ENVIRONMENTAL ASSESSMENT

DENSLOW HILL SOLAR PROJECT

410 DENSLOW HILL ROAD

HAMDEN, CONNECTICUT

Prepared for:

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April 2024

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1 Introduction

All-Points Technology Corporation, P.C. ("APT") prepared this Environmental Assessment ("EA") on behalf of LSE Libra LLC (the "Petitioner") for the proposed installation and utility interconnection of a solar-based electric generating facility (the "Facility" or "Project") located in the Town of Hamden, Connecticut ("Town"). This EA has been completed to support the Petitioner's submission to the Connecticut Siting Council ("Council") of a petition for declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the construction, maintenance, and operation of the Facility.

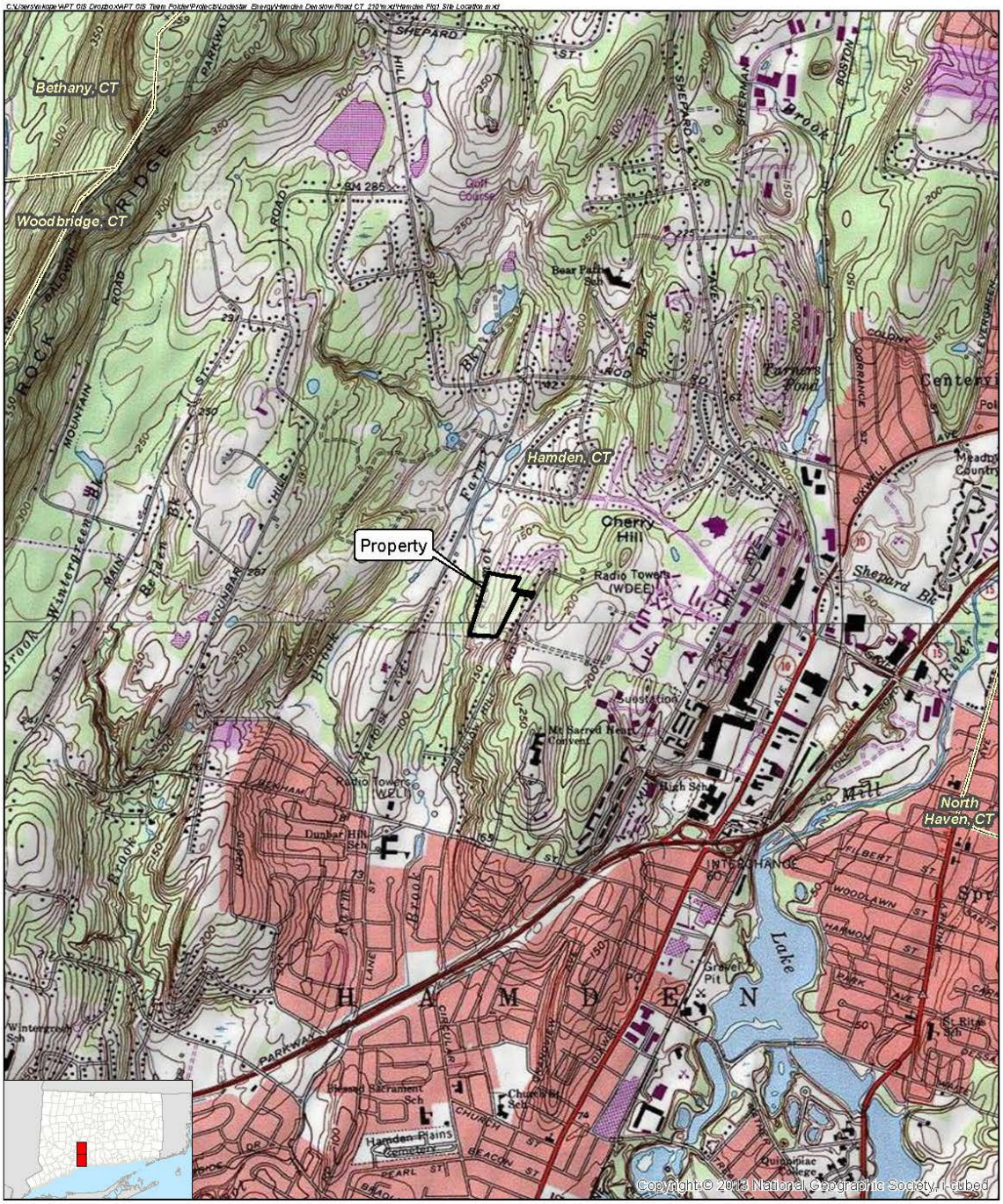
The results of this assessment demonstrate that the proposed development will comply with the Connecticut Department of Energy and Environmental Protection's ("DEEP") air and water quality standards and will not have an adverse effect on the existing environment and ecology. The Town is not an "environmental justice community"[1] and the proposed Project is not defined as an "affecting facility"[2] under Connecticut General Statutes § 22a-20a. Therefore, the Project is not subject to the requirements of that section. The Project's output capacity is under two megawatts; therefore, the requirement of Connecticut General Statutes § 16-50k(a) for representations of no material effect by the Department of Agriculture and Department of Energy and Environmental Protection does not apply.

The Facility would be located at 410 Denslow Hill Road (the "Property"), a ±11.05-acre parcel. The Property is wooded and undeveloped.

Figure 1, *Location Map*, depicts the location of the Property and the immediate surrounding area.

[1] "Environmental justice community" means (A) a United States census block group, as determined in accordance with the most recent United States census, for which thirty per cent or more of the population consists of low income persons who are not institutionalized and have an income below two hundred per cent of the federal poverty level, or (B) a distressed municipality, as defined in subsection (b) of Connecticut General Statutes § 32-9p.

[2] "Affecting facility" is defined, in part, as any electric generating facility with a capacity of more than ten megawatts.



Legend

- Property
- Municipal Boundary

Map Notes:
Base Map Source: USGS 7.5 Minute Topographic Quadrangle Map, Mount Carmel, CT (1984) and New Haven, CT (1984)
Map Scale: 1 inch = 2,000 feet
Map Date: April 2024

2,000 1,000 0 2,000 Feet

Figure 1
Location Map

Proposed Solar Facility
Denslow Hill Solar
410 Denslow Hill Road
Hamden, Connecticut

2 Proposed Site

2.1 Project Setting

The Project will be located in the central part of Hamden, in a relatively sparsely developed area of the Town north of the Wilbur Cross Parkway (U.S. Route 15) and west of the Town's primary commercial areas. The Property is privately owned.

Grades within the Property generally slope down from east to west. Elevations range from approximately 203 feet above mean sea level ("AMSL") in the eastern part of the Property to 110 feet AMSL in the western area.

The Project consists of one (1) solar panel array, an access drive, and electrical service interconnection occupying ±8.02 acres ("Site" or "Project Area").

Figure 2, *Existing Conditions*, depicts current conditions on the Property with the extent of the Project Area outlined.

The immediately surrounding area consists of residential development to the east and north; an electric transmission line to the south; and a wooded area to the west. The areas beyond the immediate surroundings include a mix of woodland and cleared areas, with residential development interspersed.

Legend

- Property
- Site
- Approximate Parcel Boundary
- Approximate Wetland Boundary

Habitat

- Upland Forest

Farmland Soils

- Statewide Important Farmland Soils

Map Notes:
Base Map Source: 2019 Aerial Photograph (CTECO)
Map Scale: 1 inch = 150 feet
Map Date: April 2024

150 75 0 150 Feet

Figure 2
Existing Conditions

Proposed Solar Facility
Denslow Hill Solar
410 Denslow Hill Road
Hamden, Connecticut

2.2 Project Development and Operation

2.2.1 The Project

Upon its completion, the solar Facility will consist of one (1) array with a total of 2,704 photovoltaic modules ("panels") and associated equipment (switch gear, transformer and inverter) on a 20' x 35' concrete pad. A ground-mounted racking system will be used to secure the panels. The Facility will be surrounded by a seven (7)-foot tall chain link fence, raised six (6) inches off the ground. Access will extend west from Denslow Hill Road along a proposed 15-foot wide gravel drive to the northeastern portion of the Property, then extend north to the corner of the Facility. Two (2) stormwater management basins will be installed, one at the northwest corner of the Project Area and one at the southern end of the Project Area.

The Project will also require one (1) electrical service interconnection that will extend from the existing United Illuminating distribution system along Denslow Hill Road. The interconnection route will extend along the access drive via a series of three (3) new utility poles and two (2) concrete pads. From there, the connection will continue underground to a concrete pad at the northeastern corner of the fenced Facility.

Once complete, the entire fenced Facility will occupy approximately 4.26 acres of the Property with an additional ±3.76 acres of improvements beyond the fenced limits for a total Project Area of ±8.02 acres.

Proposed development drawings are provided in Appendix A, *Project Plans*.

The leading edge of the panels will be at least 36" above the existing ground surface, which will provide adequate room for any accumulating snow to "sheet" off. Any production degradation due to snow build-up has already been modeled into the annual system output and performance calculations. The Petitioner does not envision requiring any "snow removal" operations; rather, the snow will be allowed to melt or slide off.

Construction activities associated with the Project will include the following:

- installing erosion and sedimentation control measures;
- grading associated with drainage and stormwater management;
- installing racking and modules;

- trenching for electrical service and interconnection;
- installing three (3) utility poles and two (2) concrete pads for interconnection to the existing electrical distribution system along Denslow Hill Road; and
- stabilizing the Project Area.

Earthwork is required to allow the Project development to comply with DEEP's *Appendix I, Stormwater Management at Solar Array Construction Projects*. ("Appendix I") to the *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities* ("General Permit").

The Facility is unstaffed; after construction is complete and the Facility is operable, traffic at the Site will be minimal. It is anticipated that the Facility will require routine maintenance of the electrical equipment one (1) time per year. Annual maintenance will typically involve two (2) technicians for a day. Repairs will be made on an as-needed basis. It is expected that mowing would occur, at a minimum, one (1) time per year to suppress woody growth. Depending on site-specific conditions, additional mowings (2 to 3 times annually) may be required.

2.2.2 Public Health and Safety

The Project will meet applicable local, state, national and industry health and safety standards and requirements related to electric power generation. The Facility will not consume any raw materials, will not produce any by-products, and will be unstaffed during normal operating conditions.

The array will be enclosed by a seven (7)-foot tall chain link fence. The entrance will be gated, limiting access to authorized personnel only. All Town emergency response personnel will be provided access via a Knox padlock. The Facility will be remotely monitored and will have the ability to remotely de-energize in the case of an emergency.

2.2.3 Public Policy

The Project is consistent with state and federal policies and will support the state's energy goals by developing a renewable energy resource while not having a substantial adverse environmental effect. The Project will benefit the local community by improving electrical service for existing and future development through the availability of enhanced local generating capacity that does not rely solely on the congested regional electrical transmission network.

The Town has adopted positions in both its 2017 Zoning Regulations and 2019 Plan of Conservation and Development ("POCD") that support the use of renewable energy sources. Section 120 of the Zoning Regulations establishes policies that include "[e]ncourage the use of solar and other renewable forms of energy and energy conservation." (Zoning Regulations, Section 120.2.g.). The POCD addresses sustainability, and establishes strategies that include preparing a long-range energy plan and promoting the increased use of and alternative renewable energy sources. (POCD, Section 4.1.)

3 Environmental Conditions

This section provides an overview of the current conditions at the Site and an evaluation of the Project's potential impacts on the environment. The results of this assessment demonstrate that the Project will comply with the DEEP air and water quality standards and will not have an undue adverse effect on the existing environment and ecology.

Please refer to Figure 3, *Proposed Conditions* for a depiction of the Project and its relationship with the resources discussed herein.

Legend

- Property
- Utility Pole
- Access Drive
- Riprap Area
- Fence
- Treeline
- OH Electrical Utility
- UG Electrical Utility
- Solar Module
- Stormwater Basin
- Drainage Structure
- Concrete Pad
- Approximate Wetland Boundary
- Approximate Parcel Boundary
- Limit of Disturbance

Map Notes:
Base Map Source: 2019 Aerial Photograph (CTECO)
Map Scale: 1 inch = 150 feet
Map Date: April 2024

N

150 75 0 150 Feet

Figure 3
Proposed Conditions

Proposed Solar Facility
Denslow Hill Solar
410 Denslow Hill Road
Hamden, Connecticut

3.1 Air Quality

Due to the nature of a solar energy generating facility, no air emissions will be generated during operations. Therefore, the operation of the Facility will have no adverse effects on air quality and no permit is required.

Temporary, potential, construction-related mobile source emissions will include those associated with construction vehicles and equipment. Any potential air quality impacts related to construction activities can be considered de minimis. Such emissions will be mitigated using available measures, including limiting idling times of equipment; proper maintenance of all vehicles and equipment; and watering/spraying to minimize dust and particulate releases. In addition, all on-site and off-road equipment will meet the latest standards for diesel emissions, as prescribed by the United States Environmental Protection Agency.

3.2 Water Resources

3.2.1 Wetlands and Watercourses

APT Registered Soil Scientists performed a field inspection and wetland investigation of the Property on April 24, 2023 and determined no wetlands are present. A perennial watercourse and bordering vegetative wetlands were identified on abutting property approximately 125 feet to the west of the Site. The location of this resource is depicted on Figure 2, *Existing Conditions*.

Identified as Wilmot Brook, this wetland feature consists of a perennial watercourse with well-defined bank/channel characteristics. The jurisdictional edge of this resource is characterized by a steep slope break dominated by mature hardwood forested vegetation. Flood control structures were observed within the interior of Wilmot Brook, which contained inundation abutting the upland boundary. Recent development was observed between Wilmot Brook and the Property, consisting of a gravel access road and parking area with associated grading and typical erosion controls. Established upland forested edge areas with a dense invasive understory separate this wetland feature from the proposed Site.

3.2.2 Wetland Impacts

No direct wetland impacts would result from development of the Project. Installation of solar panels, perimeter fencing, and stormwater management basins will maintain a minimum 125-foot

separating distance from the wetland resource. Development of the Project will entirely occur within Upland Forest habitat. Post development, the remaining mature upland forested vegetation will provide typical buffer functions supporting the nearby Wilmot Brook riparian wetland system. In addition, since the Project's stormwater design complies with Appendix I regulations and the Connecticut Guidelines for Erosion and Sediment Control, the Project is not anticipated to result in a likely adverse impact to the nearby aquatic resources on the abutting property.

3.2.3 Floodplain Areas

APT reviewed the United States Federal Emergency Management Agency ("FEMA") Flood Insurance Rate Map ("FIRM") covering the Site. A FIRM is the official map of a community on which FEMA has delineated both the special hazard areas and risk premium zones applicable to the community. The Site is mapped on FIRM panels #09009C 0293 J and #09009C 0431 J, both dated May 16, 2017. Based upon the reviewed FIRM Maps, the Property and proposed Project Area are located in an area designated as Area of Minimal Flood Hazard – Zone X.

The Site is not located within a 100- and 500-year flood zone and as such, no special considerations or precautions relative to flooding are required for the Project.

3.3 Water Quality

As discussed in this section, the Project will comply with DEEP's water quality standards. Once operative, the Facility will be unstaffed, and no potable water uses or sanitary discharges are planned. No liquid fuels are associated with the operation of the Facility. Stormwater generated by the proposed development will be properly handled and treated in accordance with the Connecticut Stormwater Quality Manual and Appendix I.

3.3.1 Groundwater

The Project will have no adverse environmental effect on ground water quality.

Groundwater underlying the Property is classified by publicly available DEEP mapping as "GA".[3] This classification indicates groundwater within the area is presumed to be suitable for human consumption without treatment. Based upon reviewed DEEP mapping, the Site is not located

[3] Designated uses in GA classified areas include existing private and potential public or private supplies of drinking water and base flow for hydraulically connected surface water bodies.

within or proximate to a mapped DEEP Aquifer Protection Area, the nearest being approximately 3.1 miles northeast of the Property.

Hamden is served by the public water system of the Regional Water Authority. Construction and operation of the Facility should have no impact to groundwater resources and service to the surrounding area.

3.3.2 Surface Water

The Project will have no adverse environmental effect on surface water quality. Based upon DEEP mapping, the Property is located in Major Drainage Basin 5 (South Central Coastal Basin), Regional Drainage Basin 53 (South Central Western Complex), Subregional Drainage Basin 5304 (Wintergreen Brook)), and Local Drainage Basin 5304-02 (Wilmot Brook above Farm Brook 5304-03-2-R1). According to DEEP mapping, the nearest mapped waterbody is Wilmot Brook, located on the adjacent property to the west, approximately 125 feet and downgradient from the Site. Wilmot Brook is classified as a Class A surface waterbody by the DEEP.[4] The Project will have no adverse effect on this surface waterbody.

Based upon the reviewed DEEP mapping, the Site is not located within a mapped Public Drinking Supply Watershed.

Provided that erosion and sediment ("E&S") controls are installed and maintained in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control and stormwater is managed in accordance with the Connecticut Stormwater Quality Manual and DEEP approvals, no adverse effect on surface water quality is anticipated from development and operation of the Project.

[4] Designated uses for A classified waterbodies include potential drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply and other legitimate uses including navigation.

3.4 Habitat and Wildlife

3.4.1 Habitat Type

One (1) distinct habitat type (vegetative community), Upland Forest, is located on the Property and identified within the Site. This habitat was initially assessed using remote sensing and publicly available datasets and then verified during the April 24, 2023 field evaluation.

Upland Forest

Upland Forest habitat occupies the entirety of the Property. Within higher topographic areas, generally in the northeastern portions of the Property, a mesic oak/hickory forest is present. This area is dominated by red and white oak, pignut hickory with codominant black birch, American beech, and eastern red cedar. The remaining central and southern areas consist of a mixed-age forest of rich hardwoods dominated by sugar maple, red maple, red and white oak with inclusions of shagbark hickory, black cherry and sassafras. Tree mortality throughout the Property has resulted in canopy gaps and the establishment of invasive shrubs and woody vines in the understory, including Japanese barberry, autumn olive, winged euonymus, multiflora rose, European privet, and ornamental bittersweet. Native species located in the understory include spicebush, northern arrowwood, Canada mayflower, mayapple, Virginia creeper, fox grape vine, and poison ivy.

Project impacts associated with panel installation, perimeter fencing and stormwater management systems will occur entirely within the Upland Forest, requiring ±7.9 acres of clearing. Potential short-term impacts to this habitat will be minimized through the proper stabilization of soils during construction through strict adherence to the General Permit and Appendix I. While the Project necessitates removal of forested areas, similar undeveloped forested habitat occurs in abundance along the perimeter of the Property as well as to the west and south. Impacts to the habitat are primarily limited to isolated 'edge' type forest habitat resulting in minimal impacts to core forest. Impacts to core forest are limited to areas within the west-central portion of the Site as discussed in more detail in Section 3.4.3. As such, the Project is not anticipated to result in a significant impact to the Upland Forest habitat type.

Table 1, Habitat provides the total acreages of the habitat type located on the Property and the Site.

Table 1: Habitat		
Habitat Type	Total Area On-Property (+/- ac.)	Area Impacted by Project (+/- ac.)
Upland Forest	11.05	8.02

3.4.2 Wildlife

The roughly 8.02-acre Upland Forest habitat is located to the west and south of residential development, north of an Eversource Energy utility corridor and east of a State of Connecticut-owned undeveloped property. Although this habitat serves as a viable location for primarily forest-edge tolerant species, similar edge forest habitat exists adjacent to the west and south. Additionally, the proposed Project will create new forest edge habitat supporting wildlife that prefers the ecotone transition from the new forest edge to the fenced Facility. That ecotone transition consists of cleared forest where stumps and understory shrub and herbaceous vegetation would remain, supplemented with meadow habitat with pollinator friendly species planted in areas of soil disturbance.

Based on the surrounding land uses, the adjacent disturbed areas located in proximity to the Project are likely utilized by species that are more tolerant of human disturbance and habitat fragmentation. Generalist wildlife species common to the region, including several resident and migrant song birds and mammals such as raccoon, striped skunk, grey squirrel, Virginia opossum, white-tailed deer, and eastern chipmunk could be expected to use this area. Due to the relatively small size of this habitat patch, and given the abundance of similarly suitable habitat surrounding the Property that supports habitat needs of these common species, the Project is not anticipated to result in a significant impact to wildlife.

Noise and associated human activities during construction may result in limited, temporary disruption to wildlife using the on-Site and adjacent habitats. Any possible wildlife displaced during construction would be expected to temporarily disperse into adjacent habitats to the west and south. Post construction, operation of the Site will not result in a likely adverse effect to wildlife using these habitats because it will be unoccupied and does not generate any significant noise, traffic, or high level of human activity.

3.4.3 Core Forest Determination

APT evaluated the size and extent of the contiguous interior forest block present within and adjacent to the Property using two (2) publicly available GIS-based datasets designed to assess impacts to core forest habitat. In addition, an independent evaluation was performed (based on GIS analysis of 2019 leaf-off aerial photography, recent field observations and professional experience). The results of these analyses demonstrate no appreciable core forest exists within the Project Area; only a very small (±0.1 acre) core forest exists.

The first dataset, the DEEP's *Forestland Habitat Impact Mapping*[5], does not depict any prime continuous and connected core forestland block on the Property.

The second dataset, UConn's Center for Land Use Education and Research's ("CLEAR") Forest Fragmentation Analysis ("FFA")[6] study, designates "core forest" as greater than 300 feet from non-forested habitat. This 300-foot zone is referred to as the "edge width" and represents sub-optimal breeding habitat for forest-interior birds due to decreased forest quality, increased levels of disturbance, and increased rates of nest predation and brood parasitism within this transitional forest edge. The FFA study identifies three categories of core forest: small (< 250 acres); medium (250-500 acres); and large (>500 acres). Based on the FFA criteria and current DEEP mapping, a portion of the upland forested area along the Property's west-central boundary could be characterized as a small core forest. However, recent development on the abutting DEEP property to the west has created a perforation within the center of the mapped core forest habitat. APT observed a road and parking area between Wilmot Brook and the Property's western boundary that has resulted in the forest perforation, converting a former small core forest block to mostly edge forest. Based on these conditions, only de minimis core forest remains and therefore, the Project will not affect core forest habitat.

[5] Source: http://ctdeep.maps.arcgis.com/apps/webappviewer/index.html?id=7b81844bab634281b544c20bf2d7bfb8 This spatial screening layer identifies prime contiguous and connected core forestland blocks. If the project intersects with the Forestland Habitat Impact Map there is a potential for material effects to core forest.

[6] CLEAR's FFA: https://clear.uconn.edu/projects/landscape/ct-forestfrag

Figure 4
Existing Core Forest

Proposed Solar Facility
Denslow Hill Solar
410 Denslow Hill Road
Hamden, Connecticut

Figure 5
Proposed Core Forest

Proposed Solar Facility
Denslow Hill Solar
410 Denslow Hill Road
Hamden, Connecticut

3.5 Rare Species

APT reviewed publicly available information to determine the potential presence of state/federally listed species and critical habitat on or proximate to the Site. A discussion is provided in the following sections.

3.5.1 Natural Diversity Data Base

The DEEP Natural Diversity Data Base ("NDDB") program performs hundreds of environmental reviews each year to determine the impact of proposed development projects on state-listed species and to help landowners conserve the state's biodiversity. In furtherance of this endeavor, the DEEP also developed maps to serve as a pre-screening tool to help Petitioners determine if there is the potential for project-related impact to state-listed species.

The NDDB maps represent approximate locations of (i) endangered, threatened and special concern species and, (ii) significant natural communities in Connecticut. The locations of species and natural communities depicted on the maps are based on data collected over the years by DEEP staff, scientists, conservation groups, and landowners. In some cases, an occurrence represents a location derived from literature, museum records and/or specimens. These data are compiled and maintained in the NDDB. The general locations of species and communities are symbolized as shaded (or cross-hatched) polygons on the maps. Exact locations have been masked to protect sensitive species from collection and disturbance and to protect landowners' rights whenever species occur on private property.

APT reviewed the most recent DEEP NDDB mapping (December 2023), which revealed that no known areas of State-listed species are located on or in the vicinity of the proposed Facility or Property. The nearest NDDB buffer is ±0.40 mile north of the Property. Since the proposed Facility and Property are not located within a NDDB buffer area, consultation with DEEP is not required in accordance with their review policy[7].

[7] DEEP Requests for NDDB State Listed Species Reviews. https://portal.ct.gov/DEEP/NDDB/Requests-for-NDDB-Environmental-Reviews

3.5.2 USFWS Consultation

Federal consultation was completed in accordance with Section 7 of the Endangered Species Act ("ESA") through the U.S. Fish and Wildlife Service's ("USFWS") Information, Planning, and Conservation System ("IPaC"). Based on the results of the IPaC review, federally-listed[8] Endangered species northern long-eared bat ("NLEB"; *Myotis septentrionalis*) habitat range encompasses the Property. The NLEB's range encompasses the entire State of Connecticut and suitable NLEB roost habitat includes trees (live, dying, dead, or snag) with a diameter at breast height ("DBH") of three (3) inches or greater.

APT reviewed the DEEP's publicly available *Northern long-eared bat areas of concern in Connecticut to assist with Federal Endangered Species Act Compliance* map (February 1, 2016) and *Connecticut Northern Long-eared bat Observations by Town* map (July 24, 2023) to determine the locations of any known maternity roost trees, summer and winter occurrences, or hibernaculum in the state. This map reveals that there are currently no known NLEB maternity roost trees or occurrences within 0.25 mile of the Property. The nearest NLEB habitat resource to the Site is located in North Branford, approximately 7.4 miles to the east.

NLEB has been reclassified as Endangered under the ESA. The reclassification now eliminates use of the previous 4(d) rule for NLEB; 4(d) rules may only be applied to Threatened species. A NLEB Interim Consultation Framework has been developed by USFWS for projects that are reasonably certain to occur before April 1, 2024 (date on which the NLEB Interim Consultation Framework expires[9]) to facilitate transition from the 4(d) rule to typical ESA consultation procedures for Endangered species. APT submitted the effects determination using the current NLEB Determination Key ("DKey") within the IPaC system for this Facility and determined the Subject Property is in a known sensitive area for NLEB and therefore the Project "May Effect" NLEB. As a result, further consultation/coordination for this project is required with the USFWS New England Field Office. The Petitioner proposes to implement a time of year restriction ("TOYR") for tree clearing, which will likely be required by USFWS, resulting in tree clearing restricted to the inactive period for NLEB, November 1 – April 14. The Petitioner has also proposed the installation of four bat boxes along the western edge of the Project within the proposed tree clearance zone beyond

[8] Listing under the federal Endangered Species Act.

[9] USFWS has not issued an update on the current NLEB DKey; APT will review this consultation once the new NLEB ESA consultation process is issued.

the fenced facility. This conservation measure will support bat habitat for roosting and pup rearing that could be used by NLEB. The results of the USFWS consultation will be forwarded upon receipt.

A full review of the Endangered Species Act (ESA) Compliance Determination and USFWS's Response Letter is provided in Appendix B, *USFWS and NDDB Compliance Statement*.

3.6 Soils and Geology

The construction of the water quality basins and swales and grading within the Project Area will generate some excess material that will be redistributed on Site. Topsoil will be segregated from underlying soil, stockpiled, and spread over disturbed areas being seeded. See Appendix A, Project Plans.

All exposed soils resulting from construction activities will be properly and promptly treated in accordance with the 2024 Connecticut Guidelines for Soil Erosion and Sediment Control.

Surficial materials on the Property consist of thin deposits of glacial till. Bedrock beneath the property is identified as New Haven Arkose. New Haven Arkose is described as a red, pink, and gray coarse-grained, locally conglomeratic, poorly sorted and indurated arkose, interbedded with brick-red micaceous, locally shaly siltstone and fine-grained feldspathic clayey sandstone.

The Petitioner does not anticipate encountering bedrock during Project development.

3.6.1 Prime Farmland Soils

In accordance with the Code of Federal Regulations, CFR Title 7, part 657, farmland soils include land that is defined as prime, unique, or farmlands of statewide or local importance based on soil type. They represent the most suitable land for producing food, feed, fiber, forage, and oilseed crops.

According to the Connecticut Environmental Conditions Online Resource Guide[10], no prime farmland soils are located on the Property.

[10] Connecticut Environmental Conditions Online (CTECO) Resource Guide, www.cteco.uconn.edu

3.7 Historic and Archaeological Resources

At the request of APT, and on behalf of the Petitioner, Heritage Consultants LLC ("Heritage") reviewed relevant historic and archaeological information to determine whether the Site holds potential historic or cultural resource significance. Their review of historic maps and aerial images of the Site, examination of files maintained by the Connecticut State Historic Preservation Office ("SHPO"), and a pedestrian survey of the Site revealed that one previously identified archaeological site, one National Register of Historic Places ("NRHP"), and four State Register of Historic Places properties within one (1) mile of the Site. In addition, a stone wall bisecting the Property was identified. In terms of archaeological potential, Heritage determined that the Site retains a moderate/high archaeological sensitivity. Based on that determination, a Phase 1B cultural/archaeological investigation will be performed prior to construction, and the results will be presented to the SHPO upon completion.

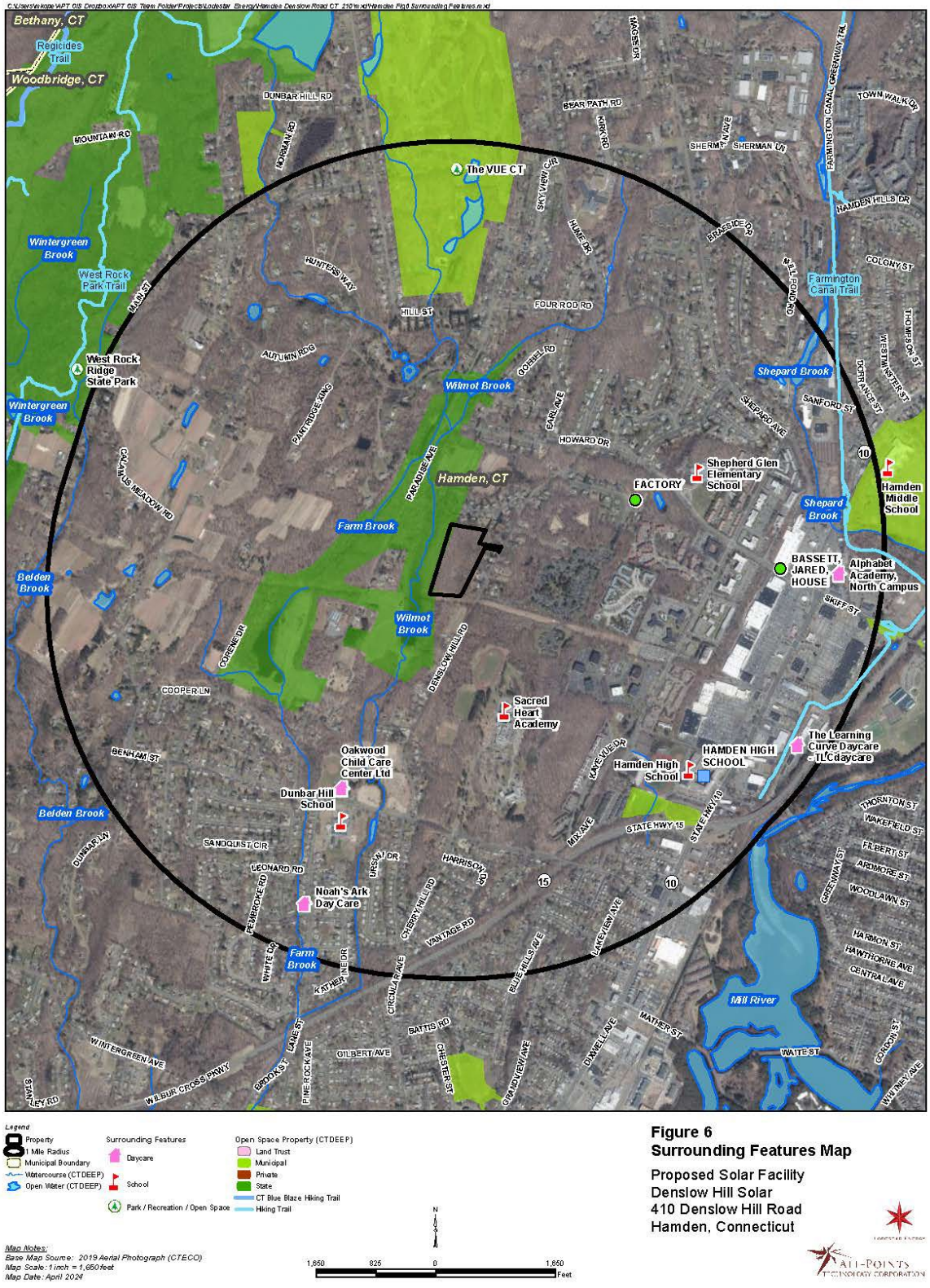
The Phase 1A Cultural Resources Assessment Survey is contained in Appendix C.

3.8 Scenic and Recreational Areas

No state or local designated scenic roads or scenic areas are located near the Site and therefore none will be physically or visually impacted by development of the Project. The nearest scenic road, a designated state scenic road, is Route 146 in Branford, approximately 9.0 miles southeast of the Property.

There are no Connecticut Blue Blaze Hiking Trails located proximate to the Site. The Farmington Canal Trail extends north-south approximately one mile to the east of the Site. The Project will have no direct or indirect effect on this resource.

See Figure 6, *Surrounding Features Map,* for resources located within one mile of the Project Area.



Legend

Property
1 Mile Radius
Municipal Boundary
Watercourse (CTDEEP)
Open Water (CTDEEP)

Surrounding Features
Daycare
School
Park / Recreation / Open Space

Open Space Property (CTDEEP)
Land Trust
Municipal
Private
State
CT Blue Blaze Hiking Trail
Hiking Trail

N

1,650 825 0 1,650 Feet

Map Notes:
Base Map Source: 2019 Aerial Photograph (CTECO)
Map Scale: 1 inch = 1,650 feet
Map Date: April 2024

Figure 6
Surrounding Features Map

Proposed Solar Facility
Denslow Hill Solar
410 Denslow Hill Road
Hamden, Connecticut

3.9 Noise

The Property is undeveloped wooded land. Noise associated with human activities is currently generated from abutting and nearby residential properties.

Construction noise is exempted under State of Connecticut regulations for the control of noise, RCSA 22a-69-1.8(h); the Town's noise ordinance exempts noise from construction equipment during daytime hours, which are defined as between 7:00 a.m. and 9:00 p.m. weekdays and Saturday and 8:00 a.m. and 9:00 p.m. on Sunday. During construction of the Facility, the temporary increase in noise would likely raise localized ambient sound levels immediately surrounding the Project Area. Standard types of construction equipment would be used for the Project. In general, the highest noise level from this type of equipment (e.g., backhoe, bulldozer, crane, trucks, etc.) is approximately 88 dBA at the source.

The Petitioner has completed a noise analysis, the results of which confirm that the Project will comply with State Noise Regulations.[11] The Facility would, conservatively, be considered a Class C (Industrial) noise emitter. Nearby residential properties are Class A noise receptors, with noise standards of 61 dBA daytime and 51 dBA at night. The nearest property line is 125 feet from the pad on which the inverters and transformer will be located. As demonstrated in the noise analysis, all off-Site receptors are of sufficient distances from the proposed Project equipment that noise levels during Facility operation will meet applicable State noise standards. See Appendix D, *Noise Analysis.*

3.10 Lighting

No exterior lighting is planned for the Project. There will be some small, non-intrusive lighting fixtures within the equipment to aid in maintenance.

3.11 FAA Determination

The Petitioner submitted relevant Project information to the Federal Aviation Administration ("FAA") for an aeronautical study to evaluate potential hazards to air navigation. The nearest airport is Tweed New Haven Airport, located approximately 7.6 miles southeast of the Site. The FAA provided Determinations of No Hazard to Air Navigation on February 6, 2024. See Appendix

[11] RCSA 22a-69-3.5. Noise Zone Standards.

E, *FAA Determinations.* There is no need to conduct a glare analysis, as the Project is not located on an airport property.

4 Conclusion

As demonstrated in this Environmental Assessment, the Project will comply with the DEEP air and water quality standards. Further, it will not have an undue adverse effect on the existing environment and ecology; nor will it affect the scenic, historic and recreational resources in the vicinity of the Project.

Once operative, the Facility will be unstaffed and generate minimal traffic. Based on an analysis of noise from inverters and a transformer, noise levels from the Project will comply with applicable requirements.

The Project Area is undeveloped wooded land. Development of the Project will have no significant impact on existing habitats and wildlife.

There are no wetlands on the Property. The Project is not anticipated to negatively impact water resources.

The Project Area does not contain Prime Farmland Soils. The Petitioner will seed all disturbed areas with a pollinator-friendly seed mix.

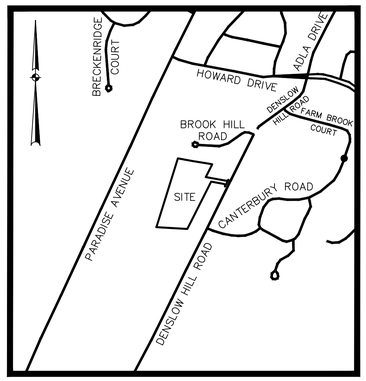
The Project will not have a negative effect on scenic or recreational resources.

APPENDIX A

PROJECT PLANS

Denslow Hill Solar

410 Denslow Hill Road
Hamden, Connecticut 06514
Map 2626 Lot 33



LOCATION MAP
1"=1000'

Applicant

LSE Libra LLC
40 Tower Lane, Suite 201
Avon, CT 06001

Owner

Clover Ridge Hamden LLC
40 Tower Lane, Suite 201
Avon, CT 06001

Prepared By

RUSSO
SURVEYORS • ENGINEERS
SERVING CT & MA

J.R. Russo & Associates, LLC
P.O. Box 938, 1 Shoham Rd East, Windsor, CT 06088
www.jrrusso.com • CT 860.623.0569 • MA 413.785.1158

DRAWING INDEX

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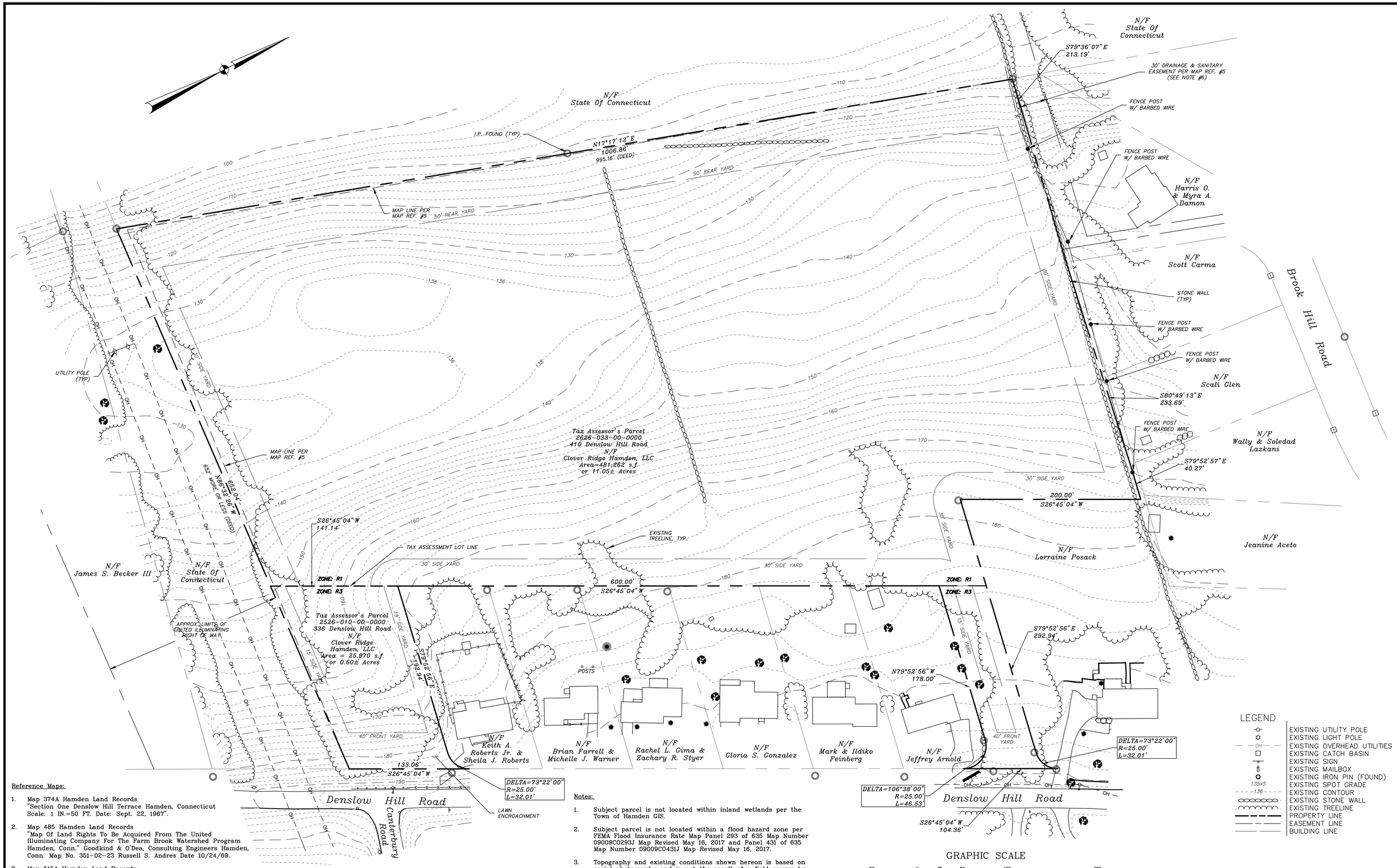

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"Brook Hill Sect. Two Hamden Conn." Scale 1"=50' Aug. 10, 1975 Rev. Oct., 1975"

5. "Property Survey Prepared For: Housewright Development Denslow Hill Road Hamden, Connecticut" Milone & Macbroom Scale 1"=40' Date June 15, 1999 Project No. 1927-01 Sheet No. 2. Revised Sept. 30 1999.

6. "Record Subdivision Map/Limited Property Boundary Survey DeLucia 2-Lot Subdivision Prepared For Giuseppe And Amalia DeLucia 270 Denslow Hill Road, Hamden, Connecticut" By Godfrey & Hoffman Associates, LLC Date: 12-28-2017 Scale: 1"=50' Project: 17-071 Drawing 1 Of 1 Revised 4/16/18.

DATA BLOCK

	ZONE R-1	ZONE R-3
MIN. LOT WIDTH:	200'	100'
MIN. AREA:	80,000 S.F.	20,000 S.F.
FRONT YARD:	50'	40'
SIDE YARD:	30'	15'
REAR YARD:	50'	40'
MAX. BLDG COVERAGE:	15%	20%
MAX. IMPERV. COVERAGE:	20%	25%

Notes:

1. Subject parcel is not located within inland wetlands per the Town of Hamden GIS.
2. Subject parcel is not located within a flood hazard zone per FEMA Flood Insurance Rate Map Panel 293 of 635 Map Number 09009C0293J Map Revised May 16, 2017 and Panel 431 of 635 Map Number 09009C0431J Map Revised May 16, 2017.
3. Topography and existing conditions shown hereon is based on aerial photography and is not the result of a field survey by J.R. Russo & Associates, LLC.
4. Underground utilities exist within Denslow Hill Road and are not shown hereon.
5. Horizontal datum is NAD 83. Vertical datum is NAVD 88.
6. 336 & 410 Denslow Hill Road conveyed subject to the following: Right of way for a sanitary sewer line and right of way for storm water drainage as reserved in Volume 597 Page 600 and Volume 600 Page 600. (See location adjacent to north property line.)
7. All underground utility locations on this plan are approximate and may not be complete. Anyone using this information without verifying the locations does so at their own risk. No construction will be done on this site prior to utility mark out. "Call Before You Dig 1-800-922-4455".

LEGEND

	EXISTING UTILITY POLE
	EXISTING LIGHT POLE
OH	EXISTING OVERHEAD UTILITIES
	EXISTING CATCH BASIN
	EXISTING SIGN
	EXISTING MAILBOX
	EXISTING IRON PIN (FOUND)
135x5	EXISTING SPOT GRADE
136	EXISTING CONTOUR
	EXISTING STONE WALL
	EXISTING TREELINE
	PROPERTY LINE
	EASEMENT LINE
	BUILDING LINE

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

This survey and map has been prepared in accordance with Sections 20-300b-1 thru 20-300b-20 of the Regulations of Connecticut State Agencies – "Minimum Standards for Surveys and Maps in the State of Connecticut" as endorsed by the Connecticut Association of Land Surveyors, Inc. It is a Property Survey based on a Resurvey conforming to Horizontal Class A-2 & a Topographic Survey conforming to Class T-3.

This document and copies thereof are valid only if they bear the live signature and embossed seal of the designated professional. Unauthorized alterations render any declaration hereon null and void.

TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

RUSSO SURVEYORS-ENGINEERS SERVING CT & MA
J.R. Russo & Associates, LLC
PO Box 938, 113 Shoham Rd East Windsor, CT 06088
www.jrrusso.com - CT 860.623.0569 - MA 413.785.1158

LODESTAR ENERGY

REVISIONS	
BY: CJC	CHK: TAC

	STC	SUBMISSION
	4-03-24	

Denslow Hill Solar

410 Denslow Hill Road
Hamden, Connecticut 06514
MBL: 2626-033-00-0000 (Zones: R-1 & R-3)

Existing Conditions Plan

DATE: 2-05-24
SCALE: 1"=50'
JOB NUMBER: 2023-024
SHEET: 2 of 6

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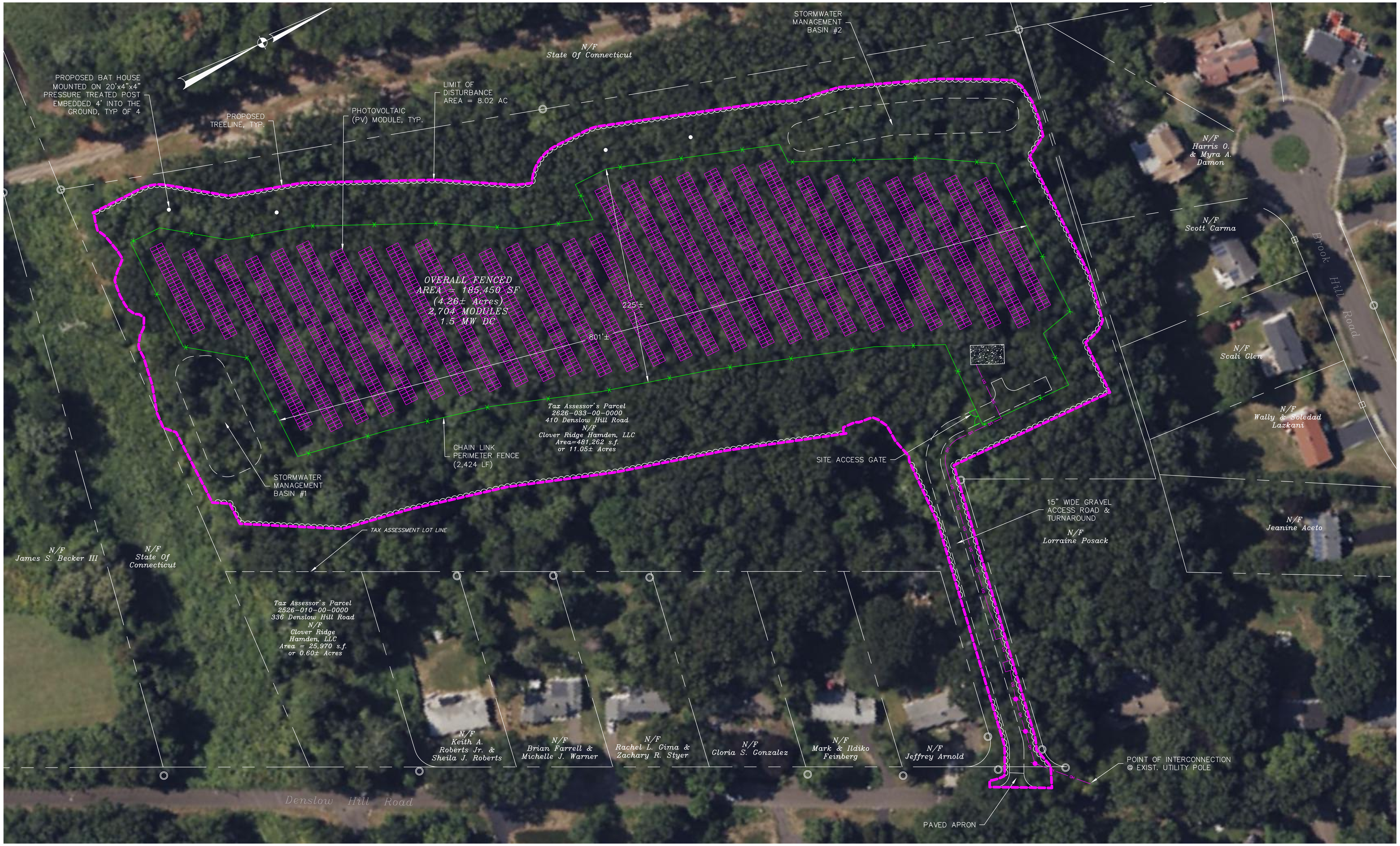

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LODESTAR ENERGY

REVISIONS

BY: JU | CHK: JEU

Denslow Hill Solar

410 Denslow Hill Road
Hamden, Connecticut 06514
MBL: 2626-033-00-0000 (Zones: R-1 & R-3)

Overall Aerial Plan

DATE	2-05-24
SCALE	1"=50'
JOB NUMBER	2023-024
SHEET	3 of 6

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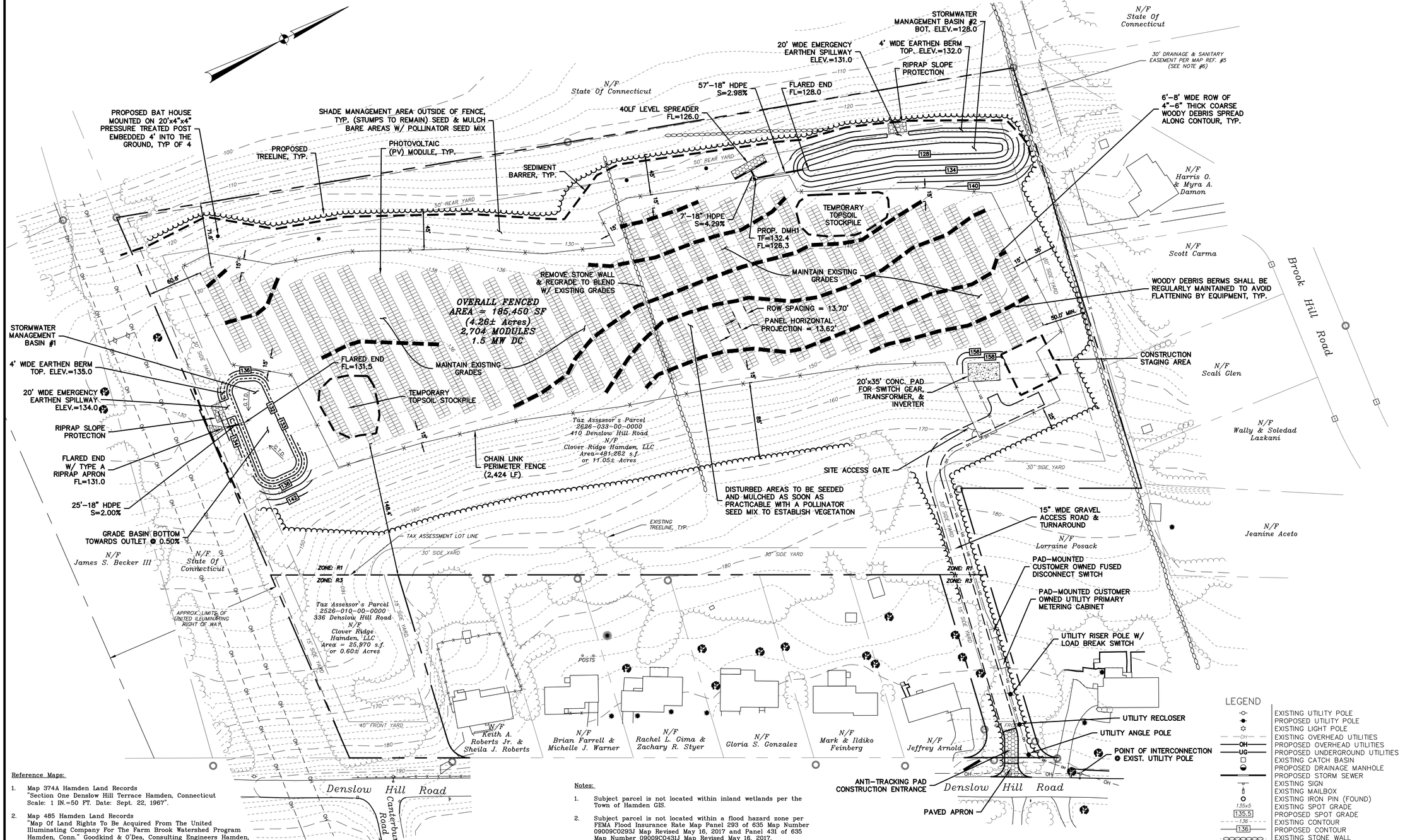

LEGEND

- EXISTING UTILITY POLE
- PROPOSED UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING OVERHEAD UTILITIES
- PROPOSED OVERHEAD UTILITIES
- PROPOSED UNDERGROUND UTILITIES
- EXISTING CATCH BASIN
- PROPOSED DRAINAGE MANHOLE
- PROPOSED STORM SEWER
- EXISTING SIGN
- EXISTING MAILBOX
- EXISTING IRON PIN (FOUND)
- EXISTING SPOT GRADE
- PROPOSED SPOT GRADE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING STONE WALL
- EXISTING TREELINE
- PROPOSED TREELINE
- PROPERTY LINE
- EASEMENT LINE
- BUILDING LINE
- STAKED HAYBALES OR SILT FENCE

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LODESTAR ENERGY

REVISIONS		
BY:	CHK:	
JU	JEU	4-03-24 STC SUBMISSION

Denslow Hill Solar
410 Denslow Hill Road
Hamden, Connecticut 06514
MBL: 2626-033-00-0000 (Zones: R-1 & R-3)

Array Site Plan

DATE: 2-05-24
SCALE: 1"=50'
JOB NUMBER: 2023-024
SHEET: 4 of 6

S:\Acad\2023 Civil 3D\2023-024 Lodestar- Hamden,CT\Russo Drawings\2023-024.dwg

PERMANENT SEEDING (PS)

SPECIFICATIONS

Time Of Year

Seeding dates in Connecticut are normally April 1 through June 15 and August 15 through October 1. Spring seedings give the best results and spring seedings of all mixes with legumes is recommended. There are two exceptions to the above dates. The first exception is when seedings will be made in the areas of Connecticut known as the Coastal Slope and the Connecticut River Valley. The Coastal Slope includes the coastal towns of New London, Middlesex, New Haven, and Fairfield counties. In these areas, with the exception of crown vetch (when crown vetch is seeded in late summer, at least 35% of the seed should be hard seed (unscarified), the final fall seeding dates can be extended and additional 15 days. The second exception is frost crack or dormant seeding, the seed is applied during the time of year when no germination can be expected, normally November through February. Germination will take place when weather conditions improve, mulching is extremely important to protect the seed from wind and surface erosion and to provide erosion protection until the seeding becomes established.

Site Preparation

Grade in accordance with the Land Grading measure which is in the Connecticut Guidelines For Soil Erosion and Sediment Control latest edition.

Install all necessary surface water controls.

For areas to be mowed remove all surface stones 2 inches or larger. Remove all other debris such as wire, cable tree roots, pieces of concrete, clods, lumps, or other unsuitable material.

Seed Selection

Basins & Disturbed Areas outside of fenced array: New England Erosion Control/Restoration Mix by New England Wetland Plants Inc. or Approved Equal.
Disturbed Areas within fenced area: Northeast Solar Pollinator Buffer Mix – ERNMX–610 by Ernst Conservation Seeds or approved equal.

Seedbed Preparation

Apply topsoil, if necessary, in accordance with the Topsoiling measure which is in the Connecticut Guidelines For Soil Erosion and Sediment Control latest edition.

Apply ground limestone and fertilizer according to soil test recommendations (such as those offered by the University of Connecticut Soil Testing Laboratory or other reliable source).

Where soil testing is not feasible on small or variable sites, or where timing is critical, fertilizer may be applied at the rate of 300 pounds per acre or 7.5 pounds per 1,000 square feet of 10–10–10 or equivalent and limestone at 4 tons per acre or 200 pounds per 1,000 square feet.

Work lime and fertilizer into the soil to a depth of 3 to 4 inches with a disc or other suitable equipment.

Inspect seedbed just before seeding. If the soil is compacted, crusted or hardened, scarify the area prior to seeding.

Seed Application

Apply selected seed at rates per manufacturer's recommendations uniformly by hand, cyclone seeder, drill, cultipacker type seeder or hydroseeder (slurry including seed, fertilizer). Normal seeding depth is from 0.25 to 0.5 inch. Increase seeding rates by 10% when hydroseeding or frost crack seeding. Seed warm season grasses during the spring period only.

Mulching

See guidelines in the Mulch For Seed measures.

MAINTENANCE

Inspect temporary soil protection area at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater during the first growing season.

Where seed has been moved or where soil erosion has occurred, determine the cause of the failure and repair as needed.

TEMPORARY SEEDING (TS)

SPECIFICATIONS

Site Preparation

Install needed erosion control measures such as diversions, grade stabilization structures, sedimentation basins and grassed waterways in accordance with the approved plan.

Grade according to plans and allow for the use of appropriate equipment for seedbed preparation, seeding, mulch application and mulch anchoring.

Seedbed Preparation

Loosen the soil to a depth of 3–4 inches with a slightly roughened surface. If the area has been recently loosened or disturbed, no further roughening is required. Soil preparation can be accomplished by tracking with a bulldozer, discing harrowing, raking or dragging with a section of chain link fence.

Apply ground limestone and fertilizer according to soil test recommendations (such as those offered by the University of Connecticut Soil Testing Laboratory or other reliable source).

If soil testing is not feasible on small or variable sites, or where timing is critical, fertilizer may be applied at the rate of 300 pounds per acre or 7.5 pounds per 1,000 square feet of 10–10–10 or equivalent.

Seeding

Apply seed uniformly by hand, cyclone seeder, drill, cultipacker type seeder or hydroseeder. The temporary seed shall be Rye (grain) applied at a rate of 120 pounds per acre. Increase seeding rates by 10% when hydroseeding.

Mulching

See guidelines in the Mulch For Seed measures.

MAINTENANCE

Inspect temporary seeding area at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater for seed and mulch movement and rill erosion.

Where seed has been moved or where soil erosion has occurred, determine the cause of the failure and repair as needed.

MULCH FOR SEED (MS)

SPECIFICATIONS

Materials

Types of Mulches *within this specification include, but are not limited to:*

1. Hay: *The dried stems and leafy parts of plants cut and harvested, such as alfalfa, clovers, other forage legumes and the finer stemmed, leafy grasses. The average stem length should not be less than 4 inches. Hay that can be windblown should be anchored to hold it in place.*

2. Straw: *Cut and dried stems of herbaceous plants, such as wheat, barley, cereal rye, or brome. The average stem length should not be less than 4 inches. Straw that can be windblown should be anchored to hold it in place.*

3. Cellulose Fiber: *Fiber origin is either virgin wood, post–industrial/pre–consumer wood or post consumer wood complying with materials specification (collectively referred to as "wood fiber"), newspaper, kraft paper, cardboard (collectively referred to as "paper fiber") or a combination of wood and paper fiber. Paper fiber, in particular, shall not contain boron, which inhibits seed germination. The cellulose fiber must be manufactured in such a manner that after the addition to and agitation in slurry tanks with water, the fibers in the slurry become uniformly suspended to form a homogeneous product. Subsequent to hydraulic spraying on the ground, the mulch shall allow for the absorption and percolation of moisture and shall not form a tough crust such that it interferes with seed germination or growth. Generally applied with tackifier and fertilizer. Refer to manufacturer's specifications for application rates needed to attain 80%–95% coverage without interfering with seed germination or plant growth. Not recommended as a mulch for use when seeding occurs outside of the recommended seeding dates.*

Tackifiers *within this specification include, but are not limited to: Water soluble materials that cause mulch particles to adhere to one another, generally consisting of either a natural vegetable gum blended with gelling and hardening agents or a blend of hydrophilic polymers, resins, viscosifiers, sticking aids and gums. Good for areas intended to be mowed. Cellulose fiber mulch may be applied as a tackifier to other mulches, provided the application is sufficient to cause the other mulches to adhere to one another.* ***Emulsified asphalts are specifically prohibited for use as tackifiers due to their potential for causing water pollution following its application.***

Nettings *within this specification include, but are not limited to: Prefabricated openwork fabrics made of cellulose cords, ropes, threads, or biodegradable synthetic material that is woven, knotted or molded in such a manner that it holds mulch in place until vegetation growth is sufficient to stabilize the soil. Generally used in areas where no mowing is planned.*

Site Preparation

Grade according to plans and allow for the use of appropriate equipment for seedbed preparation, seeding, mulch application and mulch anchoring.

Application

Timing: *Applied immediately following seeding. Some cellulose fiber may be applied with seed to assist in marking where seed has been sprayed, but expect to apply a second application of cellulose fiber to meet the requirements of* ***Mulch For Seed*** *in the Connecticut Guidelines For Soil Erosion and Sediment Control latest edition.*

Spreading: *Mulch material shall be spread uniformly by hand or machine resulting in 80%–95% coverage of the disturbed soil when seeding within the recommended seeding dates. Applications that are uneven can result in excessive mulch smothering the germinating seeds. For hay or straw anticipate an application rate of 2 tons per acre. For cellulose fiber follow manufacture's recommended application rates to provided 80%–95% coverage.*

When seeding outside the recommended seeding dates, increase mulch application rate to provide between 95%–100% coverage of the disturbed soil. For hay or straw anticipate an application rate to 2.5 to 3 tons per acre.

When spreading hay mulch by hand, divide the area to be mulched into approximately 1,000 square feet and place 1.5–2 bales of hay in each section to facilitate uniform distribution.

For cellulose fiber mulch, expect several spray passes to attain adequate coverage, to eliminate shadowing, and to avoid slippage.

Anchoring: *Expect the need for mulch anchoring along the shoulders of actively traveled roads, hill tops and long open slopes not protected by wind breaks.*

When using netting, the most critical aspect is to ensure that the netting maintains substantial contact with the underlying mulch and the mulch, in turn, maintains continuos contact with the soil surface. Without such contact, the material is useless and erosion can be expected to occur.

MAINTENANCE

Inspect mulch for seed area at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater until the grass has germinated to determine maintenance needs.

Where mulch has been moved or where soil erosion has occurred, determine the cause of the failure and repair as needed.

SOIL ERSOION & SEDIMENT CONTROL NOTES

1. *All soil erosion and sediment control work shall be done in strict accordance with the Connecticut Guidelines For Soil Erosion and Sediment Control latest edition.*
2. *Any additional erosion/sediment control deemed necessary by the engineer during construction, shall be installed by the developer. In addition, the developer shall be responsible for the repair/replacement and/or maintenance of all erosion control measures until all disturbed areas are stabilized to the satisfaction of the town staff.*
3. *All soil erosion and sediment control operations shall be in place prior to any grading operations and installation of proposed structures or utilities and shall be left in place until construction is completed and/or area is stabilized.*
4. *In all areas, removal of trees, bushes and other vegetation as well as disturbance of the soil is to be kept to an absolute minimum while allowing proper development of the site. During construction, expose as small an area of soil as possible for as short a time as possible.*
5. *The developer shall practice effective dust control per the soil conservation service handbook during construction and until all areas are stabilized or surface treated. The developer shall be responsible for the cleaning of nearby streets of any debris from these construction activities.*
6. *All fill areas shall be compacted sufficiently for their intended purpose and as required to reduce slipping, erosion or excess saturation. Fill intended to support buildings, structures, conduits, etc., shall be compacted in accordance with local requirements or codes.*
7. *Topsoil is to be stripped and stockpiled in amounts necessary to complete finished grading of all exposed areas requiring topsoil. The stockpiled topsoil is to be located as designated on the plans. Topsoil shall not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or proposed sodding or seeding.*
8. *Any and all fill material is to be free of brush, rubbish, timber, logs vegetative matter and stumps in amounts that will be detrimental to constructing stable fills. Maximum side slopes of exposed surfaces of earth to be 3:1 or as otherwise specified by local authorities.*
9. *Soil stabilization should be completed within 5 days of clearing or inactivity in construction.*
10. *Waste Materials – All waste materials (including wastewater) shall be disposed of in accordance with local, state and federal law. Litter shall be picked up at the end of each work day.*
11. *The Contractor shall maintain on–site additional erosion control materials as a contingency in the event of a failure or when required to shore up existing BMPs. At a minimum, the on–site contingency materials should include 30 feet of silt fence and 5 straw haybales with 10 stakes.*

ENVIRONMENTAL NOTES – RESOURCES PROTECTION MEASURES

NORTHERN LONG–EARED BAT PROTECTION PROGRAM

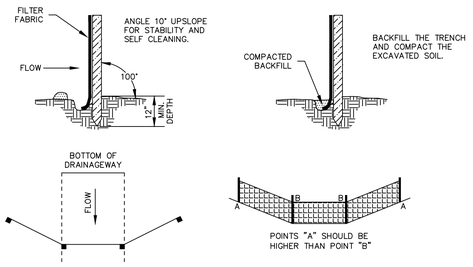
The proposed solar facility is located within sensitive habitat known to be used by northern long–eared bat ("NLEB"; Myotis septentrionalis), a Federally– and State–listed Endangered Species. In order to protect this bat species and prevent incidental take, protection and conservation measures are proposed during construction and operation of the solar facility.

It is of the utmost importance that the Contractor complies with the requirement for implementation of these protective measures and the education of its employees and subcontractors performing work on the project site.

All–Points Technology Corporation, P.C. ("APT") will serve as the Environmental Monitor for this project to ensure that these protection and conservation measures are implemented properly. APT will provide an education session for the Contractor prior to the start of construction activities on the potential presence of NLEB. The Contractor shall contact Dean Gustafson, Senior Biologist at APT, at least 5 business days prior to the start of any construction activities to schedule a pre–construction meeting. Mr. Gustafson can be reached by phone at (860) 552–2033 or via email at dgustafson@allpointstech.com.

This protection program consists of several components: education of all contractors and sub–contractors prior to initiation of work on the site; protective and conservation measures; periodic inspection of the construction project; and, reporting. Details of the NLEB protection measures to be implemented in association with construction and operation of the facility are provided below.

1. Contractor Education
   a. Prior to work on site, the Contractor shall attend an educational session at the pre–construction meeting with APT. This orientation and educational session will consist of an introductory meeting with APT to emphasize the environmentally sensitive nature of the project, the rare species resources, and the requirement to diligently follow the Protective and Conservation Measures as described in sections below.
   b. The Contractor will be provided with cell phone and email contacts for APT personnel to immediately report any encounters with any rare species. Educational poster materials will be provided by APT and displayed on the job site to maintain worker awareness as the project progresses.
   c. If any rare species are encountered, the Contractor shall immediately cease all work, avoid any disturbance to the species, and contact APT.
2. NLEB Tree Clearing Restriction
   a. Tree clearing is restricted to occur only between November 1st/ through April 14th/, during the bat's inactive season, when NLEB bats would likely be in hibernacula and not present in forested habitat on the Site. Do not remove trees between April 15th/ through October 31st/.
3. NLEB Conservation
   a. Four (4) multi–chamber nursery bat houses will be installed in the western portion of the solar facility within a tree clearing area located between the western fenced edge of the facility and the western limit of tree clearing. Bat house boxes will be installed on pressure treated 20–foot long 4–inch by 4–inch posts embedded 4–feet into the ground. Bat house boxes will be painted black or a dark shade of paint and installed facing east to capture morning sun and attain sun exposure for a minimum of 6–8 hours/day, ideal conditions for rearing young bat pups.
4. Reporting
   a. A Compliance Monitoring Report (brief narrative and applicable photos) documenting each APT inspection will be submitted by APT to the contractor and permittee for compliance verification. APT will perform inspections at the pre–construction meeting and during installation of the bat houses. Any observations of rare species will be included in the reports.
   b. Following completion of the construction project, APT will provide a Final Compliance Monitoring Report to the permittee documenting implementation of this NLEB protection and conservation program and any species observations. The permittee shall provide a copy of the Final Compliance Monitoring Report to the Connecticut Siting Council for compliance verification.
   c. Any observations of rare species will be reported to DEEP by APT on the appropriate special animal reporting form, with photo–documentation (if possible) and specific information on the location and disposition of the animal.

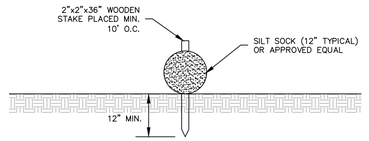


PLAN VIEW ELEVATION

SOURCE: U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, STORRS, CONNECTICUT

GEOTEXTILE SILT FENCE (GSF)

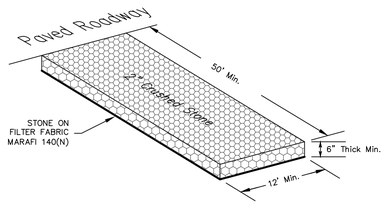
NOT TO SCALE



NOTE: MAY BE USED AS ALTERNATIVE TO GEOTEXTILE SILT FENCE.

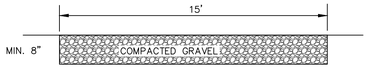
SILT SOCK (ALTERNATE SEDIMENT BARRIER)

NOT TO SCALE



ANTI-TRACKING EXIT PAD DETAIL (CE)

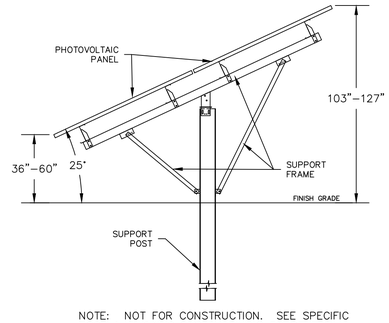
NOT TO SCALE



NOTES:
1. SUBGRADE SHALL BE EVALUATED IN THE FIELD FOR STABILITY. WHERE SUBGRADE IS WET OR CANNOT BE PROOF ROLLED WITHOUT SIGNIFICANT RUTTING OR MOVEMENT, ADDITIONAL STABILIZATION MEASURES WILL BE REQUIRED AND MAY INCLUDE EXCAVATION & INSTALLATION OF ADDITIONAL GRAVEL AND/OR INSTALLATION OF A GEOTEXTILE AS DIRECTED BY THE ENGINEER.
2. FINISH GRADE SHALL BE SET SO AS TO MAINTAIN EXISTING SHEET FLOW ACROSS THE DRIVEWAY.

GRAVEL DRIVEWAY DETAIL

NOT TO SCALE



NOTE: NOT FOR CONSTRUCTION. SEE SPECIFIC POST & RACKING SYSTEM PLANS BY OTHERS.

TYPICAL RACKING MOUNTED ON DRIVEN POST

NOT TO SCALE

CHECKLIST FOR EROSION CONTROL PLAN

PROJECT: Lodestar Energy

LOCATION: 410 Denslow Hill Road, Hamden, CT

PROJECT DESCRIPTION: Construction of a solar array

PARCEL AREA: 11.05± acres

RESPONSIBLE PERSONNEL: Sam Valone, Lodestar Energy (860) 308–8013

EROSION AND SEDIMENT CONTROL PLAN PREPARER: J.R. Russo & Associates, LLC

CHECKLIST:

Work Description Erosion & Sediment Control Measures	Location	Date Installed	Initials	Date Removed	Initials
Install construction entrance	As shown on plan.				
Install perimeter sediment barriers	As shown on plan.				

MAINTENANCE OF MEASURES:

Location	Description or Number	Date	Initials

Project Dates:

Date of groundbreaking for project:

Date of final stabilization:

PROJECT NARRATIVE AND CONSTRUCTION SEQUENCE

This project is located at 336 & 410 Denslow Hill Road in Hamden, Connecticut. The proposed activity is the construction of a solar array. The suggested schedule of construction is as follows:

1. Conduct a pre–construction meeting on–site with the contractor to review the design and requirements of the Stormwater Pollution Control Plan.
2. Install perimeter silt fence/silt sock (GSF) downgradient of the construction activities as shown on the project plans.
3. Clear trees & grub stumps in the vicinity of the Denslow Hill Road entrance. Construct anti–tracking pad.
4. Clear trees. Grub stumps within security fence and vicitnity of stormwater management basins. Stumps outside of fence to remain. All debris to be removed from the site.
5. Strip topsoil in the vicinity of the proposed stormwater management basins and access drives. Stockpile suitable amount of topsoil for reuse on–site in areas shown. Stockpiles shall be surrounded by sediment barriers (GSF).
6. Construct and stabilize access drives and stormwater management basins. Seed & mulch to establish vegetation as soon as practicable.
7. Install foundations and solar panels.
8. Install electrical equipment and distribution lines.
9. Install security fence.
10. Restore all disturbed areas with topsoil, seed mix and mulch as soon as practicable.
11. Remove silt fence after site is fully stabilized.

Construction of this site is anticipated to begin in the fall of 2024 and be complete by summer 2025, pending approvals. Temporary erosion control measures shall be installed prior to any soil disturbance and maintained throughout construction until soils have been stabilized with permanent vegetation.

The Contractor shall keep the area of disturbance to a minimum and establish vegetative cover on exposed soils as soon as practical. All soil and erosion control measures shall be installed and maintained in accordance with these plans and the "Connecticut DEP Guidelines for Soil Erosion and Sediment Control", as amended. The Contractor shall verify all conditions noted on the plans and shall immediately notify the Engineer of any discrepancies.

The developer shall be responsible for the repair/replacement/maintenance of all erosion control measures until all disturbed areas are stabilized. Accumulated sediment shall be removed as required to keep silt fence functional. In all cases, deposits shall be removed when the accumulated sediment has reached one–half above the ground height of the silt fence. This material is to be spread and stabilized in areas not subject to erosion, or to be used in areas which are not to be paved or built on. Silt fence (GSF) is to be replaced as necessary to maintain proper filtering action. Silt fence (GSF) are to remain in place and shall be maintained to insure efficient sediment capture until all areas above the erosion checks are stabilized and vegetation has been established.

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SERVING CT & MA
J.R. Russo & Associates, LLC
PO Box 938, 1 Shoham Rd East Windsor, CT 06088
www.jrrusso.com · CT 860.623.0569 · MA 413.785.1158

LODESTAR ENERGY

REVISIONS		
BY:	CHK:	
JU	JEU	4–03–24 STC SUBMISSION

Denslow Hill Solar

410 Denslow Hill Road
Hamden, Connecticut 06514
MBL: 2626–033–00–0000 (Zones: R–1 & R–3)

Erosion Control Notes & Details

DATE: 2–05–24
SCALE: As Shown
JOB NUMBER: 2023–024
SHEET: 5 of 6

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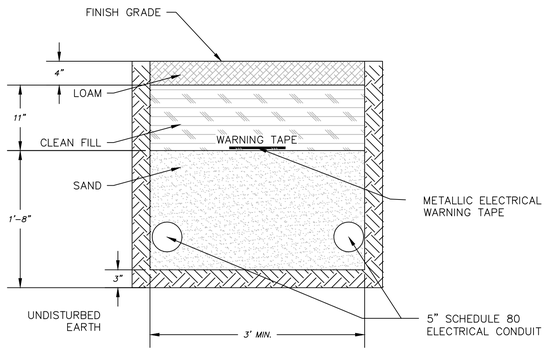
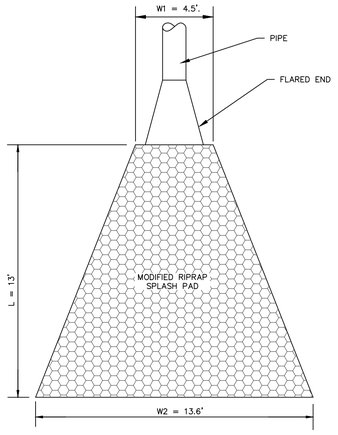


MEDIUM VOLTAGE CABLE TRENCH DETAIL (MV)

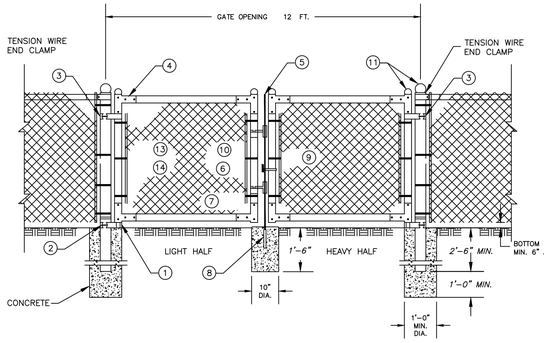
NOT TO SCALE



NOTE:
MODIFIED RIPRAP APRON (12" THICK) ON 6" GRANULAR BASE (M.02.01) ON MIRAFI 140N FABRIC OR EQUAL

TYPE A RIPRAP APRON (OP)

N.T.S.

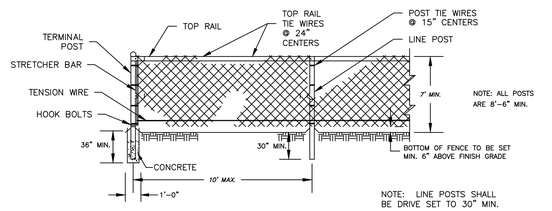


GATE DETAIL

LEGEND

PART NO.	DESCRIPTION	QUANTITY
1	STRAIGHT PLUG	2
2	BOTTOM HINGE	2
3	TOP HINGE	2
4	CORNER ELBOW	8
5	PLUNGER ROD	1
6	LATCH FORK	2
7	FORK CATCH	2
8	PLUNGER ROD CATCH	1
9	LOCK KEEPER GUIDE	1
10	LOCK KEEPER	1
11	ORNAMENTAL TOPS	6
12	TRUSS RODS	4
13	STRETCHER BAR	4
14	HOOK BOLTS	12

NOTE: THE FENCING SHALL BE #9 GAGE FENCE FABRIC, STANDARD 2-INCH CHAIN LINK DIAMOND MESH.



NOTE: LINE POSTS SHALL BE DRIVE SET TO 30" MIN. ALL TERMINAL POSTS SHALL BE SET IN CONCRETE

FENCE DETAILS

SHAPE, SIZE AND WEIGHT REQUIREMENTS FOR FENCE POSTS AND RAILS			
ITEM	SHAPE	OUTSIDE DIMENSIONS INCHES	WEIGHT LBS./LIN. FT.
** TERMINAL POSTS	ROUND	2.375	3.65
	*ROUND	2.375	3.12
LINE POSTS	ROUND	1.90	2.72
	*ROUND	1.90	2.28
TOP & BRACE RAILS	ROUND	1.66	2.27
	*ROUND	1.66	1.84
* GRADE B HIGH STRENGTH STEEL			
** INCLUDES END, CORNER, ANGLE, INTERSECTION AND INTERMEDIATE BRACED POSTS			

GATE FRAME MEMBERS SIZE AND WEIGHT		
GATE FRAME	OUTSIDE DIMENSIONS INCHES	WEIGHT LBS./LIN. FT.
ROUND	1.66	2.27
*ROUND	1.66	1.84
* GRADE B HIGH STRENGTH STEEL		

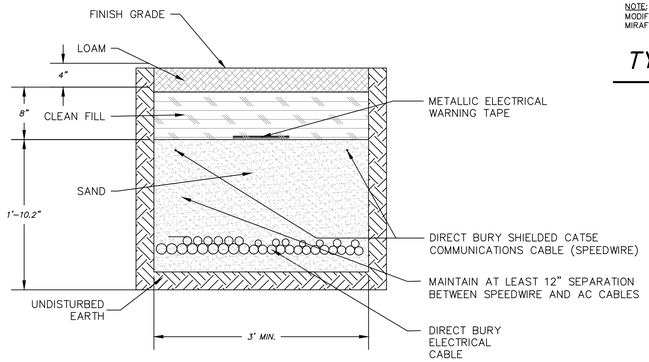
GATE POST SIZE AND WEIGHT		
GATE LEAF WIDTH OF 6 FT. OR LESS	OUTSIDE DIMENSIONS INCHES	WEIGHT LBS./LIN. FT.
ROUND	2.875	5.79
*ROUND	2.875	4.64
* GRADE B HIGH STRENGTH STEEL		

CONSTRUCTION NOTES

1. MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE MANUFACTURER'S SPECIFICATIONS.
2. ALL POSTS SHALL BE INSTALLED VERTICALLY. WHERE POSTS ARE INSTALLED ON AN INCLINED SURFACE, THE ANGLE OF THE POST SHALL BE ADJUSTED SO THAT THE POST WILL BE VERTICAL.
3. THE FENCING SHALL BE #9 GAGE FENCE FABRIC, STANDARD 2-INCH CHAIN LINK DIAMOND MESH.

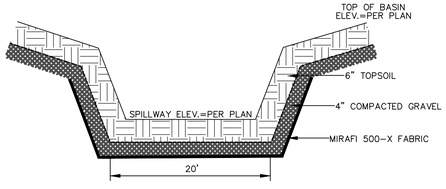
CHAIN LINK FENCE DETAIL

NOT TO SCALE



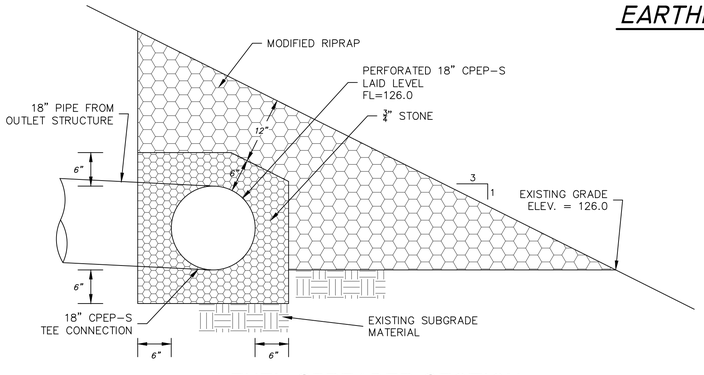
INVERTER POWER & COMMS CABLE TRENCH DETAIL (INV/C)

NOT TO SCALE



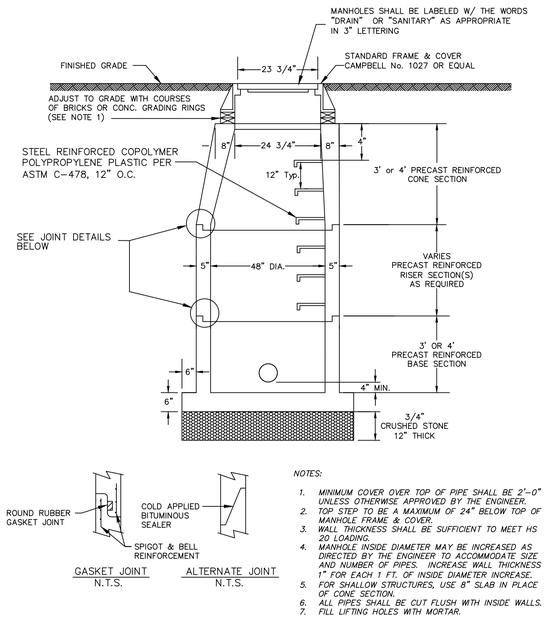
EARTHEN SPILLWAY

NOT TO SCALE



LEVEL SPREADER SECTION

NOT TO SCALE

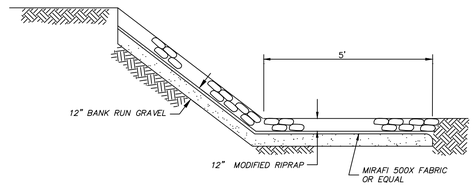


NOTES:

1. MINIMUM COVER OVER TOP OF PIPE SHALL BE 2'-0" UNLESS OTHERWISE APPROVED BY THE ENGINEER.
2. TOP STEP TO BE A MAXIMUM OF 24" BELOW TOP OF MANHOLE FRAME & COVER.
3. WALL THICKNESS SHALL BE SUFFICIENT TO MEET HS 20 LOADING.
4. MANHOLE INSIDE DIAMETER MAY BE INCREASED AS DIRECTED BY THE ENGINEER TO ACCOMMODATE SIZE AND NUMBER OF PIPES. INCREASE WALL THICKNESS 1" FOR EACH 1 FT. OF INSIDE DIAMETER INCREASE.
5. FOR SHALLOW STRUCTURES, USE 8" SLAB IN PLACE OF CONE SECTION.
6. ALL PIPES SHALL BE CUT FLUSH WITH INSIDE WALLS.
7. FILL LIFTING HOLES WITH MORTAR.

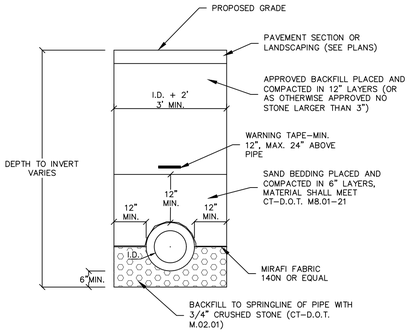
PRECAST CONCRETE MANHOLE

NOT TO SCALE



RIPRAP SLOPE PROTECTION AT SPILLWAY

NOT TO SCALE



STANDARD STORM DRAIN DETAIL

NOT TO SCALE

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PO Box 938, 1 Shoham Rd East Windsor, CT 06088
www.jrrusso.com - CT 860.623.0569 - MA 413.785.1158

LODESTAR ENERGY

REVISIONS		
BY:	CHK:	
JU	JEU	4-03-24 STC SUBMISSION

Denslow Hill Solar
410 Denslow Hill Road
Hamden, Connecticut 06514
MBL: 2626-033-00-0000 (Zones: R-1 & R-3)

Details

DATE
2-05-24

SCALE
As Shown

JOB NUMBER
2023-024

SHEET
6 of 6

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APPENDIX B

NDDB AND USFWS

COMPLIANCE STATEMENT

USFWS & NDDB COMPLIANCE

March 13, 2024

LSE Libra LLC
40 Tower Lane – Suite 201
Avon, Connecticut 06001

Re: 336 and 410 Denslow Hill Road, Hamden, Connecticut
APT Job No: CT606210

On behalf of LSE Libra LLC (the "Client"), All-Points Technology Corporation, P.C. ("APT") performed an evaluation with respect to possible Federally- and State-listed, Threatened, Endangered or Special Concern species in order to determine if the proposed referenced solar energy generation facility (the "Facility" or "Project") would result in a potential adverse effect to listed species.

APT understands that LSE Libra LLC proposes the construction of a solar energy generation facility on a portion of property located at 336 and 410 Denslow Hill Road, Hamden, Connecticut ("Subject Property").

USFWS

The federal consultation was completed in accordance with Section 10 of the Endangered Species Act through the U.S. Fish and Wildlife Service's ("USFWS") Information, Planning, and Conservation System ("IPaC") as APT understands there is no Federal Nexus[1] associated with this Project. Based on the results of the IPaC review, one Federally listed[2] Endangered species is known to occur in the vicinity of the Property documented as the northern long-eared bat ("NLEB"; *Myotis septentrionalis*). Please refer to the enclosed official species list.[3] As a result of this preliminary finding, APT performed an evaluation to determine if the proposed referenced Facility would result in a likely adverse effect to NLEB.

The proposed Facility would be located within an upland forest requiring tree clearing activities; trees potentially provide NLEB habitat. A review of the Connecticut Department of Energy & Environmental Protection ("CTDEEP") Wildlife Division Natural Diversity Data Base ("NDDB") NLEB habitat map[4] and Connecticut NLEB Observations by Town map[5] revealed that the proposed Facility is not within 150 feet of a known occupied NLEB maternity roost tree and is not within 0.25 mile of a known NLEB hibernaculum. The nearest NLEB habitat resource to the proposed Facility is located ±7.4 miles to the east in North Branford.

[1] Projects with Federal Nexus require compliance with Section 7 of the federal Endangered Species Act.
[2] Listing under the federal Endangered Species Act
[3] Monarch butterfly (*Danaus plexippus*), a Candidate species, is also listed for the Property. Candidate species have no current protections under the ESA and there is no requirement to consider project impacts.
[4] *Northern long-eared bat areas of concern in Connecticut to assist with Federal Endangered Species Act Compliance* map. February 1, 2016.
[5] *Connecticut Northern Long-eared bat Observations by Town* map. July 24, 2023.

NLEB has been reclassification as Endangered under the ESA. The reclassification now eliminates use of the previous 4(d) rule for NLEB; 4(d) rules may only be applied to Threatened species. A NLEB Interim Consultation Framework has been developed by USFWS for projects that are reasonably certain to occur before April 1, 2024 (date on which the NLEB Interim Consultation Framework expires[6]) to facilitate transition from the 4(d) rule to typical ESA consultation procedures for Endangered species. APT submitted the effects determination using the current NLEB Determination Key ("DKey") within the IPaC system for this Facility and determined the Subject Property is in a known sensitive area for NLEB and therefore the Project "May Effect" NLEB. As a result, further consultation/coordination for this project is required with the USFWS New England Field Office. Please refer to the enclosed USFWS March 1, 2024 letter confirming the NLEB "May Effect" determination. A time of year restriction ("TOYR") for tree clearing will likely be required by USFWS resulting in tree clearing restricted to the inactive period for NLEB, November 1 – April 14. Also, the Client has proposed the installation of four bat boxes along the western edge of the Project within the proposed tree clearance zone beyond the fenced facility. This conservation measure will support bat habitat for roosting and pup rearing that could be used by NLEB. The results of the USFWS consultation will be forwarded upon receipt.

NDDB

No known areas of State-listed species are currently depicted on the most recent CTDEEP NDDB Maps in the location or vicinity of the proposed Facility or Subject Property. Please refer to the enclosed NDDB Map which depicts the nearest NDDB buffer ±0.40-mile north of the Subject Property. Since the proposed Facility and Subject Property are not located within a NDDB buffer area, consultation with DEEP is not required in accordance with their review policy[7].

Therefore, with incorporation of the tree clearing TOYR for NLEB the proposed Facility is not anticipated to adversely impact any Federal or State Threatened, Endangered or species of Special Concern. This preliminary determination of the Project's impact to rare species will be updated upon conclusion of the additional USFWS consultation process for NLEB.

Sincerely,
All-Points Technology Corporation, P.C.

Dean Gustafson
Senior Biologist

Enclosures

[6] USFWS has not issued an update on the current NLEB DKey; this consultation will be reviewed once the new NLEB ESA consultation process is issued

[7] DEEP Requests for NDDB State Listed Species Reviews. https://portal.ct.gov/DEEP/NDDB/Requests-for-NDDB-Environmental-Reviews

USFWS Letters

- Species List
- NLEB Determination Key Letter

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To: February 09, 2024
Project Code: 2024-0047278
Project Name: Lodestar Energy: LSE Libra LLC - Hamden Solar Facility

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Updated 4/12/2023 - Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

About Official Species Lists

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested by returning to an existing project's page in IPaC.

Endangered Species Act Project Review

Please visit the "**New England Field Office Endangered Species Project Review and Consultation**" website for step-by-step instructions on how to consider effects on listed

species and prepare and submit a project review package if necessary:

https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review

NOTE Please do not use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

Northern Long-eared Bat - (**Updated 4/12/2023**) The Service published a final rule to reclassify the northern long-eared bat (NLEB) as endangered on November 30, 2022. The final rule went into effect on March 31, 2023. You may utilize the **Northern Long-eared Bat Rangewide Determination Key** available in IPaC. More information about this Determination Key and the Interim Consultation Framework are available on the northern long-eared bat species page:

https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis

For projects that previously utilized the 4(d) Determination Key, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective. If your project was not completed by March 31, 2023, and may result in incidental take of NLEB, please reach out to our office at newengland@fws.gov to see if reinitiation is necessary.

Additional Info About Section 7 of the Act
Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/service/section-7-consultations

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Please contact NEFO if you would like more information.

Candidate species that appear on the enclosed species list have no current protections under the ESA. The species' occurrence on an official species list does not convey a requirement to

consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see:

https://www.fws.gov/program/migratory-bird-permit

https://www.fws.gov/library/collections/bald-and-golden-eagle-management

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

PROJECT SUMMARY

Project Code: 2024-0047278
Project Name: Lodestar Energy: LSE Libra LLC - Hamden Solar Facility
Project Type: Power Gen - Solar
Project Description: A proposed development of a solar photovoltaic electric generating facility with a capacity of under 2 megawatts (MW) (“Project”) at 410 Denslow Hill Road, Hamden, Connecticut.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.37541485,-72.93417811774594,14z

Counties: New Haven County, Connecticut

ENDANGERED SPECIES ACT SPECIES

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To: March 01, 2024
Project code: 2024-0047278
Project Name: Lodestar Energy: LSE Libra LLC - Hamden Solar Facility

Federal Nexus: no
Federal Action Agency (if applicable):

Subject: Technical assistance for 'Lodestar Energy: LSE Libra LLC - Hamden Solar Facility'

Dear Deborah Gustafson:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on March 01, 2024, for 'Lodestar Energy: LSE Libra LLC - Hamden Solar Facility' (here forward, Project). This project has been assigned Project Code 2024-0047278 and all future correspondence should clearly reference this number. **Please carefully review this letter. Your Endangered Species Act (Act) requirements are not complete.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project. **Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (Dkey), invalidates this letter.**

Determination for the Northern Long-Eared Bat

Based on your IPaC submission, your proposed action will affect an area where northern long-eared bats occur. Depending on the specifics of the action, it could result in the incidental take of one or more northern long-eared bats. The presence of the species in the affected area, however, does not necessarily mean that incidental take is likely and we only recommend seeking an incidental take permit when such take is reasonably certain to occur. That is, when a project is reasonably certain to harm or kill one or more northern long-eared bats. See Next Steps below for further technical assistance.

Next Steps

The Service has developed interim voluntary guidance for non-federal[1] actions involving forest habitat modification that may affect the northern long-eared bat. Review the guidance posted here for more information https://www.fws.gov/library/collections/interim-habitat-modification-guidance.

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[1]Federal actions include all activities or programs authorized, funded, carried out, or permitted --in whole or in part --by federal agencies in the United States or on the high seas.

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination for the northern long-eared bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Candidate

You may coordinate with our Office to determine whether the Action may cause prohibited take of the species listed above.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Lodestar Energy: LSE Libra LLC - Hamden Solar Facility

2. Description

The following description was provided for the project 'Lodestar Energy: LSE Libra LLC - Hamden Solar Facility':

> A proposed development of a solar photovoltaic electric generating facility with a capacity of under 2 megawatts (MW) (“Project”) at 410 Denslow Hill Road, Hamden, Connecticut.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.3757611,-72.93399188066903,14z

DETERMINATION KEY RESULT

Based on the answers provided, the proposed Action is consistent with a determination of "may affect" for the Endangered northern long-eared bat (*Myotis septentrionalis*).

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

   Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

   No

2. Does any component of the action involve construction or operation of wind turbines?

   Note: For federal actions, answer 'yes' if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.).

   No

3. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

   No

4. [Semantic] Is the action area located within 0.5 miles of a known northern long-eared bat hibernaculum?

   Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

   Automatically answered
   No

5. Does the action area contain any caves (or associated sinkholes, fissures, or other karst features), mines, rocky outcroppings, or tunnels that could provide habitat for hibernating northern long-eared bats?

   No

6. Does the action area contain or occur within 0.5 miles of (1) talus or (2) anthropogenic or naturally formed rock crevices in rocky outcrops, rock faces or cliffs?

   No

7. Is suitable summer habitat for the northern long-eared bat present within 1000 feet of project activities?
(If unsure, answer "Yes.")

   Note: If there are trees within the action area that are of a sufficient size to be potential roosts for bats (i.e., live trees and/or snags ≥3 inches (12.7 centimeter) dbh), answer "Yes". If unsure, additional information defining suitable summer habitat for the northern long-eared bat can be found at: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

   Yes

8. Will the action cause effects to a bridge?

   No

9. Will the action result in effects to a culvert or tunnel?

   No

10. Does the action include the intentional exclusion of northern long-eared bats from a building or structure?

    Note: Exclusion is conducted to deny bats' entry or reentry into a building. To be effective and to avoid harming bats, it should be done according to established standards. If your action includes bat exclusion and you are unsure whether northern long-eared bats are present, answer "Yes." Answer "No" if there are no signs of bat use in the building/structure. If unsure, contact your local U.S. Fish and Wildlife Services Ecological Services Field Office to help assess whether northern long-eared bats may be present. Contact a Nuisance Wildlife Control Operator (NWCO) for help in how to exclude bats from a structure safely without causing harm to the bats (to find a NWCO certified in bat standards, search the Internet using the search term "National Wildlife Control Operators Association bats"). Also see the White-Nose Syndrome Response Team's guide for bat control in structures

    No

11. Does the action involve removal, modification, or maintenance of a human-made structure (barn, house, or other building) **known or suspected to contain roosting bats?**

    No

12. Will the action directly or indirectly cause construction of one or more new roads that are open to the public?

    Note: The answer may be yes when a publicly accessible road either (1) is constructed as part of the proposed action or (2) would not occur but for the proposed action (i.e., the road construction is facilitated by the proposed action but is not an explicit component of the project).

    No

13. Will the action include or cause any construction or other activity that is reasonably certain to increase average daily traffic on one or more existing roads?

    Note: For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.). .

    No

14. Will the action include or cause any construction or other activity that is reasonably certain to increase the number of travel lanes on an existing thoroughfare?

    For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

    No

15. Will the proposed action involve the creation of a new water-borne contaminant source (e.g., leachate pond pits containing chemicals that are not NSF/ANSI 60 compliant)?

    No

16. Will the proposed action involve the creation of a new point source discharge from a facility other than a water treatment plant or storm water system?

    No

17. Will the action include drilling or blasting?

    No

18. Will the action involve military training (e.g., smoke operations, obscurant operations, exploding munitions, artillery fire, range use, helicopter or fixed wing aircraft use)?

    No

19. Will the proposed action involve the use of herbicide or other pesticides (e.g., fungicides, insecticides, or rodenticides)?

    No

20. Will the action include or cause activities that are reasonably certain to cause chronic nighttime noise in suitable summer habitat for the northern long-eared bat? Chronic noise is noise that is continuous or occurs repeatedly again and again for a long time.

    Note: Additional information defining suitable summer habitat for the northern long-eared bat can be found at: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

    No

21. Does the action include, or is it reasonably certain to cause, the use of artificial lighting within 1000 feet of suitable northern long-eared bat roosting habitat?

    Note: Additional information defining suitable roosting habitat for the northern long-eared bat can be found at: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

    No

22. Will the action include tree cutting or other means of knocking down or bringing down trees, tree topping, or tree trimming?

    Yes

23. Does the action include emergency cutting or trimming of hazard trees in order to remove an imminent threat to human safety or property? See hazard tree note at the bottom of the key for text that will be added to response letters

    Note: A "hazard tree" is a tree that is an immediate threat to lives, public health and safety, or improved property and has a diameter breast height of six inches or greater.

    No

24. Are any of the trees proposed for cutting or other means of knocking down, bringing down, topping, or trimming suitable for northern long-eared bat roosting (i.e., live trees and/or snags ≥3 inches dbh that have exfoliating bark, cracks, crevices, and/or cavities)?

    Yes

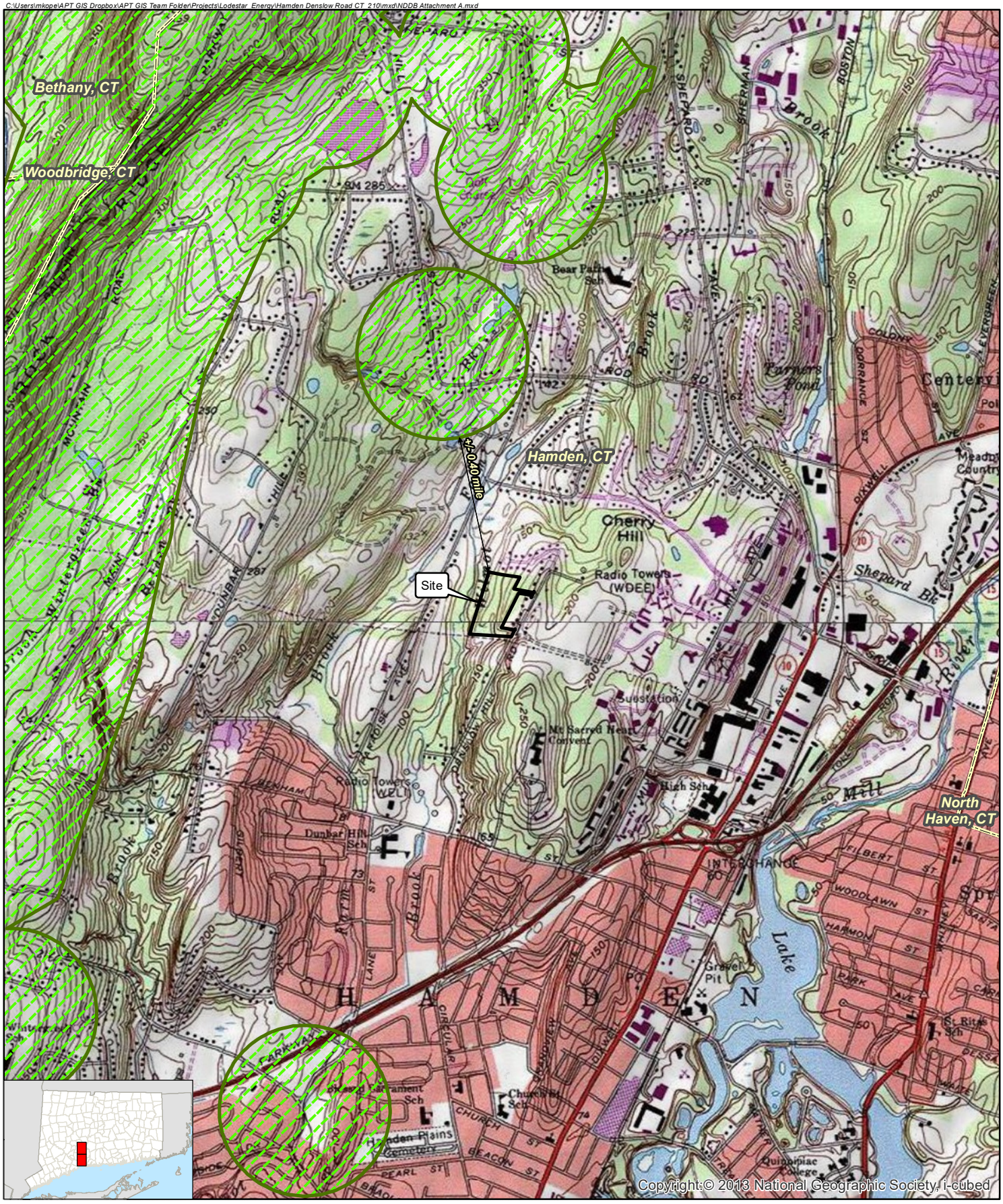
25. [Semantic] Does your project intersect a known sensitive area for the northern long-eared bat?

    Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your state agency or USFWS field office

    Automatically answered
    Yes

NDDB Map

C:\Users\mkope\APT GIS Dropbox\APT GIS Team Folder\Projects\Lodestar Energy\Hamden Denslow Road CT 210\mxd\NDDB Attachment A.mxd



Legend

- Site
- Natural Diversity Database (updated December 2023)
- Municipal Boundary

Map Notes:
Base Map Source: USGS 7.5 Minute Topographic Quadrangle Map, Mount Carmel, CT (1984) and New Haven, CT (1984)
Map Scale: 1:24,000
Map Date: February 2024

N

1,000 500 0 1,000 Feet

NDDB Map

Proposed Solar Facility
336 & 410 Denslow Hill Road
Hamden, Connecticut

LODESTAR ENERGY

ALL-POINTS TECHNOLOGY CORPORATION

APPENDIX C

SHPO CONSULTATION

FEBRUARY 2024

PHASE IA CULTURAL RESOURCES ASSESSMENT SURVEY OF OF THE PROPOSED HAMDEN SOLAR PROJECT AT 410 DENSLOW HILL ROAD IN HAMDEN, CONNECTICUT

PREPARED FOR:

ALL-POINTS TECHNOLOGY CORPORATION
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WATERFORD, CONNECTICUT 06385

PREPARED BY:

HERITAGE CONSULTANTS
830 BERLIN TURNPIKE
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ABSTRACT

This report presents the results of a Phase IA cultural resources assessment survey for a proposed Solar Facility located at 410 Denslow Hill Road in Hamden, Connecticut. The current investigation consisted of: 1) preparation of an overview of the region's precontact era, post-European Contact period, and natural settings; 2) a literature search to identify and discuss previously recorded cultural resources in the region; 3) a review of readily available maps and aerial imagery depicting the project parcel to identify potential post-European Contact period resources and/or areas of past disturbance; and 4) pedestrian survey and photo-documentation of the project area to determine its archaeological sensitivity. The results of the pedestrian survey indicate that the proposed facility area is characterized by wooded areas with mature deciduous tress, well-drained soil, and appears to be largely undisturbed. In addition, a stone wall was identified within the center of project area, running east to west; it bisects the northern half of the parcel from the south. The stone wall extends past the parcel to the west, and measures approximately 386 feet (117.6 meters) in length. The stone wall could not be attributed to a specific type, function, or time period.

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CHAPTER I
INTRODUCTION

This report presents the results of a Phase IA cultural resources assessment survey of a proposed solar facility (the Facility) located at 410 Denslow Hill Road in Hamden, Connecticut (Figure 1). All-Points Technology Corporation (All-Points) requested that Heritage Consultants, LLC (Heritage) complete the assessment survey as part of the planning process for the proposed Facility. The parcel on which the Facility will be built consists of densely wooded areas. A subdivision of residential single-family houses is located to the north and east. Heritage completed this investigation on behalf of All-Points in February of 2024. All work associated with this project was performed in accordance with the *Environmental Review Primer for Connecticut's Archaeological Resources* (Poirier 1987) promulgated by the Connecticut State Historic Preservation Office (CT-SHPO).

Project Description and Methods Overview

The proposed Facility will consist of two stormwater basins, a chain link perimeter fence, a 15 foot (4.6 meter) wide gravel access road and turnaround, a site access gate, and the solar array (Figure 2). This Phase IA cultural resources assessment survey consisted of the completion of the following tasks: 1) preparation of an overview of the region's precontact era, post-European Contact period, and natural settings; 2) a literature search to identify and discuss previously recorded cultural resources in the region; 3) a review of readily available maps and aerial imagery depicting the project parcel to identify potential post-European Contact period resources and/or areas of past disturbance; and 4) pedestrian survey and photo-documentation of the project parcel and Facility to determine their archaeological sensitivity.

Project Results and Management Recommendations Overview

The review of maps and aerial images depicting the study area, as well as files maintained by the CT-SHPO, resulted in the detection of a single previously identified archaeological site (62-1), one National Register of Historic Places property, and four State Register of Historic Places properties located within 1.6 kilometers (1 mile) of the proposed Facility. These cultural resources are discussed in Chapter V of this report. Heritage also combined data from map and aerial image analyses, as well as subsequent pedestrian survey, to stratify the project area into zones of no/low and/or moderate/high archaeological sensitivity.

Pedestrian survey of the project parcel and Facility revealed that they contain densely wooded areas, well-drained soils, and are in close proximity to Wilmont Brook to the west. Based on the above referenced information, the Facility area is deemed to possess a moderate/high archaeological sensitivity. Finally, a single dry laid stone wall was identified during the pedestrian survey; it bisects the center of the project parcel, dividing the northern and southern portions. This wall is largely intact but could not be assigned to a particular time period, origin, or cultural affiliation.

Project Personnel

Heritage Personnel who contributed to the project include David R. George, M.A., RPA, (Principal Investigator); Renee Petruzelli, M.A., RPA (Project Manager); Antonio Medina, B.A. (Field Operations Manager), Sean Buckley, B.A. (GIS Specialist), and Nita Vitaliano, M.A., (Historian).

CHAPTER II
NATURAL SETTING

Introduction

This chapter provides a brief overview of the natural setting of the region containing the proposed Facility in Hamden, Connecticut. Previous archaeological research has documented that specific environmental factors can be associated with both precontact era and post European Contact period site selection. These include general ecological conditions, as well as types of freshwater sources present, degree of slopes, and soils situated within a given project area. The remainder of this chapter provides a brief overview of the ecology, hydrological resources, and soils present within the project parcel and the Facility, as well as the larger region in general.

Ecoregions of Connecticut

Throughout the Pleistocene and Holocene Periods, Connecticut underwent numerous environmental changes. Variations in climate, geology, and physiography have led to the "regionalization" of Connecticut's modern environment. It is clear, for example, that the northwestern portion of the state has different natural characteristics than the coastline. Recognizing this fact, Dowhan and Craig (1976), as part of their study of the distribution of rare and endangered species in Connecticut, subdivided the state into various ecoregions. Dowhan and Craig (1976:27) defined an ecoregion as:

> "an area characterized by a distinctive pattern of landscapes and regional climate as expressed by the vegetation composition and pattern, and the presence or absence of certain indicator species and species groups. Each ecoregion has a similar interrelationship between landforms, local climate, soil profiles, and plant and animal communities. Furthermore, the pattern of development of plant communities (chronosequences and toposequences) and of soil profile is similar in similar physiographic sites. Ecoregions are thus natural divisions of land, climate, and biota."

Dowhan and Craig defined nine major ecoregions for the State of Connecticut. They are based on regional diversity in plant and animal indicator species (Dowhan and Craig 1976). The Facility is contained within the South-Central Lowlands ecoregion. A summary of this ecoregion is presented below. It is followed by a discussion of hydrology and soils found in and adjacent to the Facility and project parcel.

South-Central Lowlands Ecoregion

The South-Central Lowlands ecoregion consists of "a rolling area of low average elevation, crossed by several north-trending ridge systems; streams and river systems with broad, well developed flood plains, from which the land surface generally rises to the bases of the ridges" (Dowhan and Craig 1976). Elevations average less than 60 meters (200 feet) but can reach approximately 300 meters (1,000 feet) in height. The region's bedrock is sedimentary, consisting of sandstones, basalt, and traprock. Soils vary from "clayey glacial till in the uplands of the region, to sand, gravel, silt, and clay in the lowlands."

Hydrology in the Vicinity of the Facility

The Facility is situated within a portion of Connecticut that contains numerous sources of freshwater, including Mill River, Lake Whitney, Lake Watrous, Wintergreen Brook, Belden Brook, Farm Brook, Wilmot Brook, and Shepard Brook. This area also contains numerous unnamed streams, ponds, and wetlands. All these freshwater sources may have served as resource collection/extraction areas for precontact era and early post-European Contact period populations. Previously completed archaeological investigations in Connecticut have demonstrated that streams, rivers, and wetlands were focal points for precontact era

occupations because they provided access to transportation routes, sources of freshwater, and abundant faunal and floral resources.

Soils Comprising the Project Area

Soil formation is the direct result of the interaction of many variables, including climate, vegetation, parent material, time, and organisms present (Gerrard 1981). Once archaeological deposits are buried within the soil, they are subject to various diagenic and taphonomic processes. Different classes of artifacts may be preferentially protected, or unaffected by these processes, whereas others may deteriorate rapidly. Cyclical wetting and drying, freezing and thawing, and compression can accelerate chemically and mechanically the decay processes for animal bones, shells, lithics, ceramics, and plant remains. Lithic and ceramic artifacts are largely unaffected by soil pH, whereas animal bones and shells decay more quickly in acidic soils. In contrast, acidic soils enhance the preservation of charred remains.

The Facility is characterized by two soil types. They include soils belonging to the Yalesville and Cheshire-Holyoke soils (Figure 3). These soil types are considered well drained, and when undisturbed and on less than eight percent slope, they are generally well correlated with precontact era and post-European Contact period site locations and are considered to have higher archaeological sensitivity. Below is a summary of each specific soil type identified within the Project area.

Yalesville Soils

The Yalesville series consists of moderately deep, well drained soils formed in a loamy till. They are nearly level to moderately steep soils on hills and ridges. Slope ranges from 0 to 50 percent. A typical soil profile is as follows: **Ap**--0 to 20 cm; dark brown (7.5YR 3/2) fine sandy loam, pinkish gray (7.5YR 6/2) dry; weak medium granular structure; friable; common very fine, fine, and medium roots; 5 percent gravel; moderately acid; abrupt smooth boundary; **Bw1**--20 to 36 cm; reddish brown (5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; few very dark grayish brown earthworm casts; 5 percent gravel; moderately acid; gradual wavy boundary; **Bw2**--36 to 64 cm; reddish brown (5YR 4/4) loam; weak medium subangular blocky structure; friable; few fine roots; 5 percent gravel; moderately acid; gradual wavy boundary; **C**--64 to 91 cm; reddish brown (2.5YR 4/4) gravelly sandy loam; massive; firm; 12 percent gravel and 3 percent cobbles; moderately acid; abrupt wavy boundary; and **2R**--91 cm; reddish brown (2.5YR 4/4) hard sandstone bedrock.

Cheshire-Holyoke Soils

The Cheshire series consists of very deep, well drained loamy soils formed in supraglacial till on uplands. They are nearly level through very steep soils on till plains and hills. Slope ranges from 0 to 60 percent. A typical soil profile is as follows: **Ap**--0 to 8 inches; dark brown (7.5YR 3/2) fine sandy loam, pinkish gray (7.5YR 6/2) dry; weak medium granular structure; friable; common fine roots; 5 percent gravel; strongly acid; **Bw1**--8 to 16 inches; reddish brown (5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; few fine roots; 10 percent gravel; strongly acid; **Bw2**--16 to 26 inches; reddish brown (5YR 5/4) fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; 10 percent gravel; strongly acid; and **C**-- 26 to 65 inches; reddish brown (2.5YR 4/4) gravelly sandy loam; massive; very friable with firm lenses; 20 percent gravel and cobbles; strongly acid.

The Holyoke series consists of shallow, well drained and somewhat excessively drained soils formed in a thin mantle of till derived mainly from basalt and red sandstone, conglomerate, and shale. They are nearly level to very steep soils on bedrock controlled ridges and hills. Slope ranges from 0 to 60 percent. A typical soil profile is as follows: **Oe**--0 to 1 cm; black (10YR 2/1) moderately decomposed plant

material; **A**--1 to 8 cm; dark brown (10YR 3/3) silt loam; weak medium granular structure; very friable; many fine roots; 10 percent angular gravel; very strongly acid; abrupt wavy boundary; **Bw1**--8 to 20 cm; brown (7.5YR 4/4) silt loam; weak coarse granular structure; very friable; many fine roots; 10 percent gravel; very strongly acid; clear wavy boundary; **Bw2**--20 to 46 cm; yellowish red (5YR 4/6) gravelly silt loam; weak medium subangular blocky structure; friable; common fine roots; 15 percent gravel; very strongly acid; abrupt wavy boundary; and **2R**--46 cm; basalt bedrock.

Summary

The natural setting of the region is common in south-central Connecticut, which is marked by variable topography and substantial natural diversity even though the portions of the area have undergone modifications and adaptations since the retreat of the glaciers. The proximity of the project area to Mill River, Farm Brook, and Wilmot Brook, as well as unnamed streams, ponds, and wetlands, would have provided excellent resource extraction areas for precontact era and post-European Contact period populations. As a result, intact archaeological deposits may be expected near or within the undisturbed portions of the Facility that contain low slopes and well drained soils.

CHAPTER III
PRECONTACT ERA SETTING

Introduction

Prior to the late 1970s and early 1980s, very few systematic archaeological surveys of large portions of the State of Connecticut had been undertaken. Rather, the precontact era occupation of the region was studied at the site level. Sites chosen for excavation were highly visible and they were in such areas as the coastal zone, e.g., shell middens, and Connecticut River Valley. As a result, a skewed interpretation of the precontact era occupation of Connecticut was developed. It was suggested that the upland portions of the state, i.e., the northeastern and northwestern hills ecoregions, were little used and rarely occupied by precontact era Native Americans, while the coastal zone, i.e., the eastern and western coastal and the southeastern and southwestern hills ecoregions, was the focus of settlements and exploitation. This interpretation remained unchallenged until the 1970s and 1980s when several town-wide and regional archaeological studies were completed. These investigations led to the creation of several archaeological phases that subsequently were applied to understand the precontact period of Connecticut. The remainder of this chapter provides an overview of the precontact era setting of the region encompassing the Project parcel.

Paleo-Indian Period (12,000 to 10,000 Before Present [B.P.])

The earliest inhabitants of the area encompassing the State of Connecticut, who have been referred to as Paleo-Indians, arrived in the area by ca., 13,000 B.P. (Gramly and Funk 1990; Snow 1980). Due to the presence of large Pleistocene mammals at that time and the ubiquity of large fluted projectile points in archaeological deposits of this age, Paleo-Indians often have been described as big-game hunters (Ritchie and Funk 1973; Snow 1980); however, as discussed below, it is more likely that they hunted a broad spectrum of animals. While there have been over 50 surface finds of Paleo-Indian projectile points throughout the State of Connecticut, only three sites, the Templeton Site (6-LF-21) in Washington, Connecticut, the Hidden Creek Site (72-163) in Ledyard, Connecticut, and the Brian D. Jones Site (4-10B) in Avon, Connecticut have been studied in detail and dated using the radiocarbon method (Jones 1997; Moeller 1980; Singer 2017a; Leslie et al., 2020).

The Templeton Site (6-LF-21) in Washington, Connecticut was occupied between 10,490 and 9,890 years ago (Moeller 1980). In addition to a single large and two small, fluted points, the Templeton Site produced a stone tool assemblage consisting of gravers, drills, core fragments, scrapers, and channel flakes, which indicates that the full range of stone tool production and maintenance took place at the site (Moeller 1980). Moreover, the use of both local and non-local raw materials was documented in the recovered tool assemblage, suggesting that not only did the site's occupants spend some time in the area, but they also had access to distant stone sources, the use of which likely occurred during movement from region to region. More recently, the site has undergone re-investigation by Singer (2017a and 2017b), who has determined that the overwhelming majority of tools and debitage are exotic and were quarried directly from the Hudson River Valley. Recent research has focused on task-specific loci at the Templeton Site, particularly the production of numerous Michaud-Neponset projectile points, as identified through remnant channel flakes.

The Hidden Creek Site (72-163) is situated on the southeastern margin of the Great Cedar Swamp on the Mashantucket Pequot Reservation in Ledyard, Connecticut (Jones 1997). While excavation of the Hidden

Creek Site produced evidence of Terminal Archaic and Woodland Period components (see below) in the upper soil horizons, the lower levels of the site yielded artifacts dating from the Paleo-Indian era. Recovered Paleo-Indian artifacts included broken bifaces, side-scrapers, a fluted preform, gravers, and end-scrapers. Based on the types and number of tools present, Jones (1997:77) has hypothesized that the Hidden Creek Site represented a short-term occupation, and that separate stone tool reduction and rejuvenation areas were present.

The Brian D. Jones Site (4-10B) was identified in a Pleistocene levee on the Farmington River in Avon, Connecticut; it was buried under 1.5 m (3.3 ft) of alluvium (Leslie et al., 2020). The Brian D. Jones Site was identified by Archaeological and Historical Services, Inc., in 2019 during a survey for the Connecticut Department of Transportation preceding a proposed bridge construction project. It is now the oldest known archaeological site in Connecticut at +12,500 years old. The site also provides a rare example of a Paleo-Indian site on a river rather than the more common upland areas or on the edges of wetlands. Ground-penetrating radar survey revealed overbank flooding and sedimentation that resulted in the creating of a stable ancient river levee with gentle, low-energy floods. Archaeological deposits on the levee were therefore protected.

Excavations at the Brian D. Jones Site revealed 44 soil anomalies, 27 of which were characterized as cultural features used as hearths and post holes, among other uses. Of these, one hearth has been dated thus far (10,520 ± 30 14C yr BP; charred Pinus; 2-sigma 12,568 to 12,410 CAL BP) (Leslie et al., 2020: 4). Further radiocarbon testing will be completed in the future. Artifact concentrations surrounded these features and were separated in two stratigraphic layers representing at least two temporally discrete Paleo-Indian occupations. The recovered lithic artifacts are fashioned from Normanskill chert, Hardyston jasper, Jefferson/Mount Jasper rhyolite, chalcedony, siltstone, and quartz. They include examples of a fluted point base, preforms, channel flakes, pièces esquillées, end scrapers, side scrapers, grinding stones, bifaces, utilized flakes, gravers, and drilled stone pendant fragments. Lithic tools numbered over 100, while toolmaking debris was in the thousands. The channel flakes represent the production of spear points used in hunting. Scrapers, perforators, and grinding stones indicate animal butchering, plant food grinding, the production of wood and bone tools, and the processing of animal skins for clothing and tents. Other collected cultural materials included charred botanicals and calcined bone. Botanical specimens recovered in hearth features included burned remains of cattail, pin cherry, strawberry, acorn, sumac, water lily, and dogwood. Approximately 15,000 artifacts were collected in total.

The scarcity of identified Paleo-Indian sites suggests a low population density during this period. The small size of most Paleo-Indian sites, their likely inundation by rising sea levels, and the high degree of landscape disturbance over the past 10,000 years likely contribute to poor site visibility, although the presence of two deeply alluvially buried Paleo-Indian sites in Connecticut suggests that other sites may be located along stable rivers (Leslie et al. 2021).

Archaic Period (10,000 to 2,700 B.P.)

The Archaic Period, which succeeded the Paleo-Indian Period, began by ca., 10,000 B.P. (Ritchie and Funk 1973; Snow 1980), and it has been divided into three subperiods: Early Archaic (10,000 to 8,000 B.P.), Middle Archaic (8,000 to 6,000 B.P.), and Late Archaic (6,000 to 3,400 B.P.). These periods were devised to describe all non-farming, non-ceramic producing populations in the area. Regional archeologists recently have recognized a final “transitional” Archaic Period, the Terminal Archaic Period (3,400-2,700 B.P.), which was meant to describe those groups that existed just prior to the onset of the Woodland Period and the widespread adoption of ceramics into the toolkit (Snow 1980; McBride 1984;

Pfeiffer 1984, 1990; Witthoft 1949, 1953).

Early Archaic Period (10,000 to 8,000 B.P.)

To date, very few Early Archaic sites have been identified in southern New England. As a result, researchers such as Fitting (1968) and Ritchie (1969), have suggested a lack of these sites likely is tied to cultural discontinuity between the Early Archaic and preceding Paleo-Indian Period, as well as a population decrease from earlier times. However, with continued identification of Early Archaic sites in the region, and the recognition of the problems of preservation, it is difficult to maintain the discontinuity hypothesis (Curran and Dincauze 1977; Snow 1980).

Like their Paleo-Indian predecessors, Early Archaic sites tend to be very small and produce few artifacts, most of which are not temporally diagnostic. While Early Archaic sites in other portions of the United States are represented by projectile points of the Kirk series (Ritchie and Funk 1973) and by Kanawha types (Coe 1964), sites of this age in southern New England are identified on the basis of a series of ill-defined bifurcate-based projectile points. These projectile points are identified by the presence of their characteristic bifurcated base, and they generally are made from high quality raw materials. Moreover, finds of these projectile points have rarely been in stratified contexts. Rather, they occur commonly either as surface expressions or intermixed with artifacts representative of later periods. Early Archaic occupations, such as the Dill Farm Site and Sites 6LF64 and 6LF70 in Litchfield County, are represented by camps that were relocated periodically to take advantage of seasonally available resources (McBride 1984; Pfeiffer 1986). In this sense, a foraging type of settlement pattern was employed during the Early Archaic Period.

Another localized cultural tradition, the Gulf of Maine Archaic, which lasted from ca. 9,500 to 6,000 14C BP, is beginning to be recognized in Southern New England (Petersen and Putnam 1992). It is distinguished by its microlithic industry, which may be associated with the production of compound tools (Robinson and Peterson 1993). Assemblages from Maine (Petersen et al. 1986; Petersen 1991; Sanger et al. 1992), Massachusetts (Strauss 2017; Leslie et al. 2022), and Connecticut (Forrest 1999) reflect the selection of local, coarse-grained stones. Large choppers and hoe-like forms from southeastern Connecticut's Sandy Hill Site likely functioned as digging implements. Woodworking tools, including adzes, celts, and gull-channeled gouges recovered at the Brigham and Sharrow sites in Maine (Robinson and Petersen 1993: 68), may have been used for dugout canoe manufacture. The deeply stratified Sandy Hill (Forrest 1999; Jones and Forrest 2003) and Sharrow sites (Petersen 1991), with their overlapping lenses of "black sand" floor deposits, suggest intensive site re-occupations according to an adaptation that relied, in part, on seasonally available wetland resources. Thus far, sites from this tradition have only been identified within coastal and near-coastal territories along the Gulf of Maine, in southeastern Connecticut, and in Massachusetts.

Middle Archaic Period (8,000 to 6,000 B.P.)

By the onset of the Middle Archaic Period modern deciduous forests had developed in the region (Davis 1969). Increased numbers and types of sites associated with this period are noted in Connecticut (McBride 1984). The most well-known Middle Archaic site in New England is the Neville Site in Manchester, New Hampshire studied by Dincauze (1976). Careful analysis of the Neville Site indicated that the Middle Archaic occupation dated from between 7,700 and 6,000 years ago. In fact, Dincauze obtained several radiocarbon dates from the Middle Archaic component of the Neville Site associated with the then-newly named Neville type projectile point, ranging from 7,740$\pm$280 and 7,015$\pm$160 B.P. (Dincauze 1976).

In addition to Neville points, Dincauze (1976) described two other projectile points styles that are attributed to the Middle Archaic Period: Stark and Merrimac projectile points. While no absolute dates were recovered from deposits that yielded Stark points, the Merrimac type dated from 5,910±180 B.P. Dincauze argued that both the Neville and later Merrimac and Stark occupations were established to take advantage of the excellent fishing that the falls situated adjacent to the site area would have afforded Native American groups. Thus, based on the available archaeological evidence, the Middle Archaic Period is characterized by continued increases in diversification of tool types and resources exploited, as well as by sophisticated changes in the settlement pattern to include different site types, including both base camps and task-specific sites (McBride 1984:96).

Late Archaic Period (6,000 to 3,700 B.P.)

The Late Archaic Period in southern New England is divided into two major cultural traditions that appear to have coexisted. They include the Laurentian and Narrow-Stemmed Traditions (Funk 1976; McBride 1984; Ritchie 1969a and b). Artifacts assigned to the Laurentian Tradition include ground stone axes, adzes, gouges, ulus (semi-lunar knives), pestles, atlatl weights, and scrapers. The diagnostic projectile point forms of this time period in southern New England include the Brewerton Eared-Notched, Brewerton Eared and Brewerton Side-Notched varieties (McBride 1984; Ritchie 1969a; Thompson 1969). In general, the stone tool assemblage of the Laurentian Tradition is characterized by flint, felsite, rhyolite, and quartzite, while quartz was largely avoided for stone tool production.

In terms of settlement and subsistence patterns, archaeological evidence in southern New England suggests that Laurentian Tradition populations consisted of groups of mobile hunter-gatherers. While a few large Laurentian Tradition occupations have been studied, sites of this age generally encompass less than 500 m^2 (5,383 ft^2). These base camps reflect frequent movements by small groups of people in search of seasonally abundant resources. The overall settlement pattern of the Laurentian Tradition was dispersed in nature, with base camps located in a wide range of microenvironments, including riverine as well as upland zones (McBride 1978, 1984:252). Finally, subsistence strategies of Laurentian Tradition focused on hunting and gathering of wild plants and animals from multiple ecozones.

The second Late Archaic tradition, known as the Narrow-Stemmed Tradition, is unlike the Laurentian Tradition, and it likely represents a different cultural adaptation. The Narrow-Stemmed tradition is recognized by the presence of quartz and quartzite narrow stemmed projectile points, triangular quartz Squibnocket projectile points, and a bipolar lithic reduction strategy (McBride 1984). Other tools found in Narrow-Stemmed Tradition artifact assemblages include choppers, adzes, pestles, antler and bone projectile points, harpoons, awls, and notched atlatl weights. Many of these tools, notably the projectile points and pestles, indicate a subsistence pattern dominated by hunting and fishing, as well the collection of a wide range of plant foods (McBride 1984; Snow 1980:228).

Terminal Archaic Period (3,700 to 2,700 B.P.)

The Terminal Archaic, which lasted from ca., 3,700 to 2,700 BP, is perhaps the most interesting, yet confusing of the Archaic Periods in southern New England precontact period. Originally termed the "Transitional Archaic" by Witthoft (1953) and recognized by the introduction of technological innovations, e.g., broadspear projectile points and soapstone bowls, the Terminal Archaic has long posed problems for regional archeologists. While the Narrow-Stemmed Tradition persisted through the Terminal Archaic and into the Early Woodland Period, the Terminal Archaic is coeval with what appears to be a different technological adaptation, the Susquehanna Tradition (McBride 1984; Ritchie 1969b). The Susquehanna Tradition is recognized in southern New England by the presence of a new stone tool industry that was based on the use of high-quality raw materials for stone tool production and a

settlement pattern different from the "coeval" Narrow-Stemmed Tradition.

The Susquehanna Tradition is based on the classification of several Broadspear projectile point types and associated artifacts. There are several local sequences within the tradition, and they are based on projectile point type chronology. Temporally diagnostic projectile points of these sequences include the Snook Kill, Susquehanna Broadspear, Mansion Inn, and Orient Fishtail types (Lavin 1984; McBride 1984; Pfeiffer 1984). The initial portion of the Terminal Archaic Period (ca., 3,700-3,200 BP) is characterized by the presence of Snook Kill and Susquehanna Broadspear projectile points while the latter Terminal Archaic (3,200-2,700 BP) is distinguished by Orient Fishtail projectile points (McBride 1984:119; Ritchie 1971).

In addition, it was during the late Terminal Archaic that interior cord marked, grit tempered, thick-walled ceramics with conoidal (pointed) bases made their initial appearance in the Native American toolkit. These are the first ceramics in the region, and they are named Vinette I (Ritchie 1969a; Snow 1980:242); this type of ceramic vessel appears with much more frequency during the ensuing Early Woodland Period. In addition, the adoption and widespread use of soapstone bowls, as well as the implementation of subterranean storage, suggests that Terminal Archaic groups were characterized by reduced mobility and longer-term use of established occupation sites (Snow 1980:250).

Finally, while settlement patterns appeared to have changed, Terminal Archaic subsistence patterns were analogous to earlier patterns. The subsistence pattern was still diffuse in nature, and it was scheduled carefully. Typical food remains recovered from sites of this period consist of fragments of white-tailed deer, beaver, turtle, fish, and various small mammals. Botanical remains recovered from the site area consisted of *Chenopodium* sp., hickory, butternut, and walnut (Pagoulatos 1988:81). Such diversity in food remains suggests at least minimal use of a wide range of microenvironments for subsistence purposes.

Woodland Period (2,700 to 350 B.P.)

Traditionally, the advent of the Woodland Period in southern New England has been associated with the introduction of pottery; however, as mentioned above, early dates associated with pottery now suggest the presence of Vinette I ceramics appeared toward the end of the preceding Terminal Archaic Period (Ritchie 1969a; McBride 1984). Like the Archaic Period, the Woodland Period has been divided into three subperiods: Early, Middle, and Late Woodland. The various subperiods are discussed below.

<u>Early Woodland Period (ca., 2,700 to 2,000 B.P.)</u>

The Early Woodland Period of the northeastern United States dates from ca., 2,700 to 2,000 B.P., and it was thought to have been characterized by the advent of farming, the initial use of ceramic vessels, and increasingly complex burial ceremonialism (Griffin 1967; Ritchie 1969a and 1969b; Snow 1980). In the Northeast, the earliest ceramics of the Early Woodland Period are thick walled, cord marked on both the interior and exterior, and possess grit temper. Archaeological investigations of Early Woodland sites in southern New England resulted in the recovery of narrow stemmed projectile points in association with ceramic sherds and subsistence remains, including specimens of White-tailed deer, soft and hard-shell clams, and oyster shells (Lavin and Salwen: 1983; McBride 1984:296-297; Pope 1952). McBride (1984) has argued that the combination of the subsistence remains and the recognition of multiple superimposed cultural features at various sites indicates that Early Woodland Period settlement patterns were characterized by multiple re-use of the same sites on a seasonal basis by small co-residential groups.

Middle Woodland Period (2,000 to 1,200 B.P.)

The Middle Woodland Period is marked by an increase in the number of ceramic types and forms utilized (Lizee 1994a), as well as an increase in the amount of exotic lithic raw material used in stone tool manufacture (McBride 1984). The latter suggests that regional exchange networks were established, and that they were used to supply local populations with necessary raw materials (McBride 1984; Snow 1980). The Middle Woodland Period is represented archaeologically by narrow stemmed and Jack's Reef projectile points; increased amounts of exotic raw materials in recovered lithic assemblages, including chert, argillite, jasper, and hornfels; and conoidal ceramic vessels decorated with dentate stamping. Ceramic types that are indicative of the Middle Woodland Period include Linear Dentate, Rocker Dentate, Windsor Cord Marked, Windsor Brushed, Windsor Plain, and Hollister Stamped (Lizee 1994a:200).

In terms of settlement patterns, the Middle Woodland Period is characterized by the occupation of village sites by large co-residential groups that utilized native plant and animal species for food and raw materials in tool making (George 1997). These sites were the principal place of occupation, and they were positioned close to major river valleys, tidal marshes, estuaries, and the coastline, all of which would have supplied an abundance of plant and animal resources (McBride 1984:309). In addition to villages, numerous temporary and task-specific sites were utilized in the surrounding upland areas, as well as in closer ecozones such as wetlands, estuaries, and floodplains. The use of temporary and task-specific sites to support large village populations indicates that the Middle Woodland Period was characterized by a resource acquisition strategy that can best be termed as logistical collection (McBride 1984:310).

Late Woodland Period (ca., 1,200 to 350 B.P.)

The Late Woodland Period in southern New England dates from ca., 1,200 to 350 B.P., and it is characterized by the earliest evidence for the use of corn in the lower Connecticut River Valley (Bendremer 1993; Bendremer and Dewar 1993; Bendremer et al. 1991; George 1997; McBride 1984); an increase in the frequency of exchange of non-local lithics (Feder 1984; George and Tryon 1996; McBride 1984; Lavin 1984); increased variability in ceramic form, function, surface treatment, and decoration (Lavin 1980, 1986, 1987; Lizee 1994a, 1994b); and a continuation of a trend towards larger, more permanent settlements in riverine, estuarine, and coastal ecozones (Dincauze 1974; McBride 1984; Snow 1980).

Stone tool assemblages associated with Late Woodland occupations, especially village-sized sites, are functionally variable and they reflect plant and animal resource processing and consumption on a large scale. Finished stone tools recovered from Late Woodland sites include Levanna and Madison projectile points; drills; side-, end-, and thumbnail scrapers; mortars and pestles; nutting stones; netsinkers; and celts, adzes, axes, and digging tools. These tools were used in activities ranging from hide preparation to plant processing to the manufacture of canoes, bowls, and utensils, as well as other settlement and subsistence-related items (McBride 1984; Snow 1980). Finally, ceramic assemblages recovered from Late Woodland sites are as variable as the lithic assemblages. Ceramic types identified include Windsor Fabric Impressed, Windsor Brushed, Windsor Cord Marked, Windsor Plain, Clearview Stamped, Sebonac Stamped, Selden Island, Hollister Plain, Hollister Stamped, and Shantok Cove Incised (Lavin 1980, 1988a, 1988b; Lizee 1994a; Pope 1953; Rouse 1947; Salwen and Ottesen 1972; Smith 1947). These types are more stylistically diverse than their predecessors with incision, shell stamping, punctation, single point, linear dentate, rocker dentate stamping, and stamp and drag impressions common (Lizee 1994a:216).

Summary of Connecticut's Precontact Era

The precontact period of Connecticut spans from ca. 13,000 to 350 B.P., and it is characterized by numerous changes in tool types, subsistence patterns, and land use strategies. Much of this era is characterized by local Native American groups who practiced a subsistence pattern based on a mixed economy of hunting and gathering plant and animal resources. It is not until the Late Woodland Period that incontrovertible evidence for the use of domesticated species is available. Further, settlement patterns throughout the precontact period shifted from seasonal occupations of small co-residential groups to large aggregations of people in riverine, estuarine, and coastal ecozones. In terms of the region that includes the proposed project area, a variety of precontact era site types may be expected, ranging from seasonal camps utilized by Paleo-Indian and Archaic populations to temporary and task-specific sites of the Woodland era.

CHAPTER IV
POST-EUROPEAN
CONTACT PERIOD OVERVIEW

Introduction

The proposed Facility is located on an 11.64 acre parcel of land at 410 Denslow Hill Road in the Town of Hamden, which is situated in New Haven County, Connecticut. Originally part of New Haven Colony, the Town of Hamden was incorporated in 1786. Most Connecticut towns, including Hamden, originated as Native American settlements and later became English colonial villages. The Town of Hamden first developed as an agrarian community and industrial area but by the twentieth century it grew into a suburban center with substantial commercial development. This chapter presents an overview of New Haven County followed by a history of the Town of Hamden with a focus on the Facility area.

New Haven County

New Haven was one of the four original counties established in 1666 following the merger of Connecticut Colony and New Haven Colony (Van Dusen 1961). Located in southern Connecticut, it is bounded to the south by Long Island Sound, to the east by Middlesex County, to the north by Hartford and Litchfield Counties, and to the west by Fairfield County and is the fifth-largest county in Connecticut by total area. New Haven Colony's landscape includes rich farmland, upland regions to the north, significant freshwater rivers, and an extended shoreline on Long Island Sound. Important waterways associated with New Haven County include the Hammonasset, East, West, Farm, Quinnipiac, Mill, Oyster, Indian, and Wepawaug Rivers (Rockey 1892). The shoreline also has many smaller rivers, harbors, islands, and inlets. The county's three largest cities are New Haven, Waterbury, and Meriden. Other important population centers are located at West Haven, Milford, and Ansonia (Connecticut 2023). The Town of Hamden is bounded to the north by Cheshire and Wallingford, to the east by North Haven and the Quinnipiac River, to the south by New Haven, and to the west by Woodbridge and Bethany. Several significant mountains and ranges composed of trap rock are located within the town including the West Rock range with several of its hills resembling a man on his back known as "The Sleeping Giant" formation. Another formation referred to as East Ridge runs along the eastern end of town along with the Mill River which is dammed at the southern end of Hamden forming Lake Whitney. Wilmont Brook runs through the center of town while Belden Brook and Wintergreen Brook are found in the western part of Hamden (Lambert 1838; Rockey 1892).

Woodland Period to Seventeenth Century

During the Woodland Period of northeastern North American history (ca., 3,000 to 500 years ago), the Indigenous peoples who resided in what is now Connecticut were part of the greater Algonquian culture of northeastern North America (Lavin 2013). They spoke local variations of Southern New England Algonquian languages and resided in extended kinship groups on lands they maintained for a variety of horticultural and resource extraction purposes (Goddard 1978). Native people in the region practiced subsistence activities including hunting, fowling, and fishing, along with the cultivation of various crops, the most important of which were maize, squash, and beans. They supplemented these foods seasonally by collecting shellfish, fruits, and plants during warmer periods, and gathering nuts, roots, and tubers during colder times (Lavin 2013). In addition, these communities came together in large groups to hunt deer in the fall and winter. Indigenous peoples lived with their immediate or extended families in large settlements, often concentrated along rivers and/or wetlands. Some villages were fortified by wooden palisades. Their habitation, known as a *weetu* or *wigwam,* was generally constructed of a tree sapling

frame and covered in reed matting during warm months, and tree bark throughout the winter. These varied in size from a small, individual dwelling, to an expansive "long house," which could accommodate several families. Native communities commonly traded among their immediate neighbors and often maintained long-distance networks as well (Lavin 2013). At the time of the arrival of Europeans, some of the prominent Native nations within the present-day bounds of New Haven County included the Paugussett, Quinnipiac, Tunxis, and Wangunk people. These groups were closely connected through kinship, culture, language, and trade. The area that is now Hamden was part of the Quinnipiac homeland, which ran along the shoreline from parts of West Haven to New Haven, East Haven, Branford, North Branford, Guilford, and Madison but also included the towns of Wallingford, Hamden, Woodbridge, Bethany, and parts of Prospect and Cheshire (De Forest 1852; Lavin 2013).

Seventeenth Century through Eighteenth Century

As Native communities maintained oral tradition rather than a written record, most surviving information of the Indigenous people of present-day Connecticut was recorded by European observers (Lavin 2013). The earliest Europeans known to have entered Long Island Sound, the Connecticut River, and the western Connecticut shoreline were the Dutch around 1611 (Rockey 1892). The Dutch established trade relationships with Native people of the area, among which included the Pequot in what is now southeastern Connecticut and likely the Quinnipiac and Paugussett in present-day New Haven County. By 1624, the Dutch West India Company formally established the colony of New Netherland centered around Manhattan and the Hudson River, but its eastern bounds extended as far as Cape Cod, which included present-day New Haven County (Jacobs 2009). Through their relationship with the Dutch, the Pequot had steady access to a variety of European trade goods. They extended their dominance over the Connecticut shoreline, eastern Long Island, and the lower Connecticut River Valley, bringing all the Native nations in those areas, including the Quinnipiac, into a tributary relationship under their leadership (Hauptman and Wherry 2009; McBride 2013).

Increased European interaction resulted in exposure to diseases and epidemics Indigenous people had never encountered and to which they had no natural immunity. Illnesses such as smallpox, measles, tuberculosis, and cholera devastated Native communities. In 1633, an epidemic spread through the region impacting the Pequot and may have affected the Quinnipiac as well. Tensions between Native and European groups laying claim to the Connecticut River resulted in the death of several English traders between 1634 and 1636, which colonists blamed on the Pequot. In retaliation, English forces from Massachusetts Bay destroyed Pequot and Niantic villages on the Pequot (Thames) River in August 1636, which began the Pequot War. Connecticut Colony declared war on the Pequot and was joined by Native warriors from the Connecticut River and Mohegans under the Sachem Uncas (Oberg 2006). Numerous clashes took place until 1637, when English forces pursued Pequot refugees west through present-day New Haven County. In July 1637, the Pequot were defeated in present-day Fairfield and the war soon came to an end. After the war, the Connecticut English claimed Pequot territory as conquered lands for their newly established colony (Cave 1996).

Massachusetts Bay veterans of the Quinnipiac Campaign reported on the rich lands west of the Connecticut River and by September 1637, men were sent to survey the coast for settlement. Land near Quinnipiac Harbor and the nearby Quinnipiac River was selected as the site of a future colony. Settlers from Massachusetts returned to Quinnipiac in April of 1638 under the leadership of the Reverend John Davenport where they negotiated with the Sachem Momaugin for land to settle on. Soon after New Haven Colony was founded, and lands were reserved on the east side of the river for the Quinnipiac (Rockey 1892). By 1643, the colony consisted of the towns of New Haven, Milford, Guilford, Branford, and Stamford which developed around agriculture with New Haven harbor serving as the link to

maritime trade. Continued colonial encroachments forced the Indigenous population to relinquish more of their land. Some members of the Quinnipiac tribe moved north to what is now Waterbury and Farmington as well as west to New York. Others continued to live with other Native communities or worked as laborers in English towns and cities (Grant-Costa 2021).

Eighteenth through Twenty-first Century

The area that later became Hamden was not settled by English colonists until 1735, when Jonathan Ives built a home near the Mill River (Rockey 1892). This area was located within the northern bounds of New Haven and developed into a small farming community with two different church societies known as Mount Carmel and East Plains (Lambert 1838). Slavery existed in New Haven County since the seventeenth century and by the eighteenth century it was primarily practiced by wealthy families, merchants, and ministers in larger towns including New Haven. The 1774 Connecticut colonial census recorded a "White" population of 7,749, an African American population of 262, and 11 Native Americans in the Town of New Haven, although it does not state the number of enslaved individuals and it is impossible to determine the number of slaves in the northern part of town which became present-day Hamden (Hoadly 1887).

During the American Revolution (1775-1783), Connecticut played an important role in the process of recruiting soldiers, supplying food stores, and providing a variety of military goods for the war effort. The British occupation of New York City beginning in 1776, led Connecticut officials to fear attacks on the western shoreline, including the City of New Haven due to the proximity to the British. Throughout the war, the Connecticut shoreline suffered from raids from Long Island-based loyalists. In 1779, several western Connecticut shoreline towns were invaded in what became known as "Tryon's Raid." British troops looted and set fire to the towns and men from present-day Hamden mobilized and suffered some casualties in defense of the town (Lambert 1838; Van Dusen 1961). After the Revolution, Connecticut recovered from wartime economic disruptions thanks to its robust agricultural production and maritime trade while quarrying occurred in areas along East Rock (Barber 1836). By 1784 the State of Connecticut passed a gradual manumission law, but slavery was not fully abolished until 1848 (Normen 2013). In May 1786 the General Assembly incorporated Hamden as a distinct town formed from the northern sections of New Haven (Barber 1836; Rockey 1892). On January 9, 1788, Connecticut ratified the U.S. Constitution to become the fifth state (Van Dusen 1961). In the late 1780s, a log dam was built across the Mill River for early industrial power and by 1798 Eli Whitney bought the site and improved the dam for his firearms manufactory where he produced arms for the federal government (Rockey 1892). As of 1790, Hamden had 1,422 residents (Rockey 1892; Connecticut 2024a). In 1798 the Hartford and New Haven Turnpike Company constructed north from New Haven through Hamden which became a major route of transportation between the city and Hartford (Rockey 1892).

By the early nineteenth century Hamden's population grew modestly to 1,482 residents and remained an agricultural community closely connected to the markets in neighboring New Haven (Rockey 1892; Connecticut 2024a). By the 1810s, the Industrial Revolution began to take root in New Haven County with the introduction of water-powered textile mills running through rural towns. This included the Whitney Arms Manufactory around which a factory town quickly emerged which became known as the Village of Whitneyville (Barber 1836; Latham 1838). In the early 1820s a canal was constructed between New Haven and Farmington which ran through Hamden bringing shipping through the town although it quickly proved unprofitable and ceased operation around 1845 (Rockey 1892; DeLuca 2011). By 1836, the Town of Hamden was reported to have a spring manufacturer, a carriage factory, a brass foundry, and a paper mill in addition to the Whitney Armory (Barber 1836). The town continued to be industrialized due to its ample waterpower, proximity to the City of New Haven, and the existence of

other manufacturers. In 1845 the Candee Rubber Works were founded in Hamden and in 1857 the Hamden Auger Company was formed (Rockey 1892). Hamden, like many Connecticut towns, provided men and resources during the conflict including 245 men who served in the Union army (Hines 2002). During the war the Whitneyville Armory received two contracts with the State of Connecticut to produce thousands of firearms for state forces (Naumec 2005). Following the Civil War, much of the State continued to rapidly industrialize, as did Hamden, which brought hundreds of immigrant laborers to town from countries such as Italy and Ireland. In 1875, silk mills were established in town followed by a wood working factory in 1879 and sewing machine needle manufacturer by 1890 (Rockey 1892). Finally, in 1888 Hamden constructed a Town Hall and before the end of the century, Hamden's population had grown to 3,882 residents (Hartley 1962; Table 1).

Table 1: Population of Hamden, New Haven County, Connecticut, 1890-2020 (Connecticut 2024b-d; USCB 2024)

Town	1890	1900	1910	1920	1930	1940	1950
Town of Hamden, New Haven County, Connecticut	3,882	4,626	5,850	8,611	19,020	23,373	29,715
	1960	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
	41,056	49,357	51,071	52,434	56,913	60,960	61,169

Throughout the twentieth century, Hamden continued to develop rapidly and became more suburbanized. Much of the early population growth was due to an influx of immigrants attracted to industrial work in most New Haven County towns and cities. Like towns throughout the United States, Hamden contributed personnel and resources during the First World War and in the subsequent influenza outbreak of 1918, Hamden was impacted, especially due to its proximity to New Haven. New Haven County and Middlesex County faced the highest death rates from the flu, second only to New London County where the outbreak first took place (Winslow and Rogers 1920). Despite these changes and challenges associated with modernization in the early twentieth century, manufacturing in Hamden progressed and the town continued to grow. After 1920 the Spring Glen area of town developed into a residential area which attracted many New Haven residents to this early suburban development and between 1920 and 1930 the town's population spiked from 8,611 people to 19,020 residents (Becker and Sachse 1986; Table 1). By 1924, the natural trap rock ridge known as "the Sleeping Giant" became a popular tourist destination for hikers and picnickers (Hulten 2019).

By 1950, the town had 29,715 residents as the population increased dramatically due to the post-World War II 'baby boom,' the suburbanization trend facilitated by the rise of the automobile. Hamden's population more than doubled over the 20 years since 1950 and by 1970, the town had 49,357 residents (Table 1). In 1966 Quinnipiac College moved from its New Haven campus to Hamden at the foot of Sleeping Giant State Park and in 2000 it changed its name to Quinnipiac University (Quinnipiac University 2024). As of the early twenty-first century, growth had continued steadily in Hamden and the town was largely considered a suburban community with significant industrial and commercial zones and as of 2020, Hamden had 61,169 inhabitants (Table 1). Health care was the largest employment sector in town followed by Educational Services and Retail Trade with key employers including Arden House, Quinnipiac University, and a Healthcare and Rehabilitation Center (AdvanceCT and CTData Collaborative 2023). Although the Town of Hamden has developed into a suburban community it still retains aspects of its agricultural and industrial past.

History of the Project Area

The proposed Facility is located is located in the central portion of Hamden, Connecticut. According to Smith's 1856 New Haven County map, the proposed Facility area is located in the area that was then north of the Hamden Plains portion of town; it is located directly to the west of an unlabeled stream and to the west of a rail line with more densely populated areas. The nearest property owner at that time was J.P. Keep, likely John P. Keep, a Massachusetts born farmer (Figure 4; USCB 1870). Beers' 1868 New Haven County map shows that J.P. Keep still retained the property nearest the Facility within what was then noted as District Number 12 in Hamden (Figure 5). While this map shows the stream passing directly through the Facility, this is likely an inaccuracy of the map and not indicative of the presence of the stream on the project parcel.

Aerial photography shows the transition of the landscape in Hamden from largely rural and agricultural to a wooded environment with suburban neighborhoods with single-family homes. An aerial photograph from 1934, the first year in which such images were available, shows that the Facility is located on what was two lots of land that appeared to be under cultivation (Figure 6). To the west of the project parcel was the Wilmot Brook, likely the stream noted in the earlier maps, though not in the position as the older maps were likely imprecise. The greater environment surrounding the Facility was comprised of agricultural plots. By 1951 much of the project parcel had become reforested (Figure 7). Significant changes were also evident by 1970. A utility corridor was constructed to the south of the proposed Facility and it comprised the southern border of the project parcel (Figure 8). In addition, single-family homes were present along Denslow Hill Road, including near the interconnect for the Facility. Further to the north, a densely settled group of homes was also present. The project parcel itself remained wooded.

Further residential development in the vicinity of the proposed Facility is visible on the aerial photo dating from 2004. Whereas the project parcel was still wooded, the areas directly to the north and east of the Facility contained residential neighborhoods and cul-de-sacs lined with single-family homes and apartments (Figure 9). To the west of the project parcel, along the Wilmot Brook, a small pond had been formed and the track for Sacred Heart Academy was also visible further to the south. A 2019 aerial image of the project parcel shows few additional changes to the area (Figure 10).

Conclusions

The documentary of the proposed project parcel area indicates that the proposed Facility area has the potential to be associated with cultural resources. In the portion that was agricultural fields, there is the possibility of encountering evidence of post-European Contact period farming activities that may be important as a component of a rural historic landscape (*sensu* McClelland et al. 1999). Any resources found could be significant for their research potential in understanding New England farming practices. Finally, the proximity of the project area to the Wilmot Brook suggests the possibility of cultural resources related to post-European Contact period riverine activities.

CHAPTER V
PREVIOUS INVESTIGATIONS

Introduction

This chapter presents an overview of previous cultural resources research completed within the vicinity of the proposed Facility in Hamden, Connecticut. This discussion provides the comparative data necessary for assessing the results of the Phase IA cultural resources assessment survey, and it ensures that the potential impacts to all previously recorded cultural resources located within and adjacent to the Facility are taken into consideration. Specifically, this chapter reviews previously identified archaeological sites, and National/State Register of Historic Places properties situated in the project region (Figures 11 and 12). The discussions presented below are based on information currently on file at the CT-SHPO in Hartford, Connecticut. In addition, the electronic site files maintained by Heritage were examined during this investigation. Both the quantity and quality of the information contained in the original cultural resources survey reports and State of Connecticut archaeological site forms are reflected below.

Previously Recorded Archaeological Sites, and National/State Register of Historic Places Properties/Districts in the Vicinity of the Facility

A review of data currently on file at the CT-SHPO, as well as the electronic site files maintained by Heritage, revealed that there is a single previously identified precontact era archaeological site (62-1), one National Register of Historic Places property, and four State Register of Historic Places properties located within 1.6 kilometers (1 mile) of the proposed Facility (Figures 11 and 12). These cultural resources are briefly discussed below.

Site 62-1

Site 62-1, which is also known as the Dunbar Site, is located to the west of the project parcel in Hamden, Connecticut (Figure 11). The Dunbar Site was recorded in April of 1979 by the Connecticut Archeological Society (CAS) and it was described as a Woodland/Contact period site. CAS noted that a single grinding mortar was discovered by a road crew in 1941; that was the only evidence to characterize the site as a "fairly large Indian campsite." Site 62-1 has not been assessed applying the qualities of significance as defined by the National Register of Historic Places criteria for evaluation (36 CFR 60.4 [a-d]) and will not be impacted by the proposed construction.

Hamden High School

Hamden High School was listed on the National Register of Historic Places on December 12, 1994. This three-story, Colonial Revival style brick structure with a hip roof was constructed in 1935; it is located at 2040 Dixwell Avenue in Hamden, Connecticut (Figure 12). Hamden High School was the first school to offer the children of Hamden a secondary education and it was the largest public facility in town at the time. Prior to its establishment, students attended high school in the neighboring city of New Haven. At the time it was listed on the National Register of Historic Places, the school was described as having not been altered since 1935, aside from some modern additions to the rear of the structure. It was noted that the inside of the school's lobby was painted with murals detailing foliage, landscape features of Hamden, and the seals of the United States and Connecticut all dating from the late eighteenth-century to early nineteenth century. Hamden High School is located approximately 1.6 kilometers (1 mile) to the southeast of the project parcel and will not be impacted by the proposed Facility.

Jared Basset House

The Jared Basset House is located at 2 Dixwell Avenue in Hamden, Connecticut (Figure 12). It was listed on the Connecticut State Register of Historic Places (SRHP) by John L. Beringer in September of 1966. The date of construction is unknown; however, it is noted that the house had been moved and heavily modified prior to being recorded. At the time it was listed, the house was described as having a center chimney with a nine windows across the front façade. The windows were noted as having fine moulded window heads treated with Georgian brackets. The main cornice was treated with brackets and was carried around the ends to form a pediment. The small entrance hall has a Colonial location for the staircase. Other characteristics of the Jared Basset House include ionic columns, elaborate sunbursts, and egg and dart mouldings. The Jared Basset House is located approximately 1.6 kilometers (1 mile) to the east of the project parcel; no to it are anticipated as a result of the proposed construction.

Henry Mix, Hezekiah Warner, and Lewis Warner Houses

The Henry Mix House, Hezekiah Warner House, and Lewis Warner House are residences that are listed as State Register of Historic Places properties; however, it is unknown when they were listed, and there are no available forms that provide exact locational and/or descriptive data. The Henry Mix House and Hezekiah Warner House are located approximately 875 meters (0.54 miles) to the southwest of the project area, and the Lewis Warner House is located approximately 1.6 kilometers (1 mile) to the west of the project parcel. It is not anticipated that any of these properties will be impacted as a result of the proposed construction.

CHAPTER VI
METHODS

Introduction

This chapter describes the research design and field methodology used to complete the Phase IA cultural resources assessment survey of the project area in Hamden, Connecticut. The following tasks were completed during this investigation: 1) study of the region's precontact, post-European Contact period, and natural settings, as presented in Chapters II through IV; 2) a literature search to identify and discuss previously recorded cultural resources in the region; 3) a review of maps, topographic quadrangles, and aerial imagery depicting the project parcel and Facility in order to identify potential post-European Contact period resources and/or areas of past disturbance; and 4) pedestrian survey and photo-documentation of the project parcel and Facility in order to determine their archaeological sensitivity. These methods are in keeping with those required by the Connecticut State Historic Preservation Office in the document entitled: *Environmental Review Primer for Connecticut's Archaeological Resources* (Poirier 1987).

Research Framework

The current Phase IA cultural resources assessment survey was designed to assess the archaeological sensitivity of the project parcel and Facility, as well as to visually examine the development area for any previously unidentified cultural resources during pedestrian survey. The undertaking was comprehensive in nature, and project planning considered the distribution of previously recorded cultural resources located within the region, as well as a visual assessment of the project parcel and Facility. The methods used to complete this investigation were designed to provide coverage of all portions of the project parcel and Facility. The fieldwork portion of this undertaking entailed pedestrian survey, photo-documentation, and mapping (see below).

Archival Research & Literature Review

Background research for this survey included a review of a variety of maps depicting the project parcel and Facility; an examination of USGS 7.5' series topographic quadrangles; an examination of aerial images dating from 1934 through 2019; and a review of all archaeological sites and National and State Register of Historic Places, as well as electronic cultural resources data maintained by Heritage. The intent of this review was to identify all previously recorded cultural resources situated within and immediately adjacent to the project parcel and Facility, and to provide a natural and cultural context for the region. This information then was used to develop the archaeological context of the project parcel and Facility, and to assess their sensitivity with respect to the potential for producing intact cultural resources.

Background research materials, including maps, aerial imagery, and information related to previous archaeological investigations, was gathered from the CT-SHPO. Finally, electronic databases and Geographic Information System files maintained by Heritage were employed during the course of this project, and they provided valuable data related to the region, as well as data concerning previously identified archaeological sites and National and State Register of Historic Places properties within the general vicinity of the project parcel and Facility.

Field Methodology and Data Synthesis

Heritage also performed fieldwork for the Phase IA cultural resources assessment survey. This included pedestrian survey, photo-documentation, and mapping of the project parcel and Facility, including any significant above-ground features such as stonewalls. During the completion of the pedestrian survey, representatives from Heritage photo-documented all potential areas of impact using digital media.

CHAPTER VII
RESULTS OF THE INVESTIGATION & MANAGEMENT RECOMMENDATIONS

Introduction

This chapter presents the results of the Phase IA cultural resources assessment survey of the proposed Facility in Hamden, Connecticut. As stated in the introductory section of this report, the goals of the investigation included completion of the following tasks: 1) a contextual overview of the region's precontact era, post-European Contact period, and natural settings (e.g., soils, ecology, hydrology, etc.); 2) a literature search to identify and discuss previously completed cultural resources surveys and previously recorded cultural resources in the region encompassing the project parcel and Facility area; 3) a review of readily available maps and aerial imagery depicting the project parcel and Facility in order to identify potential post-European Contact period resources and/or areas of past disturbance; and 4) pedestrian survey and photo-documentation of the project parcel and Facility in order to assess its archaeological sensitivity; and 5) preparation of the current Phase IA cultural resources assessment survey report.

Overall Sensitivity of the Proposed Project Parcel and Facility

The field data associated with soils, slopes, aspect, distance to water, and previous disturbances collected during the pedestrian survey and presented above was used in conjunction with the analysis of maps, aerial images, and data regarding previously identified archaeological sites, and National and State Register of Historic Places properties to stratify the Project parcel area into zones of no/low, moderate, and/or high archaeological sensitivity. In general, post-European Contact period archaeological sites are relatively easy to identify on the current landscape because the features associated with them tend to be relatively permanent constructions that extend above the ground surface (i.e., stone foundations, pens, wells, privies, etc.). Archaeological sites dating from the precontact era, on the other hand, are less often identified during pedestrian survey because they are buried, and predicting their locations relies more on the analysis and interpretation of environmental factors that would have informed Native American site choices.

With respect to the potential for identifying precontact era archaeological sites, the project parcel and Facility area were divided into areas of no/low, and/or moderate/high archaeological potential by analyzing the landform types, slope, aspect, soils contained within them, as well as their distance to water. In general, areas located less than 300 meters (1,000 feet) from a freshwater source and that contain slopes of less than 8 percent and well-drained soils possess a high potential for producing precontact era archaeological deposits. Those areas located between 300 and 600 meters (1,000 and 2,000 feet) from a freshwater source and well drained soils are considered moderate probability areas. This is in keeping with broadly based interpretations of precontact era settlement and subsistence models that are supported by decades of previous archaeological research throughout the region. It is also expected that there may be variability of precontact site types found in the moderate/high sensitivity zones. For example, large Woodland period village sites and Archaic period seasonal camps may be expected along large river floodplains and near stream/river confluences, while smaller temporary or task specific sites may be expected on level areas with well-drained soils that are situated more than 300 meters (1,000 feet) but less than 600 meters (2,000 feet) from a water source. Finally, steeply sloping areas, poorly drained soils, or areas of previous disturbance are generally deemed to

retain a no/low archaeological sensitivity with respect to their potential to contain precontact archaeological sites.

In addition, the potential for a given area to yield evidence of post-European Contact period archaeological deposits is based not only on the above-defined landscape features but also on the presence or absence of previously identified post-European Contact period archaeological resources as identified during previous archaeological surveys, recorded on maps, or captured in aerial images of the region under study. In this case, proposed development areas that are situated within 100 meters (328 feet) of a previously identified post-European Contact period archaeological site, a National or State Register of Historic Places district/individually listed property, or an area that contains known post-European Contact period buildings also may be deemed to retain a moderate/high archaeological sensitivity. In contrast, those areas situated over 100 meters (328 feet) from any of the above-referenced properties would be considered to retain a no/low post-European Contact period archaeological sensitivity.

Results of Phase IA Survey and Management Recommendations

Heritage personnel conducted a pedestrian survey of the proposed project parcel and Facility area in February of 2024. The pedestrian survey was supplemented by mapping and photo-documentation (Figure 12 and Photos 1 through 9). The project area is situated at elevations ranging between 52 to 75 m (170 to 245 ft) NGVD. The predominant soil types located throughout the area are Yalesville and Cheshire and Holyoke soils which are well drained loamy soils. Where they are not disturbed, these types of soils are generally well correlated with both post-European Contact period and precontact era archaeological site locations.

The results of the pedestrian survey indicate that the project parcel and the Facility are currently wooded with mature oak, maple, and beech and contain well-drained sandy soil. The landform drops gradually toward the backyards of homes facing Brook Hill Road to the north and towards the overhead electric transmission powerline corridor to the south but overall, the topography is mostly flat. Wilmont Brook runs north to south and is located less than 90 meters (300 ft) to the west of the project parcel. In addition, there is one previously identified archaeological site, Site 62-1 (Dunbar Site), a single National Register of Historic Places property (Hamden High School), and four State Register of Historic Places properties *(*Jared Basett House, Henry Mix House, Hezekiah Warner House, and Lewis Warner House) within 1.6 km (1 mi) of the project parcel. Finally, no evidence of significant previous disturbances were identified within the project parcel or Facility area during the pedestrian survey. Based on this information, the entirety of the project parcel and Facility were deemed to possess moderate/high archaeological sensitivity for intact archaeological deposits.

Finally, during the pedestrian survey, a single dry laid stonewall was identified in the center of the project area (Figure 12 and Photos 10 through 12). It bisects the project area from east to west and measures approximately 386 feet (117.6 meters) in length. It is comprised of one to three courses of angular stone and is in fair condition. The wall measures between 45 and 60 cm (1.5 to 2 ft) in height. The stone wall could not be attributed to a specific type, function, or time period.

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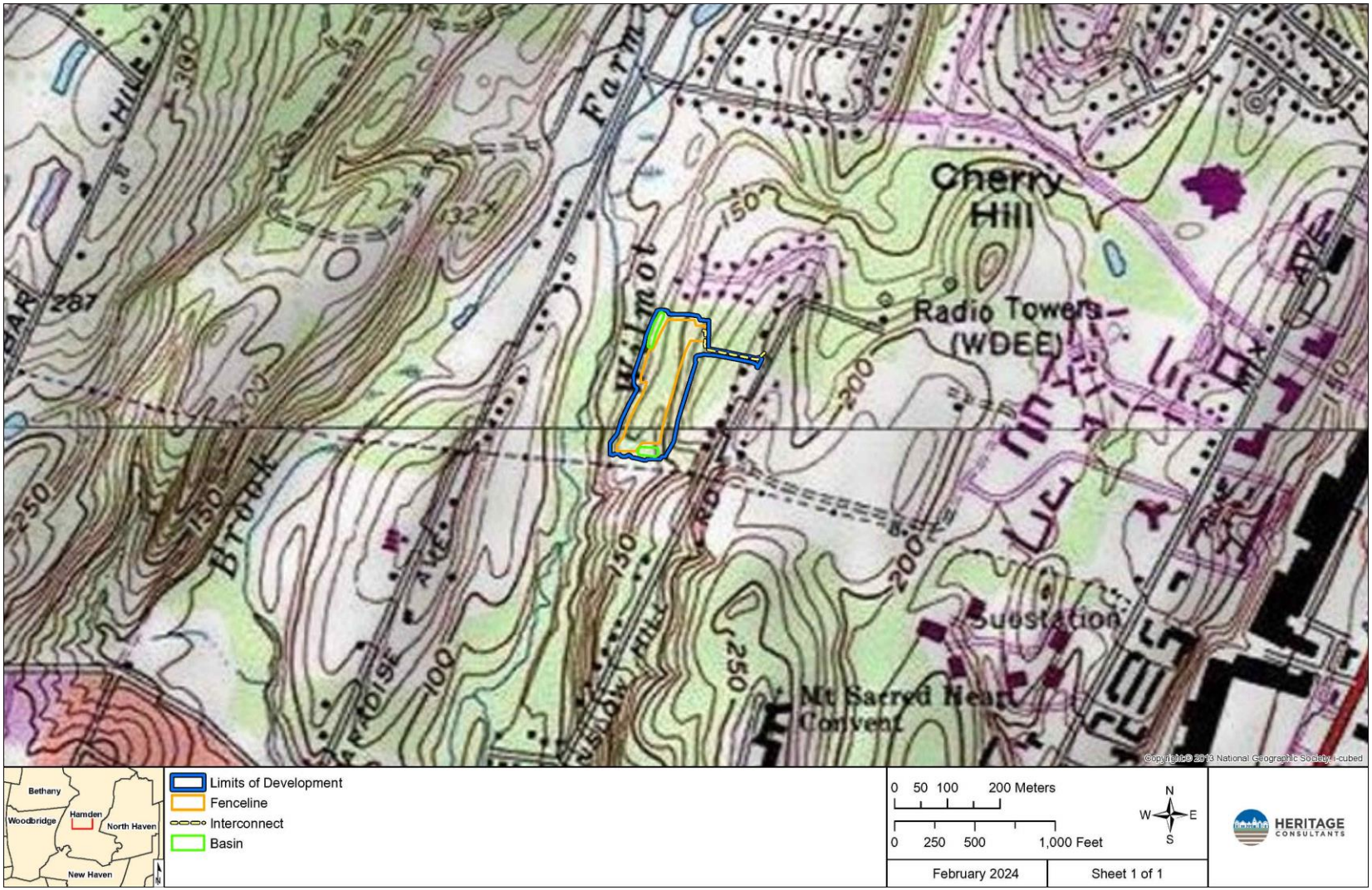


Figure 1. Excerpt from a USGS 7.5' series topographic quadrangle image showing the location of the project parcel in Hamden, Connecticut.

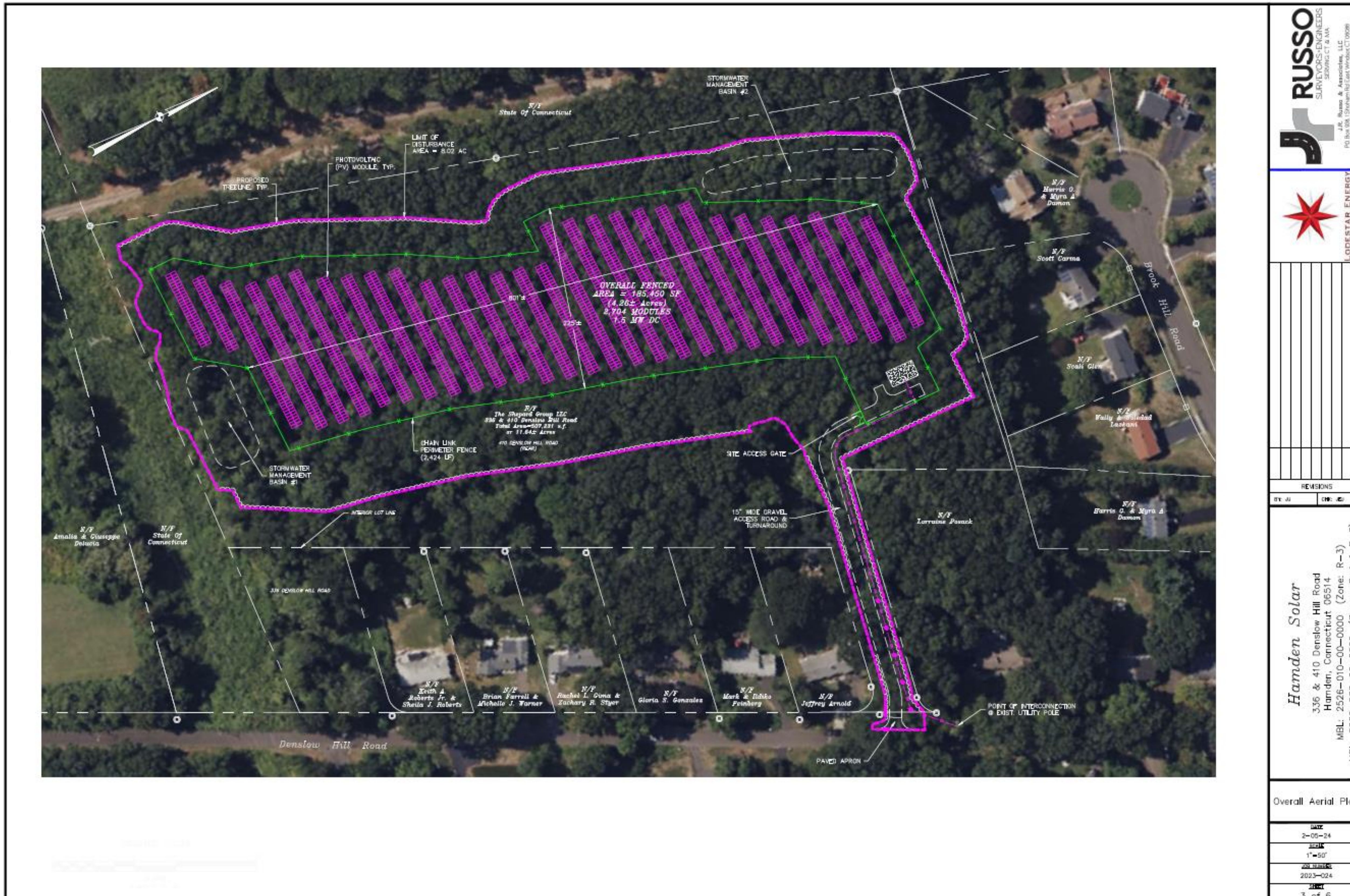


Figure 2. Proposed project plans for the solar facility at 410 Denslow Hill Road in Hamden, Connecticut.

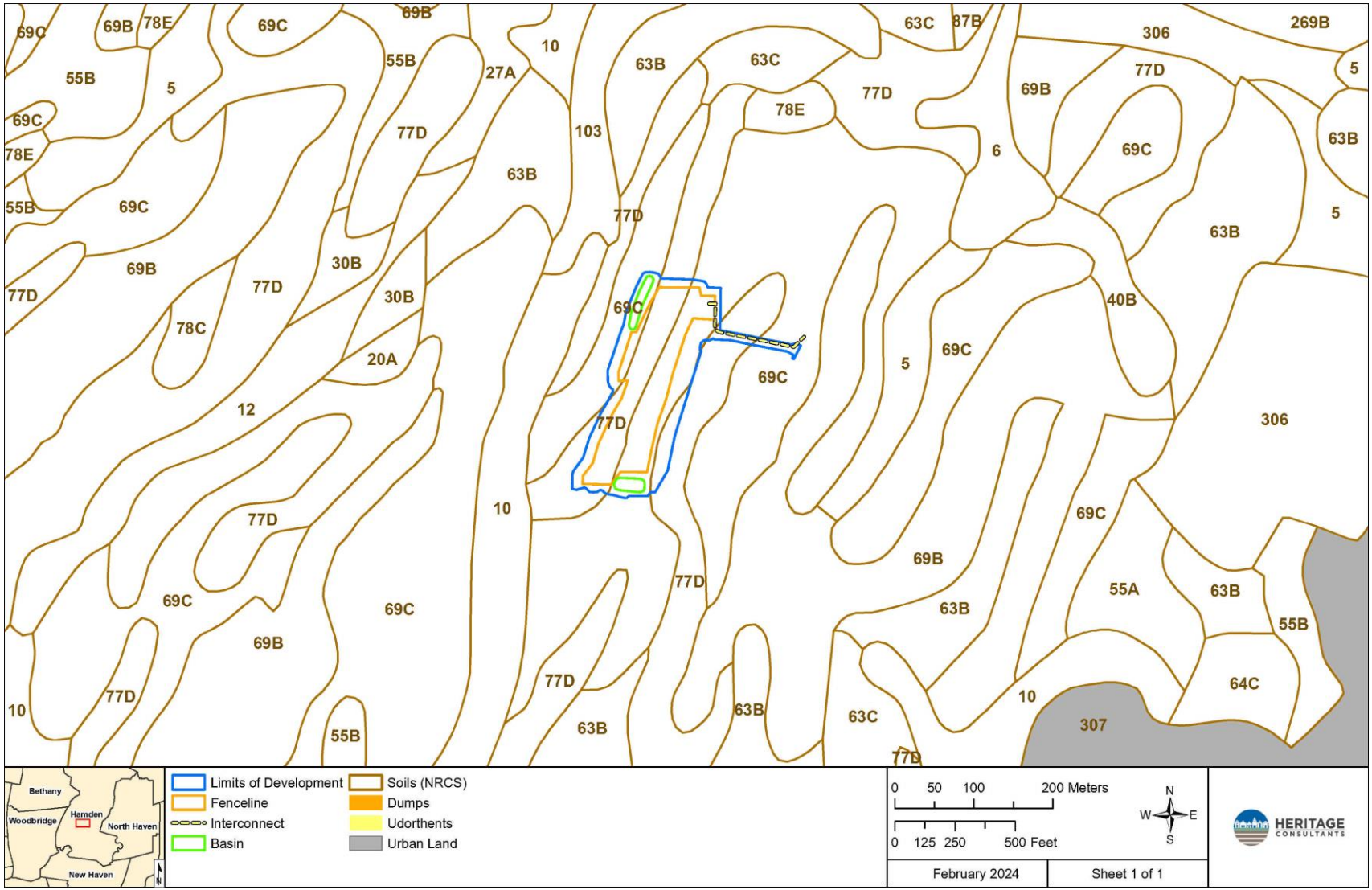


Figure 3. Digital map depicting the soil types present in the vicinity of the project parcel in Hamden, Connecticut.

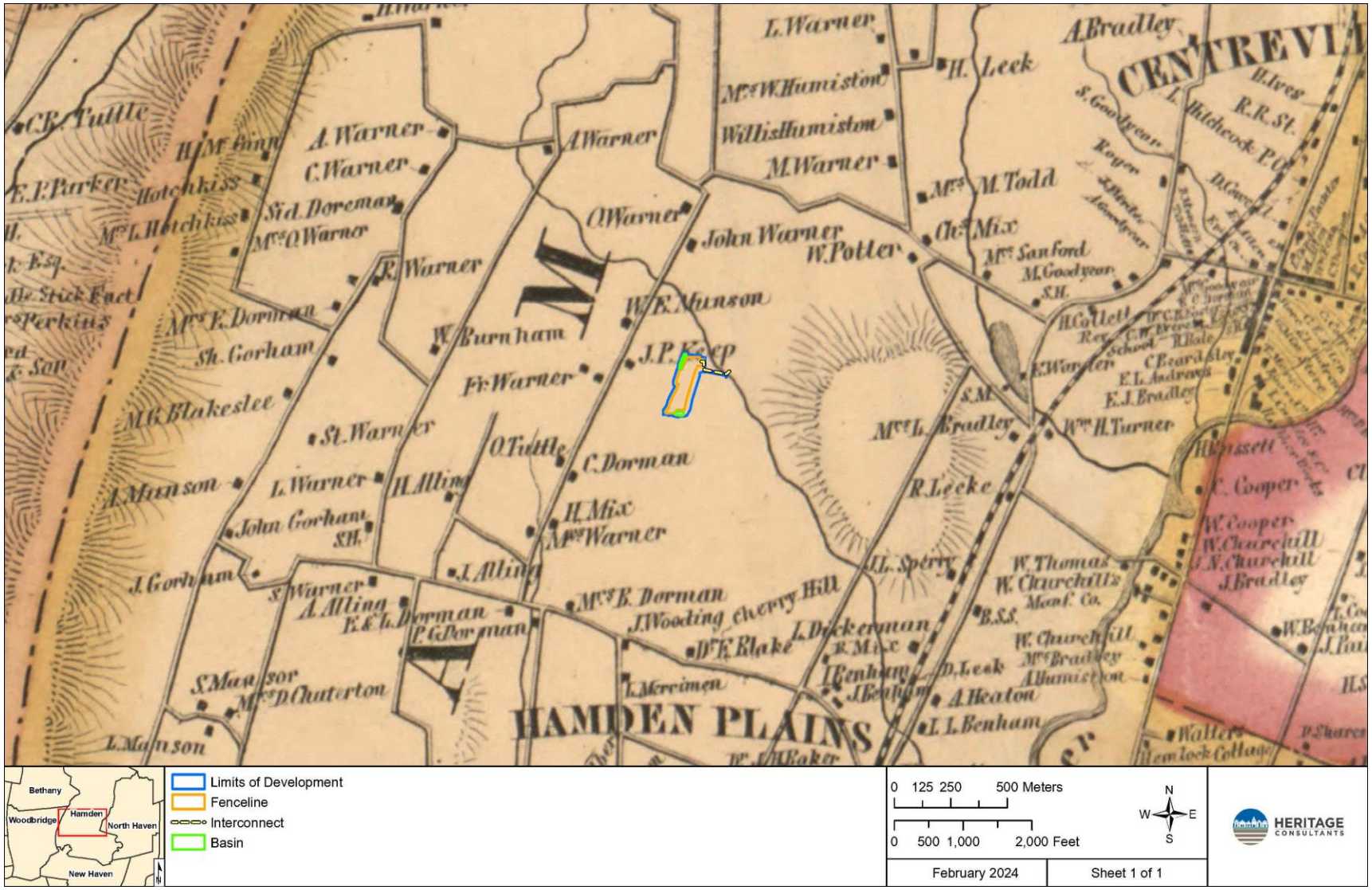


Figure 4. Excerpt from an 1856 map showing the location of the project parcel in Hamden, Connecticut.

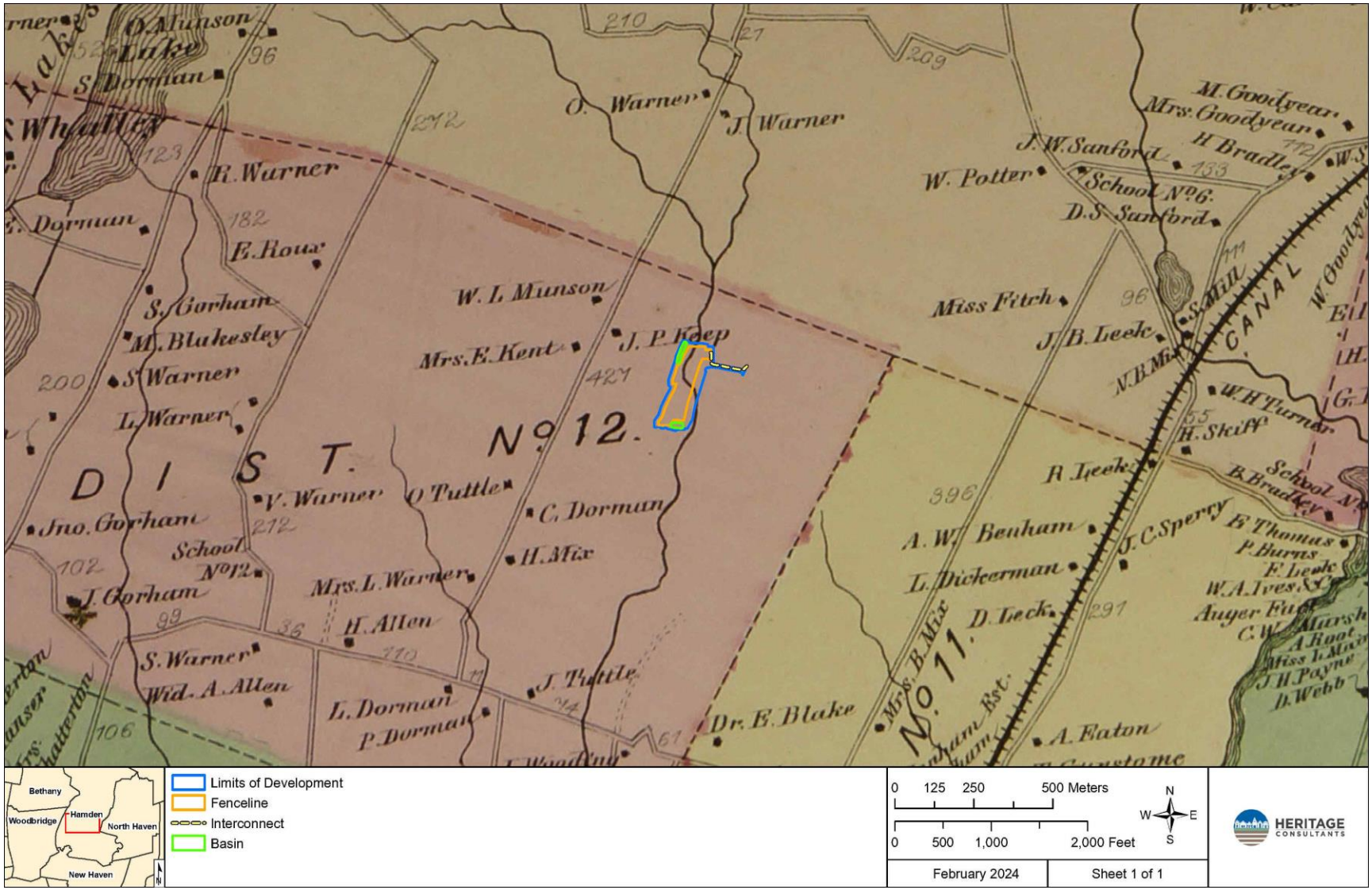


Figure 5. Excerpt from an 1868 map showing the location of the project parcel in Hamden, Connecticut.

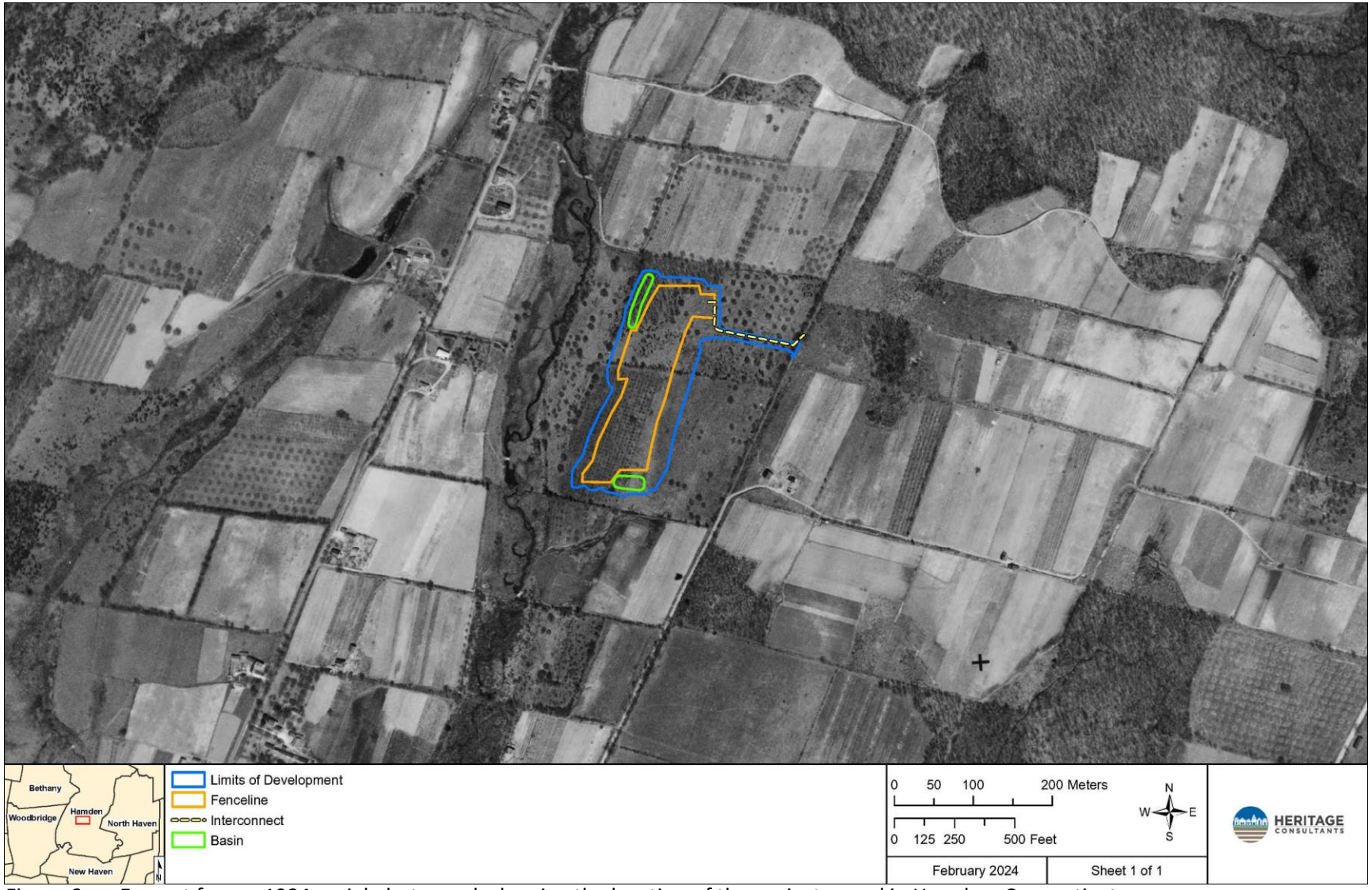


Figure 6. Excerpt from a 1934 aerial photograph showing the location of the project parcel in Hamden, Connecticut.

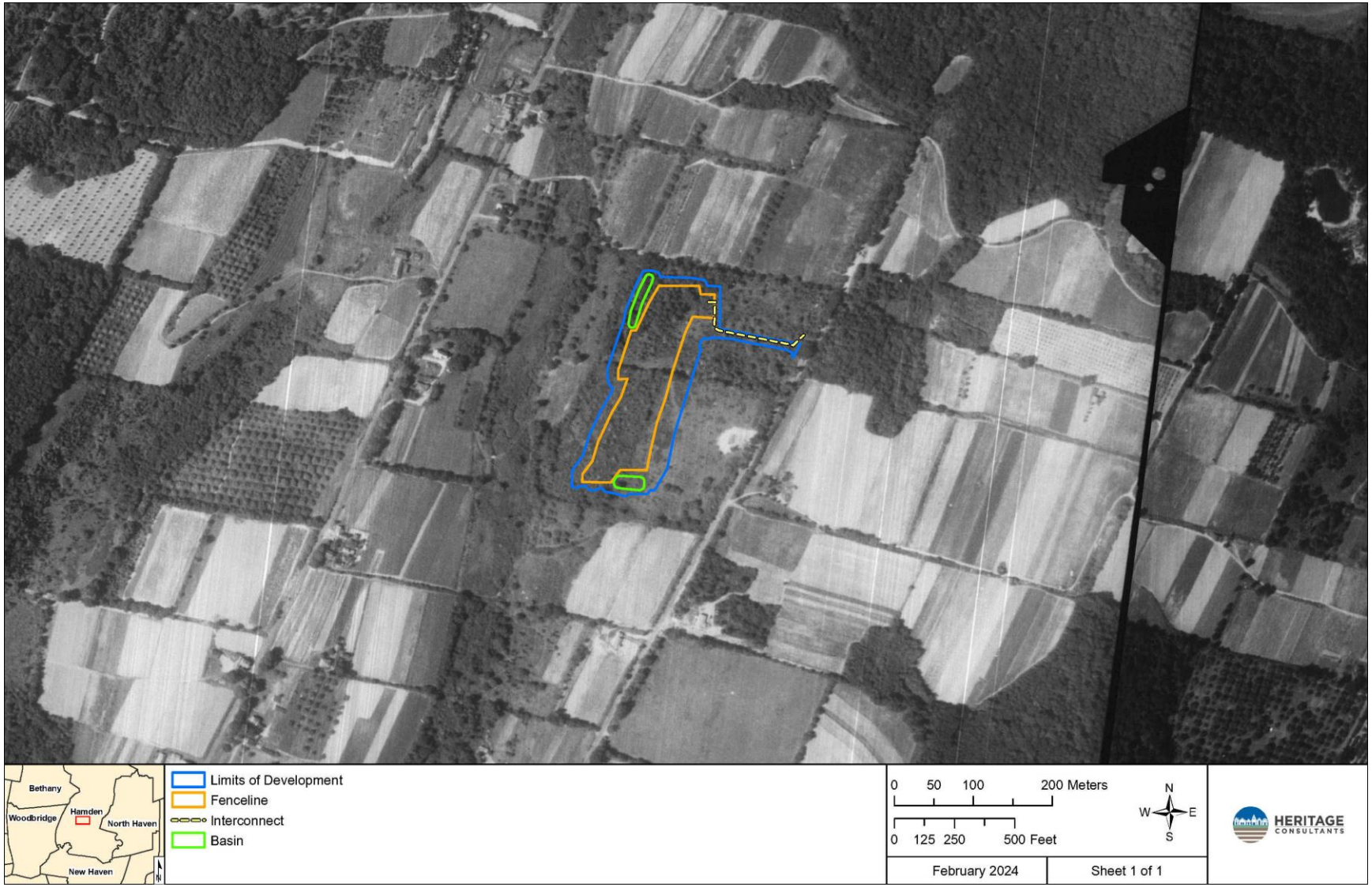


Figure 7. Excerpt from a 1951 aerial photograph showing the location of the project parcel in Hamden, Connecticut.

Figure 8. Excerpt of a 1970 aerial photograph showing the location of the project parcel in Hamden, Connecticut.

Figure 9. Excerpt from a 2004 aerial photograph showing the location of the project parcel in Hamden, Connecticut.

Figure 10. Excerpt from a 2019 aerial photograph showing the location of the project parcel in Hamden, Connecticut.

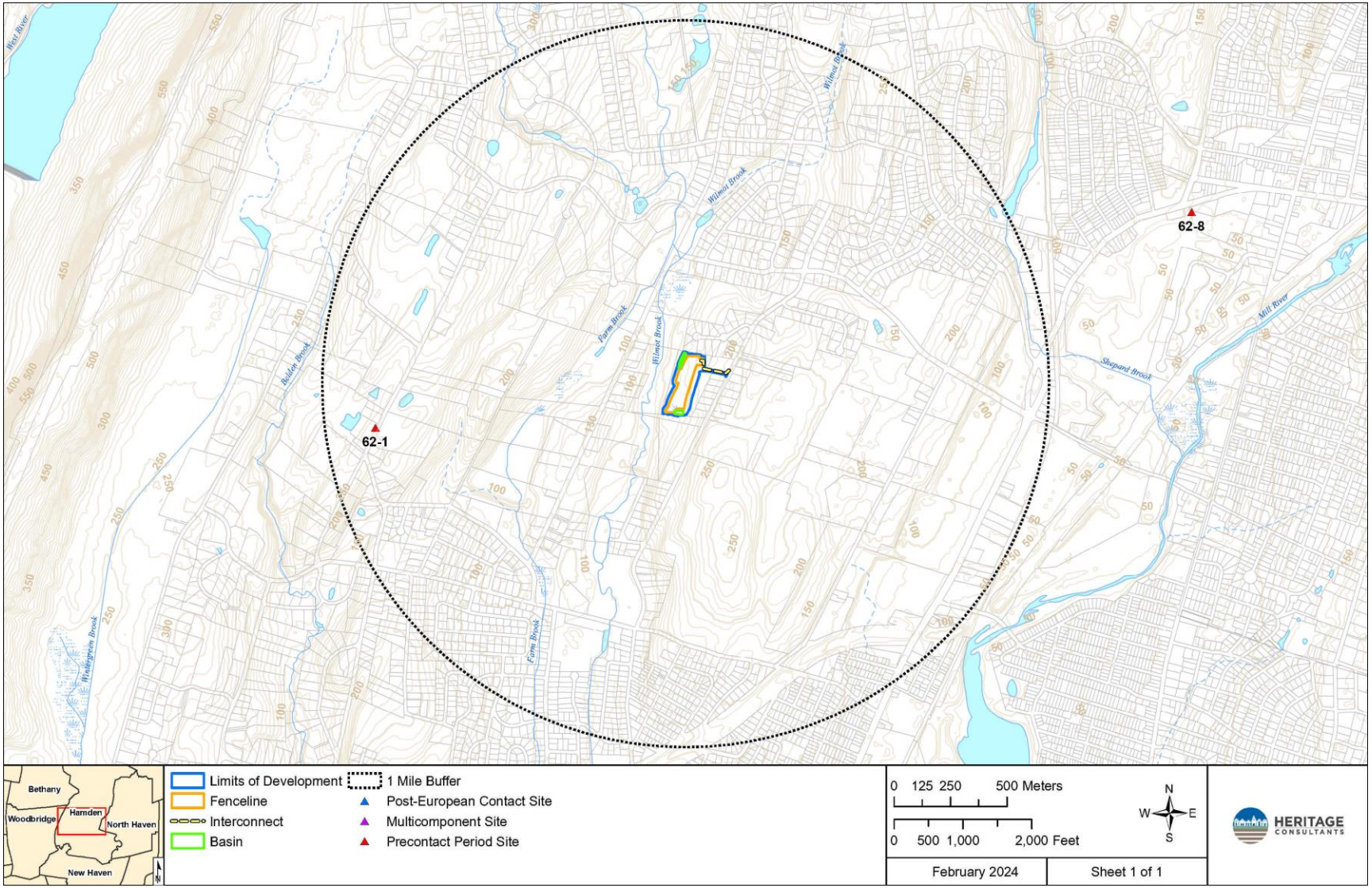


Figure 11. Digital map depicting the locations of the previously identified archaeological sites in the vicinity of the project parcel in Hamden, Connecticut.

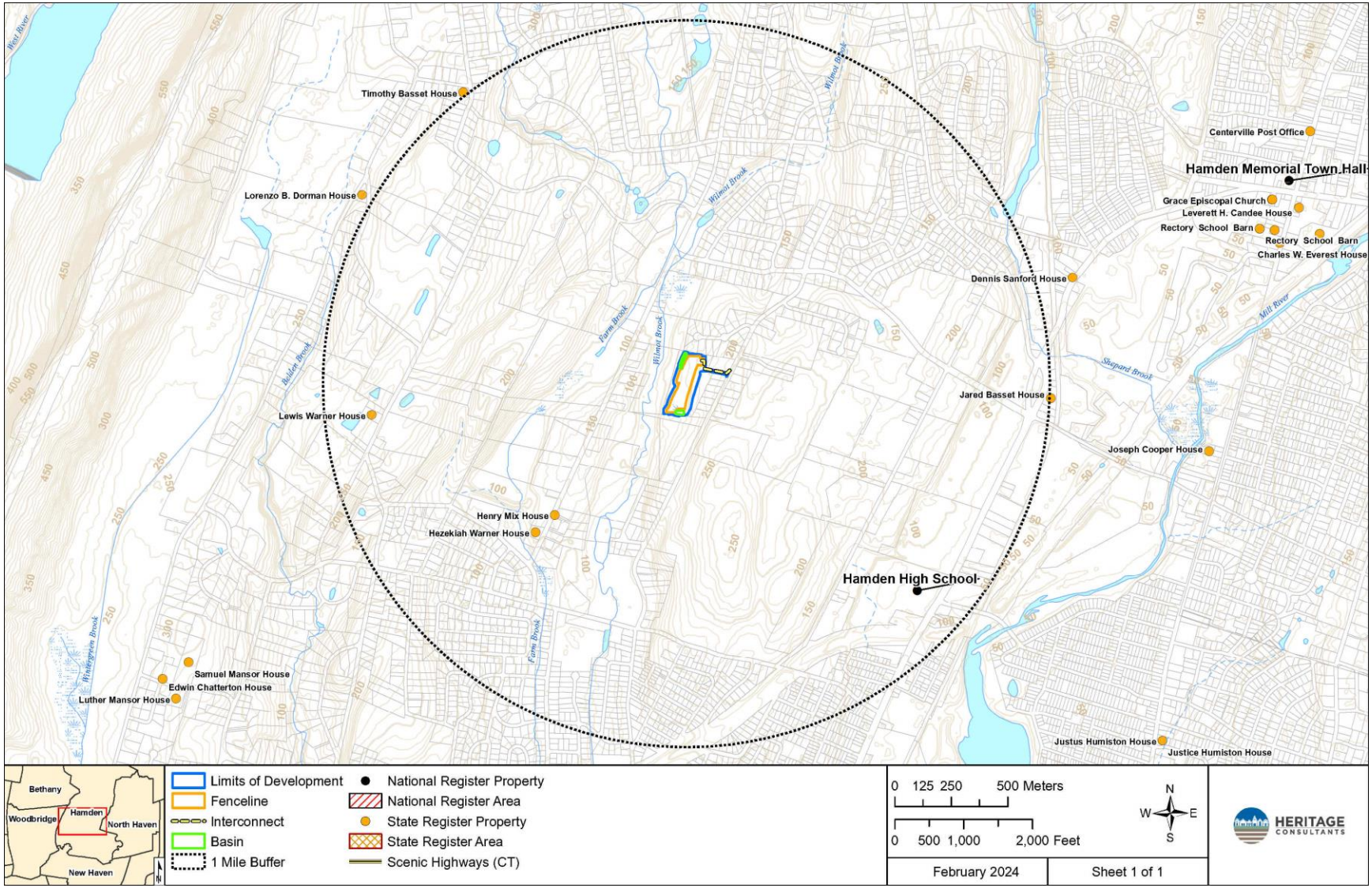


Figure 12. Digital map depicting the locations of the previously identified National Register of Historic Places and State Register of Historic Places properties in the vicinity of the project parcel in Hamden, Connecticut.

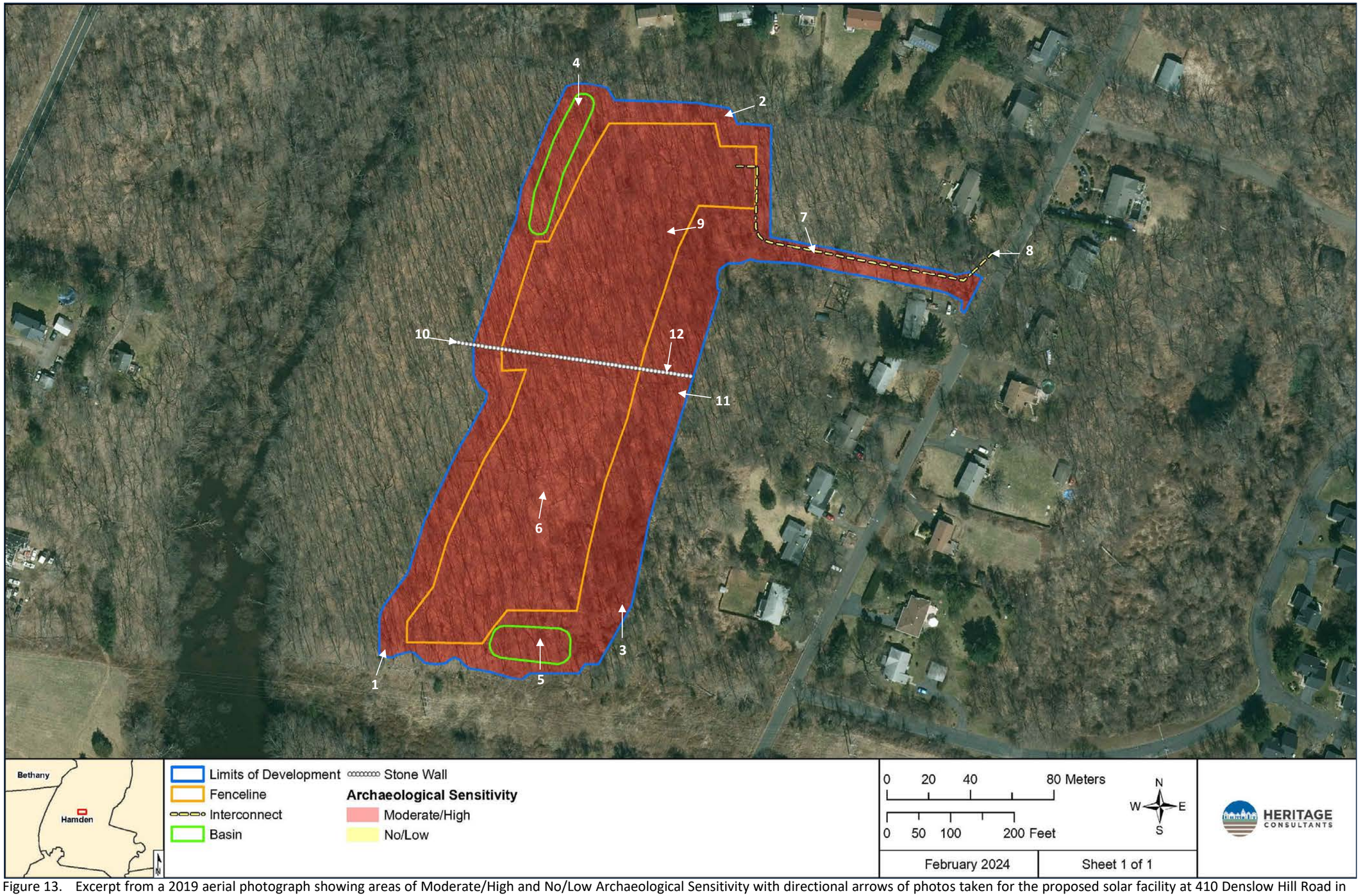


Figure 13. Excerpt from a 2019 aerial photograph showing areas of Moderate/High and No/Low Archaeological Sensitivity with directional arrows of photos taken for the proposed solar facility at 410 Denslow Hill Road in Hamden, Connecticut.

Photo 1. Overview photo from southwestern corner of the Project parcel. Photo taken facing northeast.

Photo 2. Overview photo from northeastern corner of the Project parcel. Photo taken facing west.

Photo 3. Overview photo from southeastern border of the Project parcel. Photo taken facing north.

Photo 4. Overview photo of proposed water retention basin. Photo taken facing south.

Photo 5. Overview photo of proposed water retention basin. Photo taken facing north.

Photo 6. Overview photo of southern half of Project parcel. Photo taken facing north.

Photo 7. Overview photo of narrow wooded corridor between homes. Photo taken facing southeast.

Photo 8. Overview photo of view from Denslow Hill Road. Photo taken facing west.

Photo 9. Overview photo of northern half of project parcel. Photo taken facing west.

Photo 10. Overview photo of stone wall. Photo taken facing east.

Photo 11. Overview photo of stone wall. Photo taken facing west.

Photo 12. Overview photo of stone wall profile. Photo taken facing south.

APPENDIX D

NOISE ANALYSIS

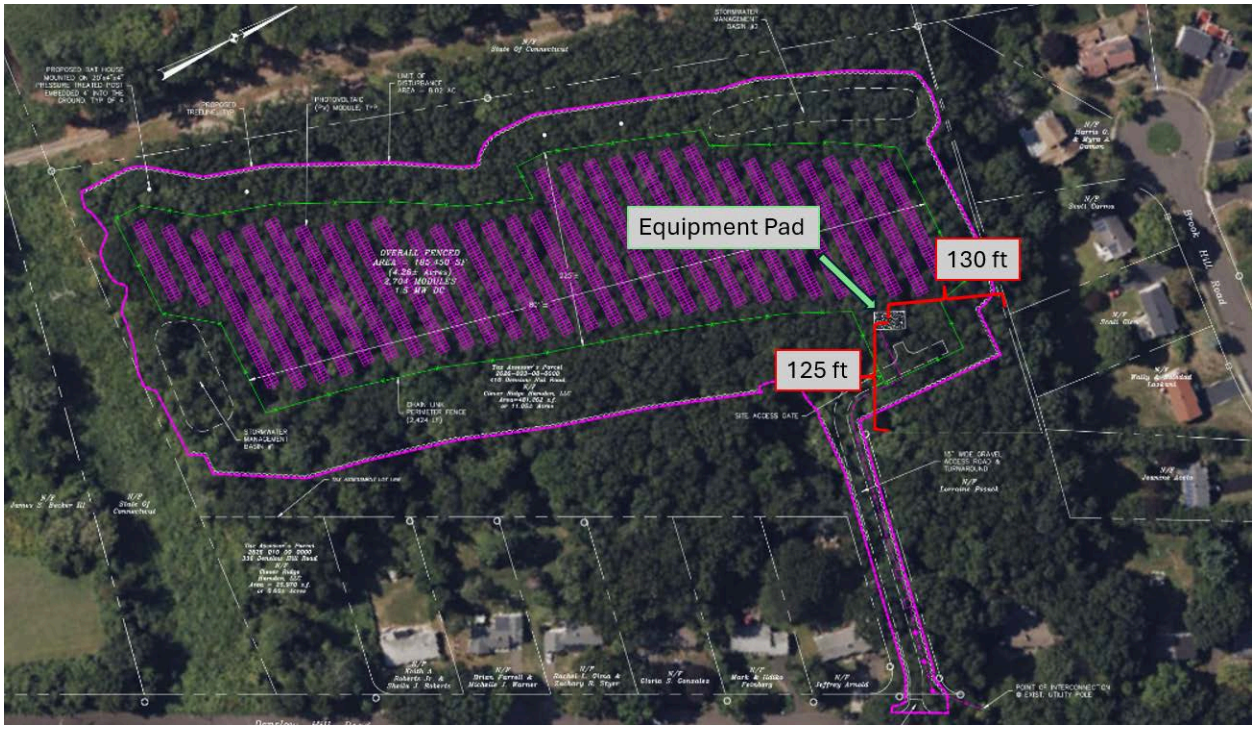
LODESTAR ENERGY

NOISE ANALYSIS

Introduction

Noise generated by this Project will derive from the operation of (6) Solectria XGI 1500-166/166kW inverters and (1) Maddox 1250kVA on a central equipment pad illustrated in Figure 1 below. A single Solectria inverter has an acoustic noise output of 73dBA at 1 meter (3.28 ft) from the unit and a single 1250kVA Maddox transformer has an output of 60 dBA at 1 meter (3.28 ft).

Figure 1: Equipment Pad Location



As stated in Regulations of Connecticut State Agencies Sec. 22a-69-3.5, noise received within residential zones (Class A Receptors) shall not exceed 51dBA at night and 61dBA during the daytime in order to minimize disturbance to abutting and adjacent property owners.

Methods/Analysis Sound Intensity of All Equipment at a Common Point

To quantify the noise output of all inverters, a logarithmic formula is required to accurately determine amplification of sound. This formula and the processes related to calculating a result are illustrated below.

Equation 1. Decibel Addition

$$L = 10 \log_{10} \left(\sum_{i=1}^{n} 10^{(L_i / 10)} \right)$$

(1) Solectria XGI 1500-150/166kW inverter = 73 dBA at 3.28 ft
(6) Solectria XGI 1500-150/166kW inverters = **80.8 dBA at 3.28 ft**
(1) Maddox 1259kVa transformer = 60 dBA at 3.28 ft
(6) Solectria XGI 1500-150/166kW inverters + (1) Maddox 1250 kVa transformers = **80.8 dBA at 3.28 ft**

Equation 2. Audibility

The proposed Project design includes the installation of inverters. The 6 inverters and 1 transformer combined have an 80.8 dBA output. To quantify the reduction in sound from the point of origin to the closest abutting properties (125 ft away), the formula stated in Equation 2 utilizes the inverse square law for sound intensity. This formula states that the reduction in sound pressure is relative to the distance from the source. The formula is set forth below in equation 2 and applied to the instant case in which proposed site conditions are calculated:

$$\textit{Equation 2. } DL = L_{P2} - L_{P1}$$

Calculation

$$DL = 10 \log log \left(R_2/R_1 \right)^2$$

$$DL = 20log(R_2/R_1)$$

$$DL = 20\ log(125/3.28)$$

DL= 31.6 dBA

80.8 dBA – 31.6 dBA = 49.2 dBA

Variables:
DL = difference in sound pressure (dBA)
L_{P1} = Sound pressure level at location 1 (1m)
L_{P2} = Sound pressure level at location 2 (Closest abutting property line)
R_1 = distance from source to location 1
R_2 = distance from source to location 2

Conclusion

In conclusion, the noise levels emitted from the inverters and transformers will be 49.2 dBA at the closest abutting property line, which is 125 ft away from the origin of noise emanation. Noise will be further reduced at farther property lines and buildings. Therefore, the proposed Project and its components comply with the applicable regulations.

APPENDIX E

FEDERAL AVIATION ADMINISTRATION
DETERMINATIONS

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2024-ANE-392-OE

Issued Date: 02/06/2024

Sam Valone
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Suite 201
Avon, CT 06001

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Denslow Hill Solar
Location:	Hamden, CT
Latitude:	41-22-36.80N NAD 83
Longitude:	72-55-59.70W
Heights:	164 feet site elevation (SE)
	11 feet above ground level (AGL)
	175 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

This determination expires on 08/06/2025 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO

SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

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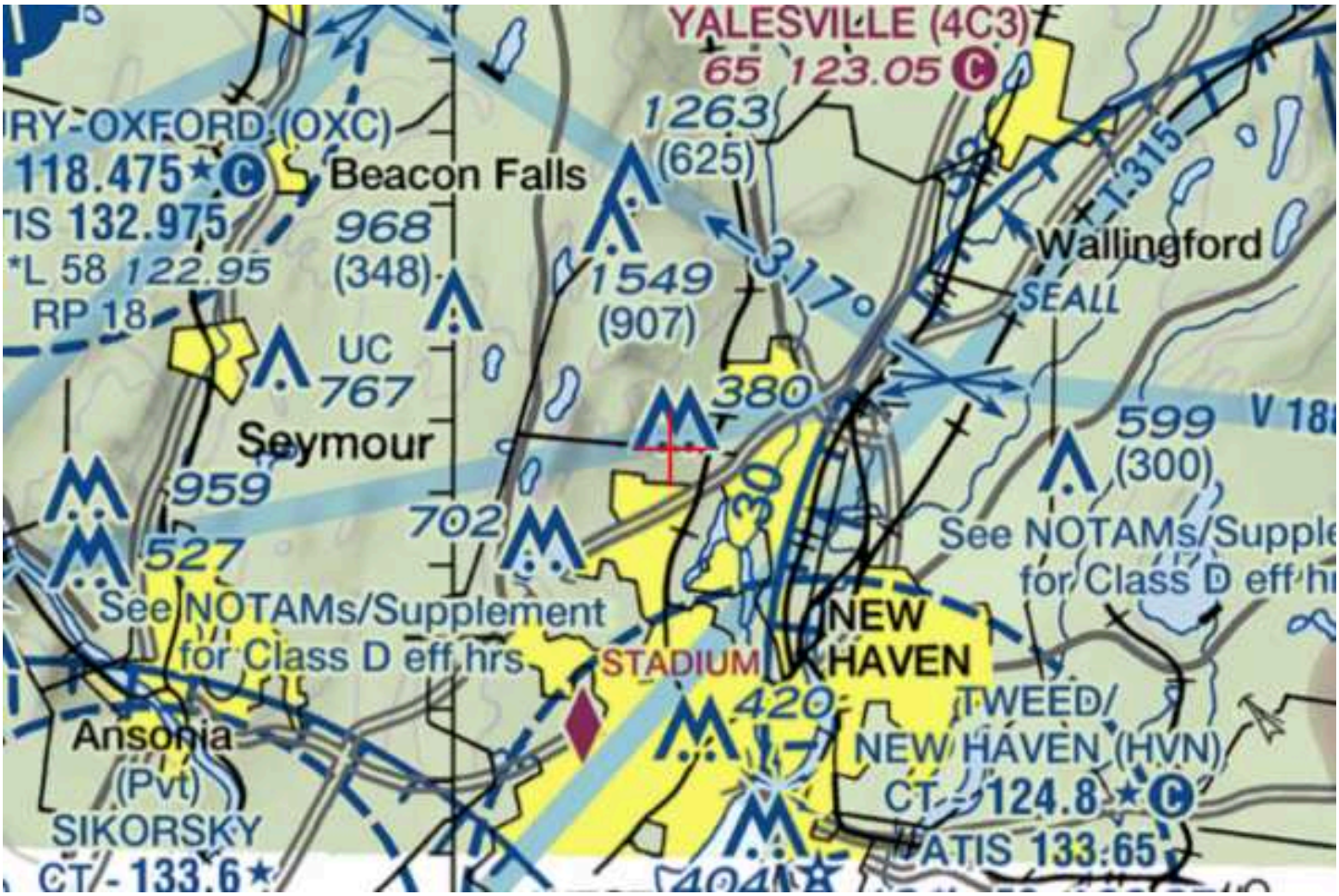
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2024-ANE-392-OE.

Signature Control No: 611168508-611833176 (DNE)
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)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Ansonia
(Pvt)
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SIKORSKY
CT 133.6
ATIS 133.65

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Sam Valone
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Avon, CT 06001

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Denslow Hill Solar
Location:	Hamden, CT
Latitude:	41-22-29.10N NAD 83
Longitude:	72-56-02.40W
Heights:	150 feet site elevation (SE) 11 feet above ground level (AGL) 161 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

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If we can be of further assistance, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2024-ANE-394-OE.

Signature Control No: 611168510-611833177 (DNE)
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

Sectional Map for ASN 2024-ANE-394-OE

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2024-ANE-393-OE

Issued Date: 02/06/2024

Sam Valone
Sam Valone
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Avon, CT 06001

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Solar Panel Denslow Hill Solar
Location:	Hamden, CT
Latitude:	41-22-37.40N NAD 83
Longitude:	72-56-03.20W
Heights:	130 feet site elevation (SE)
	11 feet above ground level (AGL)
	141 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

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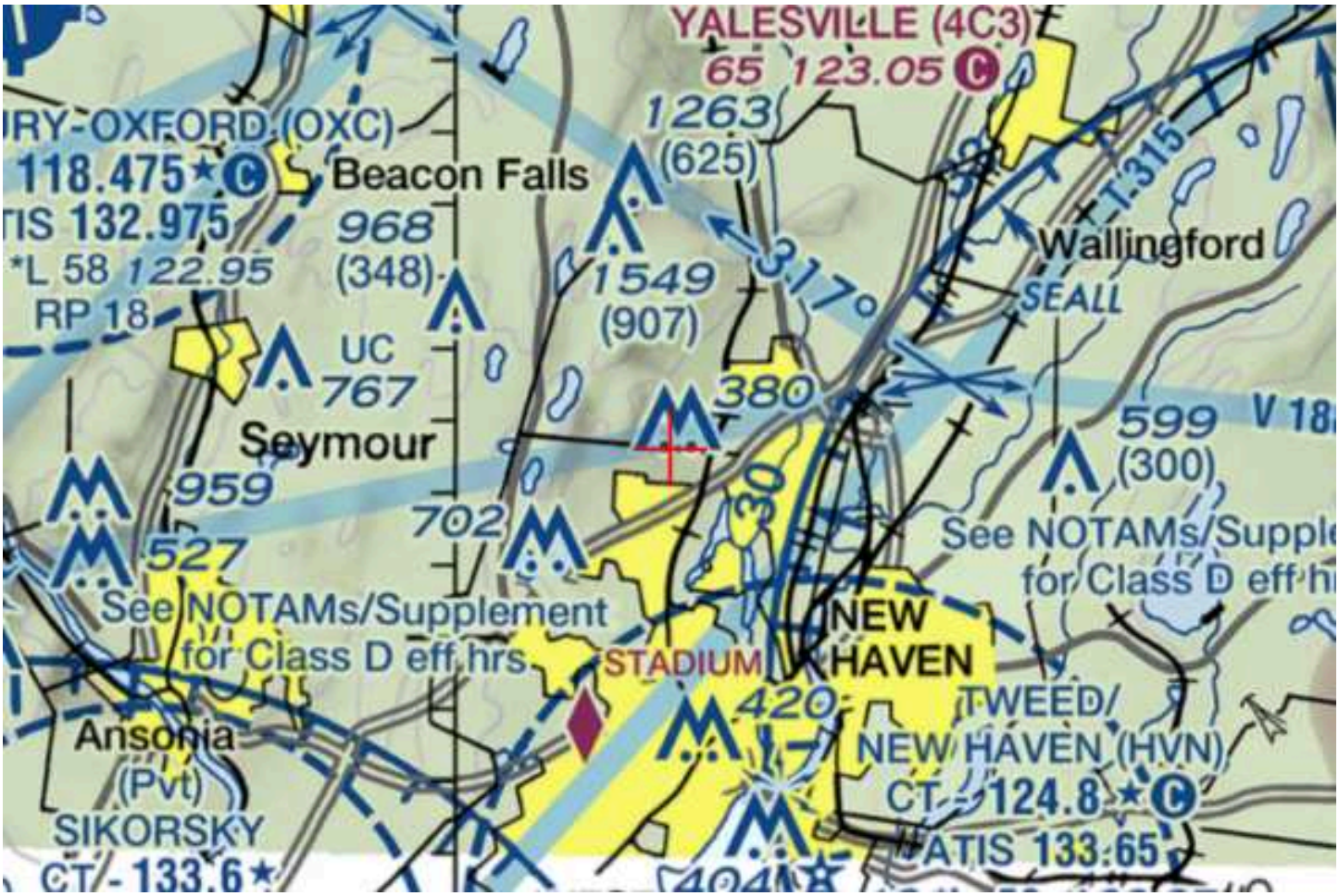
If we can be of further assistance, please contact our office at (404) 305-6582, or Stephanie.Kimmel@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2024-ANE-393-OE.

Signature Control No: 611168509-611833178 (DNE)
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)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Seymour
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(300)
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for Class D eff hrs
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STADIUM
420
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NEW HAVEN (HVN)
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Aeronautical Study No.
2024-ANE-395-OE

Issued Date: 02/06/2024

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Latitude:	41-22-29.10N NAD 83
Longitude:	72-56-05.80W
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	146 feet above mean sea level (AMSL)

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Signature Control No: 611168511-611833179 (DNE)
Stephanie Kimmel
Specialist

Attachment(s)
Map(s)

Sectional Map for ASN 2024-ANE-395-OE