

Connecticut Department of
Energy & Environmental Protection
Bureau of Natural Resources
Wildlife Division

CPPU USE ONLY

App #: _____

Doc #: _____

Check #: No fee required

Program: Natural Diversity Database
Endangered Species

Hardcopy _____ Electronic _____

Request for Natural Diversity Data Base (NDDB) State Listed Species Review

Please complete this form in accordance with the [instructions](#) (DEEP-INST-007) to ensure proper handling of your request.

There are no fees associated with NDDB Reviews.

Part I: Preliminary Screening & Request Type

Before submitting this request, you must review the most current Natural Diversity Data Base "State and Federal Listed Species and Significant Natural Communities Maps" found on the [DEEP website](#). These maps are updated twice a year, usually in June and December.

Does your site, including all affected areas, fall in an NDDB Area according to the map instructions:

Yes No Enter the date of the map reviewed for pre-screening: September 2015

This form is being submitted for a :

New NDDB request
 Renewal/Extension of a NDDB Request, without modifications and within one year of issued NDDB determination (no attachments required)

[CPPU Use Only - NDDB-Listed Species Determination # 1736]

New Safe Harbor Determination (optional) must be associated with an application for a GP for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities
 Renewal/Extension of an existing Safe Harbor Determination
 With modifications
 Without modifications (no attachments required)

[CPPU Use Only - NDDB-Safe Harbor Determination # 1736]

Enter NDDB Determination Number for Renewal/Extension:

Enter Safe Harbor Determination Number for Renewal/Extension:

Part II: Requester Information

If the requester is a corporation, limited liability company, limited partnership, limited liability partnership, or a statutory trust, it must be registered with the Secretary of State. If applicable, the name shall be stated **exactly as it is registered with the Secretary of State. Please note, for those entities registered with the Secretary of State, the registered name will be the name used by DEEP. This information can be accessed at the Secretary of the State's database CONCORD. (www.concord-sots.ct.gov/CONCORD/index.jsp)*

If the requester is an individual, provide the legal name (include suffix) in the following format: First Name; Middle Initial; Last Name; Suffix (Jr, Sr., II, III, etc.).

If there are any changes or corrections to your company/facility or individual mailing or billing address or contact information, please complete and submit the [Request to Change company/Individual Information](#) to the address indicated on the form.

1. Requester*

Company Name: **J. R. Russo & Associates, LLC**

Contact Name: **Timothy Coon**

Address: **1 Shoham Road**

City/Town: **East Windsor**

State: **CT** Zip Code: **06088**

Business Phone: **860-623-0569**

ext.

E-mail: **tcoon@jrrusso.com

***By providing this email address you are agreeing to receive official correspondence from the department, at this electronic address, concerning this request. Please remember to check your security settings to be sure you can receive emails from "ct.gov" addresses. Also, please notify the department if your e-mail address changes*

a) Requester can best be described as:

Individual Federal Agency State agency Municipality Tribal

business entity (if a business entity complete i through iii):

i) Check type corporation limited liability company limited partnership

limited liability partnership statutory trust Other:

ii) Provide Secretary of the State Business ID #: 0948628 This information can be accessed at the Secretary of the State's database (CONCORD). (www.concord-sots.ct.gov/CONCORD/index.jsp)

iii) Check here if your business is **NOT** registered with the Secretary of State's office.

b) Acting as (Affiliation), pick one:

Property owner Consultant Engineer Facility owner Applicant

Biologist Pesticide Applicator Other representative:

2. List Primary Contact to receive Natural Diversity Data Base correspondence and inquiries, if different from requester.

Company Name:

Contact Person:

Title:

Mailing Address:

City/Town:

State:

Zip Code:

Business Phone:

ext.

**E-mail:

Part III: Site Information

This request can only be completed for one site. A separate request must be filed for each additional site.

1. SITE NAME AND LOCATION

Site Name or Project Name: **NorCap North Solar Field**

Town(s): **East Windsor**

Street Address or Location Description:

Wapping Road - rear lot approximately 1,100 feet west of intersection with Miller Road just south of Ketch Brook

Size in acres, or site dimensions: **14.64 acres**

Latitude and longitude of the center of the site in decimal degrees (e.g., 41.23456 -71.68574):

Latitude: **41.88431**

Longitude: **-72.54805**

Method of coordinate determination (check one):

GPS Photo interpolation using [CTECO map viewer](#) Other (specify):

2a. Describe the current land use and land cover of the site.

Former gravel pit.

b. Check all that apply and enter the size in acres or % of area in the space after each checked category.

<input type="checkbox"/> Industrial/Commercial _____	<input type="checkbox"/> Residential _____	<input checked="" type="checkbox"/> Forest <u>29%</u>
<input checked="" type="checkbox"/> Wetland <u>1%</u>	<input type="checkbox"/> Field/grassland _____	<input type="checkbox"/> Agricultural _____
<input type="checkbox"/> Water _____	<input type="checkbox"/> Utility Right-of-way _____	
<input type="checkbox"/> Transportation Right-of-way _____	<input checked="" type="checkbox"/> Other (specify): <u>70% Gravel Pit</u>	

Part IV: Project Information

1. PROJECT TYPE:

Choose Project Type: Other , If other describe: **Solar PV Development**

2. Is the subject activity limited to the maintenance, repair, or improvement of an existing structure within the existing footprint? Yes No If yes, explain.

Part IV: Project Information (continued)

3. Give a detailed description of the activity which is the subject of this request and describe the methods and equipment that will be used. Include a description of steps that will be taken to minimize impacts to any known listed species.

The Solar PV development will require clearing and grubbing of portions of the existing wooded area and grading to create a suitable gradual grade for the placement of PV modules. The work will include construction of access roads, layout and placement of foundation systems, racking, and solar PV panels, installation of utility pads and associated electrical equipment, installation of electrical conduit, conduit supports, electrical poles, and overhead wire, and security fencing. This work will be performed using skidders, excavators, dump trucks, crane operations, dozers, and pick-up trucks.

4. If this is a renewal or extension of an existing Safe Harbor request *with* modifications, explain what about the project has changed.

5. Provide a contact for questions about the project details if different from Part II primary contact.

Name:

Phone:

E-mail:

Part V: Request Requirements and Associated Application Types

Check *one* box from either Group 1, Group 2 or Group 3, indicating the appropriate category for this request.

Group 1. If you check one of these boxes, complete Parts I – VII of this form and submit the required attachments A and B.

- Preliminary screening was negative but an NDDB review is still requested
- Request regards a municipally regulated or unregulated activity (no state permit/certificate needed)
- Request regards a preliminary site assessment or project feasibility study
- Request relates to land acquisition or protection
- Request is associated with a *renewal* of an existing permit, with no modifications

Group 2. If you check one of these boxes, complete Parts I – VII of this form and submit required attachments A, B, *and* C.

- Request is associated with a *new* state or federal permit application
- Request is associated with modification of an existing permit
- Request is associated with a permit enforcement action
- Request regards site management or planning, requiring detailed species recommendations
- Request regards a state funded project, state agency activity, or CEPA request

Group 3. If you are requesting a **Safe Harbor Determination**, complete Parts I-VII and submit required attachments A, B, and D. Safe Harbor determinations can only be requested if you are applying for a GP for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

If you are filing this request as part of a state or federal permit application(s) enter the application information below.

Permitting Agency and Application Name(s): _____

State DEEP Application Number(s), if known: _____

State DEEP Enforcement Action Number, if known: _____

State DEEP Permit Analyst(s)/Engineer(s), if known: _____

Is this request related to a previously submitted NDDB request? Yes No

If yes, provide the previous NDDB Determination Number(s), if known: _____

Part VI: Supporting Documents

Check each attachment submitted as verification that *all* applicable attachments have been supplied with this request form. Label each attachment as indicated in this part (e.g., Attachment A, etc.) and be sure to include the requester's name, site name and the date. **Please note that Attachments A and B are required for all new requests and Safe Harbor renewals/extensions with modifications.** Renewals/Extensions with no modifications do not need to submit any attachments. Attachments C and D are supplied at the end of this form.

<input checked="" type="checkbox"/> Attachment A:	Overview Map: an 8 1/2" X 11" print/copy of the relevant portion of a USGS Topographic Quadrangle Map clearly indicating the exact location of the site.
<input checked="" type="checkbox"/> Attachment B:	Detailed Site Map: fine scaled map showing site boundary and area of work details on aerial imagery with relevant landmarks labeled. (Site and work boundaries in GIS [ESRI ArcView shapefile, in NAD83, State Plane, feet] format can be substituted for detailed maps, see instruction document)
<input type="checkbox"/> Attachment C:	Supplemental Information, Group 2 requirement (attached, DEEP-APP-007C) <input type="checkbox"/> Section i: Supplemental Site Information and supporting documents <input type="checkbox"/> Section ii: Supplemental Project Information and supporting documents
<input type="checkbox"/> Attachment D:	Safe Harbor Report Requirements, Group 3 (attached, DEEP-APP-007D)

Part VII: Requester Certification

The requester *and* the individual(s) responsible for actually preparing the request must sign this part. A request will be considered incomplete unless all required signatures are provided.

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that based on reasonable investigation, including my inquiry of the individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief."



4/21/16

Signature of Requester (a typed name will substitute for a handwritten signature)

Date

Timothy A. Coon

Name of Requester (print or type)

Principal Engineer

Title (if applicable)

Signature of Preparer (if different than above)

Date

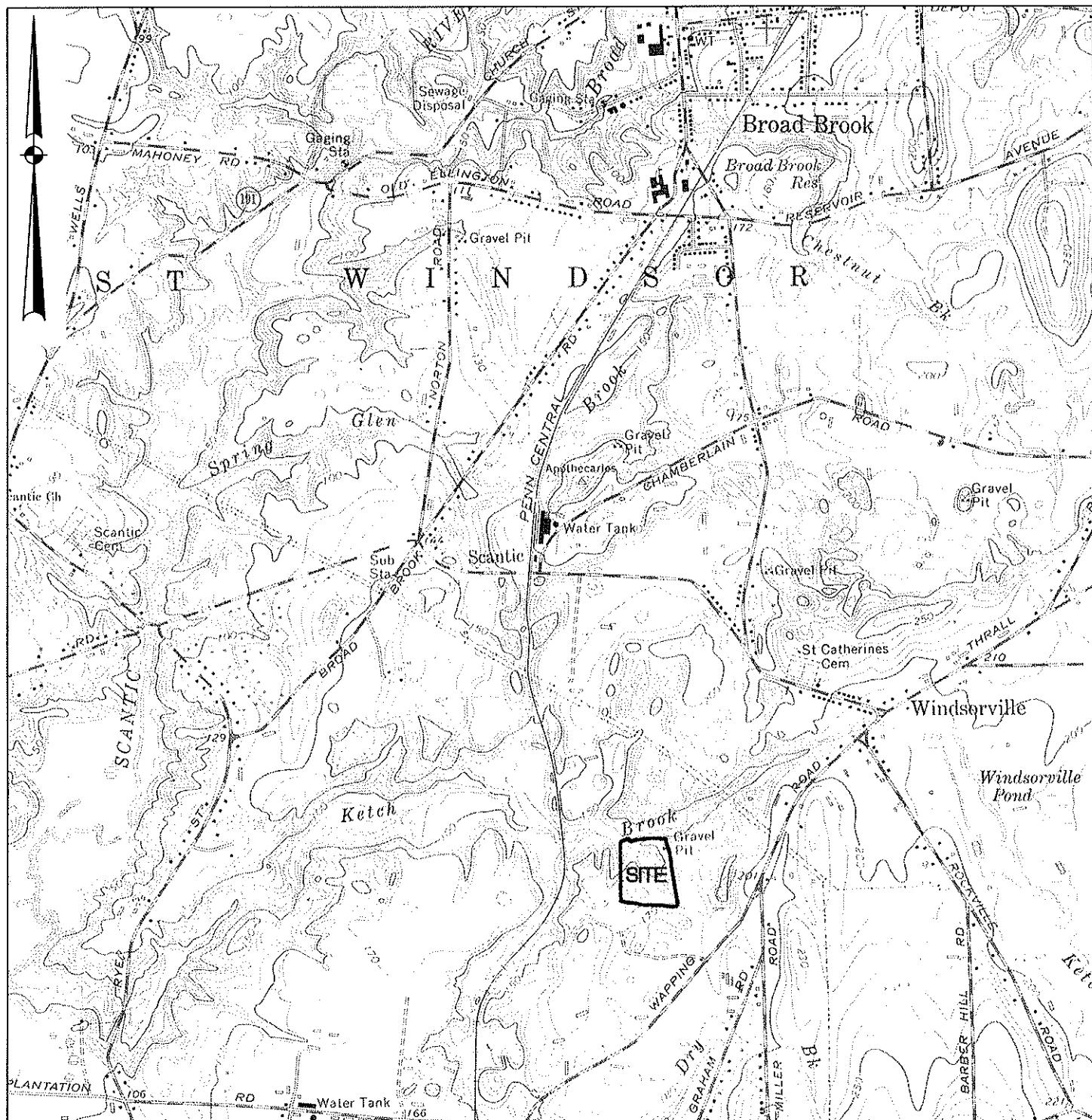
Name of Preparer (print or type)

Title (if applicable)

Note: Please submit the completed Request Form and all Supporting Documents to:

CENTRAL PERMIT PROCESSING UNIT
DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

Or email request to: deep.nddbrequest@ct.gov



VICINITY MAP

Norcap North Solar Field

Wapping Road
East Windsor, Connecticut

SOURCE:
BROAD BROOK, CT USGS QUADRANGLE
PHOTOREVISED 1972



RUSSO
SURVEYORS • ENGINEERS
SERVING CT & MA

J.R. Russo & Associates, LLC
1000 Park, 10th Floor • 1000 Wilson, N.W. • Washington, D.C. 20004-2206
www.russoassoc.com • info@russoassoc.com

DATE
4-21-16
SCALE
1"=2,000'
JOB NUMBER
2016-037
SHEET
XHIBIT



Connecticut Department of
**ENERGY &
ENVIRONMENTAL
PROTECTION**

May 16, 2016

Mr. Timothy Coon
J. R. Russo & Associates, LLC
1 Shoham Road
East Windsor, CT 06088
tcoon@jrrusso.com

Project: Preliminary Site Assessment for Solar PV Development at NorCap North Solar Field in East Windsor, Connecticut

NDDB Preliminary Assessment No.: 201605372

Dear Timothy,

I have reviewed Natural Diversity Data Base maps and files regarding the area delineated on the map provided for a Preliminary Site Assessment for Solar PV Development at NorCap North Solar Field in East Windsor, Connecticut.

According to our records there are known extant populations of State Listed Species known that occur within or close to the boundaries of this property. I have attached a list of these species to this letter. Please be advised that this is a preliminary review and not a final determination. A more detailed review will be necessary to move forward with any subsequent environmental permit applications submitted to DEEP for the proposed project. This preliminary assessment letter cannot be used or submitted with your permit applications at DEEP. This letter is valid for one year.

To prevent impacts to State-listed species, field surveys of the site should be performed by a qualified biologist when these target species are identifiable. A report summarizing the results of such surveys should include:

1. Survey date(s) and duration
2. Site descriptions and photographs
3. List of component vascular plant and animal species within the survey area (including scientific binomials)
4. Data regarding population numbers and/or area occupied by State-listed species

5. Detailed maps of the area surveyed including the survey route and locations of State-listed species
6. Statement/résumé indicating the biologist's qualifications

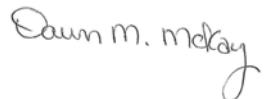
The site surveys report should be sent to our CT DEEP-NDDB Program (deep.nddbrequest@ct.gov) for further review by our program biologists along with an updated request for another NDDB review.

If you do not intend to do site surveys to determine the presence or absence of state-listed species, please let us know how you will protect the state-listed species from being impacted by this project. You may submit these best management practices or protection plans with your new request for an NDDB review.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and cooperating units of DEEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substitutes for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available. The result of this review does not preclude the possibility that listed species may be encountered on site and that additional action may be necessary to remain in compliance with certain state permits.

Please contact me if you have further questions at (860) 424-3592, or dawn.mckay@ct.gov . Thank you for consulting the Natural Diversity Data Base.

Sincerely,



Dawn M. McKay
Environmental Analyst 3

Species List for NDDB Request

Scientific Name	Common Name	State Status
Vertebrate Animal		
<i>Falco sparverius</i>	American kestrel	SC
<i>Glyptemys insculpta</i>	Wood turtle	SC
<i>Melanerpes erythrocephalus</i>	Red-headed woodpecker	E

E = Endangered, T = Threatened, SC = Special Concern, * Extirpated

Page 1 of 1



-
- Ecology
 - Soil & Wetland Studies
 - Water Quality Monitoring • GPS
 - Environmental Planning & Management
 - Ecological Restoration & Habitat Mitigation
 - Aquatic, Wildlife and Listed Species Surveys
 - Application Reviews • Permitting & Compliance

March 3, 2017

Lodestar Energy
3 Ellsworth Place, Suite 122
Avon, CT 06001

ATTN: Mr. Adam Beal, Director of Development

RE: LISTED-SPECIES INVESTIGATIONS

Norcap North Solar Array (Canes Venatici, LLC)
Wapping Road, East Windsor, CT

REMA Job No.: 16-1936-EWN33

Dear Mr. Beal:

At your request, on August 6th, and again on August 9th and 20th, 2016, REMA Ecological Services, LLC (REMA) conducted site investigations at the above-referenced property (i.e. “the site”). The primary purpose of the investigation was to screen the site for its potential to provide suitable habitat for several “listed” species (i.e. endangered, threatened, special concern). These species were identified in a May 16th, 2016 letter from Dawn McKay, of the Connecticut Department of Energy & Environmental Protection (CT DEEP), in response to a query by your engineering consultant, Mr. Timothy Coon, P.E., of J.R. Russo & Associates, who also forwarded site plans to our office (1 sheet, revised through 9/22/16).

Specifically CT DEEP records identified three listed species from the vicinity of the site: (1) the state endangered red-headed woodpecker (*Melanerpes erythrocephalus*), (2) the state special concern wood turtle (*Glyptemys insculpta*), and (3) the state special concern American kestrel (*Falco sparverius*).



The subject is a roughly 14.64-acre land-locked parcel, which can be accessed via an existing unimproved dirt/gravel roadway connecting it to Wapping Road to the southeast. A large portion of the site (i.e. +/- 8.0 acres) has been used in the past as a materials storage area. Even during the site visits remnants of soil stockpiles were observed, as well as woody debris piles (see Figure A, attached). The open portion of the site had been recently graded flat and most of it seeded. However, ground vegetation was sparse in most of the graded area, and a portion was still in bare soil (see attached annotated photographs).

In addition to the recently graded areas the overall site contains roughly 6.5 acres of deciduous woodland within the northern and eastern portions of the site, with moderate to steeply sloping topography. Along the edge of the clearing a matrix of meadow and shrub/sampling tangles were observed, particularly along the northern and eastern perimeter.

The **wood turtle** (*Glyptemys insculpta*) requires riparian habitats of rivers or perennial streams, typically sandy-bottom streams with overhanging vegetation, banks and open areas for basking, wooded floodplains, and sandy open fields for nesting (Klemens 1993, DeGraaf and Yamasaki 2001, Hammerson 2004). Moreover, in our experience with wood turtles in Connecticut during the past 29 years, they are most often associated with larger perennial watercourses.

Appropriate habitat for wood turtle likely exists within the riparian corridor associated with Ketch Brook, which crosses the far northwestern section of the subject site. Ketch Brook is a perennial tributary of the Scantic River, which it joins roughly two miles downstream to the west. At the subject site Ketch Brook has a watershed of about six square miles. This is certainly a sizeable enough perennial stream for wood turtle, although the probability for this species being present increases downstream. However, the past disturbances at the site in areas which are the most accessible to wood turtles could have drastically reduced the available habitat. Nonetheless, the likelihood of wood turtle utilizing the subject site is **moderate**. We note that the region was in a moderate to severe drought, per NOAA modeling, at the time of the site visits. Water flows in the stream were quite low.

The **red-headed woodpecker** (*Melanerpes erythrocephalus*) is commonly found in deciduous woodlands, with oak or beech, groves of dead or dying trees, river bottoms, open woods, burned areas, recent clearings, beaver swamps, orchards, parks, farmland, grasslands with scattered trees, forest edges, and roadsides (Smith et al. 2000). During the start of the breeding season they move from forest interiors to forest edges or disturbed areas. Wherever they breed, dead (or partially dead) trees for nest cavities are an important



part of their habitat requirements. They are somewhat nomadic; in a given location they can be found one year and absent the next.

According to an on-line source (i.e. eBird Range Map), red-headed woodpeckers were most recently observed in January and February of 2015 and 2016 in South Windsor, approximately 4 miles to the southwest of the subject site. We should note that the timeframe of our August 2016 observations are consistent with published data and range mapping (e.g. NatureServe) for this avian. In our region red-headed woodpeckers are year-round residents.

Red-headed woodpeckers were not observed at the site or the immediate surroundings. Although the available habitat is suitable, albeit suboptimal, and cavity trees and snags were noted, the likelihood of red-headed woodpecker utilizing the subject site is *low*. The auditory and visual disturbances associated with heavy equipment usage at the site, impacts all but the most tolerant avians.

American kestrels (*Falco sparverius*) occupy a variety of open to semi-open habitats including meadows, grasslands, parkland, agricultural fields, and both urban and suburban landscapes (Smallwood and Bird 2002). They are most likely seen perching on telephone wires along roadsides, in open country. American kestrels favor open areas with short ground vegetation and sparse trees. When breeding, kestrels need access to at least a few trees or structures that provide appropriate nesting cavities. They are also attracted to many habitats modified by humans, including pastures and parkland, and are often found near areas of human activity including towns and cities. Typical breeding habitat in the Northeast is pasture or recently fallowed field, more than 60 acres in size, with a few isolated large dead trees for nesting and perching.

According to an on-line source (i.e. eBird Range Map), American kestrels were most recently observed in January of 2016 in South Windsor, approximately 2.0 miles to the northeast of the subject site, near Frog Hollow Road. We should note that the timeframe of our August 2016 observations are consistent with published data and range mapping (e.g. NatureServe) for this avian. In our region American kestrels are year-round residents.

At present the site offers *marginal* habitat for American kestrel hunting, particularly within the recently graded open areas with sparse vegetation. Large cavity trees and snags are present within or adjacent to the site, but the periodic disturbance associated with heavy machinery, has undoubtedly impacted avian usage at this site, with the exception of the most tolerant species. Furthermore, the size of the open habitat is considered small for

American kestrels. Thus, the likelihood of American kestrel utilizing the subject site, particularly for breeding, is **low**.

Attached to this letter/report is a list of the avians encountered during our three site visits. Figure A shows the approximate routes taken during each of the surveys.

In conclusion, in my professional opinion, it is possible but unlikely that the two “listed” avians utilize the subject site. However, there is at least a moderate likelihood that wood turtle could use this site under existing conditions.

We would recommend that the CT DEEP protocol be utilized to protect against the incidental taking of wood turtles during construction. We also recommend that following construction the area of the temporary sedimentation basin be maintained to grasses and forbs, creating favorable habitat for wood turtle nesting and foraging. However, an operations and management plan should specify that mowing of this area should be conducted once a year, but only outside of the wood turtle peak activity period of late March to late October.

Please feel free to contact us with any questions on the above.

Respectfully submitted,

REMA ECOLOGICAL SERVICES, LLC



George T. Logan, MS, PWS, CSE
Certified Senior Ecologist
Wildlife Biologist

VIA E-MAIL

Attachments: Figure A; Annotated Photographs (1-13); Avian Inventory; Professional Resume

Literature Cited:

Bevier, Louis, ed. 1994. The Atlas of Breeding Birds of Connecticut. State Geological and Natural History Survey of Connecticut. Bulletin 113. Hartford, CT.



DeGraaf, R.M., and M. Yamasaki. 2001. *New England Wildlife: Habitat, Natural History, and Distribution*. University Press of New England, Hanover, NH.

Hammerson, G.A. 2004. *Connecticut Wildlife: Biodiversity, Natural History, and Conservation*. University Press of New England, Lebanon, NH.

Klemens, M.W. 1993. *Amphibians and Reptiles of Connecticut and Adjacent Regions*. State Geological and Natural History Survey of Connecticut. Bulletin No. 112.

Smallwood, J.A., and D.M. Bird. 2002. American Kestrel (*Falco sparverius*). In *The Birds of North America*, No. 602 (A. Poole and F. Gill, eds.) The Birds of North America, Inc., Philadelphia, PA.

Smith, K.G., J.H. Withgott, and P.G. Rodwald. 2000. Red-headed Woodpecker (*Melanerpes erythrocephalus*). In *The Birds of North America*, No. 508 (A. Poole and F. Gill, eds.) The Birds of North America, Inc., Philadelphia, PA.

TABLE A: Breeding Birds Recorded at the Norcap North Solar Array Site on 8/6, 8/9, and 8/20/16**Town of East Windsor, Hartford County, Connecticut**

Common Name ¹	Scientific Name	Location/Notes
Mourning dove	<i>Zenaida macroura</i>	Common
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	West edge
Ruby-throated hummingbird	<i>Archilochus colubris</i>	East edge
Red-tailed hawk	<i>Buteo jamaicensis</i>	At least two
Red-bellied woodpecker	<i>Melanerpes carolinus</i>	One individual
Downy woodpecker	<i>Picoides pubescens</i>	Ketch Brook corridor
Northern flicker	<i>Colaptes auratus</i>	One individual
Eastern wood-peewee	<i>Contopus virens</i>	Ketch Brook corridor
Least flycatcher	<i>Empidonax minimus</i>	North edge
Great crested flycatcher	<i>Myiarchus crinitus</i>	One individual
Blue jay	<i>Cyanocitta cristata</i>	Several
American crow	<i>Corvus brachyrhynchos</i>	Several
Black-capped chickadee	<i>Poecile atricapillus</i>	A few
Tufted titmouse	<i>Baeolophus bicolor</i>	A few
White-breasted nuthatch	<i>Sitta carolinensis</i>	Ketch Brook corridor
American robin	<i>Turdus migratorius</i>	Included fledglings
Gray catbird	<i>Dumetella carolinensis</i>	Ketch Brook corridor, east edge
Cedar waxwing	<i>Bombycilla cedrorum</i>	Medium size flock
American goldfinch	<i>Spinus tristis</i>	Common
Louisiana waterthrush	<i>Parkesia motacilla</i>	One individual, Ketch Brook
Yellow warbler	<i>Setophaga petechia</i>	A few
Eastern towhee	<i>Pipilo erythrophthalmus</i>	Edges
Field sparrow	<i>Spizella pusilla</i>	South edge of field
Song sparrow	<i>Melospiza melodia</i>	Common
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	Several
Indigo bunting	<i>Passerina cyanea</i>	Several
Common grackle	<i>Quiscalus quiscula</i>	A few
Brown-headed cowbird	<i>Molothrus ater</i>	Several
Baltimore oriole	<i>Icterus galbula</i>	One individual, west edge

¹ Common and scientific names according to AOU (7th Edition) and supplements through 2016 (57th)

FIGURE A: Norcap North Solar Array Site, Wapping Road, East Windsor; showing avian survey routes on a 4-20-16 aerial photo (Google Earth)

KETCH BROOK

8/20/16
Start: 8:20 AM
End: 8:58 AM

8/6/16
Start: 7:38 AM
End: 9:14 AM

8/9/16
Start: 7:38 AM
End: 9:01 AM

Norcap North Solar Array Site, East Windsor, CT
Photos taken by REMA Ecological Services, LLC, on 8/6, 8/9, and 8/20/16



Photo 1: Central bare or sparsely vegetated portions of site; facing southwesterly



Photo 2: Northern edge of sparsely vegetated field; facing westerly.



Photo 3: Edge habitat along perimeter of site (typical); northeastern section; facing northeasterly



Photo 4: Mosaic of early successional and meadow habitat; northwestern section; facing southerly.

Norcap North Solar Array Site, East Windsor, CT
Photos taken by REMA Ecological Services, LLC, on 8/6, 8/9, and 8/20/16



Photo 5: Ketch Brook at northerly extent of overall site; facing westerly (downstream)



Photo 6: Ketch Brook; facing easterly (upstream).



Photo 7: American goldfinch at edge of the site

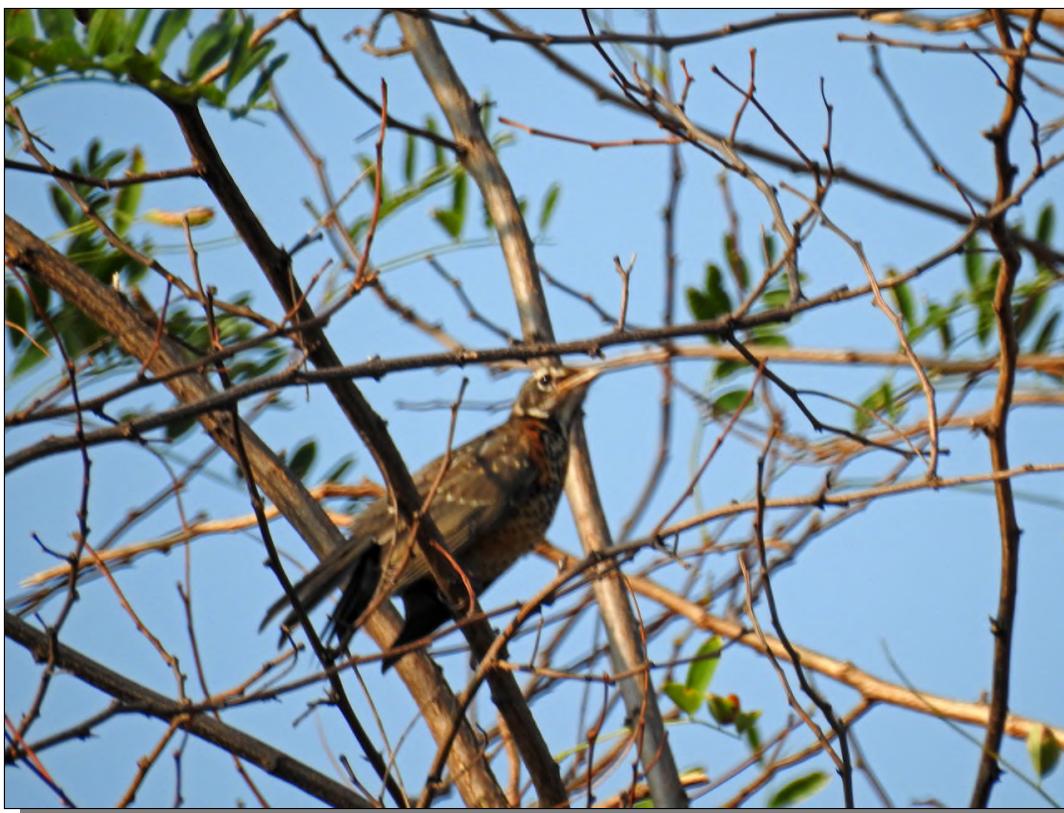


Photo 8: American robin (fledgling)



Photo 9: Indigo bunting (female) at woods edge



Photo 10: Juvenile green frog along Ketch Brook

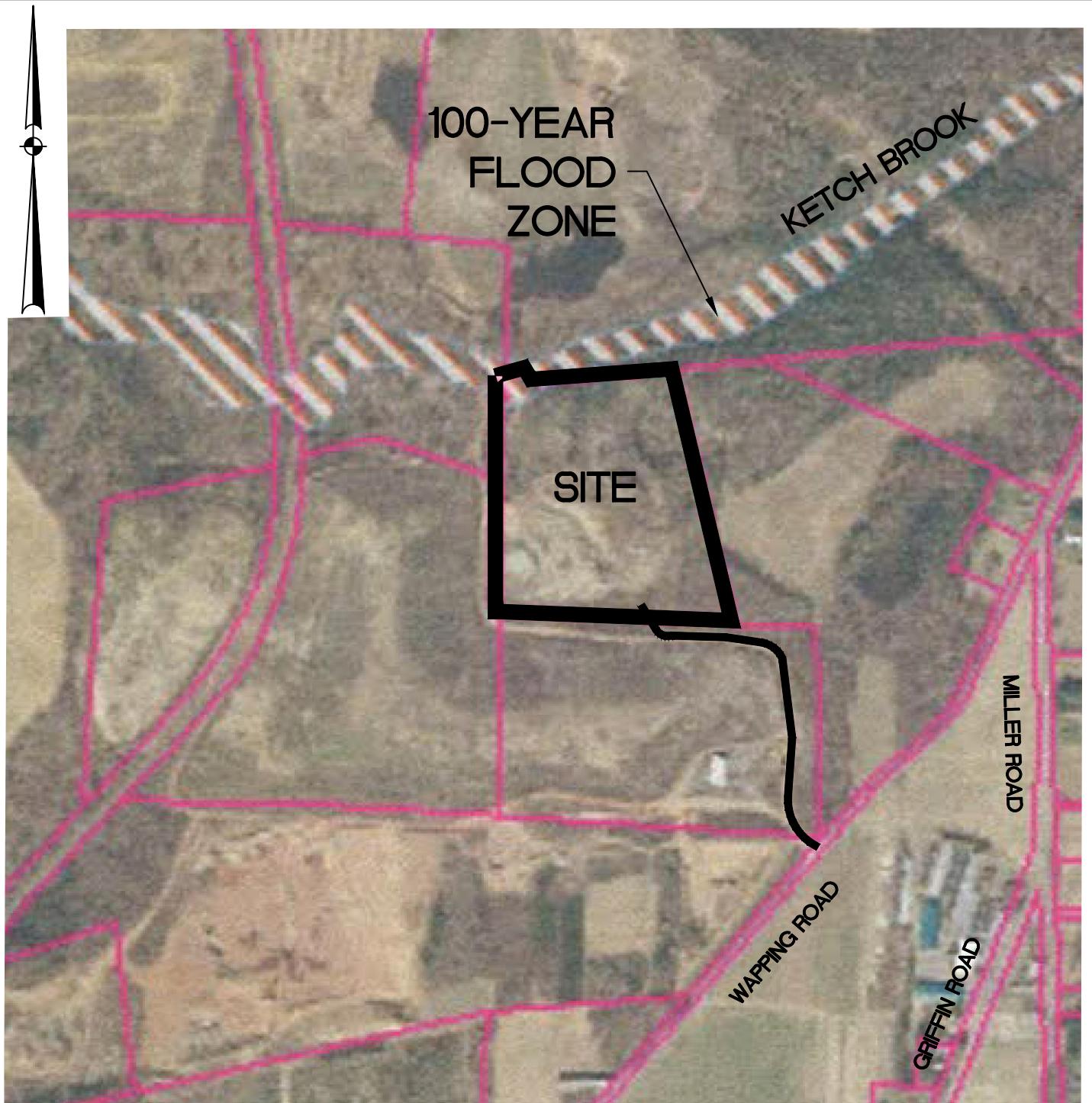
Norcap North Solar Array Site, East Windsor, CT
Photos taken by REMA Ecological Services, LLC, on 8/6, 8/9, and 8/20/16



Photo 11: Juvenile bull frog from wetland associated with Ketch Brook



Photos 12 & 13: Panoramic shots of site; from southwestern corner (top); from southeastern corner (bottom)



FLOOD MAP

*Norcap North
Solar Field*

Wapping Road
East Windsor, Connecticut

SOURCE:
EAST WINDSOR GIS W/FLOOD BOUNDARY
OVERLAYS



RUSSO
SURVEYORS • ENGINEERS
SERVING CT & MA

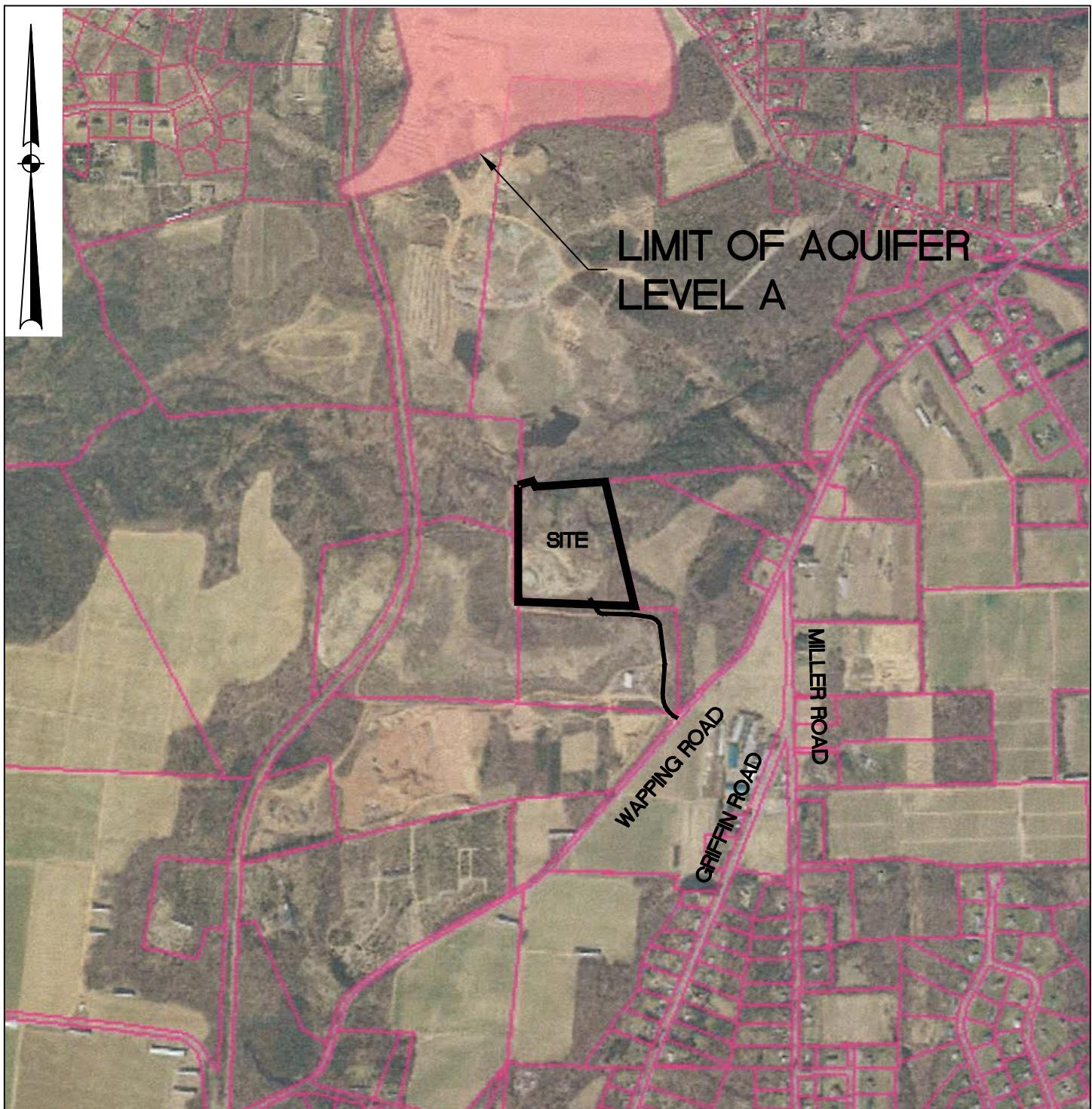
J.R. Russo & Associates, LLC
1Shoham Rd East Windsor, CT 06088 • CT 860.623.0569 • MA 413.785.1558
www.jrrusso.com • info@jrrusso.com

DATE
8-10-16

SCALE
1"=500'

JOB NUMBER
2016-037

HEET
EXHIBIT XII



AQUIFER MAP

*Norcap North
Solar Field*

Wapping Road
East Windsor, Connecticut



RUSSO
SURVEYORS • ENGINEERS
SERVING CT & MA

J.R. Russo & Associates, LLC
1 Shoham Rd East Windsor CT 06088 • CT 860.623.0569 • MA 413.785.1158
www.jrrusso.com • info@jrrusso.com

SOURCE:

EAST WINDSOR GIS W/2012 AERIAL
PHOTOGRAPH & AQUIFER BOUNDARY
OVERLAYS

DATE
8-10-16

SCALE
1"=1,000'

JOB NUMBER
2016-037

Sheet
EXHIBIT III



August 12, 2015

Catherine Labadia
Deputy State Historic Preservation Officer, Staff Archaeologist
State Historic Preservation Office
Department of Economic & Community Development
One Constitution Plaza, Second Floor
Hartford, CT 06103

Re: Request for Cultural Resources Review
Proposed Norcap North Solar Farm Development
Wapping Road
East Windsor, CT

Dear Ms. Labadia:

Lodestar Energy LLC (Lodestar), a developer of renewable energy projects, is currently developing plans for two ground mounted solar photovoltaic facilities at the Northern Capital Region Disposal Facility (NORCAP) on Wapping Road in East Windsor, Connecticut. In the near future, Lodestar plans to submit separate petitions to the Connecticut Siting Council (CSC) for approval of the two proposed projects. As part of the process, Lodestar is seeking written verification from the State Historic Preservation Office (SHPO) that the proposed projects will have no adverse effect on cultural resources. The purpose of this letter and the attachments is to provide your office with information regarding the Norcap North project location and planned construction activities to assist in your evaluation of the development. A request for review of the proposed Norcap South facility is being submitted under separate cover.

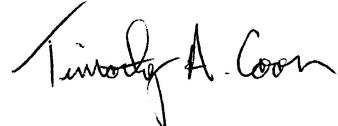
The Norcap North subject site consists of approximately 12 acres of undeveloped land, part of a larger 14.6 acre parcel located north of the existing capped landfill. With the exception of the very northern fringe of the proposed development, this site has been historically mined for gravel. Lodestar will enter into a lease agreement with NORCAP that will give them the right to construct, operate and maintain the solar farm. The project will involve the construction of approximately 10 acres of ground mounted solar photovoltaic panels and security fencing. Existing gravel drives will be used for access to the project sites. The work will include limited clearing and grubbing, grading, construction of accessways, layout and placement of foundation systems, racking, and solar PV panels, installation of utility pads and associated electrical equipment, installation of electrical conduit, conduit supports, electrical poles, and overhead wire, and security fencing. No existing structures will be impacted by the proposed project.

The following materials are attached to illustrate the location and current site conditions and assist in your review:

- SHPO Project Review Cover Form
- Property Card
- Vicinity Map (USGS Topographic Map)
- Preliminary Overall Plans w/ Aerial Photo Overlay
- NRCS Soils Map
- 1868 Historic Map

On behalf of Lodestar, J.R. Russo & Associates, LLC requests the assistance of your office in identifying archaeological or historic resources that may be affected by the Norcap North project and providing recommendations to mitigate or avoid potential impacts. We appreciate your assistance and timely response. Please let me know if you have any questions or require further information for your initial review.

Sincerely,

A handwritten signature in black ink, appearing to read "Timothy A. Coon".

Timothy A. Coon, P.E.
J.R. Russo & Associates, LLC

cc: Lodestar Energy, LLC



State Historic Preservation Office

One Constitution Plaza | Hartford, CT 06103 | 860.256.2800 | Cultureandtourism.org

PROJECT REVIEW COVER FORM

1. This information relates to a previously submitted project.

You do not need to complete the rest of the form if you have been previously issued a SHPO Project Number. Please attach information to this form and submit

SHPO Project Number _____
(Not all previously submitted projects will have project numbers)

Project Address _____
(Street Address and City or Town)

2. This is a new Project.

If you have checked this box, it is necessary to complete ALL entries on this form.

Project Name NORCAP North Solar Array

Project Location Northern Capital Region Disposal Facility, Wapping Road

Include street number, street name, and or Route Number. If no street address exists give closest intersection.

City or Town East Windsor

In addition to the village or hamlet name (if appropriate), the municipality must be included here.

County Hartford

If the undertaking includes multiple addresses, please attach a list to this form.

Date of Construction (for existing structures) _____

PROJECT DESCRIPTION SUMMARY (include full description in attachment):

Development of ground mounted solar photovoltaic facility. (see attached cover letter)

TYPE OF REVIEW REQUESTED

a. Does this undertaking involve funding or permit approval from a State or Federal Agency?

Yes No

Agency Name/Contact
Siting Council

Type of Permit/Approval
Declaratory Ruling

State	Federal
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

b. Have you consulted the SHPO and UCONN Dodd Center files to determine the presence or absence of previously identified cultural resources within or adjacent to the project area?

Yes No

If yes:

Was the project site wholly or partially located within an identified archeologically sensitive area?

Does the project site involve or is it substantially contiguous to a property listed or recommended for listing in the CT State or National Registers of Historic Places?

Does the project involve the rehabilitation, renovation, relocation, demolition or addition to any building or structure that is 50 years old or older?

**State Historic Preservation Office**

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PROJECT REVIEW COVER FORM

The Historic Preservation Review Process in Connecticut Cultural Resource Review under the National Historic Preservation Act – Section 106 <http://www.achp.gov/106summary.html> involves providing technical guidance and professional advice on the potential impact of publicly funded, assisted, licensed or permitted projects on the state's historic, architectural and archaeological resources. This responsibility of the State Historic Preservation Office (SHPO) is discharged in two steps: (1) identification of significant historic, architectural and archaeological resources; and (2) advisory assistance to promote compatibility between new development and preservation of the state's cultural heritage.

Project review is conducted in two stages. First, the SHPO assesses affected properties to determine whether or not they are listed or eligible for listing in the Connecticut State or National Registers of Historic Places. If so, it is deemed "historic" and worthy of protection and the second stage of review is undertaken. The project is reviewed to evaluate its impact on the properties significant materials and character. Where adverse effects are identified, alternatives are explored to avoid, or reduce project impacts; where this is unsuccessful, mitigation measures are developed and formal agreement documents are prepared stipulating these measures. For more information and guidance, please see our website at: <http://www.cultureandtourism.org/cct/cwp/view.asp?a=3933&q=293820>

ALL PROJECTS SUBMITTED FOR REVIEW MUST INCLUDE THE FOLLOWING MATERIALS*:

- PROJECT DESCRIPTION** Please attach a full description of the work that will be undertaken as a result of this project. Portions of environmental statements or project applications may be included. The project boundary of the project should be clearly defined**
- PROJECT MAP** This should include the precise location of the project – preferably a clear color image showing the nearest streets or roadways as well as all portions of the project. Tax maps, Sanborn maps and USGS quadrangle maps are all acceptable, but Bing and Google Earth are also accepted if the information provided is clear and well labeled. The project boundary should be clearly defined on the map and affected legal parcels should be identified.
- PHOTOGRAPHS** Clear, current images of the property should be submitted. Black and white photocopies will not be accepted. Include images of the areas where the proposed work will take place. May require: exterior elevations, detailed photos of elements to be repaired/replaced (windows, doors, porches, etc.) All photos should be clearly labeled.

For Existing Structures	Yes	N/A	Comments
Property Card	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
For New Construction	Yes	N/A	Comments
Project plans or limits of construction (if available)	<input type="checkbox"/>	<input type="checkbox"/>	
If project is located in a Historic District include renderings or elevation drawings of the proposed structure	<input type="checkbox"/>	<input type="checkbox"/>	
Soils Maps http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm	<input type="checkbox"/>	<input type="checkbox"/>	
Historic Maps http://magic.lib.uconn.edu/	<input type="checkbox"/>	<input type="checkbox"/>	
For non-building-related projects (dams, culverts, bridge repair, etc)	Yes	N/S	Comments
Property Card	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Soils Map (see above)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Historic Maps (see above)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
SHPO USE ONLY	Above	Date	Below
Indicate date of Review and Initials of Reviewer			Date

PROJECT CONTACT

Name Timothy A. Coon Title Project Engineer
Firm/Agency J.R. Russo & Associates, LLC
Address 1 Shoham Road
City East Windsor State CT Zip 06088
Phone 860-623-0569 Cell Fax 860-623-2485
Email tcoon@jrrusso.com

*Note that the SHPO's ability to complete a timely project review depends largely on the quality of the materials submitted.

** Please be sure to include the project name and location on *each page* of your submission.



State Historic Preservation Office

One Constitution Plaza | Hartford, CT 06103 | 860.256.2800 | Cultureandtourism.org

PROJECT REVIEW COVER FORM

SHPO USE ONLY

Based on our review of the information provided to the State Historic Preservation Office, it is our opinion that:

- No historic properties will be affected by this project. No further review is requested.
- This project will cause no adverse effects to the following historic properties. No further review is requested:
- This project will cause no adverse effects to the following historic properties, conditional upon the stipulations included in the attached letter:
- Additional information is required to complete our review of this project. Please see the attached letter with our requests and recommendations.
- This project will adversely affect historic properties as it is currently designed or proposed. Please see the attached letter for further details and guidance.

Daniel T. Forrest
Deputy State Historic Preservation Officer

Date

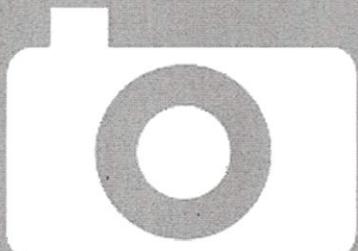


Property Information

Owner	NORTHERN CAPITAL REGION DISPOSAL	
Address	WAPPING RD	
Mailing Address	321 OLCOTT ST MANCHESTER, CT 060400000	
Land Use	- Residential	
Land Class	Vacant Land	
Previous MBL	36-65 027A	

Census Tract	
Neighborhood	08
Zoning	A-1
Acreage	14.64
Utilities	
Lot Setting/ Desc	/

Photo



PARCEL VALUATIONS (Assessed value = 70% of Appraised Value)

	Appraised	Assessed
Buildings		
Outbuildings		
Improvements		
Extras		
Land		
Total	41971	29380
Previous		

Construction Details

Stories	
Building Style	
Building Use	
Building Condition	
Total Rooms	
Bedrooms	0
Full Bathrooms	
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

EXTERIOR WALLS:

Primary	
Secondary	

BUILDING AREA:

Effective Building Area	
Gross Building Area	
Total Living Area	

INTERIOR WALLS:

Primary	
Secondary	

FLOORS:

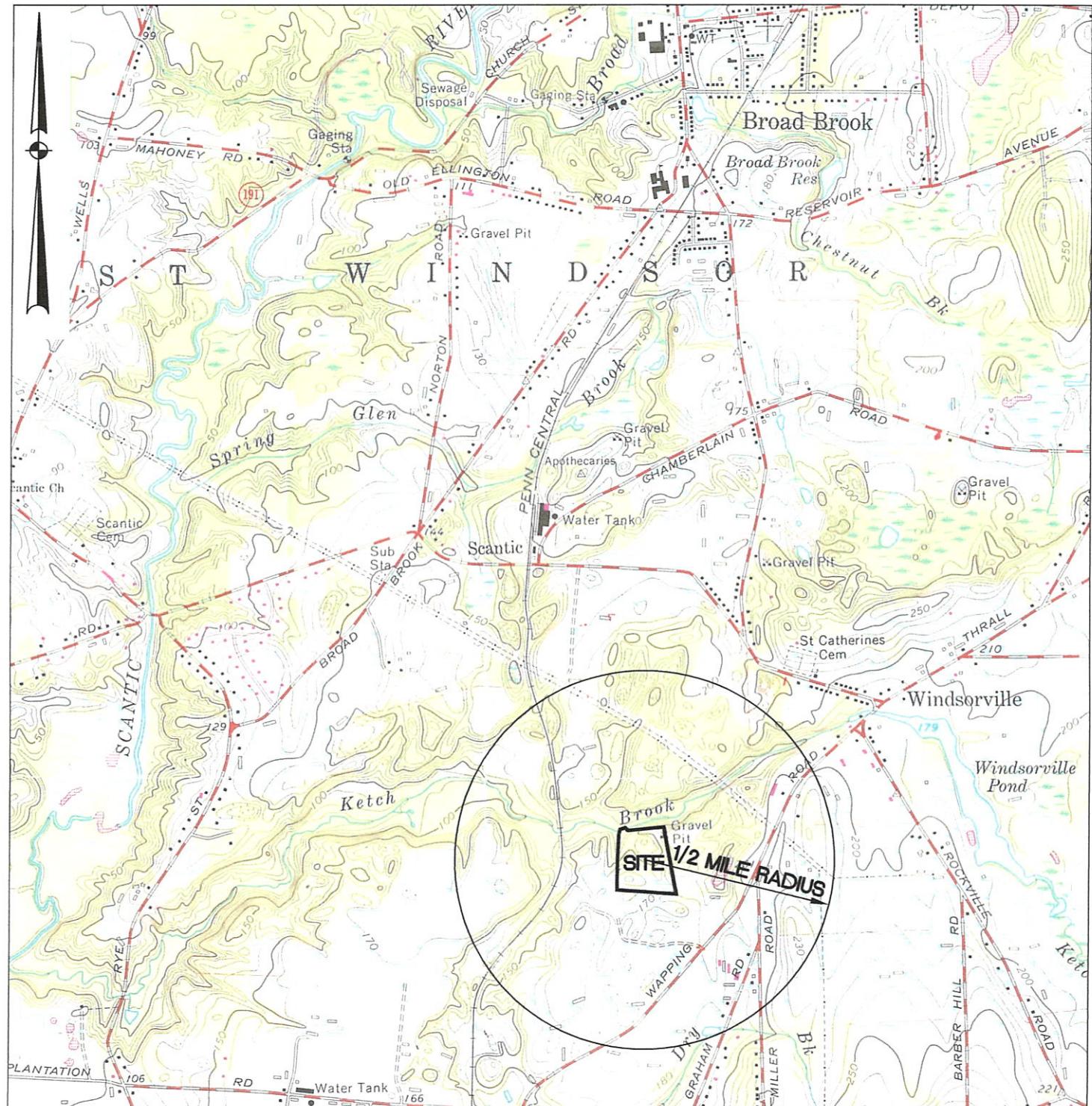
Primary	
Secondary	

SALES HISTORY:

Sale Date	04/09/1997
Sale Price	292820
Book/ Page	0195/0616

HEATING/AC:

Heating Type	
Heating Fuel	
AC Type	



VICINITY MAP

Norcap North Solar Field

Wapping Road
East Windsor, Connecticut



RUSSO

SURVEYORS • ENGINEERS
SERVING CT & MA

o & Associates, LLC

DATE

8-10-16

SCALE

1" = 2,000'

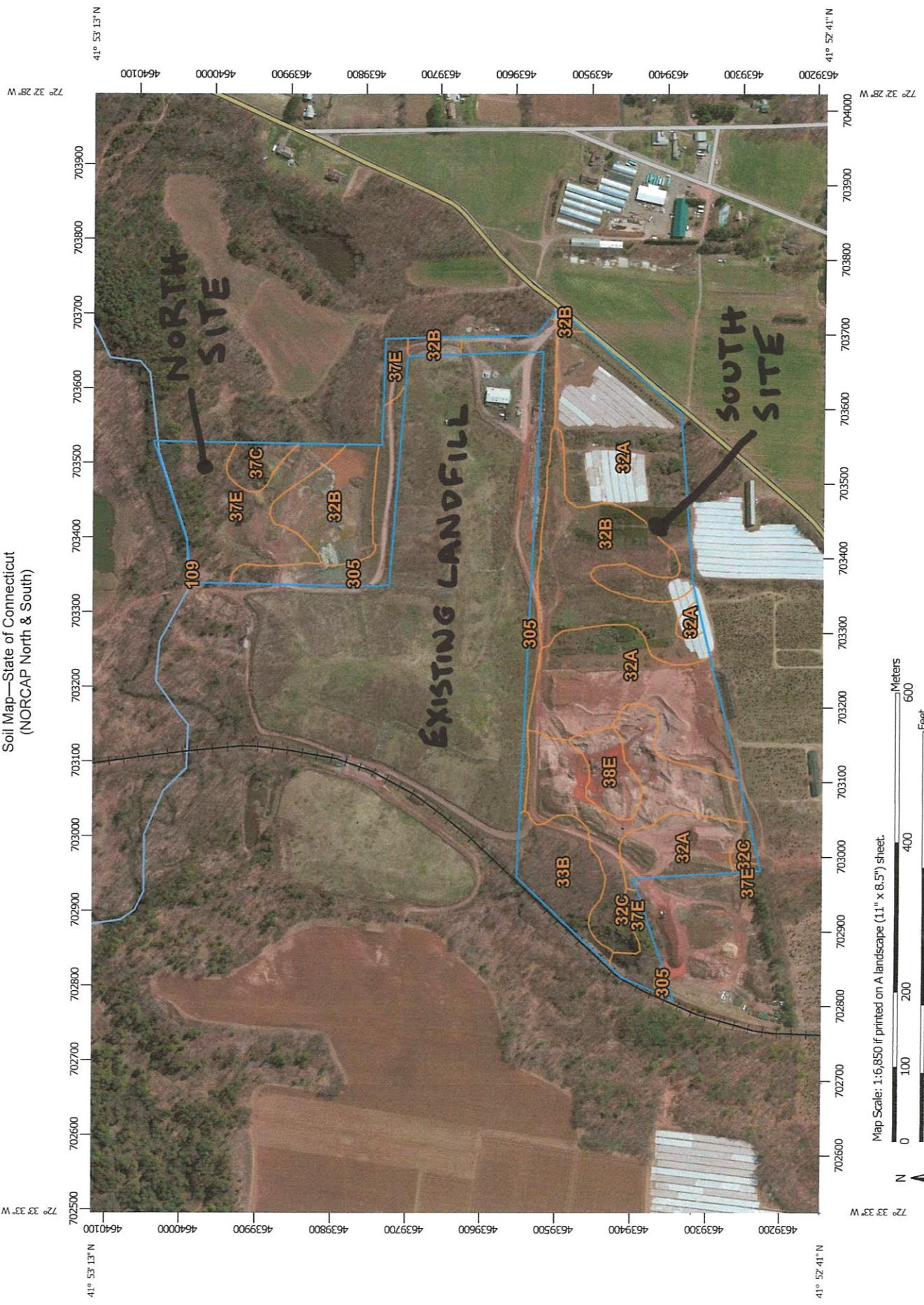
B NUMBER

SHEET

SHEET
EXHIBIT 1

SOURCE:
BROAD BROOK, CT USGS QUADRANGLE
PHOTOREVISED 1972

Soil Map—State of Connecticut
(NORCAP North & South)



MAP LEGEND

Area of Interest (AOI)		Area of Interest (AOI)
Soils		Soil Map Unit Polygons
		Soil Map Unit Lines
		Soil Map Unit Points
Special Point Features		Blowout
		Borrow Pit
		Clay Spot
		Closed Depression
		Gravel Pit
		Gravelly Spot
		Landfill
		Lava Flow
		Marsh or swamp
		Mine or Quarry
		Miscellaneous Water
		Perennial Water
		Rock Outcrop
		Saline Spot
		Sandy Spot
		Severely Eroded Spot
		Sinkhole
		Slide or Slip
		Sodic Spot
Water Features		Streams and Canals
Transportation		Rails
		Interstate Highways
		US Routes
		Major Roads
		Local Roads
Background		Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 14, Sep 22, 2015

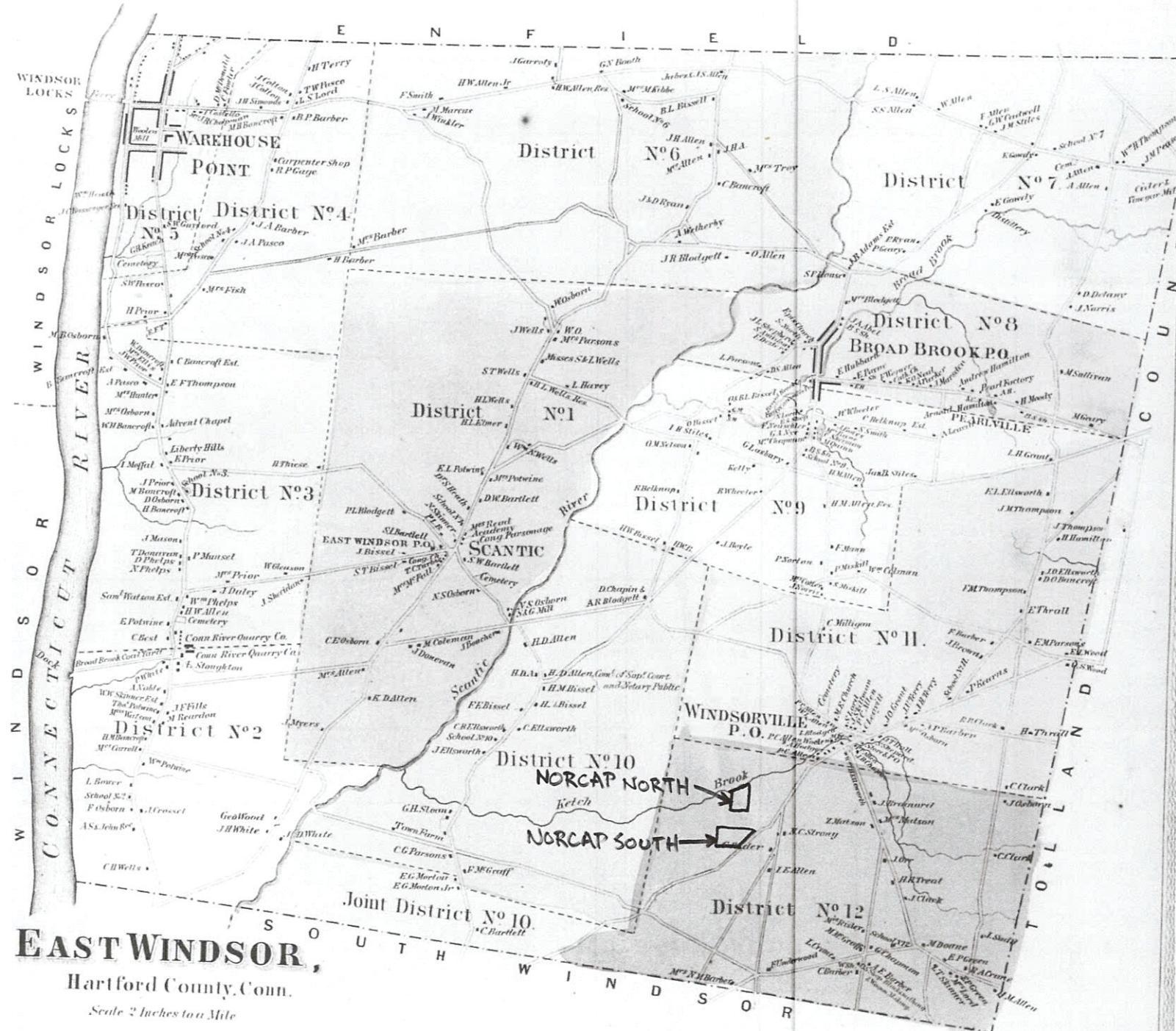
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 28, 2011—Apr 18, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
32A	Haven and Enfield soils, 0 to 3 percent slopes	21.1	34.8%
32B	Haven and Enfield soils, 3 to 8 percent slopes	11.8	19.6%
32C	Haven and Enfield soils, 8 to 15 percent slopes	7.6	12.6%
33B	Hartford sandy loam, 3 to 8 percent slopes	3.4	5.6%
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes	1.0	1.6%
37E	Manchester gravelly sandy loam, 15 to 45 percent slopes	8.0	13.2%
38E	Hinckley loamy sand, 15 to 45 percent slopes	1.7	2.8%
109	Fluvaquents-Udifluvents complex, frequently flooded	0.0	0.0%
305	Udorthents-Pits complex, gravelly	5.8	9.6%
Totals for Area of Interest		60.5	100.0%



G3784
E6
185-
E6



RABER ASSOCIATES

CONSULTANTS IN THE HISTORICAL AND SOCIAL SCIENCES

October 17, 2016



Catherine Labadia
Deputy State Historic Preservation Officer, Staff Archaeologist
State Historic Preservation Office
Connecticut Commission on Culture and Tourism
One Constitution Plaza, Second Floor
Hartford, CT 06103

***RE: Norcap North Solar Development
Town of East Windsor, Connecticut***

Dear Ms. Labadia:

This letter and the attached report supplement the letter sent to you on August 11, 2016 by Timothy Coon of J.R. Russo & Associates LLC, summarizing the Norcap North and Norcap South solar developments and requesting any evaluation you might have. Lodestar Energy LLC (Lodestar), a developer of renewable energy projects, will submit separate petitions to the Connecticut Siting Council (CSC) for approval of the two proposed projects. Based on past experience with similar projects, Raber Associated has completed the attached cultural resources assessment and reconnaissance survey for the Norcap North Project, including discussion of any potential viewshed impacts on structures listed or eligible for listing on the National Register of Historic Places. A separate report on the Norcap South Project will be submitted in the near future.

In brief, the survey found that sand and gravel extraction and related operations appear to have removed all Holocene soils except along a narrow area at the north end of the area of proposed Project effects. Three shovel tests completed in this area recovered no cultural material, and two of the tests appeared to have been stripped of Holocene soils during the gravel operations. No subsurface cultural resources eligible for the National Register of Historic Places appear to exist within proposed Project limits. Historic resource surveys and listings of architectural properties on the National Register of Historic Places indicate no such properties listed, eligible, or potentially eligible for the National Register are located within approximately 1.5 miles of the Project area. Based on the criteria used in prior evaluations of visual effects, there appear to be no potential adverse visual effects from proposed construction.

No further cultural resource investigations, or protective measures to address indirect visual effects, appear necessary. Please contact me if you have any questions or concerns.

Sincerely,

Michael S. Raber

Attachment

xc: Adam Beal, Lodestar Energy LLC
Timothy Coon, J.R. Russo & Associates LLC

81 Dayton Road • P.O. Box 46
South Glastonbury • CT 06073
(860) 633-9026 voice/fax)/msraber@aol.com (e-mail)

RABER ASSOCIATES

CONSULTANTS IN THE HISTORICAL AND SOCIAL SCIENCES



CULTURAL RESOURCES INVESTIGATIONS

FOR PROPOSED NORCAP NORTH SOLAR DEVELOPMENT

WAPPING ROAD, EAST WINDSOR, CONNECTICUT

Michael S. Raber

prepared for:

Lodestar Energy LLC
3 Ellsworth Place, Suite 122
Avon, CT 06001

October 2016

81 Dayton Road • P.O. Box 46
South Glastonbury • CT 06073
(860) 633-9026/msraber@aol.com

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- 1. LOCATION OF NORCAP NORTH PROJECT ON BROAD BROOK, CONN. U.S.G.S. 7.5-MINUTE QUADRANGLE**
- 2. AREA OF PROPOSED DISTURBANCE, LIMITS OF PAST GRAVEL OPERATIONS, AND RECONNAISSANCE SHOVEL TEST PITS**
- 3. 2016 PROJECT AREA CONDITIONS AND PREVIOUS DISTURBANCE**
- 4. PROJECT AREA AND VICINITY IN 1934 AND 1965**

I. INTRODUCTION

Lodestar Energy LLC (Lodestar), a developer of renewable energy Projects, is currently developing plans for a ground-mounted solar photovoltaic facility at the Northern Capital Region Disposal Facility (NORCAP) on Wapping Road in East Windsor, Connecticut. Lodestar will submit a petition to the Connecticut Siting Council (CSC) for a declaratory ruling that no certificate of environmental compatibility and public need is required for the proposed Project. Among the issues to be addressed for approval of the Project's environmental compatibility, potential Project effects on cultural resources must be reviewed by the Connecticut State Historic Preservation Office (SHPO) under the Connecticut Environmental Policy Act (Connecticut General Statutes Chapter 439 Section 22a), Connecticut General Statutes Section 221-90 (1)(J), and under Section 16-50k(a) of the Public Utilities Environmental Standards Act (PUESA). Cultural resources subject to review under these acts include historic architectural properties, historic industrial or engineering resources, and pre-Contact or Euroamerican archaeological sites eligible for the state or national registers of historic places. Lodestar has provided SHPO with Project information, and based on past experience with similar Projects has initiated a professional cultural resources assessment and reconnaissance survey, including potential viewshed impacts on structures listed or eligible for listing on the National Register of Historic Places (letter, Timothy A. Coon to Catherine Labadia, August 11, 2016). To be eligible, cultural resources must possess physical integrity and meet at least one of the following criteria:

- A. Association with important historic events or activities;
- B. Association with important persons;
- C. Distinctive design or physical characteristics, including representation of a significant entity whose individual components may lack distinction;
- D. Potential to provide important information about prehistory or history.

Lodestar retained Raber Associates to conduct the investigations, which were completed to standards of the SHPO *Environmental Review Primer for Connecticut's Archaeological Resources*, and the Secretary of the Interior's "Standards for Archaeology and Historic Preservation" for Identification, Evaluation and Planning. Michael S. Raber acted as principal investigator. Marc L. Banks acted as project archaeologist. Background and field investigations were conducted in August 2016.

II. PROJECT AREA, PROJECT DESCRIPTION AND ENVIRONMENTAL CONTEXT

The Norcap North Project area consists of approximately 12 acres of undeveloped land, part of a larger 14.6 acre parcel located north of an existing capped landfill. With the exception of the very northern fringe of the proposed development, this site has been historically mined for gravel. The Project will involve the construction of approximately 10 acres of ground-mounted solar photovoltaic panels and security fencing. An existing gravel drive will be used for construction and operations access. The Project will include clearing and grubbing, grading, layout and placement of foundation systems, racking, and solar PV panels, installation of utility pads and associated electrical equipment, installation of electrical conduit, conduit supports, electrical poles, and overhead wire, and security fencing. No existing structures will be impacted by the proposed Project. The solar panels are expected to be supported on steel posts, and will extend approximately 8 feet above graded surfaces at the upper end of tilted panel surfaces (Figures 1-3; J.R. Russo & Associates LLC 2016).

The Project area lies within Connecticut's Central Valley or Central Lowlands (sometimes known as North-Central Lowlands physiographic province. The valley, known to geologists as the Hartford Basin, is predominantly a lowland with "red-bed" Triassic sedimentary sandstone and arkose bedrock which slopes down to the east. The lowland is generally characterized by broad level surfaces in which the Connecticut River and most tributaries meander with limited slope, except where the waters encounter higher bedrock deposits. The bedrock underlies the lowland at varying depths, below relatively small-sized glacial till which is well covered in most places north of Rocky Hill by level deposits associated with late-glacial Lake Hitchcock and its smaller predecessor Lake Middletown. Project area bedrock depths are estimated to exceed 50 feet below the surface. Lake Hitchcock drowned the lowland along 150 miles of the present river course some 11-13,000 years ago. Lake deposits included fine silts and clays later exploited for brick manufacture, broad sandy deltaic fans or terrace deposits around larger tributary streams, and beach deposits of reddish brown sand, silt and gravel. Well-developed post-glacial sand dunes and other aeolian deposits are locally extensive above the lake and terrace deposits. After Lake Hitchcock drained, the river cut through the lake deposits, indifferent in most places to the erosible arkose, to create the gradual river slope seen in most of the lowland today. The Project area is drained by the Ketch Brook tributary of the Scantic River sub-basin of the Connecticut River. Ketch Brook flows just north of the Project area, and runs through high, steep deposits of collapsed stratified glacial drift and deltaic deposits associated with Lake Middletown (Figure 1; Colton 1965; Hyde and Colton 1973; Dowhan and Craig 1976; Rodgers, ed. 1985; Bell 1985; Stone *et al.* 1998).

Until the second quarter of the 20th century, the north section of the Project area included the lower slopes of these deposits, on which Holocene soil development included excessively-drained Manchester gravelly sandy loam and Terrace Escarpment sand-and-gravel soils. A small kame terrace with Terrace Escarpment soils rose above the southwest corner of the Project area. Remaining Project areas had moderately sloped, well-drained Enfield silt loam soils. The sand and gravel deposits, and irregular terrain, probably inhibited agricultural development in most of this area, and encouraged the gradual extraction of sand and gravel beginning by the 1930s. Sand and gravel extraction and related operations appear to have removed all Holocene soils except along a narrow slope on the south edge of the steep late glacial terrace or stratified drift deposits (Figures 1-4; Fairchild Aerial Survey 1934; U.S. Geological Survey 1944; Robinson Aerial Surveys 1951-52; U.S. Department of Agriculture 1962; Keystone Aerial Surveys, Inc. 1965; Colton 1965; Connecticut Department of Energy and Environmental Protection 2010).

Immediately northwest of the Project area, the Ketch Brook floodplain widens for a considerable distance downstream. In some periods of Native American and Euroamerican occupation, the brook likely provided freshwater and anadromous fish as prey, along with birds and mammals attracted to fresh water. Wetland plants may also have provided seasonal resources.

III. BACKGROUND DATA AND CULTURAL RESOURCE SENSITIVITY

A. Native American Resources

1. Summary of Regional Background Material

There are no reported Native American sites within at least several miles of the Project area, although this absence of data may reflect limited archaeological investigation rather than a lack of Native American activity in this vicinity. The nature and distribution of reported sites in central Connecticut probably reflects a wide variety of natural resources once available to Indian peoples, from shellfish, finfish, waterfowl and plants along the Connecticut River to seasonally-available mammals, birds, and fish on tributary drainages such as Ketch Brook. These resources were probably used in several types of settlement pattern, revealed in archaeological research conducted primarily after the mid-20th century. Prior to the introduction of agriculture in southern New England late in the first millennium A.D., archaeological evidence suggests there was generally more seasonal movement and less semi-permanent settlement through periods extending back to the earliest Native Americans in this region in Paleoindian times (c12,000-10,000 B.P.). By Middle Archaic times, c6,000-8000 B.P., seasonal resource use was well established, and site types included spring fishing camps along major streams (Dincauze 1976; Barber 1981). During Late Archaic times, there may have been a shift from seasonal or task-specific occupation of knolls just above floodplain elevations to larger seasonal camps on terraces adjacent to the floodplain as well as knolls within floodplain areas. In Woodland and early historic/Contact times (c3,000-400 years ago), Native American settlement patterns in central Connecticut focused on semi-permanent villages near planting fields, with seasonal movements to hunting or sheltered winter camps, and continual short trips to hunt or collect mammals, fish, shellfish, and a wide variety of plant resources. The larger settlements in these periods were along the Connecticut River and its coves, with relatively level, well-drained areas along the upper river and its tributaries probably used for short-term or winter activities. The Late Woodland Period (c1,200-450 B.P.) is characterized regionally by the intensive use of maize, beans, and squash. Approximately 2 miles east of the Project area the Late Woodland Fox Run 2 Site (Site No. 47-11) included a feature, radiometrically dated to 600 ± 60 B.P., with includes charred maize and other organic materials. Fox Run 2 is one of a very small number of Connecticut Native American sites with charred maize, and the only one reported a mile or more from a coastline or major river. Archaeological work during the past few decades also suggests that the Farmington River Valley, a short distance from the Project area, was a relatively self-contained region for Native American social geography beginning in Late Archaic times (McBride 1978, 1984; Feder 1981; Raber 1997; Forrest 1999; Banks 2000; Jones and Forrest 2003; Forrest *et al.* 2006; Lavin 2013).

By the 1630s, when direct European contact was felt throughout Connecticut's coasts and larger rivers, Indians were organized in groups of small households which banded together along ethnic and territorial lines in larger villages during the spring and summer and dispersed during other seasons. These small groups engaged in hunting, fishing, and gathering of wild plant foods, and in the later prehistoric period were engaged in maize horticulture. During the Contact period, trapping of beaver and other fur-bearing animals was an important economic activity. In the late prehistoric and contact periods, settlement was focused on or adjacent to the flood plains of the major tributaries, reflecting the importance of agricultural activities, fishing, and access to transportation and communication routes. Planting in the spring and capture of anadromous fish at waterfalls and choke points brought together households. Upland areas were used for hunting, trapping, and gathering from the late summer through the winter by the component household groups of the larger ethnic divisions.

For reasons which remain unclear, there appears to be a strong correlation between the territorial boundaries of Indian ethnic groups and drainage boundaries by the 1630s. Social boundaries among the Algonquian-speaking Indians of southern New England were not rigid, and political organization for most purposes was loose, with male and occasionally female sachems recognized in limited spheres of authority. With fur trade, however, political and territorial boundaries hardened and the fortified villages observed by the Europeans may date to this era of inter-tribal conflicts. Competition for trapping grounds and access to

fur markets became intense in the early seventeenth century, and some English adjudication of such matters in Connecticut during later decades used drainage boundaries as political boundaries. There is evidence from other parts of New England for at least a historic period pattern of territoriality based on drainages, and to some extent this pattern probably predates European contact. We can only surmise at this point that stream locations and water resources were always important in determining the movement of game animals and their human predators, while at the same time watercourses were often effective avenues of travel in upland areas. With competition for fur animals, both initial demands for trapping grounds and expansion of these grounds as downstream areas were depleted of furs may have resulted in attempts to control headwater areas for the first time.

In the early 17th century, there was a substantial population of Native Americans in the Connecticut River Valley. The Algonquian-speaking peoples who lived there had practiced agriculture for 500-700 years, but they also continued to hunt, gather, and fish to supplement the crops from their fields. River meadows were the primary areas of maize cultivation (Stiles 1891). The Enfield Rapids would have been an obvious location for seasonal fishing camps, and there were probably villages with cultivated fields in the nearby area as well. Smaller bands hunted in this area in the fall and winter. The earliest white explorer, Adriaen Block, saw an Indian fort along the river above Hartford in 1614. European explorers and colonists, confused about the organization of and identification of various tribes and bands, have left us with many conflicting accounts of tribal names and leadership. Historians, responding to this confusion, have often referred to the many groups on the Connecticut River as the River Tribes. From early sources we see references to the Tunxis who lived to the west on the Farmington River, the Poquonocks at present Windsor, the Massacos above the Poquonocks near Simsbury, and the Sicaogs in present West Hartford. The territory of the Agawam, centered at present Springfield, extended as far south as Stony Brook in Suffield and at about the present border of Enfield and East Windsor. One authority has estimated the pre-epidemic population of these five "sachemdoms" at 3200 (Cook 1976: 57, 61-65). There were also Mattabesecs, Wongunks, and Hammonassets south of Hartford. The Project area lies within the former territory of the Podunks, who occupied lands on the east side of the Connecticut river south of the Agawam to about Keeney Cove in present Glastonbury, and from whom some sources say English settlers purchased land rights in Enfield (Spiess and Bidwell 1924; Ingersoll, ed., 1934). To the south and east, larger tribes such as the Niantics, Pequots, and Mohegans lived along the coast and in interior areas (Cook 1976; DeForest 1851).

The Podunk population c1630 has been estimated at about 1600 people, who lived in six or seven villages and perhaps an unknown number of smaller winter encampments. Most of their principal villages were located on the Scantic, Podunk, and Hockanum rivers in present East Hartford, South Windsor, and Manchester, although some sources place two smaller villages in East Windsor, on the Scantic in the vicinity of present Broad Brook village and near the mouth of Namerick Brook. Given the models of settlement discussed above for prehistoric periods, small temporary camps or task-specific resource-procurement sites were probably dispersed within short distances of the villages. Known Podunk burial grounds were in South Windsor, on the Podunk River and opposite the mouth of the Farmington River. Burials found elsewhere, such as some at Warehouse Point uncovered before the early 19th century, have been attributed to the Podunk but could be from earlier groups (McClure 1806; Stiles 1891; Spiess and Bidwell 1924; Ingersoll, ed., 1934; Cook 1976).

The Dutch West India Company began a small trading post at later Hartford in 1623, stimulating a trade in furs which led to conflicts among Amerindian tribes. The Podunks and other River Tribes soon found themselves at odds with the larger Pequot and Mohegan groups of the Thames River drainage. The advent of English settlement around Hartford in the 1630s was in part a response to an invitation from a River Tribe sachem who may have been a Podunk. The Podunk sold land rights to English settlers of early Windsor in 1636, although there was no English settlement east of the river until the 1660s (Stiles 1891). The Mohegans, subservient to the Pequots until the Pequot War of 1637, claimed large areas of the Connecticut Valley and eastern highlands following the defeat of the Pequots. The Mohegans, under their leader Uncas, became the most important Indian political force in eastern Connecticut, using alliances with the English to subjugate or outmaneuver Indian opponents in the region. Uncas was involved in wars or serious quarrels

with nearly every Indian group in the region between the Pequot War and King Philip's War of 1676. Many of these disputes originated over control of fur trade resources and markets. During this period of conflict, the English settled affairs between the Mohegan and the Podunk by defining a boundary between them running through Bolton Notch in 1666. This line corresponds approximately to the drainage divide between the Connecticut and Thames River basins. The Mohegan may have retained a later claim to Podunk lands near the Connecticut River through Uncas' son Joshua, whose wife was willed these areas c1672 by her father, a Podunk or Sicaog sachem (Stiles 1891).

The Podunk evidently survived a 1633-34 smallpox epidemic which devastated native populations on the west side of the river around Hartford, and retained a viable military presence until about the time of King Philip's War. By the 1670s, the hunting and trapping grounds of southern New England were probably depleted as sources of Indian income, and those groups which had survived the disease and warfare of the early Contact period had begun trading land rights or money, goods, or political security. Although they resisted being drawn into tributary relations with the Pequot or Mohegan, the Podunk suffered occasional attacks from the Iroquoian Mohawks from New York, who also tried to control trade networks. The decline of the Podunk in the late 17th century is not well documented, but has been associated with Mohawk attacks and the choice by many Podunk to side with the unsuccessful Indian alliance against the English during King Philip's War. It is possible, though not documented, that the large Indian site in Enfield near Indian Run Road may in part represent a Podunk fort from this period. In 1678 and 1680, English settlers based primarily in Springfield purchased some land rights from the Podunk in present Enfield, but there is little published information on Contact-era Native American groups in this town. Small numbers of Podunk lived in East Windsor into the third quarter of the 18th century, and some were present in Manchester into the early 19th century (Stiles 1891; Speiss and Bidwell 1924; Bridge, ed. 1977: 5-7; Miller 1998).

2. Potential Issues in Project Area

In environments such as the Project area, Native American subsurface resources typically appear in well-drained soils, often in proximity to wetlands and streams. Although gravel extraction and related operations have removed most Holocene soils in the Project area, the limited areas of possible intact well-drained soils left open the possibility of Native American archaeological sites, most likely representing short-term hunting and gathering episodes. Intact evidence of small seasonal Native American occupations might yield significant new information on Native American upland settlement in the central Connecticut lowland. In particular, the use of upland areas for small sites of seasonal, temporary, or specialized activities such as fishing, and the relation of such sites to larger, more permanent encampments along major streams, remain issues of regional archaeological importance.

B. Euroamerican Resources

The Connecticut River was always an important travel corridor for early European settlers. Dutch explorer Adrien Block sailed upriver to the bottom of Enfield Rapids in 1614, the first serious obstacle for small sailing vessels, but no serious attempts at European settlement began on the river for almost another twenty years. The Dutch West India Company began a small trading post at later Hartford in 1623, completing a small fort a decade later on the eve of English settlement from the Plymouth and Massachusetts Bay colonies, which soon pushed out the Dutch. Families from Dorchester, Massachusetts began the permanent English settlement of Windsor in 1635-36, and edged out a group of fur traders from Plymouth Colony who had arrived in 1633 as well as small group arriving in 1635 with a patent from an English nobleman. Along with Hartford and Wethersfield, Windsor was one of Connecticut's first three English towns. Like many of the early river towns, Windsor began as a small fortified settlement near riparian meadows, in this instance at the mouth of the Farmington River, a major east-flowing Connecticut River tributary. Settlement quickly developed along a road parallel to Connecticut River meadows, and gradually dispersed along the Farmington's meadows as well. Alluvial meadows were the most immediately attractive cultivable areas for these English families, most of whom grew grain and managed small numbers of sheep and cattle. Windsor included present East Windsor and South Windsor, but Windsor's small population and the continued

occupation of the Podunk restricted nearly all English settlement east of the river until after King Philip's War. Prior to that conflict, English use of present East or South Windsor included the Bissell Ferry, a small number of homes along present Route 5, and the beginnings of that road as a link between Warehouse Point and Hartford. The Bissell ferry, authorized by the General Assembly in 1641 and operating by 1648, was among the earliest in the United States and ran until after the Revolution. It was located near the mouth of the Scantic River by at least c1667, but one source places the original ferry at a point on the river about opposite the Project area (Stiles 1892, I: 412, 497-8; 535-42; Potwin 1952; DeVito 1968: 12).

While the Connecticut river towns were establishing a new government in 1636, William Pynchon established a settlement upriver at Agawam, later Springfield, with a party from Roxbury, Massachusetts. This was the first European settlement on the river above Enfield Rapids, and the basis for the later founding of Suffield and Enfield. Pynchon had to use canoes or wagons for any movement of goods beyond the rapids, and soon set up transhipment facilities at Warehouse Point, on the east side of the river below the rapids. Massachusetts Bay authorized his monopoly on fur trade with the upper river basin's Native Americans in 1638, and, in 1648, gave Springfield rights on the east side of the river to a point just below Pynchon's warehouse (Winch 1886: 139). Windsor's prior claim to some of this land was one of many boundary issues requiring over a century of argument and adjustment, the most notable of which was Massachusetts' 1642 Woodward and Saffery survey which overextended the colonial border to the south by several miles.

William Pynchon's son John took over the family's extensive business and political responsibilities in 1652, and sought new outposts between Springfield, Warehouse Point, and the Connecticut river towns within the disputed area. Following land purchases from local Native Americans, he spearheaded the settlement of Suffield in 1670 and Enfield in 1679. Suffield was abandoned during King Philip's War, but quickly resettled in 1677. Windsor families moved east of the river after this conflict, establishing a separate parish in 1694 which included an area claimed by Enfield. Resolution of the boundary issues c1713-49 put Enfield and Suffield in Connecticut, and confirmed the limits between Suffield and Windsor, and Enfield and East Windsor; the latter community became a town in 1768.

The towns around Enfield Rapids agricultural economies and relatively dispersed settlement patterns typical of 18th-century Connecticut river towns, exporting produce and livestock to metropolitan and West Indian markets. East Windsor settlement after c1680 followed a model used in other river towns, with large 3-mile-long tracts granted perpendicular to the river to give families meadow, upland agricultural, and woodlot resources. In addition to livestock and produce, seasonal capture of shad and salmon at several points remained important well into the 19th century. By the 1730s, areas east of the river were more intensively settled as use of pine tar for naval stores increased. Grist, saw, and fulling mills appeared on local streams to process household grain, lumber, and woolen or flax cloth goods. Flax also supplied linseed processed at local oil mills, and cider mills flourished as well. Until the 1830s, Warehouse Point remained a small but important transhipment center until well into the 19th century, and the only nucleated river community along the Enfield Rapids. Boat and ship yards operated here and in Windsor, and to a less extent just above the rapids in Suffield. Warehouse Point was well-placed to manufacture and ship commodities for the coastal and West Indies trades. By the early 19th century, gin distillers operated on both sides of the river, part of a large Hartford county trade which capitalized on the river route and the lowland climate conducive to rye culture. East Windsor had six distilleries by 1819, the largest of which were at Warehouse Point. Local distilling lasted into the 1830s, but was damaged by an 1810 Hartford bridge, along with some other local trades such as shipbuilding which depended on river transportation (Pease and Niles 1819:65-6; Tarbox 1886; Winch 1886; Stiles 1892, I:5-4-5; McClure 1949:13).

Cereal crop distilling was one of several Federal Period strategies practiced by local landowner-merchants searching for new investments in the face of depleted natural resources, trade fluctuations, or fortuitous opportunities. In Suffield and East Windsor, small-scale manufacture of cigars from local leaf flourished for several decades, c1810-30, after the adoption by Samuel Viets of methods imparted by an unnamed itinerant Cuban cigar maker. Specialized production of Connecticut Valley cigar wrapper after 1830, for final cigar assembly elsewhere, ended the growth of local cigar plants. East Windsor remained generally rural, with the

villages of Scantic, Melrose, Broad Brook, and Windsorville focused on commercial tobacco production from c1810-1945, with scattered paper, cider, gin, and textile mills at various times. Brick yards flourished at times in the 19th century between the Scantic and Connecticut Rivers, using the glacial lake bottom clays to supply Hartford and other downriver Connecticut River urban centers via scow. The river and rapids gradually became less important to the river communities beginning c1850, as river traffic disappeared, bridges replaced ferries, flood control programs were introduced, and riverside industries closed. As tobacco land values declined, the town gradually transformed into a series of predominantly bedroom communities (Ramsey 1930; Potwin 1952; DeVito 1968; Raber and Malone 1991; Ransom and Andrews 1992).

There is almost no documented Euroamerican activity for the Project area. Less than a mile from the Project area, the village of Windsorville grew as noted above based on waterpower from Ketch Brook, which was used to operate three or four mill sites for sawmill, gristmill, and textile mill operations. All these mills were upstream of the Project area. A small portion of the Project area may once have been cultivated, but most of the original irregular terrain appears to have remained wooded until the early 20th century, when gravel operations and related disturbance began which impacted all but a very small portion of the area (Figures 3-4; Warren and Gillet 1812; Woodford 1855; Baker and Tilden 1869; Fairchild Aerial Survey 1934; Robinson Aerial Surveys, Inc. 1951-52; Keystone Aerial Surveys, Inc. 1965; Ransom and Andrews 1992; Connecticut Department of Energy and Environmental Protection 2010).

IV. SUBSURFACE INVESTIGATION RESULTS AND INTERPRETATION

Background research indicated potential for Native American archaeological resources in any surviving post-glacial soil strata within a very small portion of the Project area. Reconnaissance field methods included:

walkover survey to identify areas sensitive for archaeological sites, amplified as appropriate with detailed existing condition plans and soil maps;

hand-excavated shovel tests at no more than 15-meter/50-foot intervals in potentially undisturbed areas with slopes of less than approximately 25%, and comparison of test results with a published profile of typical intact Manchester gravelly sand loam soil mapped for this part of the Project area (Figure 2 ; U.S. Department of Agriculture 1962).

The testing interval has proven successful in intercepting at least some evidence of all but perhaps the very smallest of Native American or Euroamerican archaeological sites. Each hand-excavated 50-cm.² shovel test was excavated with a shovel and small hand tools to well-defined pre-cultural, late glacial material, with all excavated material run through 0.25-inch-mesh hardware cloth to isolate artifacts. Three shovel tests (numbered 1-3) were completed at locations shown on Figure 2, to depths of 19-25 cm. below surface. No cultural material was recovered. Soil profiles, shown on Figure 2, suggest Tests 1 and 3 were in areas where post-glacial soils were stripped at the edges of gravel operations extending to the south. Field investigations indicated no cultural resources eligible for the National Register of Historic Places appear to exist within proposed Project limits.

Tests 1, 3

0 - 5/8 cm.:	brown/light brown fine sandy loam (probable non-intact A horizon, re-deposited or eroded from steeper slopes to north)
5/8 - 19/25 cm.:	red brown sand, gravel, cobbles, fractured arkose (C horizon)

Test 2

0 - 5 cm.:	brown fine sandy loam (A horizon)
5 - 15 cm.:	yellow brown gravelly sandy loam (B horizon)
15 - 25 cm.:	red brown sand, gravel, cobbles (C horizon)

V. ASSESSMENT OF VISUAL EFFECTS

Available guidelines for SHPO assessment of visual effects on cultural resources appear in Section 16-50p(a)(4)(C) of PUESA, and in regulations of the federal Advisory Council on Historic Preservation (36CFR 800.5). Both sets of guidelines apply to properties listed, or eligible for listing, on the National Register of Historic Places. Based on Federal Power Commission guidelines to which it refers, PUESA mandates avoidance of National Register properties where possible, or, if avoidance is not possible, minimization of transmission structure visibility or effects on the character of National Register property environ. Advisory Council on Historic Preservation (AHP) regulations, while not required in SHPO review of Projects subject to Connecticut Siting Council approval, provide *de facto* guidelines commonly used by SHPO. Criteria for findings of adverse effects on historic properties include change of the physical features within a property's setting which contribute to property significance, and introduction of visual elements which diminish the integrity of a property's significant features.

Previous studies by Raber Associates of visual effects on historic properties (e.g., Raber 2007), including consultations with SHPO, indicated that these guidelines provide no established or objective criteria for determining when a visual effect is adverse, leaving identification of adverse effects to the judgment of the reviewer. In general, visual effects will be diminished if new structures are as low as possible relative to existing structure heights, and/or if new structures are located further from historic properties. Most previous visual effects evaluations in Connecticut have addressed cell towers and electric transmission facilities, structures far taller than the 8-foot-high solar panels proposed for this Project. For electric transmission structures, SHPO has previously concurred that that adverse visual effects were highly unlikely at distances exceeding 0.25 mile.

Historic resource surveys and listings of properties on the National Register of Historic Places indicate no properties listed, eligible, or potentially eligible for the National Register are located within approximately 1.5 miles of the Project area (Ransom and Andrews 1992). Based on the criteria noted above, there appear to be no potential adverse visual effects from proposed construction.

VI. CONCLUSIONS AND RECOMMENDATIONS

The proposed Norcap North Solar Array will have no effects on any cultural resources listed, eligible, or potentially eligible for the national or state registers of historic places. No further investigations, or protective measures to address indirect visual effects, are recommended.

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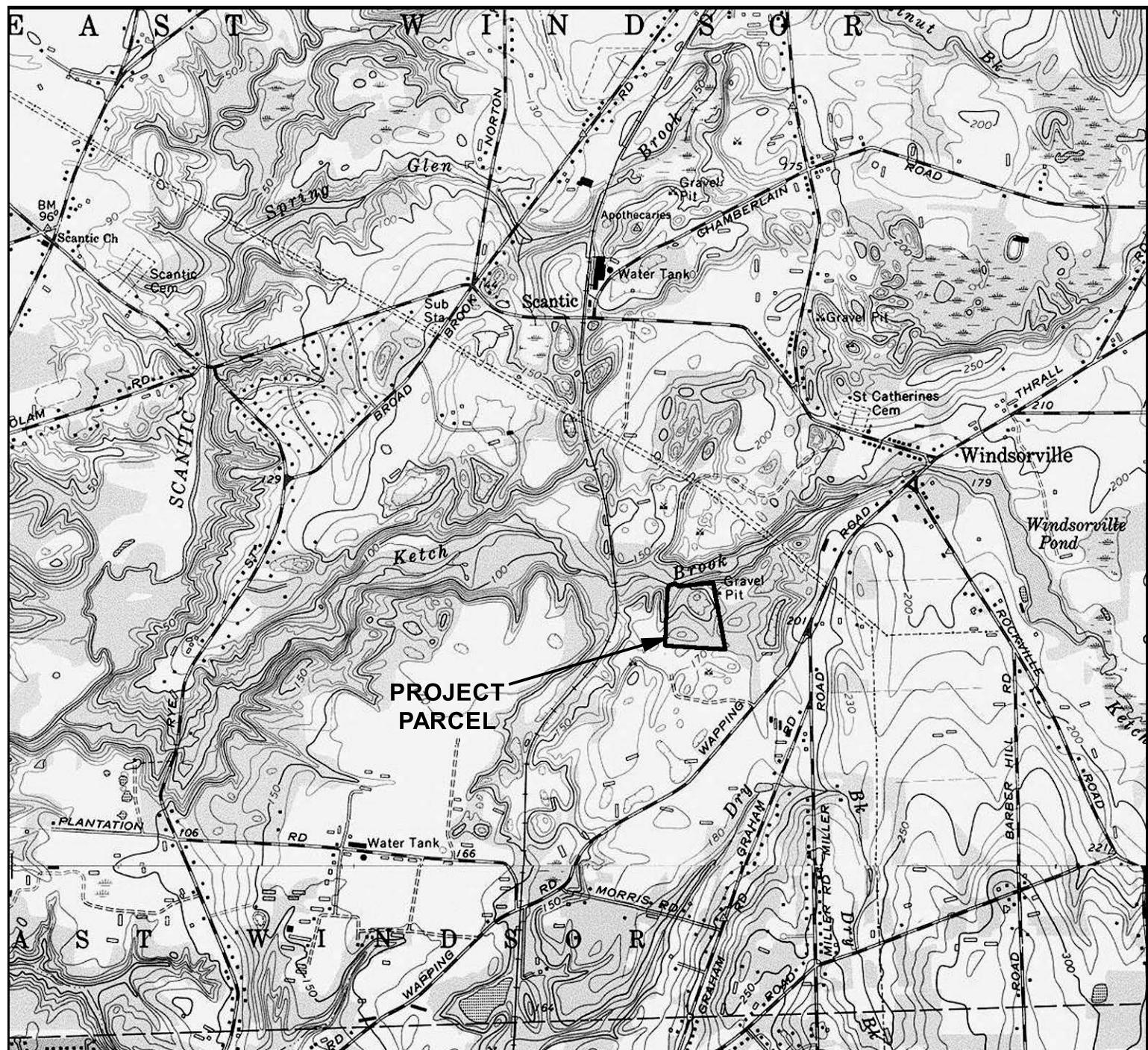
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PERSONAL COMMUNICATIONS

Dennis Botticello, Owner, Northern Capital Region Disposal Facility (NORCAP)

Timothy A. Coon, J.R. Russo & Associates, LLC

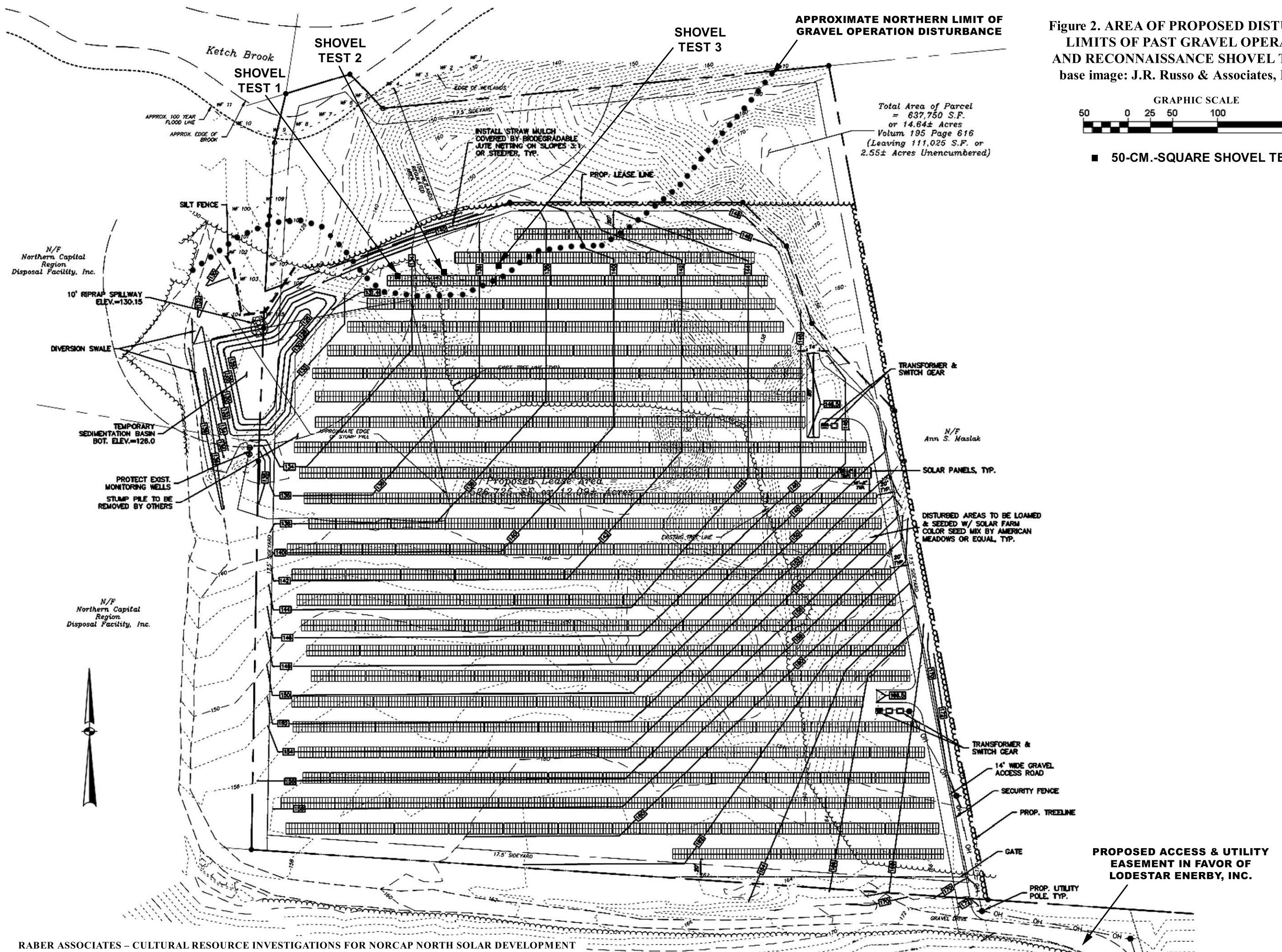
Catherine Labadia, Deputy State Historic Preservation Officer and Staff Archaeologist, Connecticut State Historic Preservation Office, Department of Economic & Community Development



**Figure 1. LOCATION OF NORCAP NORTH PROJECT
ON BROAD BROOK, CONN. U.S.G.S. 7.5-MINUTE QUADRANGLE**

0  1/2 MILE
 1000 0 1000 2000 3000 4000 FEET

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**Figure 2. AREA OF PROPOSED DISTURBANCE,
LIMITS OF PAST GRAVEL OPERATIONS,
AND RECONNAISSANCE SHOVEL TEST PITS**
base image: J.R. Russo & Associates, LLC 2016

RABER ASSOCIATES – CULTURAL RESOURCE INVESTIGATIONS FOR NORCAP NORTH SOLAR DEVELOPMENT

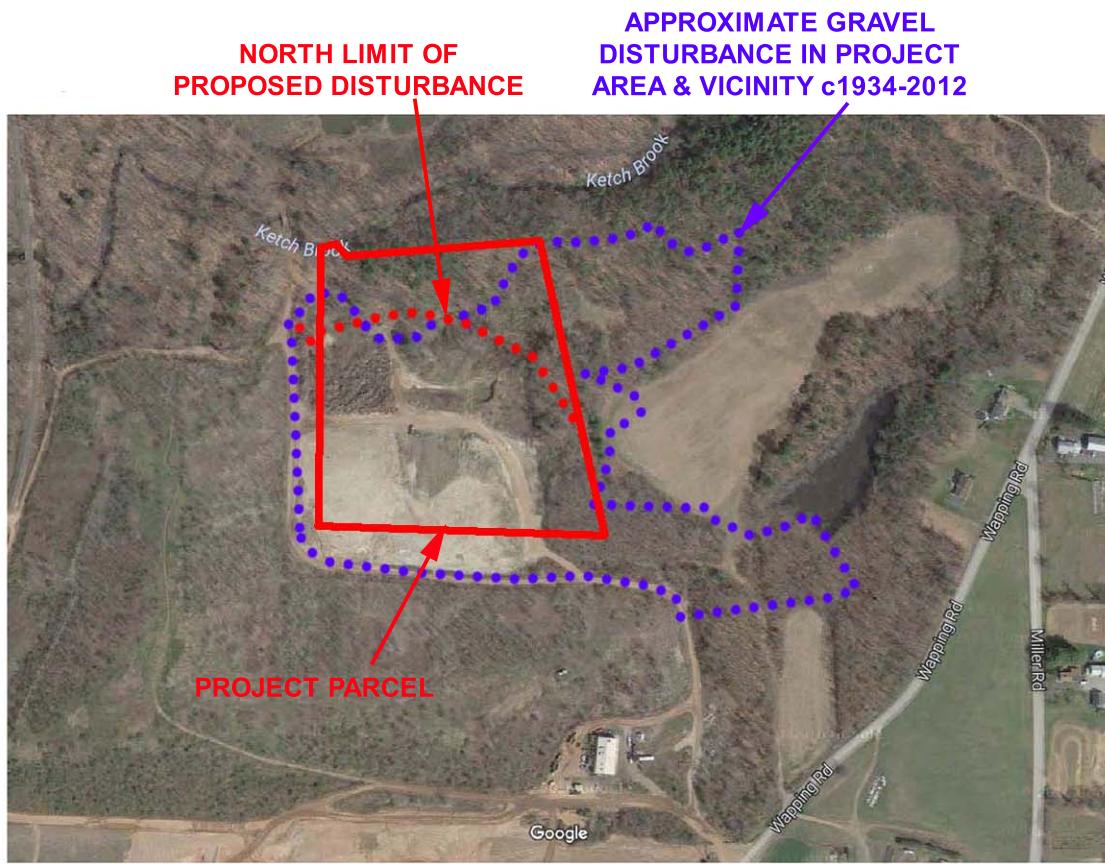


Figure 3. 2016 PROJECT AREA CONDITIONS AND PREVIOUS DISTURBANCE
 base image: Google Maps 2016

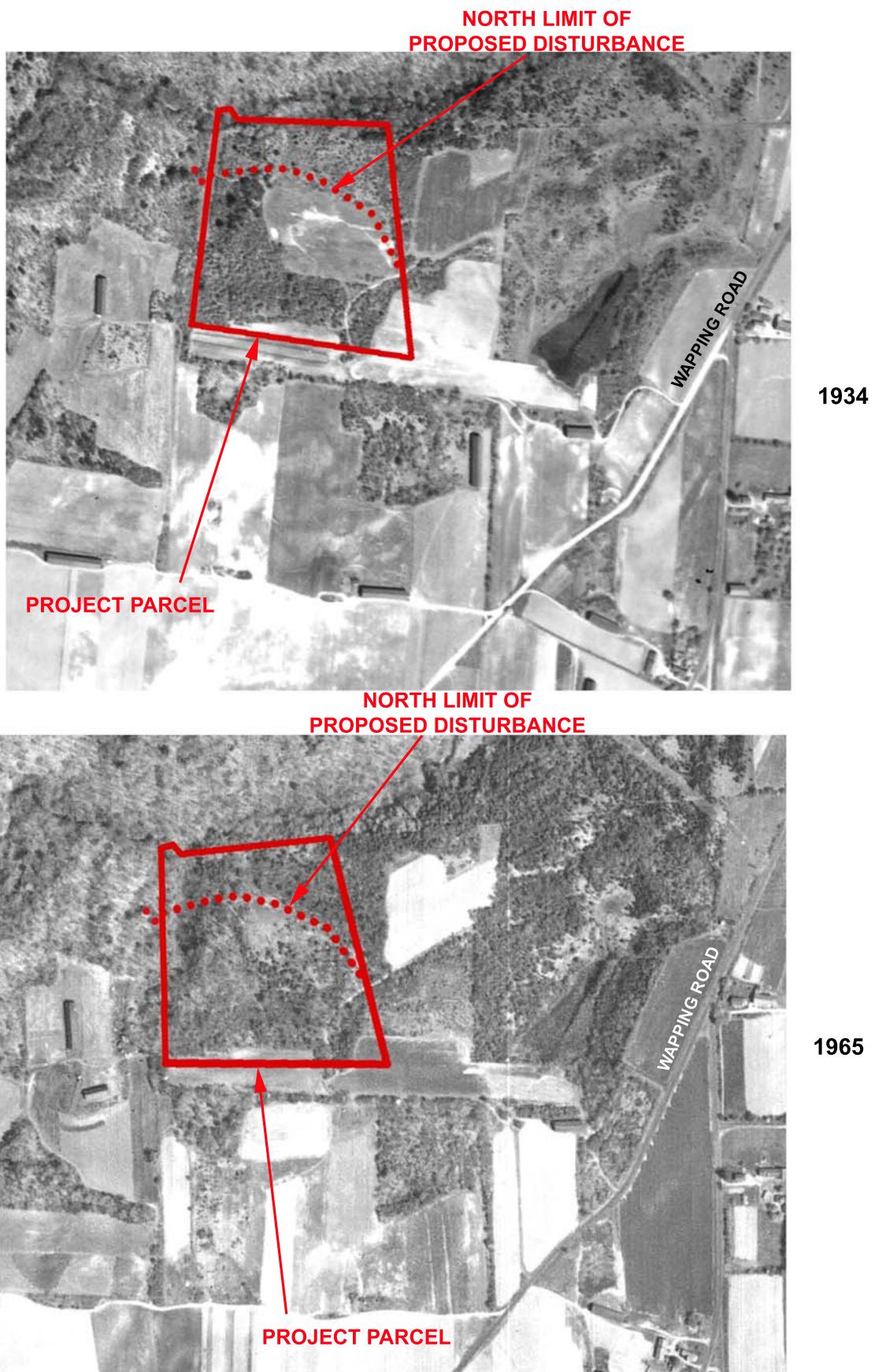


Figure 4. PROJECT AREA AND VICINITY IN 1934 AND 1965
 base images: Fairchild Aerial Survey 1934, Keystone Aerial Surveys, Inc. 1965





Department of Economic and
Community Development

State Historic Preservation Office

March 13, 2017

Dr. Michael S. Raber
81 Dayton Road
PO Box 46
South Glastonbury, CT 06073

Subject: Cultural Resources Investigations
Norcap North Solar Development
Wapping Road
East Windsor, Connecticut

Dear Dr. Raber:

The State Historic Preservation Office (SHPO) has reviewed the Cultural Resources Investigations report prepared by Raber Associates (Raber) for the referenced project. SHPO understands that the proposed ground-mounted solar facility will consist of approximately 12 acres within a 14.6 acre parcel located west of Wapping Road and south of Ketch Brook. The background research and pedestrian survey identified evidence of substantial prior subsurface disturbances related to gravel mining. As a result, only limited subsurface testing was completed. During the survey, three shovel tests were excavated to examine areas of potentially intact soils. Subsurface testing confirmed the extent of soil disturbances and did not result in the recovery of any archeological deposits. The investigation meets the minimum standards set forth in the *Environmental Review Primer for Connecticut's Archaeological Resources*. SHPO concurs with Raber that no additional archeological investigation of the project area is warranted.

A consideration of potential visual effects also was considered as part of the investigation. SHPO concurs with Raber that the proposed project is not likely to cause visual impacts to historic properties. Based on the information provided to our office, it is SHPO's opinion that no historic properties will be affected by the proposed Norcap North Solar Development.

This office appreciates the opportunity to review and comment upon this project. These comments are provided in accordance with Connecticut Environmental Policy Act. For additional information, please contact me at (860) 256-2764 or catherine.labadia@ct.gov.

Sincerely,

Catherine Labadia
Deputy State Historic Preservation Officer

State Historic Preservation Office

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