STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
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VIA ELECTRONIC MAIL

November 5, 2020

TO: Service List dated August 7, 2020

FROM: Melanie Bachman, Executive Director MAB

RE: **DOCKET NO. 492 –** Gravel Pit Solar application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 120-megawatt-AC solar photovoltaic electric generating facility on eight parcels generally located to the east and west of the Amtrak and Connecticut Rail Line, south of Apothecaries Hall Road and north of the South Windsor town boundary in East Windsor, Connecticut and associated electrical interconnection.

Comments have been received from the State of Connecticut Department of Agriculture, dated November 4, 2020. A copy of the comments is attached for your review.

MB/MP/lm

c: Council Members

STATE OF CONNECTICUT
DEPARTMENT OF AGRICULTURE
Office of the Commissioner

Bryan P. Hurlburt
Commissioner

860-713-2501
www.CTGrown.gov

November 4, 2020

Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Docket No. 492** - Gravel Pit Solar application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 120-megawatt-AC solar photovoltaic electric generating facility on eight parcels generally located to the east and west of the Amtrak and Connecticut Rail Line, south of Apothecaries Hall Road and north of the South Windsor town boundary in East Windsor, Connecticut and associated electrical interconnection.

Dear Executive Director Bachman:

Upon review of the above referenced docket, and the attached memo, the Connecticut Department of Agriculture is opposed to this project due to the significant amount of valuable prime farmland being consumed for non-agricultural purposes.

Specifically, we have the following comments on this proposed project:

1) The project will convert approximately 230 acres[1] of prime farmland from its existing agricultural use of growing crops such as feed corn, shade tobacco and vegetables, to a use which compromises the future viability of that farmland by placing a large-scale utility solar project on the property;

2) The farmland will be impacted by the use of heavy equipment, installation of driven metal support posts, extensive trenching for electrical conduit, surface grading, construction of access roads and equipment pads. These activities will have an adverse impact on the upper 24 inches of the soil which are critical to plant growth - inversion of soil horizons, compaction, destruction of soil structure, acidification, loss of fertility, and changes to surface and subsurface soil hydrology are likely, with negative consequences for agricultural productivity; and

3) Mitigation of the prime farmland soils, which has been the case for much smaller (2-5 megawatt) projects, is not being proposed. For example, consideration could have been given to co-use opportunities and/or other mitigation measures, including but not limited to, the following:

    a. Restoration of farmland on the site to allow for production agriculture during the life of the project;
    b. Restoration of farmland at another location within the same municipality to retain prime and important farmland soils within the Connecticut River Valley;
    c. A proposal to the purchase of conservation easements on other farmland in the community;
    d. Setting aside a percentage of the prime farmland for continued agricultural use;

[1] The information regarding the prime farmland acreage is derived from a memo titled "Connecticut Department of Agriculture Consultation Gravel Pit Solar Project East Windsor, CT," dated July 22, 2020, copy attached.

e. Incorporating the use of agrivoltaics to allow for the continued production agriculture throughout the life of the project (e.g., increasing spacing and height of the panels to allow for growing crops);
f. Creation of pollinator habitat, maintaining beehives and honey production; and
g. Incorporating the use of grazing on the site.

When the project is decommissioned, the soil productivity will have been compromised and require restoration with unknown productivity levels for future farmers. We note the comments made by the Council on Environmental Quality about decommissioning in their letter to the Siting Council dated October 1, 2020, and adopt their comments on this matter, along with their other concerns about the negative impact of this project on prime farmland.

The loss of 230 acres of actively used prime farmland soils will likely put additional farms at risk for conversion to non-agricultural use, including development. The Department takes its mission to preserve farmland for future generations as a critical one that greatly benefits the State and its residents. Permitting such large-scale projects on prime farmland would set a poor example for demonstrating the State's stewardship of it agricultural resources.

With respect to siting of these projects, the agency encourages the use of alternative locations such as highway right of ways, brownfield sites, developed sites and gravel mines, placement of solar in parking lots and on parking lot sheds, and on large structures such as malls and warehouses. These locations are much better suited to solar development, and would be a better alternative than one that results in the permanent loss of finite prime farmland soil resources that provide significant ecosystem goods and services.

The Department supports properly scaled renewable energy on farms and farmland where such projects are in concert with Connecticut's farmland protection goals and policies, but this project does not align with those goals. This project will materially adversely affect the status of such land as prime farmland, and therefore the Department opposes the issuance of a Certificate of Environmental Compatibility. Approval of this project would be counter to the state's goals of farmland protection and the promotion of agricultural economic development, both of which, are important components of sustainability and climate change adaptation and mitigation.

Thank you for the opportunity to comment on this project.

Sincerely,

Bryan P. Hurlburt
Commissioner

Enc.

Cc: Katie Dykes, Commissioner
Department of Energy and Environmental Protection w/ Enc.

Memorandum

Gravel Pit Solar, LLC
Gravel Pit Solar II, LLC
Gravel Pit Solar III, LLC
Gravel Pit Solar IV, LLC

Date: July 22, 2020

Project #: 42569.01

Re: Connecticut Department of Agriculture Consultation
Gravel Pit Solar Project
East Windsor, CT

The information in this Memorandum has been drafted for the Connecticut Department of Agriculture and in support of the Gravel Pit Solar Project (GPS or the Project) proposed by Gravel Pit Solar, LLC, Gravel Pit Solar II, LLC, Gravel Pit Solar III, LLC, and Gravel Pit Solar IV, LLC (collectively Gravel Pit Solar). The Project includes the development of a 120 megawatt (MW) alternating current (AC) ground-mounted solar photovoltaic system. The Project will encompass approximately 485 acres (the Project Area) and will be sited on eight parcels of land totaling approximately 737 acres (the Project Site) located near Apothecaries Hall Road, Plantation Road, Wapping Road, and Windsorville Road in the Town of East Windsor, Connecticut.

Farmland Soils

The Connecticut General Statutes Section 16-50k(a) as well as the Connecticut Department of Agriculture *Solar Energy Project Considerations* guidance (dated January 16, 2020) were referenced while developing this Memorandum.

Farmland is present within five of the eight properties that comprise the Project Site. Less than one third of the Project Site consists of tilled farmland. Parts of the existing agricultural fields are designated as Prime Farmland or Farmland of Statewide Importance by the Natural Resource Conservation Service (NRCS) (see Table 1 and Figure 1). Farmland Soils of Local Importance do not exist within the Town of East Windsor, and therefore, the Project Site.

Table 1. Project Site Properties and Farmland Areas

Parcel ID	Parcel Area (ac)	Farm Field ID	Farmland Area (ac)
057-65-001	97.5	A & B	22.0
057-65-002	3.6	--	0
048-65-007	132.4	--	0
037-65-005A	14.6	--	0
025-49-017C	86.5	C	6.7
025-49-017A	127.2	D & E	45.5
016-49-007	119.7	F & G	74.1
016-50-001	155.5	H, I, & J	81.5
Total Area	**737.2**		**229.8**

Source: Town of East Windsor Assessor's Office, VHB, ESRI

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Prime Farmland is defined as 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.

Farmland Soils of Statewide Importance[1] are defined as Soils that fail to meet one or more of the requirements of prime farmland, but are important for the production of food, feed, fiber, or forage crops. They include those soils that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods.

Farmland Soils of Local Importance[1] are defined as Soils that are not prime or statewide importance but are used for the production of high value food, fiber or horticultural crops. This land may be important to the local economy due to its productivity or value. Farmland Soils of Local Importance have been established in the Towns of Ashford, Canterbury, Chaplin, Eastford, Lebanon, Milford, New Milford, and Norfolk, Connecticut.

The NRCS assigns Prime Farmland and Farmland of Statewide Importance designations to specific map units in the cooperative soil survey (see Table 2 and Figure 2). Several criteria factor into a map unit being assigned Prime Farmland status including slope, surface stoniness, texture, climate and the availability of irrigation. We used the latest USDA data available from the Soil Survey Geographic (SSURGO) database to produce this analysis.[2]

Table 2 provides an inventory of the Prime Farmland and Farmland of Statewide Importance within the Project Site that were in production or fallow in 2019. The soil map units identified as Prime Farmland are assigned this designation regardless of whether they are farmed. Large areas of Prime Farmland map units have been irretrievably lost by earth materials mining operations in the northern part of the Project Site. In the future when revisions are made to soil maps, reclaimed areas within the former mines will be mapped as Udorthents, soils where the evidence of natural soil development has been destroyed. Portions of Prime Farmland Map units that have been altered by grading around farm and non-farm infrastructure have also been deducted from this inventory.

Based on GIS analysis of the 2019 CTECOS aerial photogrammetry and field reconnaissance there are approximately 233.2 acres of farmland, that were planted or fallow in 2019, within the 737-acre Project Site. Nearly all of this cropped farmland is classified as Prime Farmland. There are approximately 5,783 acres of Prime Farmland mapped within the Town of East Windsor according to the NRCS. According to the National Agricultural Statistics Service, in 2019 there were 5,500 farms operating in Connecticut covering 380,000 acres. The percentage of this operating farmland that is Prime Farmland is not reported.

[1] https://cteco.uconn.edu/guides/resource/CT_ECO_Resource_Guide_Soils_Farmland.pdf
[2] https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

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Table 2. Prime Farmland and Farmland of Statewide Importance

Field ID	Area Tilled (ac)	NRCS Map Units[3]	Prime Farmland (ac)	Farmland of Statewide Importance (ac)
A & B	22.0	**704A**, 37E	21.7	0.1
C	6.7	**704A**, 33B, 37E	4.7	1.5
D	41.4	**704A**, 37E	41.2	0
E	4.1	**704B**	4.1	0
F	70.0	**704A**	70.0	0
G	4.1	**704A**, **704B**	4.1	0
H & I	69.1	**704A**, **704B**, **29A**, **29B**, **33A**, 37C	68.8	0.3
J	12.4	**704A**, **704B**	12.4	0
Total	**229.8**		**227**	**1.9**

Prime Farmland Map Units (**BOLD**): **704A**: Enfield silt loam, 0 to 3 percent slopes; **704B** Enfield silt loam, 3 to 8 percent slopes; **29A** Agawam fine sandy loam, 0 to 3 percent slopes; **29B** Agawam fine sandy loam, 3 to 8 percent slopes; **33A** Hartford sandy loam, 0 to 3 percent slopes, Farmland of Statewide Importance 37C Manchester gravelly sandy loam, 3 to 15 percent slopes. Not Prime Farmland: 37E Manchester gravelly sandy loam 15 to 45 percent slopes. Source: NRCS Web Soil Survey, ESRI, VHB.

Some of the factors that make Prime Farmland ideal for agriculture also make these areas attractive to competing land uses such as residential, commercial, and Industrial development. When residential, commercial or industrial developments occur on Prime Farmland, the soil resource is irretrievably lost.

In contrast, the ground-based solar array will occupy the Project Area for approximately 25 to 30 years. Once the useful life of the Project has been completed the Project Area, including areas of current Prime Farmland, will be decommissioned in accordance with the plan approved by the Connecticut Siting Council. Specific measures have been included in the Project layout, engineering design, and proposed management to avoid and minimize alteration of the existing farmland soil resources. The Decommissioning Plan will require mitigation for soil compaction or other soil degradation which may have been caused by the Project operation or decommissioning activities.

Existing Agricultural Practices

VHB Soil Scientists initiated wetland investigations in the fall and winter of 2019-2020. During this time, they collected notes on cropping patterns in the agricultural fields that had been planted in 2019 (refer to Table 3). Farming practices have a strong influence on soil health which will be considered later in this Memorandum.

[3] https://data.nal.usda.gov/dataset/soil-survey-geographic-database-ssurgo

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Table 3. Summary of Crop and Cover Crop Practices in Project Site Farmland

Field ID	Area Tilled (ac)	Crop Planted	Cover Crop
A & B	22.0	Corn (feed)	Rye/tillage radish
C	6.6	Corn (feed)	Corn Stover
D	41.4	Shade tobacco	Rye
E	4.1	Gourds	Oats
F	70.0	Shade tobacco	Rye/oats
G	4.1	Corn (feed)	Corn Stover
H & I	69.1	Shade tobacco	Rye/oats
J	12.4	Vegetables	Oats
Total	**229.8**		

All of the fields within the Project Site are tilled each year before planting. None of the farmland present within the Project Site is managed in no-till practices, field grasses, or perennial crops. Tilling breaks down the natural soil structure that forms when permanent soil cover such as grasses, shrubs or forest are maintained. The loss of soil structure reduces the infiltration rate of precipitation and the ability of the soil to exchange gases necessary for root respiration and microbial respiration.

In early spring 2020, soil scientists collected soil samples from fields across the Project Site for analysis including standard nutrient testing, pH, soil texture and soil organic matter content to provide a preliminary assessment of soil fertility and tilth. During sample collection soil penetrometer[4] tests were conducted to evaluate soil compaction. When the force applied to advance a penetrometer further into the soil exceeds 250 to 300 pounds per square inch (psi) the underlying compacted layer is considered impenetrable to roots. Farmland that is plowed for each crop can develop an impenetrable layer just below the tillage depth. This feature is called a "plow pan" and it impairs the soil internal drainage and rooting depth of plants. A summary of soil test results are provided in Table 4, below.

[4] Dickey-John Soil Compaction Tester http://www.dickey-john.com/product/soil-compaction-tester/

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Table 4. Preliminary Chemical and Physical Characterization of Farmland, Forest Control and Reclaimed Gravel Pit Soils

Field ID	Texture	Organic Matter (%)	pH	Penetrometer (psi) 0-6 in / 6-18 in	Comments
A	SiL	2.7	6.2	>300 / >300	Excess P, compacted
B	FSL	3.0	6.2	> 300 />300	Excess P, compacted
C	FSL	0.8	5.4	150 / >250	Low OM, Ca, Mg
D & E	L	2.4	6.3	150 / >300	Excess P, low Ca
F & G	L / SL	2.3	5.8	125 / >300	Excess P, low Ca
H & I	FSL	2.1	6.2	100 / >300	Excess P, low Ca
J	SL	1.9	6.3	150 / >300	Excess P, low Ca
Control	FSL	3.8	4.5	100 / 175	Acid, high Al
Reclaimed	SL	2.0	5.0	100 / >300	Low Ca, Mg

SiL – silt loam; FSL – fine sandy loam; L – loam; SL – sandy loam; P – phosphorus; OM – organic matter; Ca – calcium; Mg – magnesium; Al – aluminum. Penetrometer readings are median values for minimum five replicated samples. Source: VHB.

All of the farm fields tested exhibited excessive compaction within 18 inches of the surface. Several fields had the restrictive layer within 12 inches of the soil surface seriously limiting rooting depth, internal soil drainage, and gas exchange. Fields A and B along Apothecaries Hall Road were excessively compacted within six inches of the surface (see Figure 1). Water remained in low points in these fields days after rainfall as the soils had been puddled and sealed by compaction. The farmer managing these fields included tillage radish as a cover crop which is used to penetrate and decompact soils.

Results from the University of Connecticut Soil Lab indicated the nutrient status of the soils managed in tobacco were all maintained in a productive range. These soils had acceptable levels of organic matter in the topsoil but could be improved by further additions. The topsoil and subsoil in the tobacco fields had weak structure due to the effects of repeated tillage. All the tobacco fields had excessive levels of phosphorus typical for this crop and all were low in calcium, an important nutrient. Nearly all profiles tested had a dense traffic pan considered impenetrable by roots within 1.5 feet of the soil surface.

Field C, north of the Sand and Gravel Mine, has been poorly managed with an organic matter content less than one percent, low pH, and areas of severely accelerated, unchecked soil erosion (see Figure 1).

The control sample collected in a woodland east of Field F had an organic matter content of 3.8 percent a full percent greater than the adjacent tobacco fields and strongly acid pH of 4.5. Soils were friable without a root inhibiting layer within 18 inches of the soil surface. The soil also had moderate structure with aggregates visible on the sides of the hand dug pits. A soil sample from a reclaimed part of the Gravel Pit in a stand of black locust (*Robinea pseudoacacia*) had moderate organic matter content and low nutrient status.

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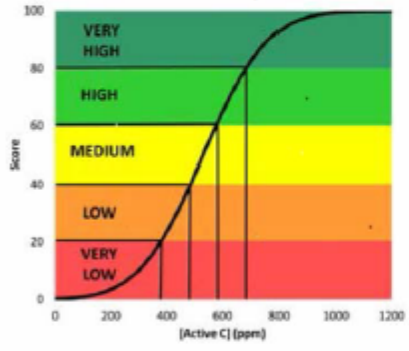
Soil samples were collected for the Comprehensive Assessment of Soil Health by the Cornell Soil Laboratory in Ithaca, New York. The tests requested include active carbon, autoclave-citrate extractable (ACE) protein, and soil respiration. The active carbon test assesses that portion of soil organic matter (SOM) that is available to the soil microbial community for food or energy supporting soil food web in a healthy soil that enhances nutrient cycling and availability to crops. The ACE test measures the soil protein content as an indicator of the biological and chemical quality of the soil. Soil respiration is a measure of biological activity with the soil. Results from these tests have been delayed significantly as the lab shut down for months in response to COVID-19. Results are presented in Table 5.

Table 5. Comprehensive Assessment of Soil Health Results.

Sample Number	Field ID	Crop ID	Active C mg C/kg soil	Score	Respiration mg CO2/g soil	Score	Protein mg/g soil	Score
1	F	ST	409.6	42	0.30	16	4.38	26
2	F	ST	391.5	39	0.32	18	4.70	29
3	C	SC	192.7	10	0.14	6	2.08	9
4	F	ST	413.2	43	0.36	21	4.79	30
5	B	SC	545.2	68	0.52	40	6.77	53
6	A	SC	603.0	78	0.57	46	7.44	61
7	D	ST	465.6	53	0.42	28	5.01	33
8	J	V	377.1	36	0.30	16	4.17	24
9	H	ST	386.1	37	0.34	20	4.42	26
10	R	F	476.5	55	0.46	32	10.53	89
11	C	F	718.7	91	0.61	51	18.04	100

Source: Cornell Soil Health Lab, G01 Bradfield Hall, Ithaca, NY.
Crop ID Codes: ST Shade Tobacco, SC: Silage Corn, V: vegetables, F: Forest



Color delineations apply to all parameters.

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The five samples taken from area managed in shade tobacco averaged a score just above the very low/low classifications (average 20.6). Soil protein also scored low with an average value of 28.8. These low scores may reflect the effects of the various pesticides applied to the crop to produce a high quality tobacco leaf. Active carbon scored in the medium range which is probably influenced by the beneficial use of cover crops as green manure. These crops are fall seeded after harvest and grow in during the early spring before the fields are tilled.

The soils in Fields A and B used to grow silage corn in the northern part of the Project Site scored high for active carbon (see Figure 1). A cover crop was used on this soil and poultry manure was applied in liquid form in the late fall of 2019. Soil respiration was medium and soil protein medium to high. The poorly-managed, heavily eroded silage corn Field C next to the mid-Project Site gravel pit was not included in this discussion. The soil health results from this field confirmed the general observations of degraded soils.

Field J had been planted in vegetables during the 2019 growing season (see Figure 1). The health profile of the soil sample from this field was similar to the soil results from the shade tobacco fields. This field had been used in tobacco production in the past.

The soil sample taken from a reclaimed portion of a gravel pit which supports a stand of black locust scored very high in extractable protein and medium in active carbon and low in soil respiration. These values are anticipated to increase as a topsoil layer develops and biodiversity increases. The control sample taken from a native oak forest scored very high for active carbon demonstrating how nutrients are cycled through the forest and for extractable proteins associated with the soil ecosystem. Soil respiration was only medium but represented the highest individual rating of all the samples collected.

Project Benefits to Soil Health

The Prime Farmland designation is assigned to certain map units developed by the National Cooperative Soil Survey, maintained by the NRCS. Map units consist of similar natural soil groups based on parent material, mode of surficial geologic deposition, topography, drainage class and other physical and chemical factors. The concept of soil health considers factors beyond these mostly inherited abiotic soil characteristics used to identify Prime Farmland. The concept of soil health begins with the premise that maintaining the diverse biologically driven processes inherent in natural soils sustains soil productivity. In addition to soil fertility, improving soil biodiversity enhances other ecological services provided by soils such as carbon sequestration, clean air, water infiltration and improvements to human and wildlife habitat.

In agricultural settings, soil health is strongly affected by management practices. Tillage is one of the practices that reduces the SOM. Each time the soil is tilled, it is aerated. As the decomposition of organic matter and the liberation of carbon are aerobic processes, the oxygen stimulates or accelerates the action of soil microbes, which feed on organic matter. Decomposition increases liberation of CO_2 to the atmosphere and reduces SOM. As levels of SOM decrease, so does biodiversity.

The USDA operates the Conservation Reserve Program (CRP) and the Conservation Reserve Enhancement Program which provides financial support to farmers who remove farmland from production to implement long-term conservation measures, typically for 10 to 15-year time spans. Studies have examined the values of grasslands

Memorandum

planted on these CRP and other agricultural lands for carbon sequestration. Acharya et al. (2012) compared agricultural lands converted in grasslands and found carbon sequestration rates increased with grassland age up to the study limit of 17 years. Swan et al. (2015) scored the potential carbon sequestration increases which would be anticipated for various standard NRCS conservation practices. For practice No. 327, converting marginal croplands to conservation cover, the value is an additional 0.42 to 0.94 Mg C ha-1 y-1 (360 to 820 lbs C ac-1 y-1) to be sequestered.

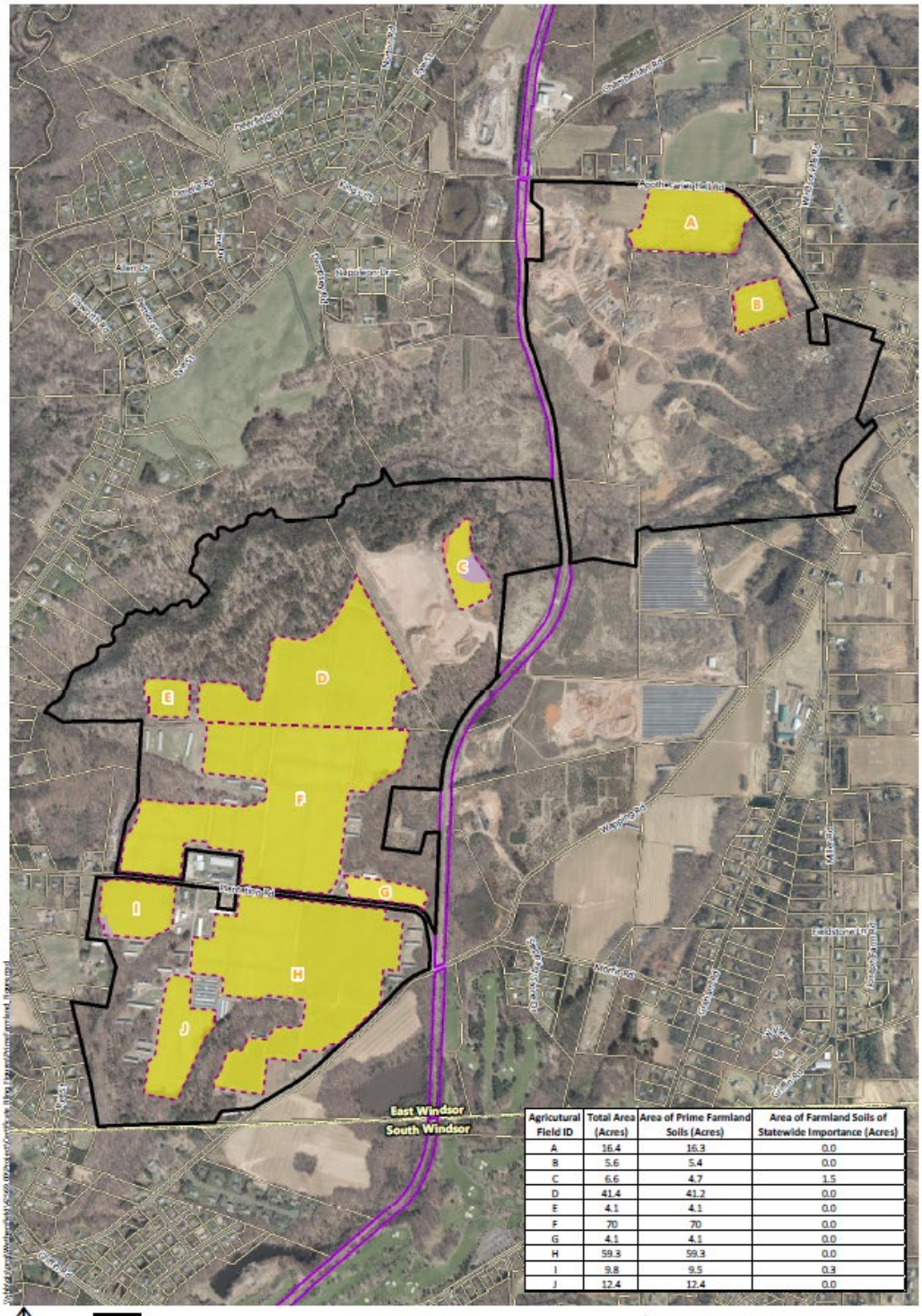
In addition to increased rates of carbon sequestration and enhancements to soil biodiversity, a long-term grassland cover will virtually stop the ongoing soil erosion that is occurring at different rates across the different farm fields within the Project Site.

GPS believes that farmland sites can be developed and managed as a renewable energy facility while preserving and enhancing farmland soils through grassland management during the Project operation. The near level fields now manage primarily in tobacco or silage corn can be developed with little to no grading required preserving the soil profile.

Decommissioning

GPS has prepared a decommissioning plan which will be updated to be in compliance with rules and regulations in effect at that time. GPS will remove buried infrastructure to a depth of three feet to avoid future conflicts with farming operations and, in agricultural areas, soil will be amended and decompacted to return a soil resource with favorable tilth for future agricultural production.

vhb July 10, 2020



Agricultural Field ID	Total Area (Acres)	Area of Prime Farmland Soils (Acres)	Area of Farmland Soils of Statewide Importance (Acres)
A	16.4	16.3	0.0
B	5.6	5.4	0.0
C	6.6	4.7	1.5
D	41.4	41.2	0.0
E	4.1	4.1	0.0
F	70	70	0.0
G	4.1	4.1	0.0
H	59.3	59.3	0.0
I	9.8	9.5	0.3
J	12.4	12.4	0.0

0 500 1000 2000 Feet

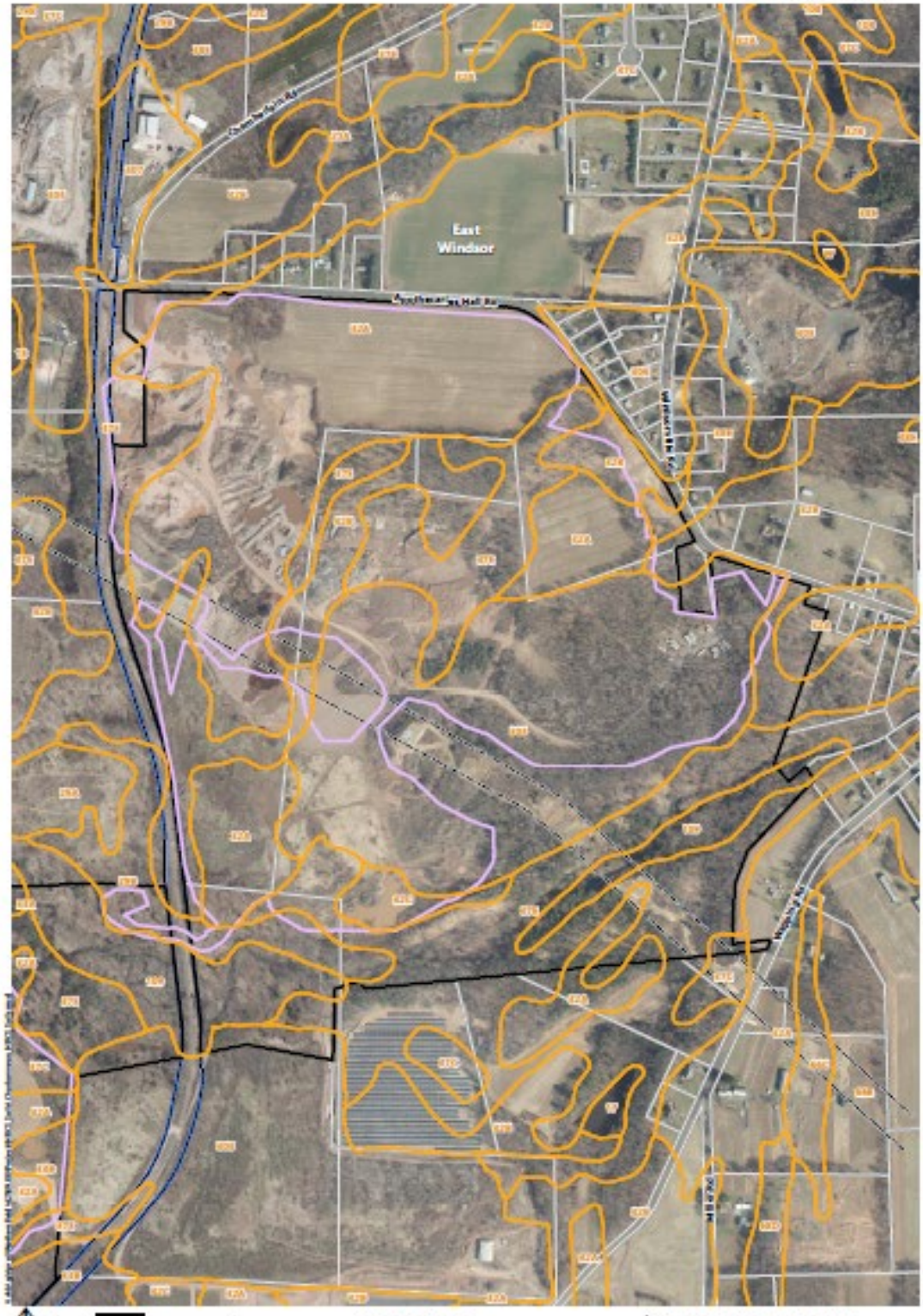
- Property Boundary
- Adjacent Parcels
- Town Boundary
- Approximate Railroad ROW
- Agricultural Field Boundary
- Prime Farmland Soils
- Statewide Important Farmland Soils
- Other Soils

Gravel Pit Solar | East Windsor, Connecticut

Farmland Soils Map

Source: VHB, CTDEEP, ESRI, NRCS

vhb July 10, 2020



0 250 500 1000 Feet

Project Site
Limit of Work
Parcel Boundary
Approximate Eversource ROW
Approximate Railroad ROW
NRCS Soil Boundary

Gravel Pit Solar | East Windsor, Connecticut

NRCS Soil Map
Page 1 of 3

Source: VHB, CTDEE, ESRI, NRCS

0 250 500 1000 Feet

Legend

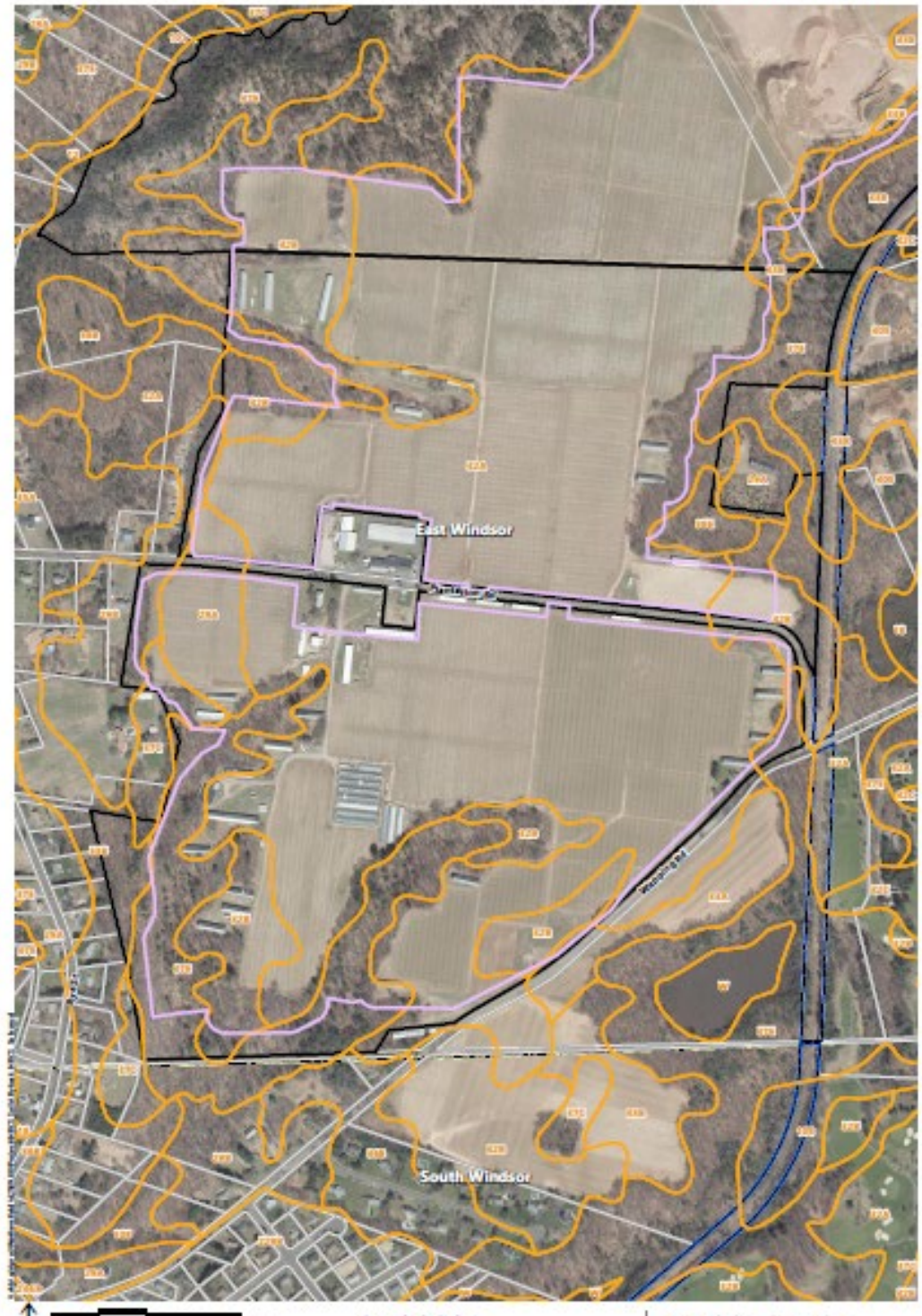
- Project Site
- Limit of Work
- Parcel Boundary
- Approximate Eversource ROW
- Approximate Railroad ROW
- NRCS Soil Boundary

Gravel Pit Solar | East Windsor, Connecticut

NRCS Soil Map
Page 2 of 3

Source: VHB, CTDEE, ESRI, NRCS

vhb July 10, 2020



0 250 500 1000 Feet

Project Site
Limit of Work
Parcel Boundary
Approximate Railroad ROW
NRCS Soil Boundary

Gravel Pit Solar | East Windsor, Connecticut

NRCS Soil Map
Page 3 of 3

Source: VHB, CTDEEP, ESRI, NRCS