual impacts and screening; physical access; and security.	

Evaluate Development Standards More Closely

Third Step (Exempt Solar Energy from Certain Development Standards such as Dimensional and Lot Coverage Requirements): Appropriate sites and locations for solar energy can be challenging given the architectural characteristics and locations of existing buildings, existing topographic conditions and lot configurations, surrounding tree coverage, and physical site access, etc. Zoning and planning regulations need to recognize these factors, be more flexible and allow for the placement of solar energy systems where solar radiation is most abundant. The following dimensional standards should be waived or made more flexible in your zoning and planning regulations: building height regulations, setback requirements, and lot and impervious coverage restrictions. Exempting solar energy from these development standards can enhance solar energy deployment for land owners, businesses and residential home owners without impacts to the community.

Solar Best Practice	Reference
1. Consider exempting all solar energy systems from building height restrictions in your zoning and planning regulations. 2. Consider exempting all roof mounted and building integrated solar energy systems from all your building setback requirements even if these systems extend beyond the building footprint as solar energy systems are mechanical appurtenances to the building. 3. Consider exempting or waiving all solar energy systems from lot coverage and Floor Area (FAR) requirements. These lot coverage requirements can prevent the design of a solar energy system from maximizing the available solar gain on a site.	• Exemptions from building height requirements for rooftop solar energy systems should be similar to exemptions given for rooftop appurtenances such as a chimney, television antennae, rooftop mechanical equipment, etc. Exemptions from building height restrictions for free-standing (e.g. ground and pole-mounted systems) should also be provided. Similar exemptions and waivers should also be applied in your Planning Board site plan regulations and historic district provisions. • All roof mounted and building integrated solar energy systems can be exempt from building lot setback requirements (e.g. front, side and rear yard setbacks). These setbacks could also be reduced for free standing and ground mounted systems. Lot setback requirements can impact solar PV systems depending on where on a site the best access to sunlight is available.

4. Exclude free standing and ground mounted solar energy systems from impervious surface regulations, or the impervious surface calculation should be limited only to the system's footings (the parts of the solar system that make contact with the ground). Free-standing solar systems do not cap the ground or prevent water absorption.	• Free standing and ground mounted solar energy systems should be excluded from counting towards lot coverage, FAR and imperious surface requirements, as the contact with the ground is limited to only the footings. This is significant as local zoning laws typically set maximum impervious surface coverage percentages. The application of these percentages can be confusing to municipal officials in determining whether solar panels should or should not constitute an impervious surface.

Update Historic District, Subdivision and Site Plan Regulations

Fourth Step (Update Historic District, Subdivision and Site Plan Regulations): Local historic district (planning and zoning requirements), subdivision and site plan regulations should all be reviewed and updated to address the best practices and recommendations as outlined in this resource guide. Local regulations also need to be updated to promote the benefits of renewable solar energy; streamline the approval process and the deployment of solar energy systems; and promote the use of passive solar techniques while protecting the visual character and appearance of your community.

Solar Best Practice	Reference
1. Locate and design all solar energy systems to respect the historic character and integrity of existing buildings and properties. It is important that local historic regulations and guidelines allow solar energy similar to other mechanic equipment and that local regulations provide opportunities and prescriptive standards for solar installations.	• Update local historic district regulations and planning guidelines to allow for and provide opportunities for the deployment of all solar energy systems, including the issuance of a Certificate of Appropriateness for these systems. • Add clear prescriptive standards to local guidelines which would allow for example (1) flush mounted solar panels on all existing roofs and (2) the installation of roof and free-standing and ground mounted solar panels to historic buildings and properties which are not visible from the street or are located in rear or side yards which do not "substantially impair" the historic appearance or visual character of the district or neighborhood.[5]

[5] For examples of prescriptive standards see the National Trust for Historic Preservation Design Guidelines for Solar Installations, the National Alliance of Preservation Commission's Sample Guidelines for Solar Systems in Historic Districts, or NREL's Implementing Solar PV Projects on Historic Buildings and in Historic Districts.

2. Consider updating both historic district and site plan regulations to allow solar energy systems to be approved through a no-cost administrative review. Adding prescriptive standards to planning regulations can help streamline approval for projects meeting specific criteria. Local planning regulations should not be used to exclude projects which do not impair the historic or visual character of your community. 3. Update Planning Board's site and subdivision regulations to set up administrative procedures and waivers for site and subdivision plan approvals particularly for free-standing or ground mounted systems. The cost in preparing these plans can be prohibitive and prevent the solar energy system from being installed. 4. Encourage new development to utilize Passive Solar Energy techniques when planning and building a new building or new development. See the following Solar Site Design Worksheet for a Proposed Subdivision or Site Plan. 5. Consider adding solar access rights to site planning and subdivision regulations. Issues such as shade from vegetative growth over time and the addition of new structures on abutting properties can be a long term threat for solar energy system performance. Often solar easements are needed to ensure an abundant source of sunlight will be available.	• Work with local Planning Board to establish procedures for administrative site and subdivision plan approval for free standing and ground mounted solar energy systems or procedures for the waiver or amendment of these plans that can be approved by the Municipal Planner or Planning Board under certain requirements. • Encourage or require street and lot layout and new home and building development in new subdivision and site plans to be arranged and oriented to maximize solar gain. • Encourage or require the planting of vegetation that is both supportive of passive heating and cooling solar radiation techniques as well as providing and addressing opportunities and needs in screening large solar arrays. • Adopt the NH Solar Sky space Easement (see NH RSA 477:51) that protects the owner's right to sunlight on their property. See: http://www.dsireusa.org/solar/solarpolicyguide/?id=19 (NH Solar Access Law). • Encourage or require roofs in new development and buildings to be built "Solar Ready" for future installation of a solar energy system. • Encourage or require in new development and buildings appropriate plumbing, wiring, heating and water systems to accommodate existing and future installations of solar energy systems.

6. Consider in municipal master plan a Natural Resource Inventory and other land use plans and regulations, the identification of your community's solar resources (appropriate lands and opportunities) and work to protect and promote the use of these resources for community-wide and local benefits in renewable solar energy.	

Streamline Planning and Building Permit Processes

***Fifth Step (Streamline Planning Review and Building Permitting Process)*:** Getting an approval to install a solar energy system is in most cases a multi-step process and can be very time consuming and costly for property owners and solar contractors. Applicants may be less prone to install solar energy systems because of lengthy review and permitting processes and the amount of time and cost needed for both planning and building permit approvals.

Solar Best Practice	Reference
1. To facilitate the installations of all solar energy systems establish a standard **"one stop" solar permit** process and a one-time flat application fee for both planning review and building permit applications. 2. As part of a "one stop" solar permit, include a checklist that outlines your municipality's requirements for installing all types of solar energy systems. A checklist will help to improve consistency and reduce guesswork among applicants and contractors.	• Many examples exist across the country where municipalities are putting in practice a "one stop" solar permit and flat fee for solar installations. See following link for the Connecticut solar permit at: http://www.energizect.com/sites/default/files/uploads/Solar%20PV%20Permit%20Application%20Supplement_F_V2_8.18.14.pdf. • Also see the Connecticut Structural Review Worksheet at: http://www.energizect.com/sites/default/files/uploads/%285%29%20CT%20Solar%20PV%20Structural%20Review%20Worksheet%20v1.0.pdf.

Consider Developing Local Solar Incentives

***Sixth Step (Consider Establishing a PACE District)*:** The cost of installing a solar energy system for a residential dwelling or a business can be costly and require significant upfront capital in order to pay for the solar system installation. To help address this issue, the New Hampshire planning statutes allow municipalities to develop local financing incentives to help residents and property owners pay for the cost of solar installations. The Property Assessed Clean Energy District (PACE) under NH RSA Chapter 53-F offers municipalities a new financing tool to address this issue.

Solar Best Practice	Reference
1. Consider establishing a **Property Assessed Clean Energy District (PACE)** under NH RSA Chapter 53-F in certain areas and corridors in your community. These districts can also be used to promote solar installations for business growth and development through local financing incentives and loans.	• PACE: See NH RSA Chapter 53-F; also see NH Office of Energy and Planning resource guide on Energy Efficiency and Clean Energy Districts at: www.nhoep.org; and Commercial- PACE Financing Moves Forward, New Hampshire Town and City, September/October 2014 at: www.nhmunicipal.org/TownandCity/Article/589
Begin Planning for Solar Energy	
Final Step (Start Planning): There are many opportunities for solar planning as part of your community development activities and master plans. It is important that you begin to plan now and work toward advancing and implementing solar energy among all sectors of the community, including municipal, residential, educational, and business development and use.	
Solar Best Practice	**Reference**
1. Encourage **"solar arrays"** to be built on brownfield sites, former sand pits, municipal landfills, public buildings and facilities, schools, libraries, police and fire stations, transfer stations, water and wastewater treatment plants and parks to produce clean and renewable energy and reduce electrical costs for municipal buildings and property owners. 2. Consider establishing a **"Community Solar"** project under the new Group Net Metering (GNM) laws to benefit your municipality and community residents. 3. Establish a formal **Energy Commission** for your municipality as provided by RSA 38-D. 4. Develop an **Energy Chapter** in your municipal master plan which includes and promotes solar energy use and development in your community.	• Solar arrays can be privately owned; publicly owned; or leased to a 3rd party investor and the electricity produced can be sent back through a meter to the grid or utilized behind the grid to power your buildings and facilities. • New Hampshire's Group Net Metering (GNM) – See RSA 362-A:9,XIV and for laws and rules -- See PUC website at: www.puc.nh.gov/sustainableEnergy/GroupNetMetering.html • For Energy Commissions -- See RSA 38-D at: www.nh.gov/oep/resource-library/energy/index.htm • For Master Plan Energy Chapters – See New Hampshire Local Energy Solutions – at: www.nhenergy.org/master-plan-energy-chapters.html

Solar Site Design Worksheet for New Subdivisions and Site Plans

HAVE YOU INCLUDED ANY OF THE FOLLOWING SOLAR-FRIENDLY DESIGN PRINCIPLES IN YOUR SUBDIVISION and SITE PLAN? (Check all below elements that apply)

Note that solar-friendly design is not required for subdivisions and site plans; however, developers are strongly encouraged to include solar-friendly design elements in their plans.

Street and Lot Layout

☐ Home and building lots are arranged on streets that run within 20 degrees of east/west to maximize solar exposure

House Orientation

☐ Homes and buildings are designed in a manner so that the longer axis of the house or building is aligned within 20 degrees of east/west in order to maximize solar exposure

☐ Homes and buildings are designed so that south-facing roof surfaces (and more generally, sections of the roof ideal for placement of solar energy systems) receive unobstructed sun between 9 am and 3 pm

☐ Homes and buildings are designed so that primary living and office spaces include a southern exposure

☐ Homes and buildings are designed so that at least 50% of window area contributes to passive heating during the heating season and are shaded in the cooling season

☐ Roof structures that might create shading and block solar panels are installed on the north slope of the roof to minimize impacts

Vegetation

☐ Plantings support passive heating and cooling techniques and do not shade roof surfaces ideal for solar energy systems

Protection of solar access within the development

☐ Subdivision and site plan regulations protect the property owner or homeowners' right to install solar and eliminate potential obstructions from neighboring structures or vegetation

For any of the above design principles that were not included in your subdivision/site plan, please explain why:

_____

_____

_____

EXHIBIT B

Model Zoning for the Regulation of Solar Energy Systems[1]

Department of Energy Resources
Massachusetts Executive Office of Energy and Environmental Affairs
December 2014

This model zoning and accompanying Guidance were prepared to assist Massachusetts cities and towns in establishing reasonable standards to facilitate development of solar energy systems. These systems include small-, medium- and large-scale as well as both ground-mounted and roof-mounted installations.[2] *The model zoning language provided here is not intended for adoption precisely as it is written. Communities will need to carefully consider how this language may be modified to suit local conditions and where it should be inserted into an existing Zoning Bylaw/Ordinance. Further, it is highly recommended that any language adapted from this model be reviewed by municipal counsel prior to adoption.*

As small-, medium-, and large-scale ground-mounted and roof-mounted solar energy systems become more prevalent in Massachusetts, many communities are attempting to regulate the installation of these systems through their Zoning Bylaw/Ordinance. Developing these regulations has been particularly challenging for a number of reasons. Most notably, the Massachusetts General Laws contains several provisions that specifically address the ability of local governments to regulate solar energy systems and/or to protect solar access from development or vegetation (shading) on adjacent properties. While the language within Chapter 40A Section 3 states that a local government may not prohibit these uses, it does say they cannot be "unreasonably regulated" without providing guidance on what that particular phrase means. The Solar Energy Systems Policy Guidance, which accompanies this model zoning and succeeding sections of this document provide more explanation regarding the implications of the statutes on this issue and its significance to local zoning.

Unlike model bylaws/ordinances typically developed by the Commonwealth, the regulatory language provided here is not packaged as a "stand-alone" section of a Zoning Bylaw/Ordinance. With ground-mounted and roof-mounted solar energy systems, the statutory framework and "accessory" nature of some of these installations lend themselves to a different approach. This model zoning therefore assumes that municipalities will have many "typical" sections within their Zoning Bylaw/Ordinance and that several of these sections would be amended to address this issue. For the purposes of this model zoning, the Bylaw/Ordinance sections that are amended include:

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[1] This material is based upon work supported by the U.S. Department of Energy under Award Number DE-EE0005692. This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.
[2] This material was prepared by the Horsley Witten Group.

The Definitions Section;
Allowable Uses;
Dimensional Requirements; and
Site Plan Review.

There is also further discussion intended to help communities regulate these systems in the context of a Local Historic District.

Definitions

Commentary: Within a Zoning Bylaw/Ordinance, the Definitions Section usually stands alone. Definitions are also sometimes included as a sub-section within other sections of the Zoning Bylaw/Ordinance. For example, terms related to the protection of water resources may be included in a water resource protection overlay district section. We recommend that the following terms be added to the general Definitions Section of the Zoning Bylaw/Ordinance.

Photovoltaic System (also referred to as Photovoltaic Installation): An active solar energy system that converts solar energy directly into electricity.

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

Solar Access: The access of a solar energy system to direct sunlight.

Solar Collector: 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.

Solar Energy: Radiant energy received from the sun that can be collected in the form of heat or light by a solar collector.

Commentary: While it is anticipated that installed solar energy systems will most frequently be photovoltaic, this model zoning uses the statutory definition of a solar energy system, which is broader and permits the installation of solar thermal systems as well.

Solar Energy System: A device or structural design feature, a substantial purpose of which is 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.

> Solar Energy System, Active: A solar energy system whose primary purpose is to harvest energy by transforming solar energy into another form of energy or transferring heat from a collector to another medium using mechanical, electrical, or chemical means.
>
> Solar Energy System, Grid-Intertie: A photovoltaic system that is connected to an electric circuit served by an electric utility.
>
> Solar Energy System, Ground-Mounted: An Active Solar Energy System that is structurally mounted to the ground and is not roof-mounted; may be of any size (small-, medium- or large-scale).

Solar Energy System, Large-Scale: An Active Solar Energy System that occupies more than 40,000 square feet of surface area (equivalent to a rated nameplate capacity of about 250kW DC or greater).

Solar Energy System, Medium-Scale: An Active Solar Energy System that occupies more than 1,750 but less than 40,000 square feet of surface area (equivalent to a rated nameplate capacity of about 10 - 250 kW DC).

Solar Energy System, Off-Grid: A photovoltaic solar energy system in which the circuits energized by the solar energy system are not electrically connected in any way to electric circuits that are served by an electric utility.

Solar Energy System, Passive: A solar energy system that captures solar light or heat without transforming it to another form of energy or transferring the energy via a heat exchanger.

Solar Energy System, Roof-Mounted: An Active 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).

Solar Energy System, Small-Scale: An Active Solar Energy System that occupies 1,750 square feet of surface area or less (equivalent to a rated nameplate capacity of about 10 kW DC or less).

Solar Thermal System: An Active Solar Energy System that uses collectors to convert the sun's rays into useful forms of energy for water heating, space heating, or space cooling.

Use Regulations

Commentary: Within a Zoning Bylaw/Ordinance, the Use Regulations describe which land uses are allowed within different zoning districts of the community, and which permits are required. The Use Regulations typically include a Use Table and/or a narrative description of the principal and accessory uses that are allowed, prohibited and/or allowed only through a Special Permit within each zoning district.

Pursuant to Chapter 40A Section 3, a Massachusetts municipality may not prohibit or unreasonably regulate solar energy systems except where necessary to protect public health, safety or welfare. Therefore, although these systems must be allowed within the community, they may be regulated where necessary to protect public health, safety or welfare through other provisions of the Zoning Bylaw/Ordinance. For example, these systems will still need to meet dimensional regulations and other performance standards necessary to protect public health, safety or welfare. In addition, a Site Plan Review process may be used to collect information that will ensure compliance with the performance standards in the Zoning Bylaw/Ordinance. Where some communities include Design Review in their permit processes, these communities will need to balance their desire for certain design objectives with the Commonwealth's protection of solar energy systems. Finally, as drafted this model zoning requires a special permit for a large-scale ground-mounted facility in a residential district and prohibits such systems in another residential district. While a special permit is discretionary, and language expressing uncertainty and cautioning communities about the lack of case law regarding Chapter 40A Section 3 has been included, the Attorney General's Office has approved local

zoning using this permitting mechanism. While DOER cannot offer a definitive interpretation, limited use of special permits when applied to the largest of solar systems, especially when these systems are allowed elsewhere by right, may well be reasonable regulation. In DOER's view, given the plain language of the statute, it is prudent to allow opportunity to site all scales of solar energy systems somewhere in the community. These provisions are described in more detail in the following sections. A more detailed discussion of DOER's understanding of Chapter 40A Section 3 is provided in the Policy Guidance for Regulating Solar Energy Systems that serves as a companion piece to this regulatory guidance.

As a cautionary note, while regulating aesthetics can arguably be considered a matter of protecting public welfare, attempting to place restrictions on materials, setbacks or height, and other similar items, as related to aesthetics, can create roadblocks to actual installation. It is therefore not recommended that communities regulate aesthetics of solar energy systems, or that they do so very cautiously, due to the strong statutory protections in Chapter 40A Section 3.

Two examples are provided in this section for how roof-mounted, small-scale ground-mounted, medium-scale ground-mounted, and large-scale ground-mounted solar energy systems can be incorporated into a municipality's Use Regulations. In these examples, roof-mounted solar energy systems, regardless of size, are allowed as-of-right throughout the community. As-of-right siting means that development may proceed without the need for a Special Permit, variance, amendment, waiver, or other discretionary approval. These projects cannot be prohibited, and can be built once a building permit has been issued by the inspector of buildings, building commissioner or local inspector.

For ground-mounted systems, there is a distinction between how small-scale, medium-scale and large-scale systems are treated and where each are allowed as-of-right, via site plan review, or by special permit. The model zoning allows small-scale ground-mounted systems as-of-right throughout the community. These are of a size that would service a house, small businesses, or small municipal building.

The model zoning allows medium-scale ground-mounted systems as-of-right in all districts except residential zoning districts; in these districts Site Plan Review is required. This means that medium-scale ground-mounted systems cannot be prohibited, and that DOER considers Site Plan Review reasonable regulation. Site Plan Review is discussed in more detail later in this document, but in general it establishes criteria for the layout, scale, appearance, safety, and environmental impacts of certain types and/or scales of development. Typically, site plan approval must be obtained before the building permit is issued. Since medium-scale ground-mounted systems can reach up to approximately an acre in size, DOER believes it is reasonable and appropriate to provide more regulatory scrutiny via Site Plan Review for these projects in residential districts to protect public health, safety, or welfare.

As drafted, the model zoning requires Site Plan Review for large-scale ground-mounted systems within most zoning districts, a special permit in one residential district, and prohibits such systems in another residential district. However, communities should remember that the language of the zoning exemption for solar energy systems is imprecise. While some communities already require a Special Permit to install a large-scale ground mounted solar facility, and/or

restrict them to certain districts, it is not clear whether these regulations are consistent with the Chapter 40A Section 3 mandate that they be reasonable and necessary to protect public health, safety, or welfare.

Connection to the Massachusetts Green Communities Designation and Grant Program
Recognizing the uncertainty around how regulations may or may not be interpreted as reasonable, DOER allows communities to meet Green Communities Criterion One by zoning for the as-of-right installation of a solar facility of at least an acre in size in a designated location. For more information on the Green Communities Designation and Grant Program, please visit: http://www.mass.gov/eea/energy-utilities-clean-tech/green-communities/.

Siting Preferences
Where a solar facility is sited, as well as placement on the site once selected, is an important consideration, particularly in regard to large-scale ground mounted facilities. DOER strongly discourages locations that result in significant loss of land and natural resources, including farm and forest land, and encourages rooftop siting, as well as locations in industrial and commercial districts, or on vacant, disturbed land. Significant tree cutting is problematic because of the important water management, cooling, and climate benefits trees provide.

In regard to farm properties, rooftops are preferable. If roof space is inadequate non-productive, non-arable agricultural land is the second choice. Should this also prove infeasible or inadequate a dual use of land design concept could preserve productive farmland by continuing crop production underneath high-mounted and well spaced panels. Finally, if none of these are feasible or they are inadequate the least productive land should be used first to minimize the loss of productive food/crop land.

Overlay Zoning Districts
Overlay zoning districts are one zoning approach that could be used to permit solar energy systems, and in ways not allowed under the base zoning districts. For example, the model zoning as drafted requires Site Plan Review for medium-scale ground mounted solar energy systems in residential districts. An overlay district could be used to permit such facilities without Site Plan Review in a portion of these residential districts where Site Plan Review is deemed unnecessary, while retaining the review for the balance of the districts.

In addition, some communities may wish to conduct a feasibility analysis to determine where large-scale solar energy systems are most appropriate within the municipality and use an overlay zoning district approach to encourage the siting of facilities in the most feasible locations. Once an area has been established through a thoughtful and analytical process, the municipality could enact overlay zoning legislation to prioritize these areas for large-scale solar energy systems. Many Massachusetts communities have already taken this approach through adoption of a large-scale ground-mounted solar overlay district, often based on DOER's Model As-of-Right Zoning Bylaw: Allowing Use of Large-Scale Ground-Mounted Solar Photovoltaic Installations.

Agricultural Exemption:
In addition to the exemption pertaining to solar energy systems Section 3 of Chapter 40A also exempts agricultural uses from zoning regulations that would otherwise apply. Thus, when the majority of the power from a solar energy system (or a wind turbine) is integral to farm production construction and operation of the system would covered by the exemption. Questions on the applicability of the agricultural exemption to solar energy systems should be directed to Gerry Palano at the Dept. of Agricultural Resources (Gerald.Palano@state.ma.us or 617-626-1706).

Example 1 (Use Tables):

	Residential-1 (R1)	**Residential-2 (R2)**	**Residential-3 (R3)**	**Commercial (C)**	**Industrial (I)**	**Public (P)**
PRINCIPAL USE						
Medium-Scale Ground-Mounted Solar Energy System	SPR	SPR	SPR	Y	Y	Y
Large-Scale Ground-Mounted Solar Energy System	SP	N	SPR	SPR	SPR	SPR

Y = Allowed N = Prohibited
SP = Special Permit SPR = Site Plan Review

	Residential-1 (R1)	**Residential-2 (R2)**	**Residential-3 (R3)**	**Commercial (C)**	**Industrial (I)**	**Public (P)**
ACESSORY USE						
Roof-Mounted Solar Energy System	Y	Y	Y	Y	Y	Y
Small-Scale Ground-Mounted Solar Energy System	Y	Y	Y	Y	Y	Y
Medium-Scale Ground-Mounted Solar Energy System	SPR	SPR	SPR	Y	Y	Y

Y = Allowed N = Prohibited
SP = Special Permit SPR = Site Plan Review

Example 2 (Uses listed):

1.0 Residential District Uses

1.1 Uses Permitted

1.1.1 Roof-Mounted Solar Energy Systems
1.1.2 Small-Scale Ground-Mounted Solar Energy Systems

1.2 Uses Allowed through Site Plan Review

1.2.1 Medium-Scale Ground-Mounted Solar Energy Systems
1.2.2 Large-Scale Ground-Mounted Solar Energy Systems in the R3 District

1.3 Uses Allowed via Special Permit

1.3.1 Large-Scale Ground-Mounted Solar Energy Systems in the R1 District

2.0 Non-Residential District Uses

2.1 Uses Permitted

2.1.1 Roof-Mounted Solar Energy Systems
2.1.2 Small-Scale Ground-Mounted Solar Energy Systems
2.1.3 Medium-Scale Ground-Mounted Solar Energy Systems

2.2 Uses Allowed through Site Plan Review

2.2.1 Large-Scale Ground-Mounted Solar Energy Systems

Dimensional Regulations

Commentary: In most cases, the existing dimensional standards in a Zoning Bylaw/Ordinance will allow for the development of small-, medium-, and large-scale solar energy systems. However, if a municipality finds alternate dimensional standards are necessary to allow solar energy systems while protecting public health, safety, or welfare, it may impose them. As a reminder, while regulating aesthetics can arguably be considered a matter of protecting public welfare, attempting to place restrictions on dimensional standards, such as setbacks or height, as they relate to aesthetics can create roadblocks to actual installation. It is therefore not recommended that communities regulate aesthetics of solar energy systems due to the strong statutory protections in Chapter 40A Section 3, or that they do so very carefully.

With regard to more basic dimensional requirements such as setbacks from the property line, municipalities may also find that adjustments can be made to encourage broader use of solar energy systems. Below is a series of dimensional regulation amendments that a municipality could adopt to further encourage small-, medium-, and large-scale ground-mounted and roof-mounted solar energy systems, or simply clarify requirements pertaining to them.

Height

Commentary: It is recommended that for purposes of height, roof-mounted solar energy systems should be considered similar to chimneys, television antennae, roof-top mechanical equipment and other appurtenances that are usually either allowed a much higher maximum height (e.g., 100 feet instead of 35 feet) or are exempted altogether from building height requirements. Such

an exemption can be stated in the definition of "Building Height" or through language similar to that provided in the following example.

It is recommended that existing zoning district height limitations apply for all ground-mounted solar energy systems. If the 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. If the ground-mounted solar energy system is the principal structure on a lot, then the height restriction for principal structures would apply.

Example:

1.0 Building Height Regulations

1.1 Exemptions

1.1.1 Mechanical equipment and appurtenances necessary to the operation or maintenance of the building or structure itself, including chimneys, ventilators, plumbing vent stacks, cooling towers, water tanks, broadcasting and television antennae and roof-mounted solar energy systems.

Setbacks

Commentary: It is recommended that small- and medium-scale ground-mounted solar energy systems that are accessory to a primary building or structure on a lot be provided with more flexible setback requirements than those that would typically apply to a primary structure. Many communities already provide some flexibility for "accessory structures" like sheds, allowing these to be closer to the lot line than the primary structure. For example, where a front/side/rear yard setback for the primary structure may be 50 feet, setbacks of 20 feet may be allowed for accessory structures. When ground-mounted solar energy systems are developed as accessory structures to a home, business or other building or structure, they should be afforded at least the same flexibility.

If a community does not have this type of reduced setback already built into the Zoning Bylaw/ Ordinance, a provision could be added that effectively reduces the setback distance just for this use. For example, if the community has a dimensional table, a special footnote could be added to the dimensional table as indicated in the following examples. It should be noted that often times there is a distinction between how accessory structures are regulated in a residential zoning district and how they are regulated in a commercial or industrial district. Therefore, communities should ensure that provisions for flexible setbacks for small- and medium-scale ground-mounted solar energy systems are incorporated wherever appropriate.

The first example applies a reduction of 50% to the otherwise required setbacks for accessory uses. The value of 20 feet is used in the second example; however, this may be altered based on local conditions. For example, in some communities, particularly urban communities, the required side- and rear-yard setback distances may be shorter than 20 feet. In these

circumstances, the existing shorter setback distances should remain for small- and medium-scale ground-mounted solar energy systems.

As opposed to small- and medium-scale ground-mounted solar energy systems, which are typically sited as accessory to a principal building or structure on a lot, large-scale ground-mounted solar energy systems are usually sited as principal structures. Whenever a solar energy system is sited as a principal structure on a lot, it is recommended that the setback requirements for principal structures in that zoning district apply. Regardless of the scale of the system or the minimum setback required solar energy system installers often allow a sufficient setback to avoid the issue of shading by vegetation on neighboring properties.

Placement of solar energy systems in front yards should be avoided if at all possible. However, in DOER's view the statutory protections for solar energy systems create a situation where a ground-mounted array could not be prohibited outright in a front yard, so the language provided in the following example includes a standard for the front yard setback. DOER recognizes the concerns this may raise in residential neighborhoods and acknowledges that communities should work with property owners to find appropriate locations for ground-mounted systems in side or rear yards.

Example Dimensional Table Footnotes for Accessory Installations:

(1) Small- and medium-scale ground-mounted solar energy systems accessory to principal use may be located no closer than [1/2 of the setback that would otherwise apply] from the front, side or rear lot line. All ground-mounted solar energy systems in residential districts shall be installed either in the side yard or rear yard to the extent practicable

(2) Small- and medium-scale ground-mounted solar energy systems accessory to a principal use may be located no closer than [twenty (20) feet] from the front, side or rear lot line. All ground-mounted solar energy systems in residential districts shall be installed either in the side yard or rear yard to the extent practicable.

Lot Coverage

Commentary: A number of communities use "maximum lot coverage" or "maximum impervious surface" as one of their dimensional standards. While it is clear that such features as driveways or buildings would be included in any calculation of lot coverage, many other features may be more ambiguous depending on how clearly the definition in the Zoning Bylaw/Ordinance is written. Awnings, porches, decks and similar features can often become a matter of dispute. Regardless of the definition, it is recommended that solar energy systems with grass or another pervious surface under them be exempted from lot coverage or impervious surface calculations. If the area is to be paved or otherwise rendered impervious then this land area should in fact count toward any coverage or impervious surface limit. It is also important to note that this recommended exemption is not intended to apply to municipal stormwater regulations, as the panels could have the effect of altering the volume, velocity, and discharge pattern of stormwater runoff. The following provision could be included as a footnote to the Dimensional Table related

to maximum lot coverage and impervious cover requirements, or as a separate provision within the dimensional regulations.

Example:

Solar energy systems shall not be included in calculations for lot coverage or impervious cover as defined in [INSERT SECTION REFERENCE FOR 'DEFINITIONS'].

Site Plan Review Requirements and Performance Standards

Commentary: Although not specifically addressed under Chapter 40A, Site Plan Review is included within the local Zoning Bylaws/Ordinances of many Massachusetts communities. Site Plan Review is meant to enforce clear and fair design standards for different types of development. This is typically done through a coordinated review process that circulates development applications among, and invites input from, all local boards and commissions that might permit a project, including Local Historic District Commissions as applicable. Site Plan Review is usually triggered by either specific types of uses (e.g., commercial or industrial development), or certain scales of uses (e.g., non-residential buildings over 5,000 square feet).

Typically, Site Plan Review procedures and requirements are provided within a separate section of the Zoning Bylaw/Ordinance. However, there are instances when communities provide separate Site Plan Review provisions and procedures within a section pertaining to a particular use or development type (e.g., Planned Business Development, etc.). Consistent with the Legislature's intent to facilitate the siting of solar energy, communities should shape the Site Plan Review provisions of their Zoning Bylaws/Ordinances to enable large-, medium- and small-scale solar energy system projects to proceed without undue delay.

Model language for Site Plan Review for medium-scale ground-mounted solar energy systems is provided in the following Example 1. As discussed earlier in this document, Site Plan Review may be appropriate when medium-scale ground-mounted systems are sited within residential districts. The model language provided in Example 1 below is based on, but is less stringent than, the provisions in the Massachusetts DOER Model As-of-Right Zoning Bylaw: Allowing Use of Large-Scale Ground-Mounted Solar Photovoltaic Installations.

Example 2 provides model language for Site Plan Review for large-scale ground-mounted solar energy systems when they are permitted as of right. As discussed earlier in this document, Site Plan Review may be appropriate for large-scale ground-mounted systems when they are sited anywhere within the community. The model language provided in Example 2 below is based on the provisions in the Massachusetts DOER Model As-of-Right Zoning Bylaw: Allowing Use of Large-Scale Ground-Mounted Solar Photovoltaic Installations. Example 2 is also intended for use in concert with the special permit language in the next section of this model zoning.

Example 3 provides model language for roof-mounted and small-scale ground-mounted systems when they are part of a larger project where Site Plan Review is triggered through another threshold (e.g., commercial development, non-residential buildings over 5,000 square feet, etc.). It is important to note that the installation of roof-mounted or small-scale ground-mounted solar

energy systems does not trigger Site Plan Review on its own. However, when such systems are included as part of a larger development proposal that requires Site Plan Review, the municipality has the opportunity to review the roof-mounted or small-scale ground-mounted solar energy systems as part of the larger proposal.

As discussed earlier in this document, while regulating aesthetics can arguably be considered a matter of protecting public welfare, attempting to place restrictions on solar energy systems as they relate to aesthetics can create roadblocks to actual installation. It is therefore not recommended that communities regulate aesthetics of solar energy systems, or that they do so very cautiously, due to the strong statutory protections in Chapter 40A Section 3. However, where communities already have Site Plan Review standards that relate to aesthetics, such as screening requirements, these standards should also apply to solar energy systems. In other words, solar energy systems should not be singled out and regulated more stringently than other uses that require Site Plan Review; however, they can be held to the same level of restrictions that are in place for other uses.

Example 1 (Site Plan Review provisions for medium-scale ground-mounted solar energy systems in residential zoning districts):

1.0 Site Plan Review

1.1 Applicability

1.1.1 Medium-scale ground-mounted solar energy systems proposed within residential zoning districts shall undergo Site Plan Review prior to construction, installation or modification as provided in this section.

1.2 Site Plan Document Requirements

Pursuant to the Site Plan Review process, the project proponent shall provide the following documents, as deemed applicable by the Site Plan Review Authority:

1.2.1 A site plan showing:

(a) Property lines and physical features, including roads, for the project site;
(b) Proposed changes to the landscape of the site, grading, vegetation clearing and planting, exterior lighting, screening vegetation or structures;
(c) Blueprints or drawings of the solar energy system showing the proposed layout of the system, any potential shading from nearby structures, the distance between the proposed solar collector and all property lines and existing on-site buildings and structures, and the tallest finished height of the solar collector;

(d) Documentation of the major system components to be used, including the panels, mounting system, and inverter;
(e) Name, address, and contact information for proposed system installer;
(f) Name, address, phone number and signature of the project proponent, as well as all co-proponents or property owners, if any;
(g) The name, contact information and signature of any agents representing the project proponent; and
(h) Zoning district designation for the parcel(s) of land comprising the project site.

If the following are not addressed in existing site plan review regulations, then the community may wish to include them:

(i) Locations of active farmland and prime farmland soils, wetlands, permanently protected open space, Priority Habitat Areas and BioMap 2 Critical Natural Landscape Core Habitat mapped by the Natural Heritage & Endangered Species Program (NHESP) and "Important Wildlife Habitat" mapped by the DEP.
(j) Locations of floodplains or inundation areas for moderate or high hazard dams;
(k) Locations of local or National Historic Districts;

1.2.2 Proof that the project proponent will meet the required Site Plan Review notification procedures.

Commentary: Provision 1.2.2 above should reference the municipality's existing Site Plan Review public and/or abutter notification procedures if applicable. For example, a community may require projects that are subject to Site Plan Review to notify all property owners within 100 feet of the project site.

1.3 Site Plan Review Design Standards

1.3.1 Standards for medium-scale ground-mounted solar energy systems proposed within residential zoning districts

1.3.1.1 Utility Notification - No grid-intertie photovoltaic system shall be installed until evidence has been given to the Site Plan Review Authority that the owner has submitted notification to the utility company of the customer's intent to install an interconnected customer-owned generator. Off-grid systems are exempt from this requirement.

1.3.1.2 Utility Connections - Reasonable efforts, as determined by the Site Plan Review Authority, shall be made to place all utility connections from the solar photovoltaic installation underground, depending on appropriate soil conditions, shape, and topography of the site and any requirements of the utility provider. Electrical transformers for utility interconnections may be above ground if required by the utility provider.

1.3.1.3 Safety - The medium-scale ground-mounted solar energy system owner or operator shall provide a copy of the Site Plan Review application to the local fire chief. All means of shutting down the solar installation shall be clearly marked.

Commentary: With regard to issues of access and safety, communities looking to adopt zoning for medium-scale solar energy systems should be aware of any unique local requirements that could apply. For example, if the fire department will want an Emergency Response Plan as part of approval, this should be folded into the review process as seamlessly as possible.

1.3.1.4 Visual Impact – Reasonable efforts, as determined by the Site Plan Review Authority, shall be made to minimize visual impacts by preserving natural vegetation, screening abutting properties, or other appropriate measures.

1.3.1.5 Land Clearing, Soil Erosion and Habitat Impacts - Clearing of natural vegetation shall be limited to what is necessary for the construction, operation and maintenance of ground-mounted solar energy systems or as otherwise prescribed by applicable laws, regulations, and bylaws/ordinances.

Commentary: As drafted, this model zoning does not require medium-scale ground mounted solar energy systems to be fenced, but this is something communities will want to consider. Regardless, many project proponents will find fencing prudent.

Example 2 (Site Plan Review provisions for large-scale ground-mounted solar energy systems):

1.0 Site Plan Review

1.1 Applicability

1.1.1 Large-scale ground-mounted solar energy systems shall undergo Site Plan Review prior to construction, installation or modification as provided in this section.

1.2 Site Plan Document Requirements

Pursuant to the Site Plan Review process, the project proponent shall provide the following documents, as deemed applicable by the Site Plan Review Authority:

1.2.1 A site plan showing:

(a) Property lines and physical features, including roads, for the project site;
(b) Proposed changes to the landscape of the site, grading, vegetation clearing and planting, exterior lighting, screening vegetation or structures;
(c) Blueprints or drawings of the solar energy system signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts showing the proposed layout of the system, any potential shading from nearby structures, the distance between the proposed solar collector and all property lines and existing on-site buildings and structures, and the tallest finished height of the solar collector;
(d) One or three line electrical diagram detailing the solar photovoltaic installation, associated components, and electrical interconnection methods, with all Massachusetts Electric Code (527 CMR 12.00) compliant disconnects and overcurrent devices;
(e) Documentation of the major system components to be used, including the panels, mounting system, and inverter;
(f) Name, address, and contact information for proposed system installer;
(g) Name, address, phone number and signature of the project proponent, as well as all co-proponents or property owners, if any;
(h) The name, contact information and signature of any agents representing the project proponent; and
(i) Zoning district designation for the parcel(s) of land comprising the project site.

If the following are not addressed in existing site plan review regulations, then the community may wish to include them:

(j) Locations of active farmland and prime farmland soils, wetlands, permanently protected open space, Priority Habitat Areas and BioMap 2 Critical Natural Landscape Core Habitat mapped by the Natural Heritage & Endangered Species Program (NHESP) and "Important Wildlife Habitat" mapped by the DEP.
(k) Locations of floodplains or inundation areas for moderate or high hazard dams;
(l) Locations of local or National Historic Districts;

1.2.2 Documentation of actual or prospective access and control of the project site (see also Section 1.3.1.1);
1.2.3 An operation and maintenance plan (see also Section 1.3.1.2);
1.2.4 Proof of liability insurance; and
1.2.5 A public outreach plan, including a project development timeline, which indicates how the project proponent will meet the required Site Plan Review notification procedures and otherwise inform abutters and the community.

Commentary: Provision 1.2.6 above should reference the municipality's existing Site Plan Review public and/or abutter notification procedures if applicable. For example, a community may require projects that are subject to Site Plan Review to notify all property owners within 100 feet of the project site.

1.3 Site Plan Review Design and Operation Standards

1.3.1 Standards for large-scale ground-mounted solar energy systems

1.3.1.1 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 energy system.

1.3.1.2 Operation & Maintenance Plan - The project proponent shall submit a plan for the operation and maintenance of the large-scale ground-mounted solar energy system, which shall include measures for maintaining safe access to the installation, stormwater controls, as well as general procedures for operational maintenance of the installation.

1.3.1.3 Utility Notification - No grid-intertie photovoltaic system shall be installed until evidence has been given to the Site Plan Review Authority that the owner has submitted notification to the utility company of the customer's intent to install an interconnected customer-owned generator. Off-grid systems are exempt from this requirement.

1.3.1.4 Lighting - Lighting of large-scale ground-mounted solar energy systems shall be consistent with local, state and federal law. Lighting of other parts of the installation, such as appurtenant structures, shall be limited to that required for safety and operational purposes, and shall be reasonably shielded from abutting properties. Where feasible, lighting of the solar energy system shall be directed downward and shall incorporate full cut-off fixtures to reduce light pollution.

1.3.1.5 Signage - Signs on large-scale ground-mounted solar energy systems shall comply with a municipality's sign bylaw/ordinance. A sign consistent with a municipality's sign bylaw/ordinance shall be required to identify the owner and provide a 24-hour emergency contact phone number. Solar energy systems shall not be used for displaying any advertising except for reasonable identification of the manufacturer or operator of the solar energy system.

1.3.1.6 Utility Connections - Reasonable efforts, as determined by the Site Plan Review Authority, shall be made to place all utility connections from the solar photovoltaic installation underground, depending on appropriate soil conditions, shape, and topography of the site and any requirements of the utility provider. Electrical transformers for utility interconnections may be above ground if required by the utility provider.

1.3.1.7 Emergency Services – The large-scale ground-mounted solar energy system 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 energy system shall be clearly marked. The owner or operator shall identify a responsible person for public inquiries throughout the life of the installation.

Commentary: With regard to issues of access and safety, communities looking to adopt zoning for large-scale solar energy facilities should be aware of any unique local requirements that could apply.

1.3.1.8 Land Clearing, Soil Erosion and Habitat Impacts - Clearing of natural vegetation shall be limited to what is necessary for the construction, operation and maintenance of solar energy system or otherwise prescribed by applicable laws, regulations, and bylaws/ordinances.

1.3.2 Monitoring and Maintenance

1.3.2.1 Solar Energy System Installation Conditions - The large-scale ground-mounted solar energy system owner or operator shall maintain the facility in good condition. Maintenance shall include, but not be limited to, painting, structural repairs, and integrity of security measures. Site access shall be maintained to a level acceptable to the local Fire Chief, Emergency Management Director, and Emergency Medical Services. The owner or operator

shall be responsible for the cost of maintaining the solar energy system and any access road(s), unless accepted as a public way.

1.3.2.2 Modifications - All material modifications to a large-scale ground-mounted solar energy system made after issuance of the required building permit shall require approval by the Site Plan Review Authority.

1.3.3 Abandonment or Decommissioning

1.3.3.1 Removal Requirements

Any large-scale ground-mounted solar energy system which has reached the end of its useful life or has been abandoned consistent with Section 1.3.3.2 of this bylaw/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 Site Plan Review Authority by certified mail of the proposed date of discontinued operations and plans for removal. Decommissioning shall consist of:

(a) Physical removal of all solar energy systems, 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 Site Plan Review Authority may allow the owner or operator to leave landscaping or designated below-grade foundations in order to minimize erosion and disruption to vegetation.

1.3.3.2 Abandonment

Absent notice of a proposed date of decommissioning or written notice of extenuating circumstances, the large-scale ground-mounted solar energy system shall be considered abandoned when it fails to operate for more than one year without the written consent of the Site Plan Review Authority. If the owner or operator of the solar energy system 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 retains the right, after the receipt of an appropriate court order, to enter and remove an abandoned, hazardous, or decommissioned large-scale ground-mounted solar energy system. As a condition of Site Plan approval, the applicant and landowner

shall agree to allow entry to remove an abandoned or decommissioned installation.

Commentary: Recognizing that other remedies, such as a tax lien, are available to communities in the event an abandoned facility is legitimately putting public safety at risk this model zoning does not require the provision of surety to cover the cost of removal in the event the municipality must remove the installation and remediate the landscape. Communities can, however, require surety in circumstances where a valid planning purpose for doing so exists.

Commentary: As drafted, this model zoning does not require large-scale ground mounted solar energy systems to be fenced, but this is something communities will want to consider. Regardless, many project proponents will find fencing prudent.

Example 3 (Site Plan Review provisions for roof-mounted and small-scale ground-mounted solar energy systems as part of a larger project that triggers Site Plan Review):

1.0 Site Plan Review

1.1 Site Plan Document Requirements

1.1.1 Requirements for Roof-Mounted and Small-Scale Ground-Mounted Solar Energy Systems - Where these solar energy systems may be accessory to a use allowed through Site Plan Review, the Site Plan Review shall include review of their adequacy, location, arrangement, size, design, and general site compatibility.

1.1.1.1 Roof-Mounted Solar Energy Systems – For all roof-mounted systems, the applicant shall provide:

(a) The shortest distance between the solar collector and all edges of the roof.
(b) The distance between the solar collector and any other existing rooftop features such as chimneys, spires, access points, etc.
(c) The height of the solar collector both from finished grade and, where applicable, from the finished surface of the roof.

1.1.1.2 Small-Scale Ground-Mounted Solar Energy Systems – For all ground-mounted systems, the applicant shall provide:

(a) The distance between the proposed solar collector and all property lines and existing on-site buildings and structures.
(b) The tallest finished height of the solar collector.
(c) Proposed changes to the landscape of the site, grading, vegetation clearing and planting, exterior lighting, screening vegetation or structures.

1.1.1.3 System Components – The Plan must include documentation of the major system components to be used, for example the panels, mounting system, and inverter.

1.1.1.4 Installer Details – The Plan must include the name, address, and contact information for proposed system installer.

1.2 Site Plan Review Design Standards

1.2.1 Standards for roof-mounted and small-scale ground-mounted solar energy systems

1.2.1.1 Utility Notification - No grid-intertie photovoltaic system shall be installed until evidence has been given to the Site Plan Review Authority that the owner has submitted notification to the utility company of the customer's intent to install an interconnected customer-owned generator. Off-grid systems are exempt from this requirement.

1.2.1.2 Emergency Access - Solar energy systems shall be located in such a manner as to ensure emergency access to the roof, provide pathways to specific areas of the roof, provide for smoke ventilation opportunities, and provide emergency egress from the roof.

(a) For buildings with pitched roofs, solar collectors shall be located in a manner that provides a minimum of one three-foot wide clear access pathway from the eave to the ridge on each roof slope where solar energy systems are located as well as one three-foot smoke ventilation buffer along the ridge.

(b) Residential rooftops that are flat shall have a minimum three-foot wide clear perimeter and commercial buildings that are flat shall have a minimum four-foot wide clear perimeter between a solar energy system and the roofline, as well as a three-foot wide clear perimeter around roof-mounted equipment such as HVAC units.

(c) To the extent practicable, the access pathway shall be located at a structurally strong location on the building (such as a bearing wall).

Commentary: Building and Fire Department personnel should be involved in the development of emergency access standards, and any zoning standards that are adopted should be consistent with local building and fire codes.

1.2.1.3 Safety – No roof-mounted solar energy system shall be located in a manner that would cause the shedding of ice or snow from the roof into a porch, stairwell or pedestrian travel area.

Special Permits

Commentary: Special Permits are addressed in Chapter 9 of the Zoning Act, and most Massachusetts communities have regulations pertaining to them within their zoning bylaw or ordinance. Below is model language for municipalities requiring special permits for large-scale ground-mounted solar energy systems. It is intended to be adopted and implemented alongside Site Plan Review language for large-scale ground-mounted systems included as Example 2 in this model zoning. Rather than include separate special permit standards applicable specifically to large-scale ground-mounted solar energy systems, this language simply directs that a permit be issued pursuant to the already established special permit bylaw/ordinance of the community.

Municipalities will, however, want to audit their special permit language, especially the approval standards, for compatibility with the siting of large-scale ground-mounted solar energy systems. Such systems should have far lower impacts than commercial or industrial uses that often require issuance of special permit, and communities should keep in mind the requirement in Chapter 40A Section 3 that any regulations pertaining to solar energy systems be reasonable.

1.0 Special Permit with Site Plan Review

1.1 Special Permit Requirements

1.1.1 Where required a special permit shall be issued prior to construction, installation or modification of any large-scale ground-mounted solar energy system. The special permit granting authority shall include as part of its special permit review and proceedings all the provisions and requirements of the Site Plan Review standards applicable to large-scale ground-mounted solar energy systems.

Pre-Existing Non-Conforming Uses and Structures

Commentary: Alterations, extensions and structural changes to pre-existing non-conforming uses and structures (e.g., existing buildings that do not meet the dimensional requirements of the Zoning Bylaw/Ordinance) that intensify non-conformities or result in additional non-conformities may not be allowed beyond a certain threshold or may require a Special Permit pursuant to the local Zoning Bylaw/Ordinance. It is recommended that the installation of roof-mounted or small-scale ground-mounted solar energy systems associated with pre-existing non-conforming uses or structures be exempt from this requirement. An example provision is provided below. Communities not comfortable with providing this exemption to small-scale ground mounted systems due to their potential to be located on very small lots may wish to apply Site Plan Review or continue to require a Special Permit where this can be justified to protect public health, safety, or welfare. As to roof mounted systems on non-conforming properties, given the exemption afforded solar energy systems, DOER believes it would be unreasonable to disallow them or require a Special Permit even when installation would exacerbate a pre-existing building height non-conformity.

Example:

1.0 Pre-Existing Non-Conforming Uses and Structures

1.1 Improvements that do not change the use or the basic exterior characteristics or appearance of the building or structure are allowed. Such improvements include but are not limited to the following:

1.1.1 Installation or replacement of solar energy systems.

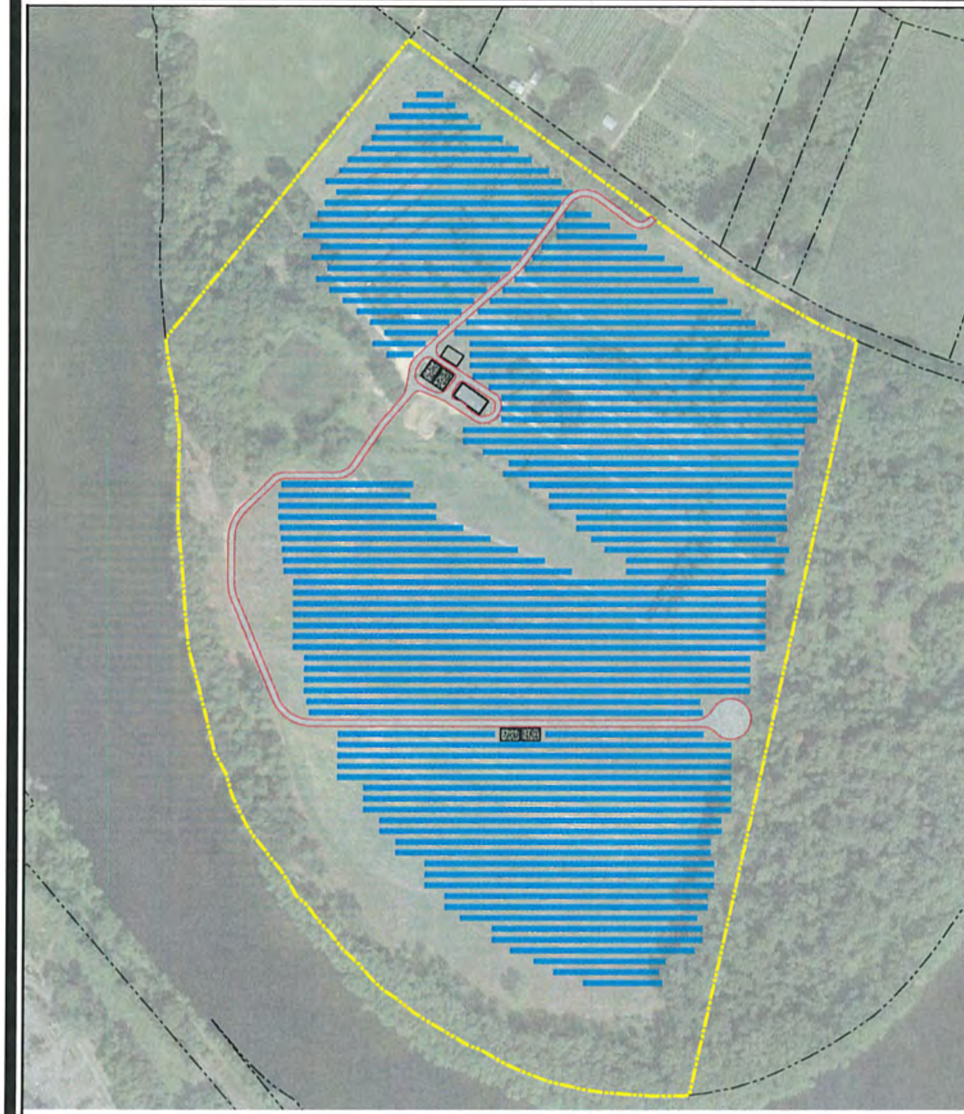
Historic Districts

Commentary: Many communities in the Commonwealth have adopted Local Historic Districts to protect and preserve buildings, landscapes and neighborhoods of historic significance. In recent years, conflict has occasionally arisen about the installation of solar energy systems within these districts on historic buildings and structures, since some argue that they have adverse impacts on the visual appearance and integrity of the buildings and structures.

As described in the DOER Policy Guidance for Regulating Solar Energy Systems, Local Historic District Commissions must consider the policy of the Commonwealth to encourage the use of solar energy systems and to protect solar access when considering issuance of a certificate of appropriateness for a solar energy system. However, thoughtful design guidelines can help ensure that solar energy systems are sited while the goals of historic preservation continue to be achieved.

Design guidelines can require that solar energy systems not be visible from public areas, to the greatest extent practicable. When it is not feasible (either physically or economically) to locate solar energy systems out of the public eye, solar energy systems can be required to be designed to certain architectural standards (e.g., building-integrated, use of solar shingles) to the greatest extent practicable. However, these options may be infeasible as well due to the high cost and low performance of many of these technologies. To meet these challenges, Local Historic District Commissions are encouraged to write design guidelines that support the development of solar energy systems and are sensitive to the historic preservation goals of the Commission.

EXHIBIT C



LOT COVERAGE - SOLAR PANELS, ROADS, & CONCRETE PADS

LOT COVERAGE - IMPERVIOUS AREA (PILES, ROADS, & CONCRETE PADS)

10 MW SOLAR ARRAY - LOT COVERAGE COMPARISON

WEST PORTSMOUTH STREET SOLAR, LLC

SCALE IN FEET 0 150' 300'

GRAPHIC SCALE

N

Tighe&Bond

Engineers | Environmental Specialists

MAY 2018

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