WHITE PAPER

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ASSOCIATION OF NEW JERSEY ENVIRONMENTAL COMMISSIONS

Solar Siting and Sustainable Land Use

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With the rapid growth of New Jersey's highly incentivized solar industry, a new type of development pressure has emerged. There is growing momentum to build large, utility-scale solar electric generating facilities on farmland, open space, forests and environmentally sensitive areas.

Solar electric generation is an integral part of advancing New Jersey's clean energy goals, and is a key element of our State's *Energy Master Plan (EMP)*; however, sacrificing thousands of acres of productive, open land to vast, ground-mounted solar arrays is neither necessary nor prudent in America's most densely populated state. New Jersey can easily realize its solar electric generation goals by locating solar projects in already developed areas, abandoned mineral extraction sites, rooftops, brownfields, landfills, and over new and existing impervious areas.

Because municipal governments control land use within their boundaries, they are empowered to ensure appropriate siting and conditions for large-scale solar developments. The purpose of this paper is to help equip municipalities with information and tools to:

- assess the impact of proposed solar farms;
- determine optimal siting for solar facilities within their community, based on their master plans;
- enact ordinances that promote appropriate solar development while conserving land and protecting critical resources.

We will also discuss specific actions municipal governments can take under existing law to assure harmonious integration of these facilities into the existing land use pattern.

THE RIGHT PLACE FOR SOLAR

New Jersey's Municipal Land Use Law (MLUL) now defines solar electric generating facilities as "inherently beneficial uses;" however, the law has not removed the necessity to prove that the solar facility will not frustrate the overall planning efforts of the town or become a detriment to the well being and safety of the community. In other words, inherently beneficial does not mean "permitted." As in all good planning, balance is critical. Municipalities can anticipate the most appropriate location for large-scale solar facilities through their zoning and planning without compromising productive farmland, forests, and sensitive environmental areas. Defining the proper location for the solar electric industry will facilitate clean energy production while avoiding unwanted environmental, planning and political impacts.

The first state-owned landfill solar farm in Kearny, NJ
Governor's Office/Tim Larsen

If one of our objectives is to meet our energy goals with the minimum use of scarce land, we should first be encouraging roof-mounted or other flat installations on existing impervious cover or already disturbed areas. The modest goals of New Jersey's existing renewable energy portfolio are achievable and even higher outputs are possible without

Solar panels on carport parking facility at Mennen Sports Arena in Morristown, NJ
Morris County Park Commission

compromising natural processes or consuming large tracts of undeveloped land.[1]

New Jersey's 2011 *EMP* does not support the subsidized conversion of productive farmland to solar energy uses, stating: *"Although a number of utility-scale solar installations have been proposed for, and installed on, what were previously working farms, the Christie Administration does not support the use of ratepayer subsidies to turn productive farmland into grid-supply solar facilities."* (NJ 2011 *EMP*, p.107)

WHAT IS A "UTILITY-SCALE" SOLAR PROJECT?

In this paper, the term "utility-scale" facilities refer to solar facilities that:

- are connected directly to the distribution system, not net-metered (Under net-metering, a system owner receives retail credit for unused energy generated.)
- are larger than 1Megawatt (MW)
- involve intensive land use, and
- have significant connection and financing requirements.

This paper will not address the siting of residential or commercial net-metered facilities that serve individual homes or businesses, net metered and solar aggregated governmental or school facilities, or solar installations that supply energy for commercial farms, including those on preserved farmland.[2]

This paper also does not deal with other renewable energy facilities, including wind, biomass, hydroelectric or tidal-electric.

WHY HERE AND WHY NOW?

Several factors have been driving the solar development boom:

- State and federal incentives have made large-scale solar projects more attractive to investors.
- Developers can earn Solar Renewable Energy Certificates (SRECs), tradable certificates issued to solar energy generators.
- The competition for grid access without triggering costly capital upgrades to substations and connecting lines has resulted in a "grid space race."
- During the prolonged economic slump, solar development has provided jobs to help jumpstart the economy.
- The depressed housing market has led landowners to seek alternatives to traditional real estate development.

Farmland throughout New Jersey has become an easy target, especially where land is cleared, relatively flat and affordable with sufficient electric utility interconnection locations (substations) present. However, as with any development, careful planning and appropriate siting are essential. Integrating this desirable technology into the municipal planning framework is challenging many municipalities.

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1. As of January 2010, the *Solar Energy Advancement and Fair Competition Act* requires energy suppliers to procure 2,164 GWh GWh (1803 MW) of instate solar electric generation per year by 2021, and at least 5316 GWh (4,430 MW) by 2026 and each year thereafter. Meeting these goals solely with ground mounted (tilted or tracking) installations would consume 5600 acres (8.8 square miles) by 2020. By 2026 the higher goal of 5,316 GWh (4,430 MW) would require 16,000 acres (24 square miles).
   Less land-intensive rooftop installations would enable New Jersey to meet the 2020 goals by covering only 4.23 square miles of flat-mounted photovoltaic panels, and 11.73 square miles of panels in 2026.
2. Energy generation on preserved farmland, authorized under P.L. 2009, c 213 *www.njleg.state.nj.us/2008/Bills/PL09/213_.PDF*

Planning and zoning boards of adjustment have received many large-scale solar facility applications that propose, in aggregate, to convert thousands of acres of prime agricultural soils to "solar farms." In addition to jeopardizing prime agricultural soils, applications may also propose to clear woodlands, displace existing wildlife habitat, disturb wetlands and transition zones, and place solar arrays within the 300-foot riparian buffers required for Category 1 (C-1) waterways and Highlands Open Waters.

THE ECONOMICS OF SOLAR SITING

New Jersey's solar resource, while not outstanding compared with the southwestern US, is relatively evenly distributed over the state.[3] Generally, the amount of solar energy reaching the earth's surface in New Jersey is roughly between 4 and 5 kilowatts per square meter daily (kWh/m/day).

This "middling" solar intensity leads solar developers toward maximizing output per panel. Because the panels represent a large portion of the cost of a solar installation, solar developers try to obtain the greatest yield from each panel by favoring tilted panels and panels that track the sun throughout the day. These are typically used on ground-mounted arrays.

Although the tilted and tracking systems produce more power per panel, they must be installed in a configuration that prevents the panels from shading one another and, particularly for tracking panels, allows for servicing and maintenance. Because of this need for space between panels, ground-mounted systems are extremely consumptive of land. They use more land per unit of electricity produced than roof-mounted systems. Thus, low-cost, "vacant," agricultural land that typically is flat, clear and ready to develop in large parcels is far more attractive to solar developers than expensive retrofits to existing rooftops, parking lots and brownfields.

Flat-mounted, rooftop panels use less space per unit of electricity produced because they can generally be packed more closely together than ground mounted systems. As a result, flat-mounted systems produce more electricity from a given land area. They have the added advantage of occupying sites already devoted to another use, rather than land suitable for agriculture or other environmental functions.

Solar development pressure has been greatest in the southern part of the State, where land prices are generally lower and parcels are larger than in the north. The solar resource in South Jersey is also slightly better. Conversely, in the northern part of the State where land prices are higher and parcels are smaller, there are more flat roofs and impervious cover suitable for flat-mounted systems and the energy produced has less distance to travel to where it is needed.

WHAT'S AT RISK?

The rush to gain approval for large solar projects is being driven primarily by financial incentives, such as the solar renewable energy credit (SREC) program and federal tax credits and not necessarily by sound planning or engineering principles. Developers of many proposed projects have not conducted the studies required to obtain permission to connect to the distribution system nor have they secured the financing required for construction.

Serious environmental and economic risks could result from haphazard conversion of farmland to solar energy generation. Some issues to consider include:

- Environmental degradation – Ground-mounted solar development could impact stormwater runoff patterns and compromise natural resources and critical areas.
- Local food – Further conversion of farmland to energy production could reduce access to fresh, locally grown food.
- Agricultural impacts – Solar developers generally are willing to pay far more for land than farmers. Competition for leased acreage is especially problematic.

Roof-mounted solar panels at Mennen Sports Arena in Morristown, NJ
Morris County Park Commission

3. Amount of solar radiation reaching the earth's surface throughout the US *www.nrel.gov/gis/solar.html/images/images/images/map_csp_national_lo-res.jpg*

- Jobs impacts – Many renewable technology jobs are out-of-state, and the local jobs associated with solar installation tend to be short-term. On the other hand, agriculture in New Jersey employs thousands of people in packing, warehousing, cold storage, transportation, farm equipment sales and service of farm equipment, seeds, and irrigation.
- Undermining comprehensive plans – Haphazardly devoting more prime agricultural land to solar development could undermine existing farmland/open space plans. Diverting large tracts of land zoned for other desired purposes, such as commercial or industrial uses, could also undermine the intent of a town's master plan and zone plan.
- Destroying habitat – due to a lack of scientific research on the long-term impacts of large-scale solar development on wildlife within the Northeastern Climate Region, it is not clear how inappropriate siting might affect wildlife and lead to loss of species habitat. However, it is clear that sites generally exclude larger terrestrial wildlife and remove most if not all of the existing vegetation except for short grasses.
- Decommissioning and disposal – Fast-evolving technologies could lead to decommissioning and disposal issues for abandoned or obsolete panels.[4]
- Impacted scenic views and vistas could affect tourism, compromise valuable cultural landscapes and result in a loss of sense of place that is highly valued in the community.

THE ROLE OF STATE LEGISLATION

The rush to foster New Jersey's clean energy future has led to a flurry of legislative activity relating to solar energy. Much of this activity is taking place without benefit of a coherent overall energy policy, policies on renewable energy development or within a comprehensive framework for environmental protection or land use planning.

In the absence of comprehensive statewide policies, it is important that municipalities carefully consider how solar development will be integrated into the local land use planning framework. Local governments still have the power to create siting criteria for solar developments within the context of normal land use regulatory practices.

4. Recycling solar collectors is technically feasible and is happening in the European Union. However, there currently is no requirement for solar panel recycling in New Jersey. First Solar is a photovoltaic panel manufacturer that collects and recycles its panels. *www.firstsolar.com/en/Sustainability/Environmental/Module-Collection-and-Recycling-Program*.

See Appendix A for a summary of recent legislation and the implications for municipalities.

PLANNING WITH PURPOSE

Integrating large-scale solar facilities into the existing municipal land use framework without compromising other planning objectives affecting natural and cultural resources presents unique challenges and requires specific fact-based responses.

In order to effectively direct where solar development should and should not go, municipalities will need to support their actions with proper planning documents and ordinances, or they will be left to respond to individual variance applications in a piecemeal fashion or be exposed to legal challenge.

Planning objectives might include:

- Encouraging solar siting on rooftops, existing impervious surfaces, brownfields, quarries and sand and gravel pits;
- Keeping farmland, parks and preserved lands, environmentally critical areas, wildlife habitats, cultural landscapes and scenic vistas either off limits to large-scale solar development or, if permitted, establishing conditions to mitigate impacts;
- Reserving sewer service areas for desired residential, commercial or industrial development;
- Avoiding development of land-intensive solar projects in areas designated for affordable housing.

Master planning is key

Under the Municipal Land Use Law, towns can regulate the location, scale and character of utility scale solar facilities to protect the public health, safety and welfare, but most New Jersey communities have not anticipated the recent demand for solar facilities and consequently have not adequately addressed this type of land use in their master plans and zoning ordinances. It is critical that the master plan and any ordinances adopted to regulate solar facilities are consistent with one another.

The master plan should contain a clear vision statement and description of what is essential to the future well-being of the town. A master plan can set forth potent policies that detail the town's objectives of ensuring compatibility between sustainable energy goals and sustainable agricultural and environmental protection policies within the community.

Many municipalities are trying to identify ways to determine suitable placement for large, commercial solar installations. Large solar fields occupying hun-

Demonstration solar facility in Middlesex County

dreds of acres may compete directly with other planning objectives, particularly maintaining sustainable agriculture in the municipality. Solar developers often offer landowners higher prices than the established farmland preservation program can pay, interfering with municipal farmland preservation objectives. A municipality may adopt a farmland preservation plan element of the master plan, which can be a powerful tool in setting forth the community's commitment to the industry of agriculture and farmland preservation. Municipalities can target land for preservation within the county's designated Agricultural Development Areas and ensure coordinated planning for preservation with open space and recreation plans.

Soil quality is an important criterion for determining the areas where farmland preservation should be a planning priority. Many municipalities have designated certain types of soils, especially prime soils, as important indicators of agricultural quality. Other determining factors for preservation include parcel size, locations of other preserved farmlands, and the contiguity of agricultural land uses.

Gather information

The planning process begins with fact finding to develop a clear picture of what the proposed use will mean for the town. Examining and visiting other operational solar sites is recommended.

The environmental resource inventory (ERI) can provide an excellent foundation of background information. Its maps should show the location of prime agricultural soils and sensitive environmental features like streams, floodplains and forests. Other important municipal planning documents include the open space plan and farmland preservation plan. Land use/land cover mapping and impervious cover mapping can be useful in identifying large roof areas, impervious surfaces, landfills, quarries, sandpits and other barren areas.[5]

5. NJ DEP GIS data may be viewed and acquired at: *www.nj.gov./dep/gis/lists.html*.

Environmental commissions can review their environmental resource inventories and make recommendations to the planning board and governing body for appropriate and inappropriate areas for utility-scale solar facilities. Large solar facilities should not be located on existing surface water, beaches and dunes or on wetlands and transition areas, vernal pools and their transition zones that are regulated by the New Jersey Department of Environmental Protection (NJ DEP). Cemeteries, public parks and other permanently deed-restricted open spaces and preserved farmland are also questionable locations.

Other locations to avoid:

- Wildlife habitats
- Preserved open space
- Stream corridors
- Contiguous forests
- Vacant land in sewer service areas/areas zoned for growth
- Historic districts, especially when "cultural landscape" is a rationale
- Scenic views and vistas
- Land adjoining/abutting preserved farmland or preserved open space.

Critical area constraints

Soils

The ERI soil chapter can help ensure the appropriateness of the soil for the proposed use. Many municipal environmental resource inventories show certain types of soils as important indicators of agricultural quality. (See Appendix B for soil classifications.) Other important characteristics are soils with frequent flooding, high seasonal water tables, shallow depth to bedrock, acid producing deposits, and those underlain by cavernous limestone (karst). These factors may pose severe constraints for seasonal access, structural stability and site design features. Even with facilities

using steel supports driven 20 feet into the soil, the extensive trenching may encounter "running sand" (sandy soil saturated with water that collapses when trenched) that can be problematic in wet conditions.

Erosion and runoff potential of the hydrologic soil group may also be issues due to the extensive land clearing and grading.

Solar panels on building and parking lot in Bridgewater, NJ
Kerry Miller

Forests

In many regions, upland forests and trees are of key importance to the hydrologic functioning of the watersheds. Forested areas generally have higher groundwater recharge rates than other types of land cover, making them important to the maintenance of aquifer volume and ground water quality. Also, since trees sequester carbon, clear-cutting of forests to produce "green energy" is not sustainable. In addition, land clearing, coverage with structures, and fencing destroy wildlife habitat – a particular consideration in areas of high sensitivity, such as Natural Heritage Priority Sites, threatened and endangered species habitat and critical grassland habitat.

Wetlands and Transition Areas

Developers should be restricted from locating solar panels in wetlands. Even if supported by single posts, the installation of solar panels into wetland soils can permanently damage wetland functions. Use of heavy equipment during installation, maintenance and replacement could further damage and disrupt the functions wetlands serve. Transition areas provide important water quality and habitat protection around wetlands.[6]

Solar installations are not specifically mentioned in New Jersey's wetlands rules, but the rules have sufficient scope to control these activities in wetlands and their buffering transition zones. The clearing of vegetation, access by construction equipment and shading of the ground by solar collectors would negatively affect wetlands and their transition areas.

Other potential impacts of solar installations in wetland environments include:

- Loss of the vital carbon sequestration function due to impaired access to sunlight;
- Permanent compaction of hydric soils;
- Loss of light needed for particular vegetative communities and natural succession;
- Invasion of alien weeds due to soil disruption and reduced vitality and competitive ability of light-loving native wetland species;
- Disruption of animal species using the wetland habitat;
- Impairment to the hydrology of the wetland complex, due to severe slowing of evapotranspiration;
- Reduced ability to absorb nutrients and filter pollutants due to lack of vegetative biomass;
- Increased erosion and downstream sedimentation due to the loss of perennial root systems and conversion to alien weeds.

When an applicant proposes to build a solar facility on wetlands or transition zones, municipal environmental commissions should take full advantage of the public comment provisions of the Freshwater Wetlands rules (*www.nj.gov/dep/landuse/fww.html*).

Riparian zones and flood hazard areas

Solar projects located in flood hazard areas, either floodway or flood fringe areas, pose serious concerns about panel stability, electrical malfunction, damage from flood debris and lack of access during floods.

Since solar fields involve removal of all natural vegetation, they are unsuitable for riparian zones, which support the important functions of filtration of surface runoff, discharge of groundwater, wildlife interaction between aquatic and terrestrial environments, stream shading and a host of other chemical and biological functions.

6. New Jersey protects wetlands under the *Freshwater Wetlands Protection Act* (*www.state.nj.us/dep/landuse/13_9b.pdf*) and subsequent NJ DEP regulations (*www.nj.gov/dep/rules/rules/njac7_7a.pdf*). The *Act* preempts local authority to regulate freshwater wetlands.

Municipalities should make sure that their ERIs and master plans contain up-to-date flood mapping by checking FEMA's recently updated flood maps.[7] The riparian areas required by NJ DEP's Flood Hazard Area Control Act Rules NJAC 7:13, should be clearly shown on the ERI maps.

LOCAL ORDINANCES ARE ESSENTIAL

Using the ERI's information on environmentally sensitive features, the master plan's farmland preservation priorities, and other planning documents, municipalities should develop an ordinance that controls where large solar facilities are allowed and what conditions they must meet.

Ordinances should regulate utility-scale solar in a manner that realizes both the need for these facilities and the associated impacts. They should also consider whether an alternative use of the land might have a greater undesirable impact. In the current economic downturn, landowners are looking for revenue without major permitting or investment, which could lead to important tracts being committed to solar energy generation for an extended period.

In land use ordinances, municipalities have a choice of regulatory options for solar development:

- **Not Permitted Use:** The ordinance may prohibit the use in a particular zone, or be silent and not mention that it is allowed. In this instance, the developer would have to apply for a use variance from the zoning board of adjustment (or land use board where zoning and planning boards are combined);
- **Permitted Use:** The ordinance can permit solar facilities in specific zoning districts where the town wishes to encourage their location. This approach would not preclude applications for facilities within other zones through the use variance process. The permitted use could be either the primary use or an accessory use. Utility-scale facilities by their nature are usually considered to be primary uses.
- **Conditional Use:** Municipalities can regulate utility-scale solar facilities as a conditional use, and define the conditions under which such development would be permitted.

7. FEMA Map Service Center – *www.fema.gov*.

8. *www.njlandlaw.com/archives/280#more-280* provides a description of the term "inherently beneficial use" in general and as it applies to solar and wind facilities in New Jersey.

Use variances

Because many municipalities have not yet passed solar ordinances to specifically allow or condition the use in particular zones, boards of adjustment are hearing many applications for use variances. Use variances are one type of "d variance," so named because it comes from paragraph (d) in the MLUL, 40:55D-70(d). In a variance format, each case is heard individually, "positive" and "negative" criteria are applied and specific findings are made. Decisions by zoning boards of adjustment do not set precedent for future cases.

Using the variance process to consider large-scale solar applications has several disadvantages:

- Projects may be proposed in any zone, resulting in a potentially chaotic mixture of solar projects and other uses.
- The projects may clash with other municipal planning objectives, particularly agricultural preservation.
- The board of adjustment has less experience evaluating comprehensive impacts of such large-scale applications, because site plans usually go to the planning board.

Municipal boards have a legal disadvantage in responding to solar variance requests. The New Jersey Legislature has given solar facilities several advantages that can influence the variance process. Of particular note is the designation of both solar and wind facilities as "inherently beneficial uses."[8] By definition, inherently beneficial uses satisfy the positive criterion for use variance approval.

Conditional Use

The conditional use designation has certain advantages in regulating commercial solar energy facilities.

- The ordinance sets defined and predictable conditions under which the facility would be permitted, which is important to the review board and the applicant.
- The impact on the land is controlled (i.e., the impact on highly productive lands is minimized).
- It enables towns to balance sustainable agriculture and sustainable energy objectives.
- It establishes objectives of the zone plan regarding utility-scale solar, which must be recognized in the review of the negative criteria when developers seek variances in other districts or from the conditional use standards.
- It specifies facility closure procedures and assurances.

- It may enable application of stormwater management performance standards.

The ordinance can provide a well conceived and reasonable set of conditions that address bulk requirements, visual and offsite impacts and facility location.

In developing conditional use requirements, land use boards can use different considerations and guidelines for various types of solar developments, including:

- Small scale accessory use for home, business or institutions;
- Agricultural accessory use;
- Principal use on publicly owned land or redevelopment areas;
- Principal use on private land (commercial).

Where?

The ordinance can prohibit utility-scale solar in specific areas. These could include areas targeted for residential or commercial growth enabled by planned or existing water and sewer systems. Many communities have planned and zoned for center-based development and redevelopment areas. Because available land is scarce in these zones, large ground-mounted solar facilities should be precluded, but roof-mounted facilities and installations on impervious surfaces should be allowed.

Municipalities may wish to allow facilities on large rooftops, above existing impervious areas, on designated brownfield sites or landfills, and in abandoned quarries or sand and gravel extraction sites.

Delineated critical areas can also be protected, either with specific standards or by carefully defining the permitted use area. The ordinance could require that prime soils receive higher protection, and it could define setbacks and buffers from adjacent farming operations, residential areas and open spaces. The ordinance should require an applicant to submit an adequate geotechnical report to support decision making with information on soil conditions, depth to bedrock, and water table levels.

An ordinance could also require landscaping plans that include native vegetation. Vegetation can be required to screen perimeter fencing, which can be up to seven-feet high, topped with barbed wire. Dark colored chain link fencing can be specified to reduce visual impacts. Even in industrial zones, an ordinance may set requirements like setbacks, buffers and stormwater control and address accessibility for service and emergencies. The ordinance should also include noise standards and setback provisions for the inverters to assure that their fan noise does not bother neighbors.

A municipality can consider allowing solar on some farmland if it has confidence that the land can return to agricultural use at the end of the facility's life span, typically assumed to be 20 years. Solar ordinances should require a decommissioning plan for when a solar installation reaches the end of its productive use. The ordinance can include conditions to ensure that future use is possible by limiting soil removal, impervious cover, controlling coverage by stone or gravel, limiting soil compaction, and requiring soil restoration.

Some municipalities have proactively addressed siting and zoning requirements through the adoption of ordinances.[9] The Pinelands Commission[10] and the State Agricultural Development Committee also have adopted guidance to assist municipalities in developing their own ordinances.

Critical Areas Ordinances

The municipality can pass other ordinances that protect natural resources when solar and other types of development are proposed for the town. Unlike freshwater wetlands law, no State statute preempts

Ground-mounted solar array

9. Hamilton Twp., Mercer County, has a very comprehensive ordinance. (*www.hamiltonnj.com/filestorage/83868/83968/97152/47798/Ordinance_11-043.pdf*). Kingwood Township passed a solar ordinance (No. 16-16-2010) and Pemberton was considering one at the time of this printing. (*http://m.b5z.net/i/u/6106776/f/Establishing_solar_energy_systems.pdf*).

10. *www.state.nj.us/pinelands/cmp/amend/index.html*

municipal regulation of flood hazard areas. Although many municipalities rely on the NJ DEP "minimum standards" under the *Flood Hazard Areas Control Act* (NJSA 58:16A-62), they have the option to adopt more stringent rules. Municipalities can also enact stream corridor protection ordinances that require buffers along streams to protect water quality and wildlife habitat.

SITE PLAN REVIEW CONSIDERATIONS

The standard components of ground-mounted solar installations include: photovoltaic panels (solar collectors), footings and support structure, wiring, inverters and foundations, access roads, electrical substations, transmission lines, perimeter fencing and sometimes small administrative buildings.

Solar arrays can have many different sizes and configurations, and the physical character of the sites for solar panels can vary widely, calling for site-specific considerations.

Although each site is unique, it is possible to predict some impacts of a proposed solar installation based on its configuration. For example, fencing to completely enclose the site could result in visual impacts. In addition, considerable ground disturbance may result from the construction of roads, inverter stations, substations, wiring and other necessary features. Depending on topography, site grading may be a major issue.

Wetlands In reviewing the application for solar development, the municipality must know where the wetlands are and the size of the transition zones. Municipalities should require that a solar applicant include a Letter of Interpretation (LOI) from the NJ DEP with the application. LOIs verify the absence or extent of wetlands on the property and classify the resource value of the wetlands. The resource classification determines the width of the transition area, which may range from 0 to 150 feet. If the wetlands have not been field verified or if the municipality believes that the LOI is incorrect, it can challenge its contents. Reviewers should be aware that they can participate in the permitting process at the NJ DEP and should strive to see that the Freshwater Wetland Rules are strictly enforced on solar or any other land use application.

Flood Areas The local application should depict the extent of the regulated flood areas. The solar panels should not be allowed in the flood hazard areas.

Stormwater Runoff Stormwater management should always be a consideration in siting ground-mounted solar arrays. While state legislation exempts solar panels from inclusion as impervious area in stormwater calculations, the other elements of a solar facility are not exempt. Inverters, inverter foundations, access roads, and buildings are required to comply with impervious cover restrictions such as in the *Stormwater Management Act* and NJ DEP rules at NJAC 7:8.

Even though solar panels are exempt from the calculations of impervious cover, ground-mounted solar arrays do in fact create runoff impacts. Rainwater flowing off the edges of the panels strikes the ground surface in a concentrated way that inhibits infiltration and could lead to erosion over time, carrying sediment and polluting nearby waterways. Resulting erosion could also undermine the stability of the panels. Onsite stormwater management for solar installations is critical to protect the installation itself and to protect neighboring properties from flooding and damage.

Vegetation removal also causes stormwater impact. If forested areas are removed, the change in runoff will be larger than if agricultural fields are used. Even among agricultural fields, runoff potential can vary considerably. A meadow in good condition will produce less runoff than a bare field without conservation treatment.

Grading and compaction may also materially change the runoff behavior. The municipal engineer should carefully examine the application to identify these changes between preconstruction and postconstruction conditions.

If runoff water is directed through channels or into a stream, the stability and capacity of the receiving channels should be assured and the possible impact on adjacent properties should be considered.

Vegetation Clearing Clearing border trees and internal hedgerows to avoid shading the solar panels may materially impact the aesthetics of the roadside view and the cultural landscape. Leaving the vegetation in place and moving the panels away from the shaded area may be preferable.

In large-scale solar facilities, most other existing shrubby and herbaceous vegetation will be replaced with a gravel surface or replanted to grasses, further impacting wildlife habitat. Special shade tolerant seed mixtures can be specified for the areas under the

panels. Native warm season grass and wildflower mixtures, if properly established, do not require fertilization or irrigation.[11]

System Access

Connecting utility scale solar facilites to the electrical distribution system might require the construction of substations, electric lines and clearing of rights of way to accommodate them. Connection of these types of facilities to the distribution systems is governed by PJM Interconnection (Pennsylvania-Jersey-Maryland), a regional electrical transmission organization that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia.

PJM requires the following studies before a solar facility is allowed to tie onto the distribution system. According to PJM:

- **Feasibility Study** – assesses project practicality and developer cost to interconnect to PJM. Study results provide preliminary estimates of upgrade type, scope, cost and construction lead time.
- **System Impact Study** – tests deliverability under peak load conditions and impacts on system stability. The study provides refined, comprehensive cost responsibility and construction lead time estimates for required upgrades.
- **Facilities Study** – encompasses the engineering design work necessary to begin construction of required expansion plan upgrades to accommodate an interconnection request. Some interconnections can combine several stages.

Without these studies, the actual impact and mitigation needs cannot be known. Municipalities should require that the applicant provide evidence of completing all the required PJM studies as a condition of approval and review these studies to evaluate the required onsite and offsite features.

System Components

- **Solar Panels** – Direct, onsite impacts from the panels themselves are primarily visual. They produce no emissions, light, or noise. However they are highly reflective, shiny, and have an "industrial" aesthetic character. Review of overall landscape sighting considerations, setbacks and screening can sometimes address impacts from the panels.

A ballast system was used to anchor the solar panels on this 1.3 MW PSE&G facility on a brownfield site in Trenton, NJ.
Peter Craig

- **Footings** – The choice of panel mounting systems should consider the soil and geologic conditions, as well as the intended future use of the site. If the land is to be available for future agricultural use, permanent mountings such as concrete footings should be avoided. On a contaminated site, in acid producing soils, or over a protective landfill cap, footings should not be allowed to penetrate the ground or expose subsoil. For these applications, so called "ballast systems," which consist of large boxes filled with rock or made of precast concrete, can anchor the panels without penetrating the ground. Other types of mounting systems include some that are simply pressed into the soil hydraulically and others that are screwed into the soil. Issues of concern for municipalities include shallow depth to bedrock, high seasonal water tables, acid producing deposits or cavernous limestone (karst).
- **Wiring** – The wiring connecting the solar panels together may be run in underground trenches or in conduits on the surface. Surface mounting is generally preferable for contaminated sites or above landfill caps to avoid the need for excavation, backfilling and surface stabilization associated with trenching. Soil conditions that may interfere with trenching operations include shallow depth to bedrock, high seasonal water table,

11. See *www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_022122.pdf.* for more information on native grasses. Allowing "natural re-vegetation" should not be permitted. Vegetation used for buffering and screening should consist of native species and should be dense enough to achieve the screening objectives.

acid producing soils and "running sand" (sandy soil saturated with water that collapses when trenched). If trenching is proposed, the geotechnical report should include enough information to assure that trenching can be accomplished without encountering these conditions. Standard erosion control practices should be applied. If vegetative cover is proposed, the plant type should be specified. Special shade tolerant seed mixtures are available to revegetate disturbed shaded areas.

- **Inverters** – Inverters convert the DC output of the panels to AC current suitable for the distribution system. The large box-like structures can be freestanding or incorporated into a roofed structure. They require routine access and are cooled by fans. Cooling loads, and hence fan noise, will be highest when the panels are producing power and will diminish after sunset. Ordinances should specify acceptable noise levels at the property line and require inverters to be set back from the property line to avoid disturbing neighbors with fan noise.
- **Inverter Foundations** – Inverters are quite heavy and require durably constructed footings that provide adequate support. They may be cast-in-place concrete, pre-cast concrete or already incorporated into the base of the inverter unit. Inverters and their foundations are considered impervious cover.
- **Access Roads** – Access roads may be paved or covered with crushed stone. Road construction specifications should relate to soil conditions and standard engineering practices apply to their construction. They are considered impervious, and as in other projects, the creation of impervious surfaces should be minimized. In low traffic areas, and where soil conditions permit, grassed roadways should be considered.
- **Electrical Substations** – Each facility will need to connect to the grid in a safe and operationally correct manner. Substation configuration will depend on project capacity and the condition of the system to which it is connected. Municipalities should have assurance that the project can be connected to the grid and should require applicants to provide full details of the substation's design. In addition to noise abatement, additional screening requirements or fire protection access may be needed.
- **Transmission Lines** – When a site is located far from a feasible grid connection, a right of way will have to be acquired and transmission lines constructed, usually at the applicant's cost. Applicants should be required to provide a thorough explanation of any transmission line required by the project, including its route, starting and ending points, capacity, conductor configuration and pole design, and right-of-way width.
- **Perimeter Fencing** – Perimeter fencing is proposed on most sites for security reasons, often 7- to 10- feet-high chain link, sometimes with barbed wire on top. This raises aesthetic concerns, especially in a rural environment. Appropriate types of fencing and treatments should be specified for different locations, such as along road frontage. Additionally, applicants should be required to address displacement and movement of wildlife, particularly large mammals.
- **Small Administrative Buildings** – When these structures are proposed they are generally relatively small, often prefabricated structures. They should be considered like any other building proposed in the municipality.

Parking lot covered with solar panels at Randolph High School.
Elizabeth Ritter

SUMMARY

Municipalities, with the help of their environmental commissions, should consider adoption of a master plan policy language and an ordinance to regulate large-scale solar facilities. Under their existing powers, they have adequate authority to do so. Although recent legislation has conditioned this authority to a

degree, municipalities can control this land use if they follow normal policies. Ordinances can encourage large solar facilities in appropriate places and discourage their installation on farmland, environmentally critical areas, wildlife habitats, and in forested areas among others.

New Jersey's solar energy goals can be accommodated by using rooftops, impervious surfaces, brownfields and abandoned mineral extraction sites. Invading critical areas, prime farmland, preserved lands or parks and open spaces is not needed to achieve these goals.

Planning for large solar systems can be harmonized with existing municipal goals through thoughtful land use planning and sound ordinances, resulting in more predictable outcomes, less conflict and a better community.

MORE INFORMATION

For more information and sample ordinances, please contact the ANJEC Resource Center: *resourcecenter@anjec.org*; (973) 539-7547.

Appendix A

RECENT NJ LEGISLATION AND ITS IMPACTS ON SITING

Inherently Beneficial Use Designation, S-1303: amending 40:55D-4 and seven MLUL definitions to define Inherently Beneficial Use and wind, solar, photovoltaic energy facilities. November 20, 2009, P.L. 2009 c. 146

S-1303 amended the NJ Municipal Land Use Law (MLUL, NJSA 40:55D-1 et.seq.) classifying solar technology as an "inherently beneficial use" in all zones. This classification means that the use is "*universally considered of value to the community because it fundamentally serves the public good and promotes the general welfare.*"[12]

Because few municipalities have developed comprehensive planning and zoning responses to large-scale solar development, most applications are variance requests. The inherently beneficial use designation has consequences for municipalities without solar siting ordinances when reviewing requests for use variances. Generally, in variance cases both "positive criteria" and "negative criteria" are presented. The board of adjustment (or land use board) then determines how to treat the variance request by balancing the public benefits (positive criteria) against the detriments (negative criteria) that would result from allowing a variance from the existing zoning.

Under a beneficial use designation, the positive criteria are considered presumptively satisfied. The negative criteria are resolved by balancing the benefits of the project against any detriments. Detriments may be addressed by imposing reasonable conditions. The board then weighs the positive and negative criteria, including any reasonable imposed conditions to determine whether it can grant the variance.

In dealing with applications for large-scale solar facilities, some zoning boards of adjustment approve the proposals because solar technology has been designated an inherently beneficial use.

12. See *www.njlandlaw.com/archives/category/inherently-beneficial-use* for a discussion of this legislation and the concept of inherently beneficial uses.

However the New Jersey Legislature amended the Municipal Land Use Law in 1997, making clear that inherently beneficial uses must outweigh the negative effects. The Legislature emphasized that if the proposed use has a negative impact on the overall zone plan of the community, it may be denied. The MLUL reads, "*No variance or other relief may be granted under the terms of this section, including a variance or other relief involving an inherently beneficial use, without a showing that such variance or other relief can be granted without substantial detriment to the public good and will not substantially impair the intent and the purpose of the zone plan and zoning ordinance.*" NJSA *40:55D-70(d)*.

Thus, the applicant must address the negative criteria and show to the satisfaction of the board that, on balance, the public benefit outweighs the impairment(s) to the master plan and zoning ordinance.

It is possible that, after study, analysis and making specific "findings" **applicable only to the case at hand**, the board of adjustment may deny the variance request.

The allowed uses should not cause a substantial detriment to expressed planning goals of the community or deviate unacceptably from the master plan. Maintaining the integrity of the comprehensive master plan and the zone plan is a well recognized principle of New Jersey land use law.

Environmental commissions may wish to offer testimony in support of the master plan and zoning. Possible detriments include:

- interference with the legitimate planning objective of protecting farmland;
- negative impacts on environmentally critical areas and other planning objectives.

The *EMP* recognized potential conflict with the important planning objective of preserving farmland, stating: "*In cases where it* (the Inherently Beneficial Use Amendment to the MLUL) *is invoked to obtain approvals for*

development of a renewable project on farmland, this Act *may be in conflict with State policies to preserve farmland.*" (NJ *EMP*, p.72).9

By Right Use in Industrial Zones (with conditions), **A-2550/S1299 amending 40:55D-66.11** March 31, 2009, P.L. 2009 c. 35

In 2009 the Legislature amended the MLUL to permit renewable energy facilities in industrial zones as a "use by right" on "parcels of 20 or more contiguous acres that are owned by the same person or entity."[13]

Municipalities with substantial undeveloped industrial land may wish to consider the appropriateness of zoning prime, level, well drained and currently worked farmland for industrial use due to transportation access or the perceived ease of development. In terms of economic development, municipalities should be aware that large solar facilities produce few permanent local jobs as compared to many industrial facilities.

Solar Panel Area Not to Be Counted as Impervious Cover, S-921: P.L. 2010 c. 4 approved April 22, 2010

According to this law, solar collectors cannot be counted as impervious cover in calculations of stormwater runoff. While the law exempts solar panels from calculations of impervious surface cover, it does not exempt other components associated with solar installations like roadways, inverter stations, ancillary buildings and the footings of the solar panels.

This exemption could make it more difficult for municipalities to fully determine the impact of solar facilities on the hydrologic behavior of the site and its immediate surroundings, particularly downstream or down-gradient. Although this exemption makes it easier for developers to comply with NJ stormwater regulations and obtain environmental permits for large solar installations, municipalities reviewing these applications for stormwater compliance should be careful to consider the nonexempt portions of the projects and the impact on runoff caused by the clearing of vegetation and soil compaction caused by construction equipment.

Right to Farm, Farmland Assessment and Agricultural Management Practices, S-1538: P.L. 2009 c. 213 Concerning agriculture, biomass, solar, and wind, adopted January 16, 2010

This legislation extends the protections of the *Right to Farm Act* to the generation of solar energy used to operate commercial farms. Commercial farms generating solar energy for their own farming operation are protected against restrictive local ordinances and regulations. These installations must be owned by the farmer and of limited size.

Subsequently, the State Agriculture Development Committee (SADC) developed an Agricultural Management Practice (AMP) that specifies the conditions that a commercial farm must meet to maintain agricultural assessment.[14] Care should be taken in local ordinance development to avoid interfering with legitimate on-farm solar uses.

On preserved farmland, different conditions and a different review process are in place. On preserved farms, the SADC must review all solar development proposals, in consultation with the owner of the agricultural easement (e.g., the county agriculture development board or nonprofit entity). The projects must comply with the AMP as well as any municipal ordinances and siting standards.

Siting Incentives and Disincentives through SRECs, S-1925: PL 2012 c. 24 adopted July 23, 2012

This extensive piece of legislation is a major landmark for solar development in New Jersey. Although large portions of the bill relate to SRECs and other renewable energy issues, the bill also addresses siting issues, including incentives for locating large solar facilities on brownfields, cleaned-up landfills, and impervious areas while discouraging installations on farmland.

IMPORTANT DEFINITIONS FROM S-1925

"Brownfield"
The legislation defines a brownfield as: "…any former or current commercial or industrial site that is currently vacant or underutilized and on which there has been, or there is suspected to have been, a discharge of a contaminant."

"Connected to the distribution system"
Whether a large solar project is connected to the electricity distribution system is a key element in determining whether a solar installation is eligible to receive SRECs. This is a major financial issue for solar developers. Eligibility to earn SRECs in a timely manner makes a site more attractive.

In addition to other requirements, the legislation authorizes the state Board of Public Utilities (BPU), in consultation with NJ DEP, to certify a project as eligible for SRECs if it is located on:

- A brownfield
- Impervious or paved parking areas with a capacity of 350 or more spaces that is "associated with" any of these existing or proposed uses:
  - Commercial
  - Retail

13. See *www.extension.org/pages/Permitted_Uses,_aka_%22Use_by_Right%22* for a brief discussion of the concept of "use by right."

14. The adopted AMP can be found at *www.nj.gov/agriculture/sadc/rtfprogram/amps/adoptedamps/solar.html*. The regulation addresses several issues such as size, screening, noise, location and setbacks. A good Powerpoint presentation on the AMP12, available on ANJEC's web site at *www.anjec.org*, may prove useful in ordinance development.

- Industrial
- Municipal
- Professional
- Recreational
- Transit
- Commuter
- Entertainment complex
- Multi use
- Mixed use.

- An area of "historic fill"[15]
  According to S-1925, "Historic Fill means generally large volumes of non-indigenous material, no matter what date they were emplaced on the site, used to raise the topographic elevation of a site, which were contaminated prior to emplacement and are in no way connected with the operations at the location of emplacement and which include, but are not limited to, construction debris, dredge spoils, incinerator residue, demolition debris, fly ash, and non-hazardous solid waste. 'Historic fill' shall not include any material which is substantially chromate chemical production waste or any other chemical production waste or waste from processing of metal or mineral ores, residues, slags, or tailings."

- A properly closed sanitary landfill
  The legislation defines a properly closed landfill as "…a sanitary landfill facility, or a portion of a sanitary landfill facility, for which performance is complete with respect to all activities associated with the design, installation, purchase, or construction of all measures, structures, or equipment required by the Department of Environmental Protection, pursuant to law, in order to prevent, minimize, or monitor pollution or health hazards resulting from a sanitary landfill facility subsequent to the termination of operations at any portion thereof, including, but not necessarily limited to, the placement of earthen or vegetative cover, and the installation of methane gas vents or monitors and leachate monitoring wells or collection systems at the site of any sanitary landfill facility."

Farmland Policies in S-1925

The law defines farmlands as "…land actively devoted to agricultural or horticultural use that is valued, assessed, and taxed pursuant to the *Farmland Assessment Act of 1964*." P.L.1964, c.48 (C.54:4-23.1 et seq.)

Solar facilities on land assessed as farmland within the past 10 years are generally not eligible to receive SRECs unless PJM has issued a system impact study before June 30, 2011, in which case they are grandfathered in.

Assessed farmland is generally not eligible for "net metering aggregation," a procedure for calculating the combined annual energy usage for all solar electric power generating facilities owned by a single institution, such as a State entity, school district, a county authority, or municipal agency. However a municipal planning board can waive this restriction for solar generating systems located within the municipality.

Municipalities interested in net metering aggregation or installation on farmland-assessed lands should contact the BPU.

Some Appropriate Municipal Actions Based on S-1925

Municipalities may wish to encourage solar facilities on any designated brownfields in their jurisdiction after considering other possible desired uses.[16]

Municipalities should examine their land use patterns and aerial photographs to determine if large, impervious areas exist in the municipality. Local zoning should reflect the legislative intent to permit facilities on large impervious areas.

Municipalities may wish to enact an ordinance encouraging solar facilities on any properly closed former sanitary landfill sites. However, they should not assume that a landfill has been properly closed just because it is inoperative. Former sanitary landfills sites can be determined by using the NJ DEP's Geoweb data (*http://www.nj.gov/dep/gis/geowebsplash.htm*) and looking at the aerial photographs, Known Contaminated Sites, Groundwater Contaminated Areas (CKE), Groundwater Contaminated Areas (CEA) and Deed Notice Areas. Once existing landfills have been identified, municipalities should contact NJ DEP to determine if the landfill in question is "properly closed" under the terms of the legislation.

In developing their ordinances, municipalities should carefully evaluate whether to encourage solar development on areas of historic fill that have already been reused or converted to parklands or other uses incompatible with the solar development. The State has mapped areas of historic fill in major urban areas, the Atlantic coast and the Delaware River, but the maps do not include all areas of the State, so municipalities should treat information from this database[17] as a beginning point. Site-specific conditions will determine if the site complies with the definition.

15. Pursuant to paragraph (4) of subsection e. of section 38 of P.L.1999, c.23 (C.48:3-87)

16. Municipalities can determine if there are any designated brownfields in their jurisdiction by checking the Brownfields Redevelopment Task Force Inventory at *www.njbrownfieldsproperties.com/Search.aspx*. Searches can be performed by city, county, site size range, planning area (SDRP), site number or site name.

17. Mapping of "Historic Fill" areas is available in digital form at *www.state.nj.us/dep/njgs/geodata/dgs04-7.htm.*

Pinelands Rules
The Pinelands Commission adopted changes to the *Pinelands Comprehensive Management Plan (CMP)* dealing with solar facilities on Oct. 14, 2011.[18] These amendments provide excellent guidance for municipalities seeking to develop a solar ordinance, whether or not they are in the Pinelands region.

Solar facilities are permitted as accessory uses throughout the entire Pinelands region. The Pinelands Commission defines accessory solar uses as those that supply electricity to the principal use on the property, such as a home or a business. The amendments exempt accessory uses from the need to file a development application with the Pinelands Commission when solar panels are installed on existing structures and impervious surfaces. This exemption is meant to hasten the approval process and minimize costs to applicants while facilitating appropriately scaled renewable energy development and without substantial environmental impact to Pinelands resources.

The *CMP* authorizes all Pinelands municipalities to permit solar energy facilities in all Management Areas by ordinance and provides for these ordinances in section 5.36 of the adopted amendments.

Municipalities should consider these standards in developing their own ordinances:

- **Connection infrastructure** – Infrastructure to connect the proposed facility to the distribution network must be currently available or must be provided without any offsite development in the Preservation District. The *CMP* prohibits offsite infrastructure associated with a solar facility as a principal use in the Preservation Area District, the Special Agricultural Production Area and Forest Area districts.

- **Screening/scenic protection** – The amendment requires minimizing the visual impact of the facilities themselves and their associated infrastructure to protect views of:
  - Wild and scenic rivers;
  - Special scenic corridors;
  - The Pine Plains and Forked River Mountains;
  - Publically dedicated roads and highways;
  - Low intensity recreational facilities and campgrounds;
  - Existing contiguous residential dwellings.

- **Vegetation clearing and rights of way** – The *CMP* sets limits on clearing of vegetation to only what is needed to accommodate the use. Rights of way are limited to 20 feet in width, unless otherwise necessary to address safety and reliability concerns.

- **Decommissioning** – Solar facility owners must dismantle and remove all structures, equipment, surface wires and footings within 12 months after activity ceases. The parcel must be restored in accordance with NJAC 7:50-6.24 unless it will be put into active agricultural use or approved for other development in accordance with the certified local ordinance within that 12-month period. Decommissioning also includes addressing any ecological and visual impacts associated with the solar energy facility, including the removal of off-site infrastructure and restoration of affected lands.

- **Solar facilities as a principal use** – The *CMP* limits the development of solar facilities as a principal use to certain types of sites in the Preservation Area District, Special Agricultural Production Area and Forest Area:
  - *Closed and remediated landfills*
    Installations are limited to previously disturbed lands that have not been ecologically restored and to areas that have been or will be disturbed by closure and site remediation activities. If other lands are proposed for solar development as a principal use, they must be included in the application to the Commission for closure or site remediation.
  - *Contaminated sites (similar to brownfields)*
    Solar facilities may be located on parcels that have been remediated or are the subject of an application to the Commission for remediation of contamination by wastes or hazardous or toxic substances, but the facility may only be placed on the disturbed portion of the property. Any disturbance caused by the remediation must also be restored as part of the closure plan.
  - *Resource extraction sites (mines, quarries, sandpits)*
    Solar facilites may be located on previously mined portions of these parcels that are not under a previous restoration obligation.

Agricultural Considerations – In the Agricultural Production Areas solar energy facilities may occupy up to 20 percent of any parcel but in no case may exceed 10 acres.

Siting of solar energy facilities must avoid, to the maximum extent feasible:

- Soils classified as prime farmland by the United States Department of Agriculture and Natural Resources Conservation Service; and
- Lands which have high ecological values in the Pinelands Area, as evidenced by large, contiguous areas of forest, undisturbed drainage units, undisturbed wetlands or prime habitat for characteristic and rare Pinelands plant and animal populations.

18. The adopted amendments can be viewed at *www.state.nj.us/pinelands/cmp/amend/index.html.*

Rural Development Area Considerations – Solar energy facilities may occupy any previously disturbed portions of a parcel that have not subsequently been restored. The clearing of additional lands to accommodate a proposed solar energy facility may also be permitted, provided the percentage of cleared land on any parcel does not exceed 30 percent, taking into consideration both existing and proposed clearing; and as with agricultural production areas, solar siting should avoid lands of high ecological values in the Pinelands Area.

Overall, the Pinelands rules provide an excellent reference framework for municipal ordinance development. An excellent PowerPoint presentation is available on the Pinelands Commission website at: *www.state.nj.us/pinelands/landuse/reg/solar/solar and wind planning principles.*

Appendix B
FARMLAND SOILS CLASSIFICATIONS

The Natural Resources Conservation Service has classified soils, (*www.nj.nrcs.usda.gov/technical/soils/njfarmindex.html*) based on their agricultural values as:

- ***NJ Prime Farmland Soils*** Includes all those soils in Land Capability Class I and selected soils from Land Capability Class II. Prime Farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops and is also available for these uses. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed according to acceptable farming methods. Prime Farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.
- ***NJ Farmland Soils of Statewide Importance*** Includes those soils in land capability Class II and III that do not meet the criteria as Prime Farmland but produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce yields as high as Prime Farmland if conditions are favorable.
- ***NJ Farmland Soils of Local Importance*** Includes those soils that are not classified as having Prime or Statewide importance and are used for the production of high value food, fiber or horticultural crops.
- ***NJ Farmland Soils of Unique Importance*** Soils used to produce specialty crops.

Soils information on a wide variety of other factors is readily available online using the NRCS WebSoil Survey, which includes listings of the various soil types in each category. (*http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm*).

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Founded in 1969 at the beginning of the environmental movement, the Association of New Jersey Environmental Commissions is a statewide, nonprofit organization with a unique commitment. We provide leadership, training, information, tools and support to our State's local environmental commissions, green teams and elected officials who are working to safeguard natural resources and promote sustainable land use in their communities.

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