



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

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VIA ELECTRONIC MAIL

April 14, 2016

Windham Solar LLC
c/o Ecos Energy LLC
ATTN: Steve Broyer
222 South 9th Street
Suite 1600
Minneapolis, MN 55402

RE: **PETITION NO. 1221** - Windham Solar LLC petition for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the proposed construction, maintenance and operation of two 1.0 Megawatt and one 1.5 Megawatt Solar Photovoltaic Electric Generating facilities located at 91 Plainfield Pike Road, Plainfield, Connecticut.

Dear Mr. Broyer:

The Connecticut Siting Council (Council) requests your responses to the enclosed questions no later than April 28, 2016. To help expedite the Council's review, please file individual responses as soon as they are available.

Please forward an original and 15 copies to this office, as well as a copy via electronic mail. In accordance with the State Solid Waste Management Plan, the Council is requesting that all filings be submitted on recyclable paper, primarily regular weight white office paper. Please avoid using heavy stock paper, colored paper, and metal or plastic binders and separators. Fewer copies of bulk material may be provided as appropriate.

Any request for an extension of time to submit responses to interrogatories shall be submitted to the Council in writing pursuant to §16-50j-22a of the Regulations of Connecticut State Agencies.

Yours very truly,

Melanie A. Bachman
Acting Executive Director

MB/MP/lm

c: Council Members

Michael Melone, Windham Solar LLC, c/o Allco Renewable Energy Limited

Petition No. 1221
Interrogatories
Set One
April 14, 2016

General Questions

1. Windham Solar LLC (WS) included an abutters map under Exhibit D of its Petition (Petition) dated March 15, 2016 for the proposed project in Plainfield. Please submit a properly-labeled abutters map identifying each parcel owner, including but not limited to, the abutters listed in Exhibit D of the petition.
2. Where is the nearest off-site residence from the center of the eastern portion of the project? Provide the distance, direction, and address of such off-site residence. Where is the nearest off-site residence from the center of the western portion of the project? Provide the distance, direction, and address of such off-site residence.

Electrical/Energy Questions

3. The proposed project consists of two 1.0 megawatt (MW) and one 1.5 MW solar arrays totaling 3.5 MW. Is that 3.5 MW power output for the proposed solar project based on alternating current (AC)? If no, explain.
4. Indicate which solar arrays on the Overall Site Plan (Sheet 3 of 17) are the 1 MW arrays and which array is the 1.5 MW array.
5. Page five of the Petition indicates that, "Each Facility will consist of approximately 3,395 solar modules (based on a module rating of 345 watts)." How many "Facilities" is the Petitioner referring to? In other words, how many multiples of 3,395 solar modules are proposed? Please provide the number of solar modules for the two 1.0 MW and one 1.5 MW arrays and for the entire proposed project.
6. Provide the total direct current (DC) power output in MW for the project based on the total number of modules and wattage of such modules.
7. In general, in the case of fixed solar panels, does orienting your solar panels to the south provide a sort of balance (in terms of sun exposure) between the sun rising in the east and setting in the west and ultimately result in optimizing (or attempting to maximize) your total annual energy production (in kilowatt-hours) and your capacity factor?
8. On page 7 of the Petition, WS notes that, according to the 2012 Integrated Resources Plan (IRP), the capacity factor for PV solar (and thus the proposed project) is approximately 13 percent. Is that based on the DC or AC side of the proposed solar facility?
9. How many 1,000-kilowatt inverters would be installed?
10. Provide the specifications sheet for the inverters.

11. Provide the specification sheet for the proposed solar photovoltaic modules/panels.
12. What are the estimated heights of the transformers and inverters?
13. Does Eversource currently have three-phase overhead electrical distribution on Plainfield Pike Road (Route 14A)?

Construction Questions

14. Would the tree clearing be performed in stages (e.g. five acres at a time), or would the clearing all be performed together as one stage of construction? (Note: Connecticut Department of Energy and Environmental Protection "DEEP" General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities states that, "Whenever possible, the site shall be phased to avoid the disturbance of over five acres at a time...")
15. Estimate the amounts of cut and fill in cubic yards.
16. Approximately how tall would the poles be for the video cameras and meteorological equipment noted on page 12 of the Petition?
17. How would the H-beams (that support the racking system) be driven into the ground?
18. What are the estimated constructed hours (e.g. Monday through Friday 8 AM to 5 PM)?
19. Approximately what size mesh does WS anticipate utilizing for the chain link fence? While 2-inch mesh is a common size, would WS consider utilizing a mesh size less than two inches as an anti-climbing measure? Would the fence have barbed wire?
20. Did WS consider an overhead electrical connection as a way to minimize disturbance in the vicinity of wetlands? Provide the pros and cons of overhead versus underground electrical connections.

Environmental Questions

21. Did the Petitioner attempt to minimize wetland crossings when designing the access drives to each of the three solar arrays? For example, for the center (or southwestern) solar array, could the access to that solar array be shifted to the northwest to reduce the 1,455 square feet of wetland impacts? (See Overall Site Plan – Sheet 3 of 17).
22. Has the Petitioner received a response from the Connecticut Department of Energy and Environmental Protection regarding the Natural Diversity Database to date? If yes, provide a copy of such correspondence. While DEEP reviews state-listed species, are any federally-listed species known in the vicinity of the proposed project? If yes, describe possible impacts to such species and mitigation measures.

23. Is the total tree clearing area for the proposed project about 18.4 acres? If no, provide the total tree clearing area. Does this total also include the tree removal in wetland areas? Approximately how many acres of tree clearing in wetland areas are expected?
24. Provide the carbon debt payback period. Specifically, as an estimate, you may utilize the U.S. Environmental Protection Agency (EPA) number of 1.22 metric tons of carbon dioxide sequestered by one acre of average U.S. forest in one year. That number can be multiplied by the number of acres of trees to be cleared to estimate the annual loss of carbon dioxide sequestration in metric tons per year for the project. Then the total projected annual electrical production in kilowatt-hours for the solar facility can be multiplied by the EPA estimate of 6.89551×10^{-4} metric tons of carbon dioxide displaced per kilowatt-hour in order to provide the annual carbon dioxide emissions avoided by the operation of solar plant. Based on this or a different analysis, compute the number of months or years it would take to “break even” with carbon dioxide or when the carbon dioxide emissions reductions would equal the sequestration loss. (Data source: <http://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references>)
25. On page 11 of the Petition, WS estimates 115,000 tons of CO₂ equivalent offset or eliminated during the 45-year life of the facility. How was the 115,000 tons computed?
26. Has the Petitioner received a response from the State Historic Preservation Office to date? If yes, provide a copy of such correspondence.
27. Is the proposed project located within an aquifer protection area?
28. Is any of the proposed project located within a 100-year or 500-year flood zone? If yes, indicate which portion(s) of the project area are located within flood zones, and provide a Federal Emergency Management Agency flood zone map that includes the subject property.
29. In Exhibit H of the Petition, it is stated that a stormwater pond would be necessary to control stormwater runoff. On the Overall Site Plan, indicate the location of the stormwater pond. Would construction of the stormwater pond be within wetlands? If so, identify the square feet of disturbance and permits necessary for this action.
30. In Exhibit F of the Petition, by letter dated February 2, 2016, Highland Soils, LLC indicated that a more detailed wetland report would be prepared following another site visit. Does the Petitioner have an updated Wetlands Report at this time? If yes, provide a copy of such full report. Were any vernal pools located as a result of such site visit? Are any additional wetland and/or vernal pool protective measures proposed at this time? If no visit has been made, provide an estimated timeframe for the visit and updated report.
31. If vernal pools are identified as result of a site visit, include the following. Describe the methodologies used to evaluate the vernal pools and include the date(s) of his studies. Specifically detail how the egg masses were counted, how many visits over what period of time were made, and indicate if any other techniques such as minnow trapping were used, if applicable.

32. If vernal pools are identified as a result of a site visit, include the following. Analyze the vernal pools using the Calhoun and Klemens methodology. While forested habitat is preferable, open habitat may be used and also can serve as areas that animals move through. Open habitat also over time can improve by regrowth. It cannot be merely discounted as developed habitat as one can have areas that have houses and roads. An excellent example of how to correctly analyze a habitat that has various components is that for Council Docket 455 (Tab 14 of that application) which clearly shows the correct treatment of wooded, open and grassed areas, versus developed areas. Only the developed areas are considered to be lost habitat. This document, as a sample wetlands and vernal pool analysis, has been attached for your convenience. The map at the end of the document is a useful template or reference.
33. Would WS comply with the recommendations on page 22 of the Phase I Environmental Site Assessment?
34. Would the solar panels “heat” rainwater and potentially thermally pollute wetlands?
35. Would the proposed project meet the applicable DEEP noise standards at the boundaries of the subject properties? (Sources of noise might include but not be limited to inverters, transformers, etc.)

Maintenance Questions

36. How would WS handle potential snow accumulation on the panels and its effects of blocking the sunlight?
37. Has WS done any analysis to determine structural limits of snow accumulation on the solar panels and steel support structures, assuming heavy, wet snow? What accumulation of snow could the structures handle? Would WS clear snow from the panels when it approached the limit?
38. Would any mowing be required under or around the proposed solar panels/modules, and if so, approximately how often would mowing occur?



WETLAND & VERNAL POOL EVALUATION

December 17, 2014

**Verizon Wireless
99 East River Drive
East Hartford, CT 06108**

APT Project No.: CT1412300

Attn: Alexandria Carter

**Re: Proposed Southington East Street
a/k/a Meriden Relo Facility
99 East Street
Southington, Connecticut**

Dear Ms. Carter,

All-Points Technology Corporation, P.C. ("APT") understands that a wireless telecommunications facility relocation ("Facility") is proposed by Verizon Wireless at 99 East Street in Southington, Connecticut ("Subject Property"). Verizon proposes to construct a 90-foot tall self-supporting 'monopine' tower, with apertures extending to a total facility height of 97 feet above ground level ("AGL"). At your request, Dean Gustafson and Matthew Gustafson, Connecticut registered Soil Scientists with APT conducted an inspection of the Subject Property on May 3, 2014 to determine the presence or absence of wetlands and watercourses within approximately 200 feet of proposed development activities ("Study Area"). The delineation methodology followed was consistent with both the Connecticut Inland Wetlands and Watercourses Act (IWWA) and the *Corps of Engineers Wetland Delineation Manual* (1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*, Version 2.0 (January 2012). Wetland resources identified on the Subject Property were also found to support vernal pool habitat and further evaluated during the referenced site inspection. The results of these investigations are provided below.

Site and Project Description

The Subject Property consists of an approximately 27-acre municipally developed parcel with a leaf composting operation that occupies a relatively small portion of the parcel near the East Street frontage. The majority of the Subject Property is dominated by a large forested wetland system along with some mature forested uplands and actively cultivated agricultural fields. The proposed Facility is located in the central portion of the Subject Property along the edge of one of the cultivated agricultural fields near the composting operation. Verizon proposes to install a 90-foot tall unguyed monopine tower (total Facility height of 97 feet AGL) and ground equipment enclosure within a 50-foot by 50-foot gravel compound area surrounded with an 8-foot tall chain link fence. A 12-foot wide, gravel access is proposed over existing gravel and dirt access by the composting operation and then by and through a cultivated field in order to gain access to the proposed facility. The Study Area for the wetland investigation is dominated by complexes of upland and wetland forested areas, open field areas associated with the identified agricultural activities, and edge forested and scrub/shrub habitats. The wetland resource areas include interior "cryptic style" vernal pool habitat features. The surrounding land use generally consists of residential use to the west and south, maintained electrical transmission corridor to the west and large forest blocks to the north and east.

ALL-POINTS TECHNOLOGY CORPORATION, P.C.

3 SADDLEBROOK DRIVE · KILLINGWORTH, CT 06419 · PHONE 860-663-1697 · FAX 860-663-0935

P.O. BOX 504 · 116 GRANDVIEW ROAD · CONWAY, NH 03818 · PHONE 603-496-5853 · FAX 603-447-2124

Wetland Investigation

One wetland was delineated within the Study Area consisting of a forested bottomland floodplain wetland area associated with Misery Brook, which is located approximately 1,000 feet east of the proposed Facility. Please refer to the enclosed Wetland Delineation Map for the approximate location of the identified wetland resource. Wetlands were marked with pink and blue plastic flagging tape numbered with the following sequence: WF 1-01 to 1-22. General weather conditions encountered during the May inspection included mid 50° F temperatures with sunny skies.

Regulation of Wetlands

Wetlands and watercourses are regulated by local, state and federal regulations, with each regulatory agency differing slightly in their definition and regulatory authority of resource areas, as discussed below. The proposed Facility is under the exclusive jurisdiction of the State of Connecticut Siting Council and therefore exempt from local regulation, although local wetland regulations are considered by the Siting Council. If wetlands are identified on the Subject Property and direct impact is proposed, those wetlands may be considered Waters of the United States and therefore the activity may also be subject to jurisdiction by the U.S. Army Corps of Engineers ("ACOE") New England District.

Town of Southington: The Town of Southington regulates activities within wetlands and watercourses and within 50 feet of wetlands, 100 feet of perennial watercourses, and 200 feet of vernal pools and bogs through administration of the Connecticut Inland Wetlands and Watercourses Act ("IWWA").

State of Connecticut: **Freshwater Wetlands:** The IWWA requires the regulation of activities affecting or having the potential to affect wetlands under Sec. 22a-36 through 22a-45 of the Connecticut General Statutes. The IWWA is administered through local municipalities. The IWWA defines wetlands as areas of poorly drained, very poorly drained, floodplain, and alluvial soils, as delineated by a soil scientist. Watercourses are defined as bogs, swamps, or marshes, as well as lakes, ponds, rivers, streams, etc., whether natural or man-made, permanent or intermittent. Intermittent watercourse determinations are based on the presence of a defined permanent channel and bank, and two of the following characteristics: (1) evidence of scour or deposits of recent alluvium or detritus; (2) the presence of standing or flowing water for a duration longer than a particular storm incident; and (3) the presence of hydrophytic vegetation.

ACOE: The ACOE regulates the discharge of dredged or fill material into waters of the United States under Section 404 of the Clean Water Act. Waters of the United States are navigable waters, tributaries to navigable waters, wetlands adjacent to those waters, and/or isolated wetlands that have a demonstrated interstate commerce connection. The ACOE Wetlands Delineation Manual defines wetlands as "[t]hose areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any

navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters is unlawful unless the work has been approved by the ACOE.

Soil Description

Soil types encountered throughout the Study Area were generally consistent with digitally available soil survey information obtained from the Natural Resources Conservation Service ("NRCS")¹. Wetland soils field identified to be dominated by Catden and Freetown soils and narrow fringes of Walpole sandy loam and Scarborough muck along the delineated edge. The non-wetland soils were examined along the wetland boundary and more distant upland areas during the delineation, including the proposed Facility location. They are dominated by Branford silt loam, Hartford sandy loam, and Manchester gravelly sandy loam. Detailed descriptions of wetland and upland soil types are provided below.

Wetland Soils:

The **Catden** series consists of very deep, very poorly drained soils that formed in woody and herbaceous organic materials in depressions on lake plains, outwash plains, moraines, and floodplains. The organic material extends to a depth of 51 inches or more.

The **Freetown** series consists of very deep, very poorly drained soils that formed in highly decomposed organic materials in depressions or on level areas on uplands and outwash plains. The organic material extends to a depth of 48 inches or more.

The **Scarboro** series consists of very deep, very poorly drained soils on outwash plains, deltas, and terraces. They are nearly level soils in depressions. The water table is at or near the surface for 6 to 12 months of the year, and many areas are ponded for short periods. This is a mineral soil, but it has a mucky surface horizon.

The **Walpole** series consists of very deep, poorly drained sandy soils formed in water-sorted glacial outwash and stratified drift. They are nearly level to gently sloping soils in low-lying positions on terraces and plains. Walpole soils have a water table within 1' of the soil surface much of the year.

Upland Soils:

The **Branford** series consists of very deep, well drained soils formed in loamy over sandy and gravelly outwash. They are nearly level to strongly sloping soils on outwash plains and terraces. Permeability of the Branford soils is moderate or moderately rapid in the surface layer and subsoil and rapid or very rapid in the substratum. Slope ranges from 0 to 15 percent.

The **Hartford** series consists of very deep, somewhat excessively drained soils formed in sandy glacial outwash. They are nearly level to strongly sloping soils on plains and terraces. Slope ranges from 0 to 15 percent. Permeability is moderately rapid in the surface layer and subsoil, and rapid or very rapid in the substratum.

The **Manchester** series consists of very deep, excessively drained soils formed in sandy and gravelly outwash and stratified drift. They are nearly level to steep soils on outwash plains, terraces, kames, deltas and eskers. Slope ranges from 0 to 45 percent. Permeability is rapid in the surface layer, rapid or very rapid in the subsoil, and very rapid in the substratum.

¹ NRCS Web Soil Survey, <http://websoilsurvey.nrcs.usda.gov/app/>, accessed on April 2, 2014.

Wetlands Discussion

Wetland 1 Classification Summary Table

Wetland 1² (WF 1-01 to 1-22)	System Palustrine	Subsystem	Class Forested	Subclass Broad-leaved Deciduous	Water Regime Seasonally Flooded	Special Modifier
Watercourse Type (Misery Brook)	Perennial <input checked="" type="checkbox"/>	Intermittent <input type="checkbox"/>	Tidal <input type="checkbox"/>	Special Aquatic Habitat (Cryptic Type)	Vernal Pool <input checked="" type="checkbox"/>	Other <input type="checkbox"/>

Wetland 1 Description

Wetland 1 is a forested bottomland wetland system associated with the floodplain of Misery Brook, which consists of a large expansive wetland system that is oriented north-south, located east of the proposed Facility. The wetland boundary is generally well defined with a distinct topographic break from the moderately sloped forested uplands located just southwest of the delineated portion of this wetland. Within the interior of this wetland, two distinct "cryptic style" vernal pools were identified, separated by well-defined, narrow glaciofluvial deposit. Both vernal pool habitats continue to the north and east as forested areas into the interior of this organic swamp. In addition, the forest floor exhibits high levels of coarse woody debris, both within the wetland limits and in the immediate terrestrial habitat. Interior portions of both vernal pools exhibit various degrees of sphagnum-covered hummock/hollow topography with numerous egg mass attachment sites available for breeding amphibians.

Wetland 1 Dominant Vegetation

Dominant Wetland Species Common Name (Latin Name)	Dominant Adjacent Upland Species Common Name (Latin Name)
Eastern White Pine (Pinus strobus)	Eastern White Pine (Pinus strobus)
Red Maple (Acer rubrum)	Northern Red Oak (Quercus rubra)
Winterberry (Ilex verticillata)	White Oak (Quercus alba)
Northern Arrow-wood (Viburnum recognitum)	Black Oak (Quercus velutina)
Spagnum spp.	Canada Mayflower (Maianthemum canadense)
Highbush Blueberry (Vaccinium corymbosum)	Lowbush Blueberry (Vaccinium angustifolium)
Black Gum (Nyssa sylvatica)	Christmas Fern (Polystichum acrostichoides)
Sweet Pepperbush (Clethra alnifolia)	
Skunk Cabbage (Symplocarpus foetidus)	

* denotes Connecticut Invasive Plants Council invasive species

Vernal Pool Analysis

In addition to the wetland area delineated within the Study Area, two interior vernal pool resources were identified within Wetland 1 consisting of large forested, cryptic style vernal pool habitats. Recognizing the proposed Verizon development occurs in the vicinity of these vernal pool resources, APT conducted an inspection of these wetland areas on May 3, 2014 to evaluate the potential for amphibian breeding by vernal pool species. This section provides a discussion of these vernal pool habitats and analyzes the potential impact to these special aquatic habitats by the proposed relocation Facility. Please refer to the enclosed Vernal Pool Analysis Map for the approximate locations of the identified wetland areas, vernal pool habitats and proposed Facility.

² Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center Online. <http://www.npwrc.usgs.gov/resource/wetlands/classwet/index.htm> - contents.

Located interior to Wetland 1 are two depressional areas containing sufficient hydrology to support vernal pool breeding habitat, separated by a narrow glaciofluvial deposit. As such, Vernal Pools 1 and 2 are described herein as a single vernal pool feature ("vernal pool habitat") due to similar physical and hydraulic characteristics and close proximity to one another. The vernal pool habitat exhibited significant attachment sites for breeding herpetofauna. During the site investigation, a visual survey was performed of the pool perimeter resulting in observation of one (1) wood frog (*Rana sylvatica*) egg mass and two (2) chorusing adult wood frogs. It is anticipated that significant number of wood frog egg masses as well as spotted salamander (*Ambystoma maculatum*) egg masses would be located within the interior of the vernal pool habitat. However, these areas were inaccessible due to the deep organic soils, which prevent wading into those areas. The terrestrial habitat immediately surrounding the vernal pool habitat contains a good amount of coarse woody debris and duff layer providing good cover habitat for herpetofauna.

Physical Impact to Vernal Pool and Surrounding Terrestrial Habitat

This section details a recognized scientific method for analyzing the potential impact a project may have on a particular vernal pool and its surrounding upland (terrestrial) habitat.

Construction and operation of the Facility would not result in direct physical impact to any of the identified vernal pools. It is widely documented that vernal pool dependent amphibians are not only solely dependent upon the actual vernal pool habitat for breeding and egg and juvenile development, but require surrounding terrestrial habitat for most of their adult lives. Recent studies recommend protection of adjacent habitat up to 750 feet from the vernal pool edge for obligate pool-breeding amphibians.³ Since the vernal pool habitat occurs in the vicinity of the proposed Facility, an evaluation of potential impacts the proposed project may have on this special aquatic habitat was performed.

In order to evaluate potential impacts to the vernal pool habitat, and their surrounding terrestrial habitats, the resources were assessed using methodology developed by Calhoun and Klemens (2002). This methodology assesses vernal pool ecological significance based on two parameters: 1) biological value of the vernal pool, and 2) conditions of the critical terrestrial habitat. The biological rating is based on the presence of federal or state-listed species and abundance and diversity of vernal pool indicator species. (Note: based on the observations collected to date of this vernal pool, the highest biological value is assumed to be supported.) The terrestrial habitat is assessed based on the integrity of the vernal pool envelope ("VPE"; within 100 feet of the pool's edge) and the critical terrestrial habitat ("CTH"; within 100 feet to 750 feet of the pool's edge). A priority rating of Tier I was assigned to the vernal pool habitat, with Tier I considered to have relatively high breeding activity and relatively intact terrestrial habitat⁴ (Tier II and III pools represent lower amphibian productivity and fragmented terrestrial habitat). Pools with 25% or less developed areas in the critical terrestrial habitat are identified as having high priority for maintaining less than 25% development within this terrestrial habitat, including site clearing, grading and construction³.

The vernal pool evaluated in this assessment was rated based on these criteria for both the existing condition and the proposed development to determine if the compound, access, and associated grading disturbances would result in a reduction in the tier rating system, or reduce the terrestrial habitat integrity below the critical 75% non-development criterion. As previously discussed, it was conservatively assumed that the vernal pool habitat currently has the highest conservation priority rating of Tier I. The results of this analysis reveal that the pre-development condition exceeds the 25% developed threshold for both Vernal Pool 1 (36.3%) and Vernal Pool 2 (28.7%) and therefore the relative ecological value of these vernal pool habitats have already been compromised. The results of this analysis support that the proposed development will not result in further degradation of the existing tier rating

³ Calhoun, A.J.K. and M.W. Klemens. 2002. Best Development Practices (BDPs): Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States. WCS/MCA Technical Paper No. 5.

⁴ Vernal Pool Assessment Sheet (source: Calhoun and Klemens 2002)

or terrestrial habitat integrity of vernal pool habitat due to the small amount of disturbance associated with the proposed facility (approximately 20,119 square feet).

The proposed Verizon Wireless development satisfies an important BDP recommendation: The vernal pool envelope of Vernal Pools 1 and 2 will not be impacted as the proposed Facility development (grading associated with the northeast corner of the proposed compound area) is located approximately 137 feet southwest of the closest vernal pool edge. The total area of the critical terrestrial habitat associated with Vernal Pool 1, which includes land located off the Subject Property, is 67.68± acres with 24.57± acres consisting of existing development (primarily associated with residential development and agricultural fields, which the proposed Facility is to be located). This equates to approximately 36.3% of the critical terrestrial habitat as being already developed. Only the proposed northeast corner Facility compound would be located within the critical terrestrial habitat, resulting in development of 0.03 acre, which represents an increase of only 0.05% of the total critical terrestrial habitat of Vernal Pool 1. As a result, the majority of the Facility compound and the entire access drive would be located within an area that is subject to active cultivation or the composting operation, resulting in conditions akin to development and considered unsuitable as terrestrial habitat for vernal pool amphibians. The total area of the critical terrestrial habitat associated with Vernal Pool 2, which includes land located off the Subject Property, is 60.80± acres with 17.45± acres consisting of existing development (primarily associated with residential development and agricultural fields, which the proposed Facility is to be located). This equates to approximately 28.70% of the critical terrestrial habitat as being already developed. Similar to Vernal Pool 1, only the proposed northeast corner Facility compound would be located within the critical terrestrial habitat of Vernal Pool 2, resulting in development of 0.03 acre, which represents an increase of only 0.05% of the total critical terrestrial habitat of Vernal Pool 2. Therefore, the proposed Verizon Wireless development represents a de minimis increase in development of both of the vernal pools' critical terrestrial habitats and does not result in the tipping point of reduction below the 75% non-development criterion⁵ since the existing condition already falls below that threshold. Similarly, the proposed development will not result in a likely adverse impact to existing amphibian productivity and will not result in long-term adverse impact to the terrestrial habitat of either Vernal Pool 1 or 2, considering the relatively small area of development associated with the expansion of the compound area, limited traffic it will generate, and existing levels of disturbance to the critical terrestrial habitat above the 25% threshold for conservation priority.

The potential exists for possible short-term impact to herpetofauna associated with the nearby vernal pool habitat due to possible encounters with migrating and basking individuals that may intercept the proposed development footprint during construction. Best Development Practices ("BDPs"; Calhoun and Klemens, 2002) are proposed during construction in a subsequent section of this document to avoid/minimize the potential for short-term impact to herpetofauna.

Hydraulic Alterations

Land-use changes (i.e., clearing, increases in impervious surface) can increase surface runoff in the watershed of a vernal pool. Direct inputs of stormwater flows into a pool may produce sudden water level increases in a short period of time and may lengthen the duration of flooding (hydroperiod). Diversion of stormwater flows past a pool may have the opposite effect of decreasing water levels and shortening the pool's hydroperiod. In addition, stormwater features that create temporary pools of water can result in a biological "sink" as breeding amphibians deposit eggs into a water body without the necessary hydraulic period to allow for successful development of the eggs into juveniles.

⁵This threshold is generally used for prioritizing vernal pool conservation efforts: Calhoun, A.J.K. and M.W. Klemens. 2002. Best Development Practices (BDPs): Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States. WCS/MCA Technical Paper No. 5. Pg. 10.

Site clearing and grading activities will not de-water nearby Vernal Pool 1 or 2, or alter surface water drainage patterns associated with this pool. Impervious surfaces associated with the proposed Verizon Wireless project have been minimized with the use of a gravel surface for development of the wireless telecommunications Facility compound and access. The proposed development will not alter existing surface or subsurface flow conditions or directions. Therefore, the proposed development will not alter the hydrology of the nearby vernal pool. In addition, no stormwater management features are proposed that would result in creation of a temporary pool and "sink", including a grass lined swale and two rip-rap level spreaders, which could potentially affect breeding amphibians intercepted on their migration to the nearby vernal pool.

Vernal Pool Recommended Best Development Practices

No seasonal restriction for construction of this project is recommended considering the proposed Facility is primarily located within existing unsuitable vernal pool terrestrial habitat. In addition, there are no vernal pool amphibian migration corridors anticipated to be located between the proposed Facility and habitat to the west (dominated by residential developments and subdivision roadways) that could potentially intercept migrating amphibians. Research has documented that adult wood frogs prefer heavily forested areas with a thick cover of herbaceous vegetation and duff⁶; spotted salamanders also have a preference for forested areas⁷. A study in Rhode Island evaluating the effect of forest fragmentation by turf (golf course) found that wood frog metamorphs were 32 times more likely to be found in forest-interior habitats as opposed to forest-turf edge habitats⁸. DeMaynadier and Hunter (1998) classified metamorph mole salamanders (*Ambystoma spp.*) and wood frog as habitat specialists that preferred forest-interior⁹.

However, due to the proposed development's location in the vicinity of vernal pool habitat and at the edge of suitable terrestrial habitat, the following vernal pool protection plan is recommended to avoid unintentional impact or mortality to vernal pool herpetofauna (i.e., spotted salamander, wood frog, turtles, etc.) during construction activities. These protective measures would be implemented should construction activities occur during peak amphibian movement periods (early spring breeding [March 1st to May 15th] and late summer dispersal [July 15th to September 15th]). Details of the recommended protection plan are provided below.

Vernal Pool Protection Plan

A qualified professional from APT would serve as the Environmental Monitor for this project to ensure that vernal pool protection measures are implemented properly. The proposed vernal pool protection program consists of several components including: isolation of the project perimeter; periodic inspection and maintenance of isolation structures; herpetofauna sweeps; education of all contractors and sub-contractors prior to initiation of work on the site; protective measures; and, reporting.

1. Erosion and Sedimentation Controls

- a. Plastic netting used in a variety of erosion control products (i.e., erosion control blankets, fiber rolls [wattles], reinforced silt fence) has been found to entangle wildlife, including reptiles, amphibians, birds and small mammals. No permanent erosion control products or reinforced silt fence will be used on the project. Temporary erosion control products that will be exposed at the ground surface represent a potential for wildlife entanglement will use either erosion control blankets and fiber rolls composed of processed fibers mechanically bound together

⁶ Klemens, M.W. 1993. Amphibians and Reptiles of Connecticut and Adjacent Regions. State Geological and Natural History Survey of Connecticut Bulletin No. 112. Connecticut Department of Environmental Protection, Hartford CT, USA. Pg. 142.

⁷ Klemens, M.W. 1993. Amphibians and Reptiles of Connecticut and Adjacent Regions. State Geological and Natural History Survey of Connecticut Bulletin No. 112. Connecticut Department of Environmental Protection, Hartford CT, USA. Pg. 42.

⁸ Peter, P. 2000. Can Golf Courses Be Designed To Enhance Amphibian Diversity on Golf Courses: Effects of Turf on Amphibian Movements. University of Rhode Island, Kingston, RI.

⁹ DeMaynadier, P.G., and M.L. Hunter (1998) Effects of silvicultural edges on the distribution and abundance of amphibians in Maine. Conservation Biology 12:340-352.

to form a continuous matrix (netless) or netting composed of planar woven natural biodegradable fiber to avoid/minimize wildlife entanglement.

- b. Installation of erosion and sedimentation controls, required for erosion control compliance and creation of a barrier to possible migrating/dispersing herpetofauna, shall be performed by the Contractor following clearing activities and prior to any earthwork. The Environmental Monitor will inspect the work zone area prior to and following erosion control barrier installation to ensure the area is free of herpetofauna and satisfactorily installed. The intent of the barrier is to segregate the majority of the work zone from migrating/dispersing herpetofauna. Oftentimes complete isolation of a work zone is not feasible due to accessibility needs and locations of staging/material storage areas, etc. In those circumstances, the barriers will be positioned to deflect migrating/dispersal routes away from the work zone to minimize potential encounters with herpetofauna.
- c. The barrier fencing will consist of non-reinforced conventional erosion control woven fabric, installed approximately six inches below surface grade and staked at seven to ten-foot intervals using four-foot oak stakes or approved equivalent. In addition to required daily inspection by the Contractor, the fencing will be periodically inspected for tears or breaches in the fabric following installation by APT throughout the course of the construction project.
- d. The extent of the barrier fencing will be as shown on the site plans. The Contractor shall have additional barrier fencing should field conditions warrant extending the fencing as directed by APT.
- e. No equipment, vehicles or construction materials shall be stored outside of barrier fencing.
- f. All silt fencing shall be removed within 30 days of completion of work and permanent stabilization of site soils so that reptile and amphibian movement between uplands and wetlands is not restricted. If fiber rolls/wattles, straw bales, or other natural material erosion control products are used, such devices will not be left in place to biodegrade and shall be promptly removed after soils are stable so as not to create a barrier to migrating wildlife. Seed from seeding of soils should not spread over fiber rolls/wattles as it makes them harder to remove once soils are stabilized by vegetation.

2. Contractor Education:

- a. Prior to work on site and initial deployment/mobilization of equipment and materials, the Contractor shall attend an educational session at the pre-construction meeting with APT. This orientation and educational session will consist of information such as, but not limited to: representative photographs of typical herpetofauna that may be encountered, typical species behavior, and proper procedures if species are encountered. The meeting will further emphasize the non-aggressive nature of these species, the absence of need to destroy such animals and the need to follow Protective Measures as described in Section 4 below. The Contractor will designate one of its workers as the "Project Monitor", who will receive more intense training on the identification and protection of herpetofauna.
- b. The Contractor will designate a member of its crew as the Project Monitor to be responsible for the periodic "sweeps" for herpetofauna within the construction zone each morning. This individual will receive more intense training from APT on the identification and protection of herpetofauna in order to perform sweeps. Any herpetofauna discovered would be carefully translocated outside the work zone in the general direction the animal was oriented.

- c. The Contractor's Project Monitor will be provided with cell phone and email contacts for APT personnel to immediately report any encounters with herpetofauna. Educational poster materials will be provided by APT and displayed on the job site to maintain worker awareness as the project progresses.
- d. APT will also post Caution Signs throughout the project site for the duration of the construction project providing notice of the environmentally sensitive nature of the work area, the potential for encountering various amphibians and reptiles and precautions to be taken to avoid injury to or mortality of these animals.

3. Petroleum Materials Storage and Spill Prevention

- a. Certain precautions are necessary to store petroleum materials, refuel and contain and properly clean up any inadvertent fuel or petroleum (i.e., oil, hydraulic fluid, etc.) spill due to the project's location in proximity to sensitive wetlands.
- b. A spill containment kit consisting of a sufficient supply of absorbent pads and absorbent material will be maintained by the Contractor at the construction site throughout the duration of the project. In addition, a waste drum will be kept on site to contain any used absorbent pads/material for proper and timely disposal off site in accordance with applicable local, state and federal laws.
- c. The following petroleum and hazardous materials storage and refueling restrictions and spill response procedures will be adhered to by the Contractor.
 - i. Petroleum and Hazardous Materials Storage and Refueling
 - 1. Refueling of vehicles or machinery shall occur a minimum of 100 feet from wetlands or watercourses and shall take place on an impervious pad with secondary containment designed to contain fuels.
 - 2. Any fuel or hazardous materials that must be kept on site shall be stored on an impervious surface utilizing secondary containment a minimum of 100 feet from wetlands or watercourses.
 - ii. Initial Spill Response Procedures
 - 1. Stop operations and shut off equipment.
 - 2. Remove any sources of spark or flame.
 - 3. Contain the source of the spill.
 - 4. Determine the approximate volume of the spill.
 - 5. Identify the location of natural flow paths to prevent the release of the spill to sensitive nearby waterways or wetlands.
 - 6. Ensure that fellow workers are notified of the spill.
 - iii. Spill Clean Up & Containment
 - 1. Obtain spill response materials from the on-site spill response kit. Place absorbent materials directly on the release area.
 - 2. Limit the spread of the spill by placing absorbent materials around the perimeter of the spill.
 - 3. Isolate and eliminate the spill source.
 - 4. Contact the appropriate local, state and/or federal agencies, as necessary.
 - 5. Contact a disposal company to properly dispose of contaminated materials.
 - iv. Reporting
 - 1. Complete an incident report.
 - 2. Submit a completed incident report to the Connecticut Siting Council.

4. Protective Measures

- a. A thorough cover search of the construction area will be performed by APT's Environmental Monitor for herpetofauna prior to and following installation of the silt fencing barrier to remove any species from the work zone prior to the initiation of construction activities. APT's Environmental Monitor will also sweep the existing paved access drive in advance of the Contractor's initial mobilization of equipment and materials to the Subject Property. Any herpetofauna discovered would be carefully translocated outside the work zone in the general direction the animal was oriented. Periodic inspections will be performed by APT's Environmental Monitor throughout the duration of the construction.
- b. Any stormwater management features, ruts or artificial depressions that could hold water created intentionally or unintentionally by site clearing/construction activities will be properly filled in and permanently stabilized with vegetation to avoid the creation of vernal pool "decoy pools" that could intercept amphibians moving toward the vernal pools. Stormwater management features such as level spreaders will be carefully reviewed in the field to ensure that standing water does not endure for more than a 24 hour period to avoid creation of decoy pools and may be subject to field design changes. Any such proposed design changes will be reviewed by the design engineer to ensure stormwater management functions are maintained.
- c. Erosion control measures will be removed no later than 30 days following final site stabilization so as not to impede migration of herpetofauna or other wildlife.

5. Herbicide and Pesticide Restrictions

- a. Verizon Wireless and its contractors will avoid the use of herbicides and pesticides at the proposed wireless telecommunications Facility.

6. Reporting

- a. Following completion of the construction project, APT will provide a summary report to Connecticut Siting Council for compliance verification documenting any observations of herpetofauna and the monitoring and maintenance of the barrier fence and erosion control measures.

Wetland Impact Analysis:

No direct impact to Federal or State wetlands will result from the proposed relocation Facility project. The Facility would result in a relatively small development 'footprint' located primarily within the existing cultivated field and just encroach into the adjacent upland forest edge. The nearest point of Wetland 1 to the proposed limits of clearing is located approximately 113 feet to the northeast at wetland flag 1-12.

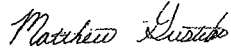
Possible short-term wetland impacts associated with the proposed compound expansion would be minimized by the proper installation and maintenance of erosion and sedimentation controls in accordance with *2002 Connecticut Guidelines For Soil Erosion and Sediment Control*. Possible long-term temporary impacts are minimized by the unoccupied nature of the Facility and limited traffic generated by routine maintenance visits (approximately once per month for Verizon Wireless). Impervious surfaces associated with the proposed compound and access have been minimized with the use of a gravel surface that promotes stormwater infiltration. The proposed permanent stormwater management features, including grass-lined swales and rip-rap lined level spreaders, will control stormwater runoff and not alter existing surface water drainage patterns or nearby wetland hydrology. Therefore, the proposed Verizon Wireless development will not result in a likely adverse impact to nearby wetland resources.

If you have any questions regarding the above-referenced information, please feel free to contact me by telephone at (860) 663-1697 ext. 202 or via email at mgustafson@allpointstech.com.

Sincerely,

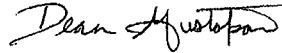
All-Points Technology Corporation, P.C.

Report Prepared by:



Matthew Gustafson
Registered Soil Scientist

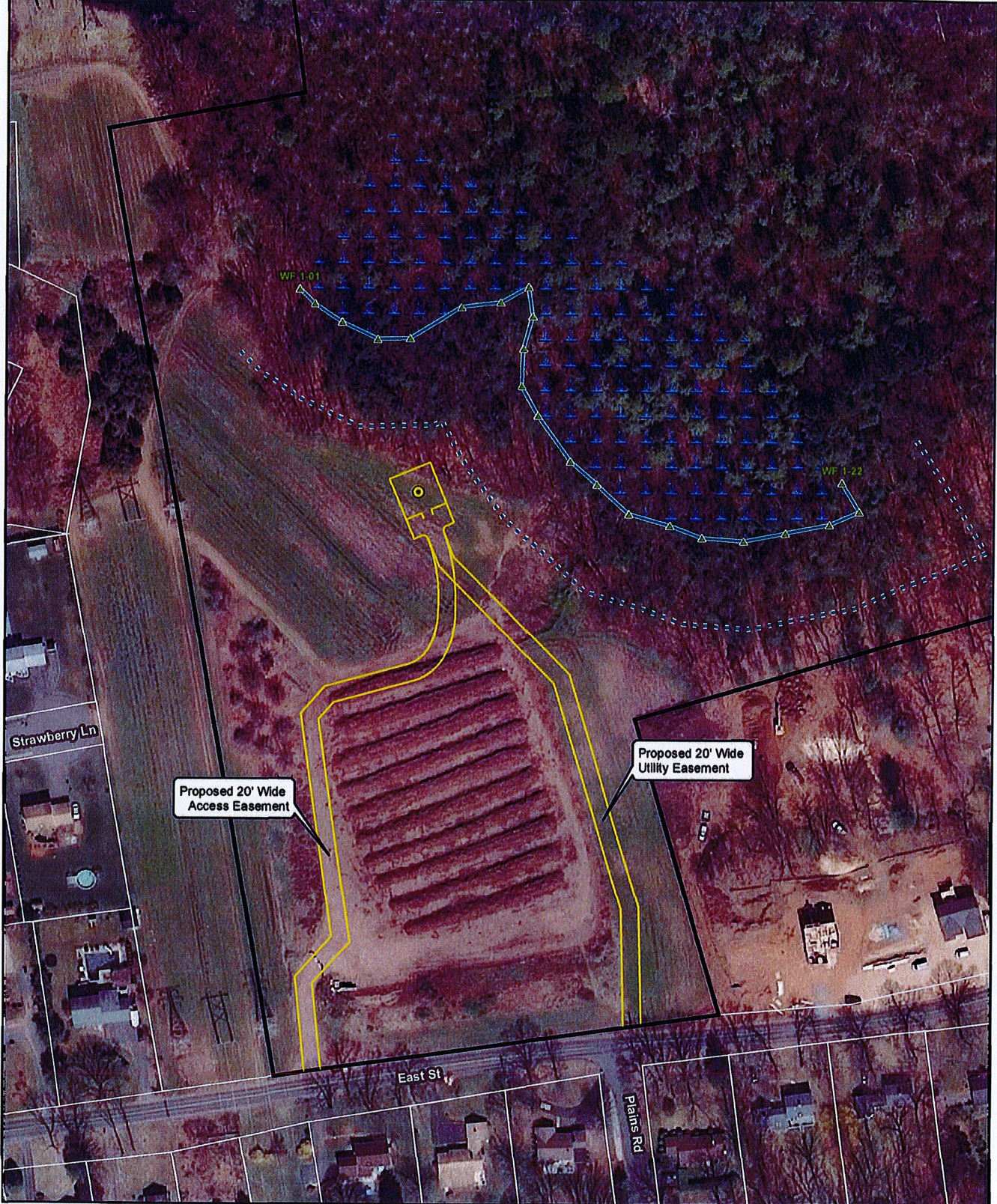
Report Reviewed by:



Dean Gustafson
Professional Soil Scientist

Enclosures

Wetland Delineation Map



Legend

- Proposed Stealth Structure Pine Tree
- Proposed Facility Layout
- Approximate Subject Parcel Boundary
- Approximate Parcel Boundary (CTDEEP)
- Wetland Flag
- Delineated Wetland Boundary
- 100' Wetland / Vernal Pool Buffer
- Wetland Area



Base Map Source: 2012 Aerial Photograph (CTECO)
 Map Scale: 1 inch = 150 feet
 Map Date: November 2014

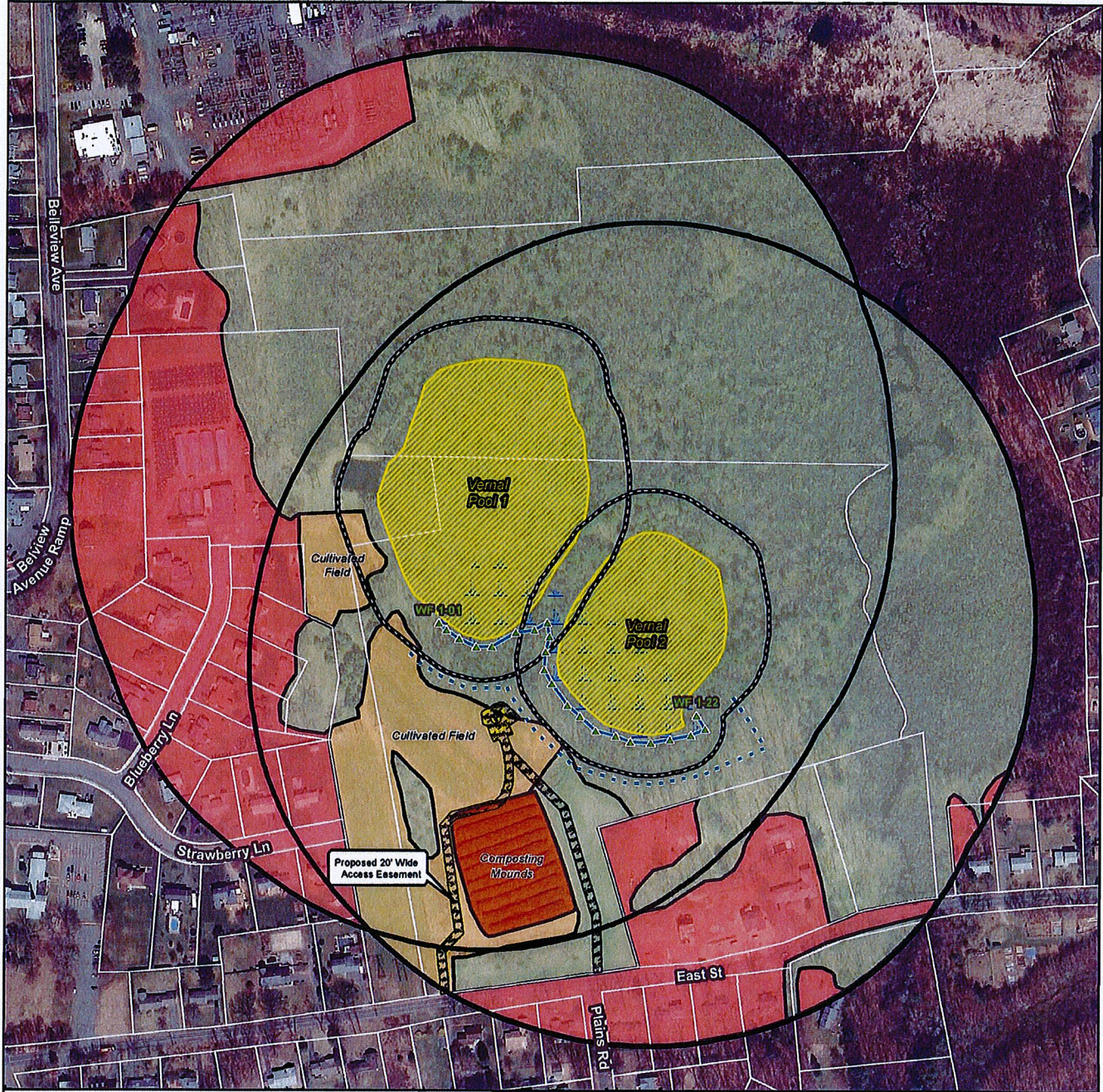
Wetland Delineation Map



Proposed Wireless
 Telecommunications Facility
 Southington East Street a/k/a Meriden Relo
 99 East Street
 Southington, Connecticut



Vernal Pool Analysis Map



Potential Vernal Pool 1 - Total 100'-750' Critical Terrestrial Habitat Area: ±267.68 acres

Existing Critical Terrestrial Habitat Areas:		
Developed	±24.57 acres	38.30%
Undeveloped	±43.11 acres	63.70%

Proposed Critical Terrestrial Habitat Areas:		
Developed	±24.80 acres	36.35%
Undeveloped	±43.08 acres	63.65%

Potential Vernal Pool 2 - Total 100'-750' Critical Terrestrial Habitat Area: ±260.80 acres

Existing Critical Terrestrial Habitat Areas:		
Developed	±17.45 acres	28.70%
Undeveloped	±43.35 acres	71.30%

Proposed Critical Terrestrial Habitat Areas:		
Developed	±17.48 acres	28.75%
Undeveloped	±43.32 acres	71.25%

Proposed Limits of Grading: 0.46 acres (±20,119 sq. ft.)

Critical Terrestrial Habitat Impact Areas:		
Developed	±0.43 acres	93%
Undeveloped	±0.03 acres (1,311 sq. ft.)	7%

No Impact to 100' Vernal Pool Envelope to either Vernal Pools 1 or 2

Legend

- Proposed Stealth Structure Pine Tree
- Proposed Facility Layout
- ▭ Proposed Limits of Grading
- ▲ Wetland Flag
- ▭ Wetland Area
- Delineated Wetland Boundary
- 100' Wetland / Vernal Pool Buffer
- ▨ Vernal Pool
- ▭ 100' Vernal Pool Envelope
- ▭ 100'-750' Critical Terrestrial Habitat Area
- Approximate Parcel Boundary (CTDEEP)
- ▭ Critical Terrestrial Habitat Type
- ▭ Undeveloped
- ▭ Developed
- ▭ Composting Mounds
- ▭ Cultivated Field

Vernal Pool Analysis Map



Proposed Wireless Telecommunications Facility
 Southington East Street a/k/a Meriden Relo
 99 East Street
 Southington, Connecticut

