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March 18, 2016

Town of Mansfield  
Inland Wetlands Commission  
14 Park Place  
Mansfield, CT 06226-2217

**Re: WETLANDS ASSESSMENT & IMPACT ANALYSIS: SUMMARY OF FINDINGS**

***Storrs Lodges, Connecticut***

Hunting Lodge Road, Mansfield, CT

*REMA Job No.: 15-1860-MNS18*

Dear Commissioners:

REMA ECOLOGICAL SERVICES, LLC (REMA) has prepared this document to be submitted as part of an application for a student housing project, currently before the Town of Mansfield's Inland Wetlands Commission ("IWC" "the Commission"). The project plans, were prepared by F. A. Hesketh & Associates, Inc., and are dated 3/18/16. This housing project, catering to UConn students, is proposed in western Mansfield, about half a mile northeast of the campus center at Storrs.

We are providing herein our *Summary of Findings* with an overview of the site's regulated resources and other environmental features, as well as an analysis of the proposal, as it relates to regulated wetlands and watercourses. This document presents the basis for our professional opinion that existing wetland and watercourse functions and values will not be degraded by the proposed activities, taking into consideration some of the benefits from the proposed mitigation.



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## **INTRODUCTION & OVERVIEW**

The applicant proposes to construct this residential housing project on a 45.9-acre property ("the site"), with roughly 6.7-acres of wetlands, and 1,439 linear feet of intermittent watercourse. The plan calls for 47 buildings, 218 units, and 692 bedrooms. The number of parking spaces would 558, close to the minimum allowed by Town zoning. Stormwater management includes pervious pavement, below-ground infiltrator galleys, and discharges to infiltration swales or water quality basins.

It should be noted that a very different application for high density student housing had previously been submitted for the subject site in 2008/2009 (i.e. Ponde Place Residential Apartment Community). This report encompasses some of the baseline ecological work in the Environmental Review Team (ERT) report (April 2009), and in the Wetlands Report, dated 7/5/07, prepared by wetland scientist and vernal pool specialist Edward Pawlak, Principal of CT Ecosystems, LLC.

Approximately 4,402 square feet (0.1 acres) of *direct* impacts to wetlands will be associated with the entry road and an emergency access road from Hunting Lodge Road. The former would cross the primary stream corridor, Wetland C, while the latter will pass between Wetlands A and C1. The wetland crossing from Hunting Lodge Road is unavoidable. Moreover, roughly 9.38 acres of encroachment to the 150-foot wide upland review area (URA) is proposed.

Regulated wetland boundaries were delineated by George T. Logan, Certified Soil Scientist, wildlife ecologist, and Professional Wetland Scientist (PWS). In 2015, the wetland boundaries were accepted by the IWC, via a Town wetlands map amendment application. Mr. Logan and other REMA natural resource professionals visited the site on 12 different occasions in the fall of 2015, and winter of 2015/2016, to obtain baseline wetland and upland data. REMA coordinated closely with Hesketh & Associates, Inc. (FHA), as the site plan was developed. The extremely tight timeline for submission did not allow for a full review of the storm water management system, before submission of the application, but REMA will complete our review in the near future, and make any final recommendations.

Attached to this report, Figures A1, and 1 through 5 show the topography, road network, soil series, and vegetation cover types in the site vicinity. They include both recent and historic aerial photos taken in different seasons, and show vegetation cover types and wetland



distribution on the site. Moreover, the attached, annotated photo-record provides information on wetland soils, plants, hydrologic regime, and microtopography, and the size-class distribution of different sections of forest.

Additional supplementary documents will follow, to be submitted under separate cover, including, wetland/watercourse functions and values forms, water quality testing by a CT-certified laboratory (nutrient parameters), and additional soils data.

The *Summary of Findings* presented below is based on field investigations, secondary-source maps and documents, and the proposed project plans.

## **2.0 SUMMARY OF FINDINGS**

### **2.1 EXISTING CONDITIONS**

#### **Site Location and Landscape Setting**

- ◆ The 45.93-acre parcel is located in Mansfield, Connecticut, about half a mile southwest of the University of Connecticut campus center. It is only 0.75 miles south of Route 44, the main east-west through-road. It is bounded to the north by student housing along Carriage House Drive and to the east by Hunting Lodge Road. Additional student housing and single-family house residential developments, associated with Northwood Road, are to the south of the site. To the west is a rural landscape with undeveloped forested land, and then large, open fields.

#### **Topography**

- ◆ The site is mostly level to gently sloping. Only the western hill has moderate slopes. The highest elevation is roughly 572.7, on the western hilltop, upgradient of the western headwaters seepage Wetland (WB), the only high-gradient stream at the site. The eastern intermittent watercourse is a moderate to low gradient (Wetlands C3 to C4) stream. Microtopography is most pronounced in WA, the west central wetland with an embedded vernal pool habitat, with classic shrub islands and vegetated tree bases, surrounded by inundation, on a seasonal basis. Moderate to slight microtopography is found throughout the WC wetlands.



### Cover Types

- ◆ The property is currently entirely forested. A 1970 CTDEEP aerial photo (Figure 5, attached) shows only one unvegetated fill area at the terminus of Northwood Road. Although the entire site is seen to be wooded in archived aerial photographs dating back to 1934, with the noted above exception, it is likely that selective logging has taken place in the 20<sup>th</sup> century. Even so, portions of two of the eastern wetlands, WC2 and WC3, have a “woodland” cover type (20% to 60% cover), because a very poorly drained hydrologic regime has limited tree growth.

### Geology

- ◆ Bedrock is in the Hebron formation, with biotite and calc-silicate gneiss. Plan Sheet IW-1 shows the distribution of soil series, per the USDA-NRCS soil survey (also see the attached *On-Site Soil Investigation & Wetland Delineation Report*). Soils derived from this bedrock are coarse loamy, free-draining, and moderately fertile. Surficial materials are characterized as thin till and include both ablation and lodgement till, the latter with a hard pan. Charlton- Chatfield complex (85) includes deep coarse loamy soils (Charlton) and shallow, coarse-loamy upland soils over bedrock (Chatfield series). This mapping unit is limited to the far western portion of the site. Associated wetland soils are the Leicester, Ridgebury, Whitman (3) fine sandy loams, a soil series complex.

Deep, coarse loamy upland soils without a compact hardpan in the Charlton and Canton series (Mapping Unit 73) are on the east side between the Wetland C3 and C4 corridor and Hunting Lodge Road. In the central portion of the site are deep, upland till soils with a densic horizon (hardpan) in the Paxton and Montauk series, and in the Woodbridge (46) series.

### Wetlands Summary

- ◆ Wetlands total 6.7 acres (see Figure A1, attached). The eastern on-site stream segment is an unnamed tributary of Eagleville Brook, to the south, and is roughly 1,439 linear feet long on-site. The eastern wetland units (WC1 to WC4) are all part of this stream system. Two intermittent, seasonal headwaters wetlands, labeled WA and WB drain toward Cedar Swamp Brook, which is offsite to the west, flowing



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southerly, shown in Photos 39 to 41. Both Cedar Swamp Brook and Eagleville Brook are tributaries of Willimantic River. The watershed divide is an old farm road built on fill, the extension of the northern terminus of Northwood Road, bisecting a seasonally flooded red maple swamp.

### **Cedar Swamp Brook Watershed**

- ◆ Wetland A (WA), contains an embedded vernal pool habitat, with moderately high productivity for wood frog, as documented by Ed Pawlak, for the prior application. A total of 53 wood frog egg masses were counted on April 20<sup>th</sup>, 2007 and water depth was 8 inches, but only a few spotted salamander egg masses; the pool likely dries out too soon for successful metamorphosis of salamanders, in most years. Large woody debris is common, but density of shrubs within the vernal pool is low; one small, young patch of buttonbush was observed. Red maple is dominant, including one three-foot diameter tree; healthy slippery elms were also noted. Herbs are sparse in ponded areas: royal fern patches and cinnamon fern on pool margins. Herbs and mosses are concentrated on tree bases: small wood ferns, sedges, Virginia creeper, small patches of sphagnum mosses and unidentified seedlings on tree bases.
- ◆ The 150-foot URA of Wetland A, which includes the 100-foot vernal pool envelope, is entirely forested, except for the dirt roadbed of the unpaved extension of Northwood Road. To the south and southeast of the pool, the moist, mixed hardwood forest has a dense understory dominated by Japanese barberry. The infestation that began along the unpaved roadway south of Northwood Drive, in the filled area, visible in the 1970 aerial photo (Figure 5). Japanese barberry is present, but has not yet become dominant in the URA to the north of the pool, which also has moist, nearly level soils, suitable for wood frog hibernation, an herb stratum dominated by hay-scented fern, and a diverse tree stratum including hickory and beech. The shrub stratum north of the pool is low in density, though one clump of wild currant was observed. This genus includes several rare species in Connecticut, but is only possible to reliably identify in early spring, when in bloom.
- ◆ Wetland B (WB) is a moderate to high gradient headwaters wetland, 80 to 120 feet wide. Saturation was observed in mid fall in the central channel, and higher flow volumes occur in times of seasonal high water. Water quality is expected to be excellent, as the small watershed is entirely forested. Bristly dewberry, Christmas



fern, and spinulose wood fern are dominant herbs. Agrimony was also observed. Spicebush and red maple are the dominant woody species, and shagbark hickory and beech are present as well. Some dieback of spicebush was noted. Clumps of barberry average about five to eight feet across, and thirty feet apart within the wetland. Barberry is also present in the URA. The most important portion of its upland review area is the upgradient hillside, its water source.

### **Eagleville Brook Watershed**

- ◆ The eastern wetland system has a watershed of 112 acres per the 2009 ERT. Much of the eastern URA of this wetland is off-site, owned by others. An old woods road on a historic fill causeway crosses this broad wetland at the location selected for the entry road. This old road impounded the south-flowing stream, creating an area of flooding (likely temporary to seasonal). WC3, the portion to the north of the causeway, averages only about eighty feet wide, and very poorly drained soils are limited to narrow zones adjacent to the stream. WC 4, which begins south of the entry road, is much wider, up to 240 feet wide. Both tributary wetlands flow into the stream from the west, from on-site sub-watersheds (i.e., WC1 and WC2).
- ◆ Adjacent wetlands throughout the system are red maple swamp, but tree maturity and density, is variable depending on hydrologic regime. Tree and shrub density is low in the partially impounded, saturated portion of Wetland WC3, though trees rooted on the old causeway overhang the very poorly drained areas. Sizable very poorly drained areas also occur in the western terrace of WC4 and the small northwestern seepage wetland, WC2. These two areas also have a low percent cover of tree canopy, dead over-turned trees, and soils high in organic matter.
- ◆ The extensive western stream terrace of WC4 has an interesting assemblage of herbs of saturated, but well-oxygenated and mineral rich conditions. In addition to skunk cabbage and Jack-in-the-pulpit, which tolerate a wide range of nutrient regimes, species of mesotrophic to oligotrophic wetland communities were also observed: abundant golden ragwort, swamp saxifrage, Carrion-flower, skullcaps, swamp violet, and occasional turtlehead, the host plant of the declining and uncommon Baltimore checkerspot butterfly. Native Pennsylvania bittercress grows within the stream channel. A swath of Cinnamon fern is dominant along the wetland boundary in



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poorly drained to somewhat poorly drained soil. An old stone “culvert” was also noted.

- ◆ In WC2 small evergreen sedges and skunk cabbage are dominants, and sphagnum and other mosses are more abundant. A network of moss-covered fallen logs creates small-scale microtopography. Shrub diversity was moderately high, including healthy arrowwood viburnum.
- ◆ WC1 is a much larger wetland than WC2, with substantial disturbance at its western end, due to fill placement and proliferation of Asiatic bittersweet and Japanese barberry. Red maples include immature pole size trees and multi-trunk sprout trees. At the eastern end, adjacent to the outlet stream, one white oak, a wolf tree, is over three feet in diameter. Highbush blueberry is also a dominant shrub, though barberry is locally the most abundant, within the wetland and in adjacent to filled areas. Footing is firmer than in the terrace of WC4, indicating that the dominant soil drainage type is poorly drained rather than very poorly drained.
- ◆ The distance between Hunting Lodge Road and the east side of this semi-perennial stream corridor (i.e. Wetland C3 and C4) averages about two hundred feet. The forest slopes down moderately steeply from four residential back yards. Sugar maple and ashes are both dominant trees. The forest community in the URA to the west of WC4 and south of WC1 has undisturbed moderately well-drained Woodbridge soils and includes a substantial evergreen component. A mix of age classes includes mature trees and understory species characteristic of mixed white pine-hardwood forest: low blueberries, sheep laurel, and starflower. To the west of WC3 at the northern end of the site the URA consists of moist mixed hardwood forest, largely with a sparse, low diversity understory (still largely free of barberry), and a short gentle slope down to the wetland boundary. Soils are pervious, in the well-drained Canton-Charlton mapping unit (62).
- ◆ The 2009 ERT reported moderately impaired water quality downgradient of the site. Water quality testing has not been completed by REMA, but field observations indicate that the diversity and productivity of aquatic life is limited, by seasonal low flow and non-point source pollution. One stream salamander was observed in WC3 and some hydroptychid net spinner caddisflies, but no stone flies, mayflies or hellgrammites. However, plants indicative of clean water do occur on the stream



terrace of WC4. REMA will likely provide a more robust macro-benthos bioassessment in the near future, when water samples are collected from the site's stream.

## **2.2 PROPOSED CONDITIONS**

### **Overview**

- ◆ The proposal would entail the development and construction of multi-unit residential buildings, associated parking areas and driveways, recreational and community amenities, and other infrastructure improvements, including stormwater conveyance, storage, and renovation. These residential units would be served by public sewer and water. The primary access would be from Hunting Lodge Road, to the east, while emergency only access would be from the south, through an extension of Northwood Road. Forty-seven (47) buildings would be concentrated at four distinct site locations (i.e. westerly, north-central, southeastern, and eastern). Two building types (i.e. Type "A" and Type "B") will contain 218 units, and 692 bedrooms. These units will be rented to students at the University of Connecticut.
- ◆ Many buildings (i.e. 24) of the proposed residential community would lie outside the 150-foot upland review area (URA) to the site's regulated wetlands, and only 10 would be located completely within the URA. Portions of the access and internal circulation driveways, the neighborhood community center, outdoor athletic fields, and the nine (9) stormwater management facilities (e.g. water quality basins, swales, and level-spreaders), would encroach into the URAs of the on-site wetlands. Of the 24 acres of URA on the subject site, the encroachment within it would be 9.38 acres, or 39% of the total.
- ◆ A total of 4,402 square feet (0.10 acres) of *direct* wetland impacts are proposed, in order to provide access to the developable portions of the site from Hunting Lodge Road. The proposed location is that of an old woods road, which would represent a roughly 4,675 square foot reduction of wetland impacts for a roadway crossing at this location, without this pre-existing wetland impact. Overall, this wetland impact is of *low intensity* and does not unduly alter or compromise the functions and values provided by Wetlands C3 and C4. We should note that the existing "breach" of the old road crossing, which allows passage of the intermittent watercourse, will be



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maintained by using a precast bridge with a 30-foot wide span and a 4-foot vertical clearance. This will not only allow for passage of wildlife, but also ensure that the hydrology of Wetland C3, upgradient of the crossing, will not be altered.

- ◆ Potential *indirect* wetland impacts would be associated with both long-term (post-construction) and short-term (during construction) impacts, particularly erosion and sedimentation during the construction phase, and nutrients in stormwater discharge, and proximity to the wetlands, in the post-construction phase.
- ◆ Adequate sedimentation and erosion controls are found in the submitted plans, but extra care should be taken due to the sloping terrain and sensitivity of some of the regulated resources to sediment. Because sediment continues to be a phosphorus source for many years following construction, it will important to rigorously comply with CT DEEP's 2002 *Connecticut Erosion & Sedimentation Control Guidelines* specifying temporary stabilization for all areas not being actively graded. Fortunately, the somewhat more sensitive vernal pool-type habitat associated with Wetland A (see Figure A1, attached), is hydrologically isolated from the site's primary wetland corridor (Wetland C1 – C4), and proposed development is at least 100 feet away. It is recommended that in addition to the silt fence and or staked haybales, Silt-Sox tube barriers be placed immediately downgradient of all perimeter controls bordering wetlands, in several critical areas, such as upgradient and to the north of Wetland A (the vernal pool wetland), and upgradient and to the north of Wetland B, the western hillside seepage wetland.
- ◆ Because most of the on-site and the off-site wetlands are in large part fed by groundwater seepage, stormwater generated on impervious surfaces at the site will be infiltrated, and level spreaders will disperse discharge from several water quality basins or water quality swales.
- ◆ REMA has not, as of yet, had the opportunity to review calculations that show that the various stormwater treatment systems are sized to detain and treat the Water Quality Volume (WQV), as specified in CT DEEP's 2004 Stormwater Quality Manual ("the Manual"). Following this submission, we will provide a more detailed analysis of the stormwater management system, from a stormwater quality renovation perspective.



- ◆ The relatively low intensity of landscaping maintenance practices, that are associated with a development proposal of this type, with relatively small lawn areas, greatly minimize the potential for adverse impacts from excess fertilizer runoff and long-lasting pesticides and herbicides that could pass through the storm water basins. In contrast, an upscale, single-family residential land use would present a substantially greater risk to the regulated resources.
- ◆ The configuration of the building clusters is such that parking lots and roadways have to a large extent been placed *within* building clusters, such that the buildings themselves will shield wildlife in adjacent forested wetlands and uplands from idling vehicles, parking lot lighting, reducing indirect disturbance from added ambient noise, nighttime illumination, and human disturbance.
- ◆ Regarding proposed wetland buffers and the proximity of the buildings to the wetlands, we note that for the most part the development has maintained a minimum 40-foot undisturbed wetland buffer to all wetlands, and a 100-foot undisturbed wetland buffer to Wetland A, and its embedded vernal pool habitat. This was a recommendation made by REMA at the start of the development feasibility analysis for the site. In fact, a greater than 40-foot wetland buffer is being proposed in many areas, such as around Wetland B, the hillside seepage wetland.
- ◆ Amphibian migration and movement between Wetland A and the site's eastern uplands and wetlands, will be maintained through the use of two state-of-the-art wildlife tunnels proposed between Wetland A and Wetland C1, under the western access and circulation roadway. These are similar to the design selected for the newly constructed entrance roadway to the UConn Tech Park.
- ◆ In-kind mitigation (i.e. wetland restoration and creation) to off-set the direct impacts to wetlands, is proposed adjacent and to west of Wetland C1 (see submitted plans). This is an area of past wetland disturbance, as seen in Figure 5 (attached). Approximately 6,400 square feet of productive wetland shall be restored at this location, through removal of the old fill, placement of suitable, organically-enriched topsoil, and planting and seeding with appropriate native species (trees, shrubs, and herbs), similar to those present within the site's wetlands. REMA will be submitting a detailed Wetland Mitigation Implementation Plan in the near future.



- ◆ Additional wetland mitigation (i.e. wetland restoration/enhancement), in the form of invasive plant removal, is being proposed for several large sections of Wetlands C3 and C4, which locally have dense infestations of Japanese barberry (*Berberis thunbergii*). In total a minimum of 77,000 square feet (1.76 acres) of Wetland C3 and C4 (and possibly other wetland areas also) will be targeted for invasive shrub eradication and control (i.e. Japanese barberry, multiflora rose, firebush). REMA will develop a detailed Invasives Plant Species Management Plan, which will include a multi-year monitoring plan, based on our experience, and the latest guidance from the CT DEEP and the Nature Conservancy.

### **3.0 CONCLUSION**

In conclusion, it is REMA's professional opinion that the proposal, if constructed as designed and shown on the plans, will not result in long-term adverse impacts to the site's regulated resources, or the functions and values that they provide. In the short-term (construction phase) it is important that diligence be exercised to minimize the risk for sedimentation into on-site and off-site wetlands and watercourses.

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

Respectfully submitted,

**REMA ECOLOGICAL SERVICES, LLC**



Sigrun N. Gadwa, MS, PWS  
Professional Wetland Scientist  
Registered Soil Scientist



George T. Logan, MS, PWS, CE  
Professional Wetland Scientist  
Registered Soil Scientist, Certified Senior Ecologist

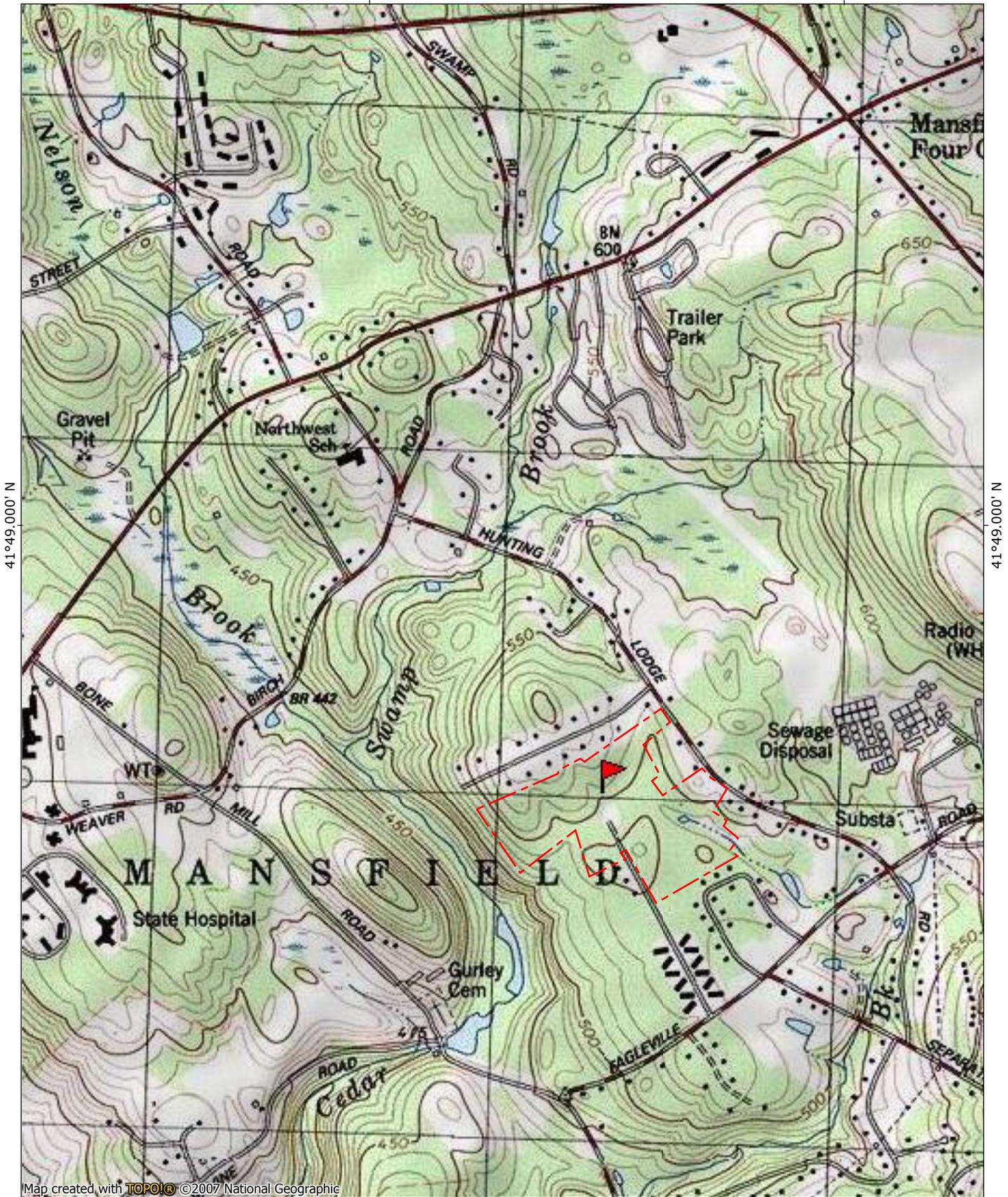
**VIA HAND-DELIVERY**

Attachments: Figures 1 through 5, and A1, Photos 1 through 56, On-Site Soil Investigation & Wetland Delineation Report

Figure 1: Site Locus; Storrs Lodges, Hunting Lodge Road, Mansfield, CT

72°17.000' W

WGS84 72°16.000' W



72°17.000' W

WGS84 72°16.000' W

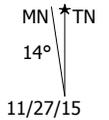
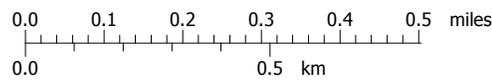




FIGURE 2: Proposed "*Storrs Lodges*" residential community, Mansfield, CT (as seen on a 5-6-15 aerial photo; Google Earth)

PRODUCED BY: REMA ECOLOGICAL SERVICES, LLC  
DATE: 3-17-16  
SCALE: NTS

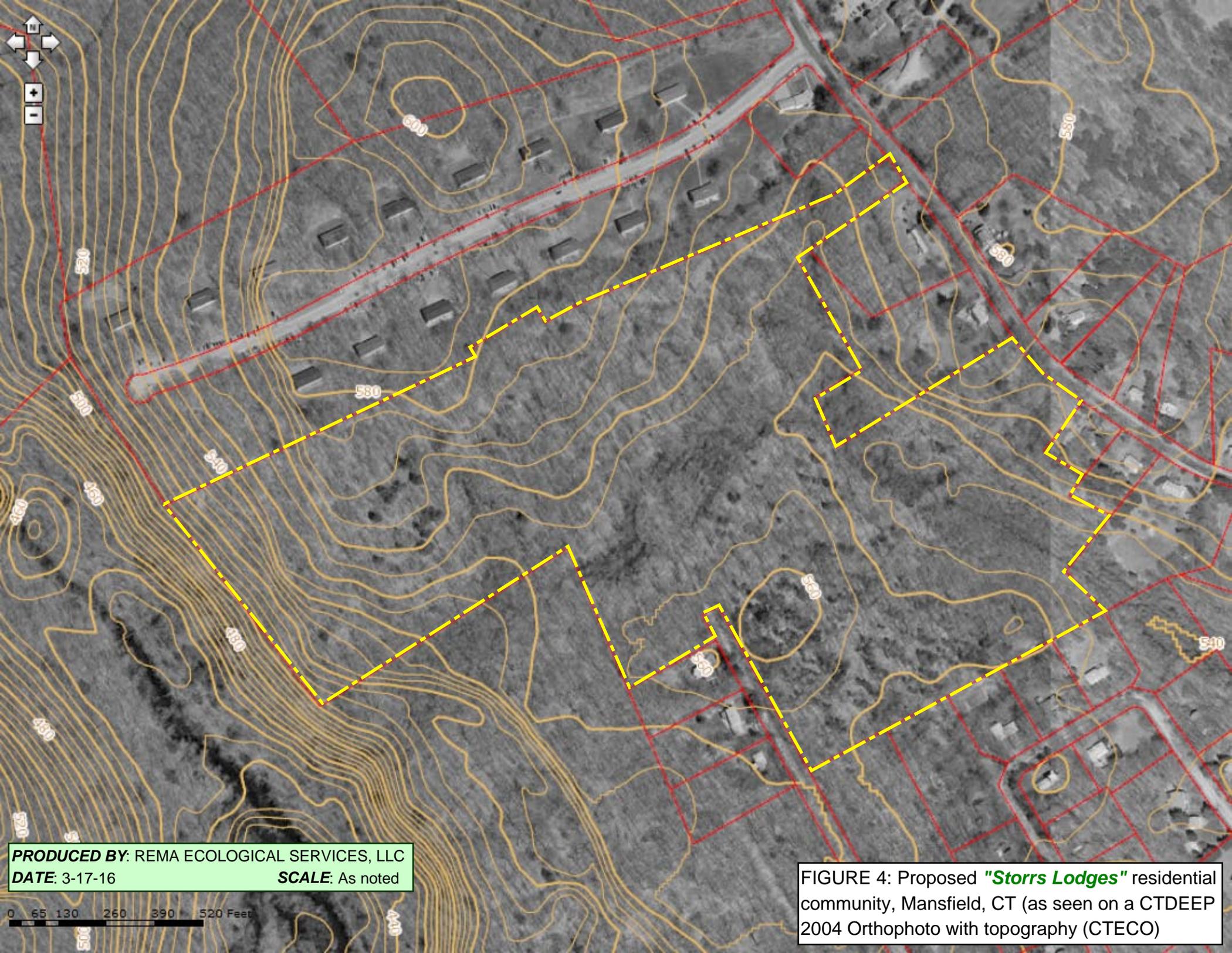
© 2015 Google



Cedar Swamp Brook

Wetland A & Vernal Pool Habitat

FIGURE 3: Proposed "*Storrs Lodges*" residential community, Mansfield, CT (as seen on a April 2013 aerial photo; Google Earth)



**PRODUCED BY:** REMA ECOLOGICAL SERVICES, LLC  
**DATE:** 3-17-16      **SCALE:** As noted

FIGURE 4: Proposed "**Storrs Lodges**" residential community, Mansfield, CT (as seen on a CTDEEP 2004 Orthophoto with topography (CTECO))

0 65 130 260 390 520 Feet

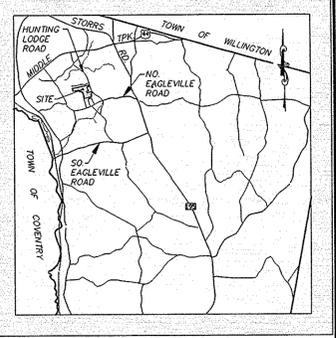
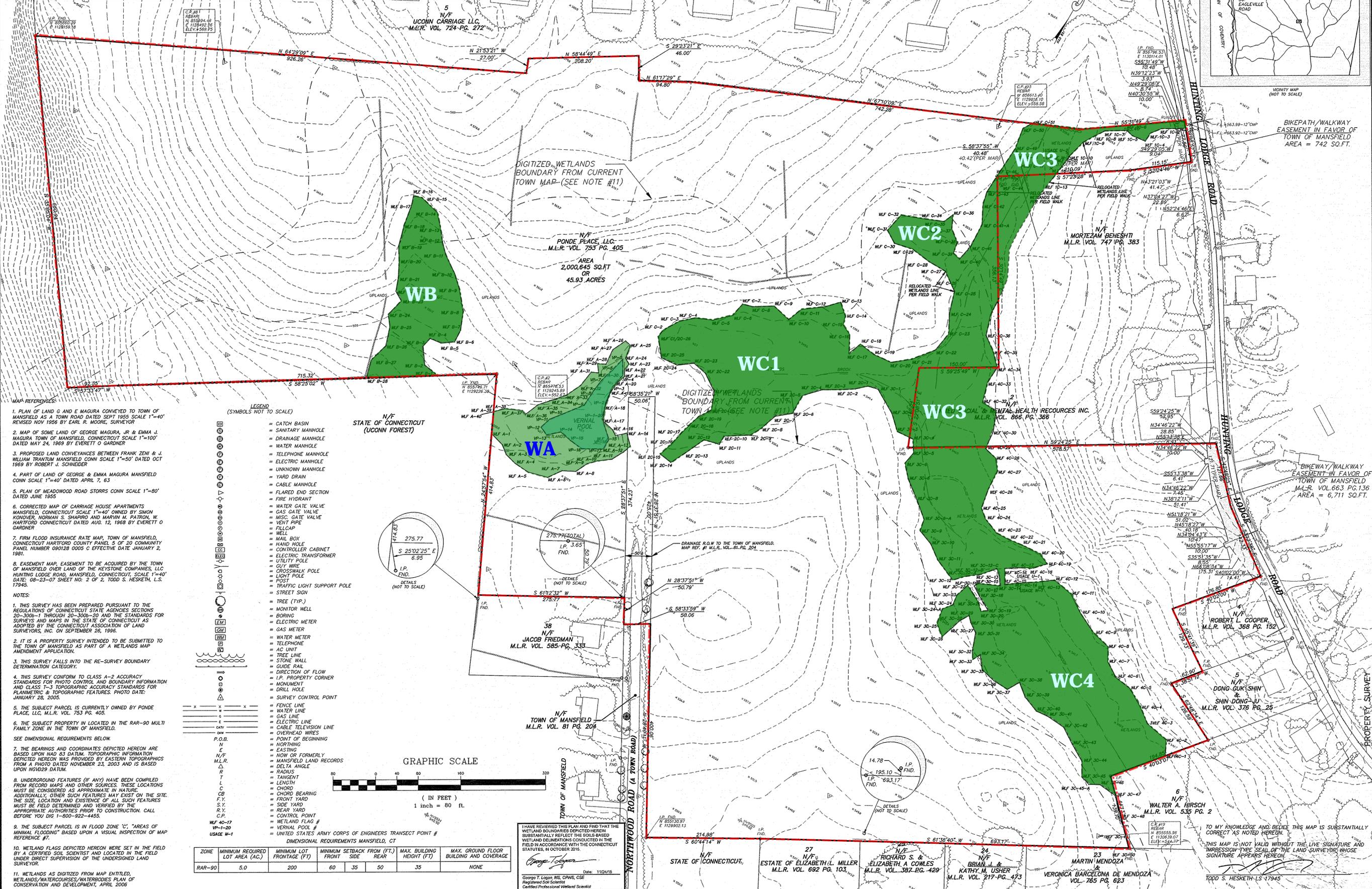


*"Historic" Wetland Fill;  
separates WA & WB &  
creates Vernal Pool*

**PRODUCED BY:** REMA ECOLOGICAL SERVICES, LLC  
**DATE:** 3-17-16  
**SCALE:** NTS

FIGURE 5: Proposed **"Storrs Lodges"** residential community, Mansfield, CT (as seen on an March 1970 aerial photo; CT

**FIGURE A1: WETLAND ECOLOGICAL UNITS AT PROPOSED "STORRS LODGES" RESIDENTIAL COMMUNITY, MANSFIELD, CT; AS SEEN ON THE APPROVED WETLAND BOUNDARY MAP**



ZONE	MINIMUM REQUIRED LOT AREA (AC.)	MINIMUM LOT FRONTAGE (FT)	MINIMUM SETBACK FROM (FT)	MAX. BUILDING HEIGHT (FT)	MAX. GROUND FLOOR BUILDING AND COVER
RAR-90	5.0	200	60 35 50	35	NONE

I HAVE REVIEWED THIS PLAN AND FIND THAT THE WETLAND BOUNDARIES DEPICTED HEREIN SUBSTANTIALLY REFLECT THE SOIL-BASED WETLAND DELINEATIONS CONDUCTED IN THE FIELD IN ACCORDANCE WITH THE CONNECTICUT REGULATIONS, IN OCTOBER 2016.

George T. Lopez, M.S., C.P.S., C.S.E.  
Registered Soil Scientist  
Certified Professional Wetland Scientist

Date: 11/20/16

Revisions:

No.	Date	Description
1	08-27-07	MISC
2	10-27-15	WETLANDS / TRLE UPDATED
3	11-30-2015	WETLANDS MAP AMENDMENT/TITLE
4	01-09-16	REVISED WETLAND LINE PER FIELD WALK

WETLAND MAP AMENDMENT  
ON PROPERTY OF  
**PONDE PLACE, LLC.**  
HUNTING LODGE ROAD  
MANSFIELD, CONNECTICUT

Drawn by: RM  
Checked by: TSH  
Scale: 1" = 80'

Date: 02-07-05  
Job no: 04161  
Sheet no: 1 OF 1

PS-1

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**F.A.H.**  
F. A. Hesketh & Associates, Inc.  
6 Creamery Brook, East Granby, CT 06026  
Civil & Traffic Engineers - Surveyors - Planners - Landscape Architects

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

THIS MAP IS NOT VALID WITHOUT THE LIVE SIGNATURE AND IMPRESSION TYPE SEAL OF THE LAND SURVEYOR WHOSE SIGNATURE APPEARS HEREON.

TODD S. HESKETH, L.S. 17945



*Photo 1: Wetland A (with embedded vernal pool habitat); early Fall 2015; facing westerly*



*Photo 2: Wetland A; a forested swamp; western section; facing westerly*



*Photo 3: Wetland A; seasonally saturated section; early Fall 2015; facing westerly*



*Photo 4: Wetland A; no inundation in mid-Fall 2015; blue/green flagging denotes edge of vernal pool habitat; pink/blue is the wetland boundary; facing northerly*



*Photo 5: Wetland A; northeastern section; December 2015; facing northerly*



*Photo 6: Wetland A; northeastern section; January 2016; facing southwesterly*



*Photo 7:* Wetland A; east-central section; February 2016; seasonally flooded pool near capacity; facing southerly



*Photo 8:* Wetland B; northcentral section; September 2015; facing southerly



*Photo 9:* Wetland B; seasonally saturated northern section; October 2015; facing southerly



*Photo 10:* Wetland B; southern section; September 2015; wall in background is at the property boundary; facing southwesterly



*Photo 11:* Wetland C1; seasonally saturated to seasonally flooded wooded swamp; central section; September 2015; floristic diversity is moderately high; facing easterly



*Photo 12:* Wetland C1; west-central section; October 2015; section filled in the late 1960s at far edge of wetland (background); facing southwesterly



*Photo 13:* Wetland C1; seasonally saturated southern section grades to moist uplands in background; central section; September 2015; facing southerly



*Photo 14:* Wetland C1 experiences seasonal groundwater seepage; Sphagnum mosses and sedge species are locally common



*Photo 15:* Wetland C1; view of westernmost section from on top of old fill (area of proposed wetland restoration); September 2015; facing southwesterly



*Photo 16:* Outlet intermittent stream from Wetland C1 connects to intermittent stream of site's main, north-south oriented wetland corridor; facing westerly



*Photo 17: Large white oak (a “wolf tree”) just south of the outlet stream for Wetland C1; facing southwesterly*



*Photo 18: Wetland C2; a seasonally saturated forested wetland seep, discharging easterly to Wetland C3; facing easterly*



*Photo 19:* Wetland C3; site's main riparian corridor; a seasonally flooded, seasonally saturated, and saturated forested swamp; facing southwesterly



*Photo 20:* Wetland C2; a significant proportion of wetland is very poorly drained, seasonally flooded, and devoid of shrubs and trees; facing southerly



*Photo 21:* Wetland C3; central section; October 2015; note invasive Japanese barberry (common throughout); facing northerly



*Photo 22:* Wetland C3; upper portion; showing intermittent stream; facing northerly



*Photo 23: Wetland C3; uppermost section; December 2015; sandy deposits originate at discharge from Hunting Lodge Road; facing northerly*



*Photo 24: Wetland C3 extends off-site to the north; September 2015; note last flag (C-51) at northern property border; facing northeasterly*



*Photo 25:* Wetland C3; stream flows through the central nearly flat mucky section (very poorly drained); facing southeasterly



*Photo 26:* A few sections of stream within Wetland C3 have small riffles; two-lined salamanders were noted here.



*Photo 27: Wetland C3; along southeastern edge, a seasonally saturated poorly drained zone; note cinnamon fern “zone;”facing southerly*



*Photo 28: Seasonally saturated, poorly drained “transitional” wetland grades into uplands with similar vegetation; facing southerly*



*Photo 29: One of two off-site, piped discharges to Wetland C3; facing northerly*



*Photo 30: Stormwater discharge to Wetland C3 from Hunting Lodge Road; located at the far northeastern corner of the site; facing northerly*



*Photo 31:* Soils in the central sections of Wetlands C3 and C4 are very poorly drained, as seen in this soil core with mucky topsoil and nearly glazed sandy subsoil



*Photo 32:* Wetland C4; typical view of central section; Wetland C4 has more trees than Wetland C3; facing southerly



*Photo 33:* Wetland boundary of WC4, indicated by flag; note the wide poorly drained zone above the very poorly drained portion of wetland with stream; facing northeasterly



*Photo 34:* Upper section of Wetland C4; old farm road crossing, separating WC3 and WC4 is the far background; facing northerly



*Photo 35: Southernmost section of Wetland C4; facing northeasterly*



*Photo 36: Eastern edge of Wetland C4 near property boundary; note “cinnamon fern zone” which can be found on both sides of the wetland boundary; facing southeasterly*



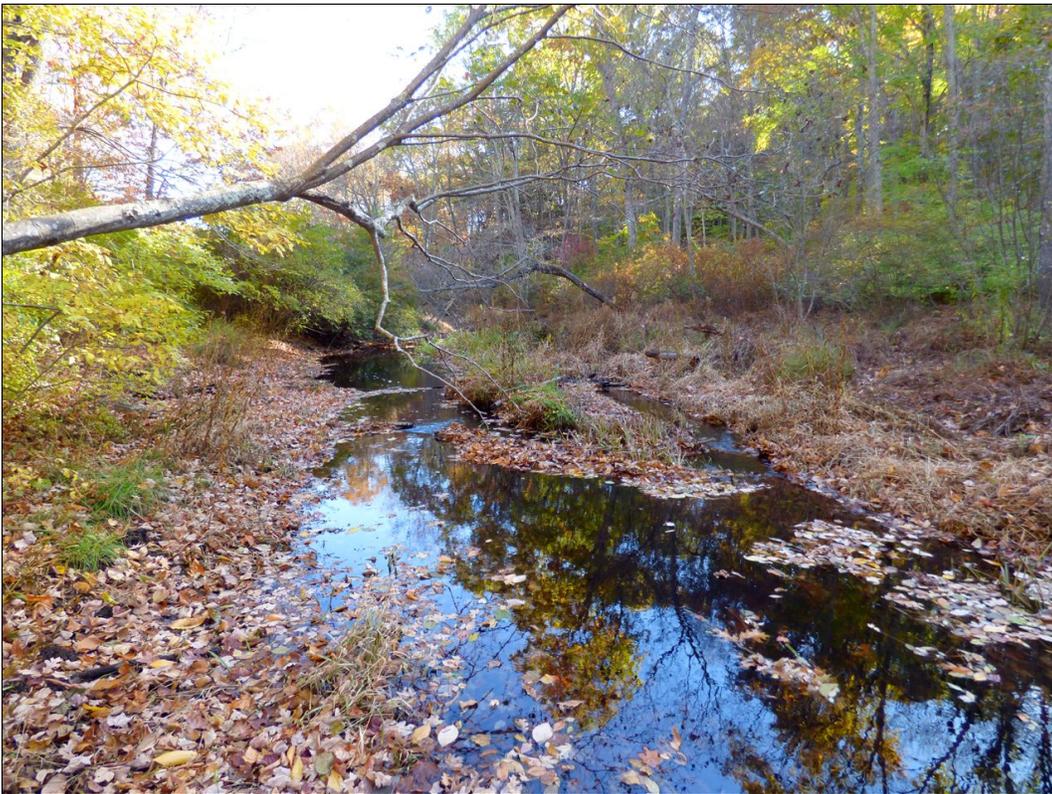
*Photo 37: Wetland C4 outlet stream near southern property boundary; facing southeasterly (downstream)*



*Photo 38: Wetland C4 intermittent stream near southern site boundary; facing westerly (upstream)*



*Photo 39:* Cedar Swamp Brook just westerly of subject site; facing northwesterly (upstream)



*Photo 40:* Cedar Swam Brook flows within a steep sided “ravine”; facing southeasterly (downstream)



*Photo 41: Cedar Swamp Brook; qualitative macro-benthos survey at this riffle, revealed the stream to be moderately impaired; facing northwesterly (upstream)*



*Photo 42: Stormflow from the western section of the subject site, including Wetland A and B flows down the steep slope above Cedar Swamp Brook; facing northeasterly*



*Photo 43:* This is the uphill section of the broad swale that drains a portion of the subject site towards Cedar Swamp Brook; facing southwesterly



*Photo 44:* Off-site wetland, with heavy Japanese barberry infestation, downgradient of the western section of the site that drains to Cedar Swamp Brook; facing easterly



*Photo 45:* The old farm road wetland crossing (left side of photo); note pink/blue wetland boundary markers; facing northerly



*Photo 46:* Old farm road crossing will be the location of the main roadway into the site from Hunting Lodge Road; WC3 to right, and WC4 to left of photo; facing southwesterly



*Photo 47:* Breach in old farm roadbed will be maintained in order not to alter the hydrology of Wetland C3, upstream; facing northwesterly



*Photo 48:* Old wetland fill area, adjacent to Wetland C1, will be removed and wetland conditions restored and planted; facing northerly



*Photo 49:* Large boulders were placed at edge of old fill and Wetland C1; facing northerly



*Photo 50:* Old wetland fill area, adjacent to Wetland C1, is replete with invasives; trees include “pioneer” species such as aspens; facing northerly



*Photo 51: Uplands east of Wetland C3; facing easterly*



*Photo 52: Maturing deciduous forest in the north-central section of subject site; facing northwesterly*



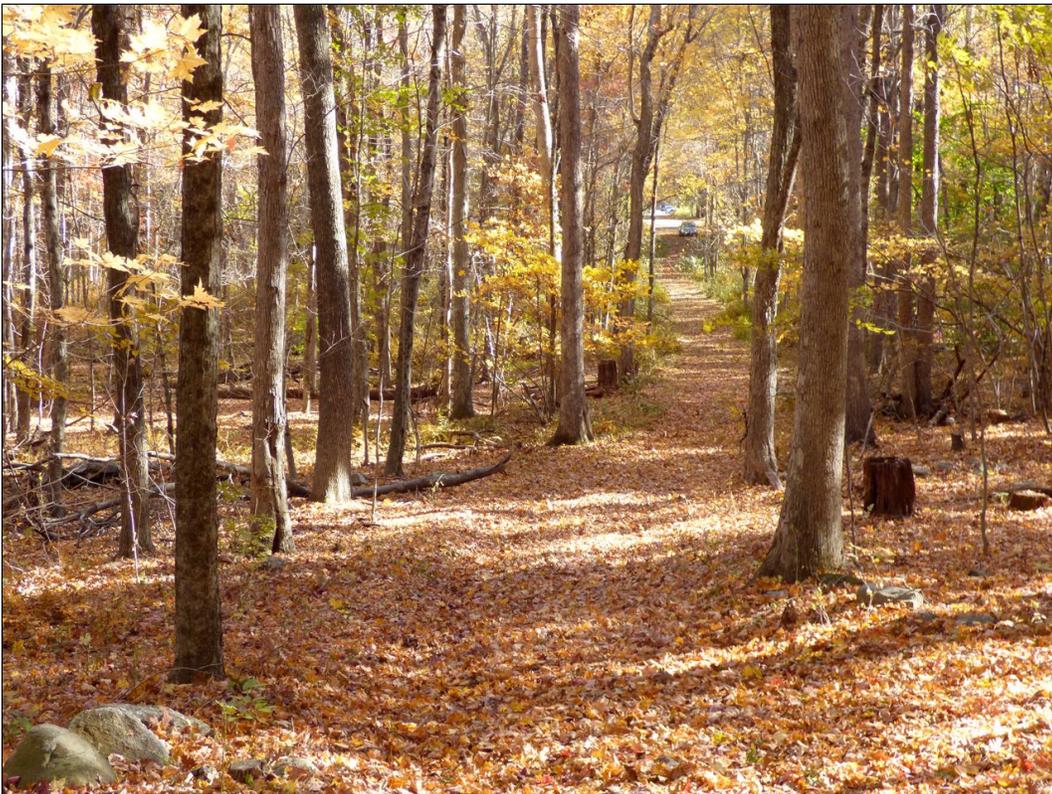
*Photo 53:* Upland woods within the westernmost development area at the site; facing southerly



*Photo 54:* Woods (upland) at the far western area of the subject site just beyond the development envelope; note well casing; facing southwesterly



*Photo 55:* Upland woods within the southeastern section of the site, designated for development; facing easterly



*Photo 56:* Existing woods road (extending north of Northwood Road) in the southwesterly section of the site; facing southeasterly



REPORT DATE: November 25, 2015

PAGE 1 OF 3

**REMA ECOLOGICAL SERVICES, LLC**

164 East Center Street, Suite 8  
Manchester, CT 06040

860.649.REMA (7362)

ON-SITE SOIL INVESTIGATION & WETLAND DELINEATION REPORT

**PROJECT NAME & SITE LOCATION:**

+/- 45.93 acres  
Hunting Lodge Road  
Mansfield, CT

**REMA Job No.:** 15-1860-MNS18

**Field Investigation Date(s):** 10/1, 10/9, 10/10/2015

**Field Investigation Method(s):**

- Spade and Auger
- Backhoe Test Pits
- Other: \_\_\_\_\_

**REPORT PREPARED FOR:**

EdR  
999 South Shady Grove Road  
Suite 600  
Memphis, TN 38120

**Field Conditions:**

Weather: Mostly sunny to cloudy, 50s to 70s  
Soil Moisture: low-moderate  
Snow Depth: none  
Frost Depth: none

**Purpose of Investigation:**

- Wetland Delineation/Flagging in Field
- Wetland Mapping on Sketch Plan or Topographic Plan
- High Intensity Soil Mapping by Soil Scientist
- Medium Intensity Soil Mapping from *The Soil Survey of Connecticut Maps* (USDA-NRCS)
- Other: \_\_\_\_\_

**Base Map Source:** CT Soil Survey web (USDA-NRCS) Figure A(attached)

**Wetland Boundary Marker Series:** RES-A-1 to RES-A-40 (open line), RES-B-1 to RES-B-28 (open line), RES-C-1 to RES-C-51 tied to RES-2C-1 to RES-2C-28 tied to RES-3C-1 to 3C-50, RES-1C-1 to RES-1C-13, and RES-4C-1 to RES-4C-36 (all open lines)

**General Site Description/Comments:** The "study area" or "site" is a roughly 49.93-acre, residentially-zoned parcel, westerly of Hunting Lodge Road, and northerly, easterly, and westerly of the northern terminus of Northwood Road, in Mansfield, CT. The site is predominately wooded and undisturbed, except for historic disturbances associated with filling just northerly of the terminus of Northwood Road, and with a crossing over the site's eastern wetland corridor and stream to connect Hunting Lodge Road with Northwood Road. The soils within the study area are both disturbed and undisturbed in nature, and are derived from glacial till (i.e. unstratified sand, silt & rock), both with and without a hardpan, and with rocky/sandy fill in the areas noted. The disturbed upland soils are identified as the Udorthents (306) soil mapping unit. The undisturbed upland soils are the well drained Paxton and Montauk (85), Canton and Charlton (60), and Charlton and Chatfield (73) soil series complexes, and the moderately well drained Woodbridge (46) soil series, while the undisturbed wetland soils belong to the poorly and very poorly drained Ridgebury, Leicester, and Whitman (3) soil series complex. The site's regulated wetland areas include a seasonally saturated to seasonally flooded eastern forested corridor associated with an intermittent stream, tributary to Eagleville Brook, and western forested wetlands, including a hillside seep and vernal pool habitat, that drain westerly to Cedar Swamp Brook. All of the forested wetlands are red-maple dominated swamps, with typical understory species (e.g. spicebush, highbush blueberry). However, the eastern forested wetland understory is dominated by Japanese barberry, and invasive shrub.

**ON-SITE SOIL INVESTIGATION & WETLAND DELINEATION REPORT (CONTINUED)**

**PROJECT NAME & SITE LOCATION:** +/- 45.93 acres  
Hunting Lodge Road, Mansfield, CT

**SOIL MAP UNITS****Upland Soils**

**Montauk loam (85).** This series consists of very deep, well drained soils formed in till derived primarily from granitic materials. These soils are on upland till plains and moraines. Slope ranges from 0 to 35 percent. Saturated hydraulic conductivity is moderately high or high in the solum and low to moderately high in the substratum. Mean annual temperature is about 49 degrees F, and mean annual precipitation is about 45 inches. Thickness of the solum and depth to the firm till substratum typically ranges from 20 to 38 inches but the range currently includes 18 to 38. Rock fragments range from 3 to 35 percent in the solum and 5 to 50 percent in the C horizon. The soil ranges from extremely acid to moderately acid throughout.

**Paxton fine sandy loam (85).** This series consists of deep, well drained soils formed in a coarse-loamy mantle underlain by firm, compact glacial till on uplands. They are nearly level to very steep soils on till plains, low ridges and drumloidal landforms. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. In tilled areas, these soils have a dark brown fine sandy loam surface layer 8 inches thick. The subsoil from 8 to 26 inches is dark yellowish brown and olive brown fine sandy loam. The substratum from 26 to 60 inches is olive, very firm and brittle gravelly fine sandy loam.

**Udorthents (306).** This soil mapping unit consists of well drained to moderately well drained soils that have been altered by cutting, filling, or grading. The areas either have had two feet or more of the upper part of the original soil removed or have more than two feet of fill material on top of the original soil. Udorthents or Made Land soils can be found on any soil parent material but are typically fluvial on glacial till plains and outwash plains and stream terraces.

**Woodbridge fine sandy loam (46).** This series consists of deep, moderately well drained soils formed in a coarse-loamy mantle underlain by firm, compact glacial till on uplands. They are nearly level to moderately steep soils on till plains, low ridges and drumloidal landforms. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. In tilled areas, these soils typically have a very dark grayish brown fine sandy loam surface layer 7 inches thick. The subsoil from 7 to 30 inches is dark yellowish brown and light olive brown fine sandy loam, mottled below 18 inches. The substratum from 30 to 60 inches is light olive brown, very firm and brittle gravelly fine sandy loam.

**Charlton very stony fine sandy loam (73).** This series consists of very deep, well drained coarse-loamy soils formed in friable, glacial till on uplands. They are nearly level to very steep soils on till plains and hills. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. In tilled areas, these soils have a surface layer of dark brown fine sandy loam 8 inches thick. The subsoil from 8 to 26 inches is yellowish brown fine sandy loam and sandy loam. The substratum from 26 to 60 inches or more is grayish brown gravelly fine sandy loam.

**Chatfield loam (73).** This series consists of moderately deep, well drained, and somewhat excessively drained soils formed in till. They are nearly level to very steep soils on glaciated plains, hills, and ridges. Slope ranges from 0 to 70 percent. Crystalline bedrock is at depths of 20 to 40 inches. Permeability is moderate or moderately rapid. In tilled areas, these soils have a surface layer that is very dark to dark grayish brown loam up to 8 inches thick. The subsoil from 8 to 26 inches is brown, flaggy silt loam.

**Canton stony fine sandy loam (61).** This series consists of deep, well drained soils formed in a coarse-loamy mantle underlain by sandy glacial till on uplands. They are nearly level to very steep soils on till plains and hills. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. Typically, these soils have a surface layer of very dark grayish brown fine sandy loam 2 inches thick. The subsoil from 2 to 23 inches is yellowish brown fine sandy loam, gravelly fine sandy loam and gravelly sandy loam. The substratum from 23 to 60 inches is pale brown gravelly loamy sand.

**ON-SITE SOIL INVESTIGATION & WETLAND DELINEATION REPORT (CONTINUED)**

**PROJECT NAME & SITE LOCATION:** +/- 45.93 acres  
Hunting Lodge Road, Mansfield, CT

**SOIL MAP UNITS****Wetland Soils**

**Ridgebury fine sandy loam (3).** This soil series consists of deep, poorly and somewhat poorly drained soils formed in a coarse-loamy mantle underlain by firm, compact glacial till on uplands. They are nearly level to moderately steep soils on till plains, low ridges and drumloidal landforms. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. Typically these soils have a black sandy loam surface layer 6 inches thick. The mottled subsoil from 6 to 16 inches is olive gray sandy loam. The mottled substratum from 16 to 60 inches is a light olive brown and olive, very firm and brittle gravelly sandy loam.

**Leicester fine sandy loam (3).** This series, which is some Connecticut counties is found only in complex with the Ridgebury and Whitman series, consists of deep, poorly drained loamy soils formed in friable glacial till on uplands. They are nearly level to gently sloping soils in drainage ways and low lying positions on till covered uplands. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. Typically, these soils have a surface layer of black fine sandy loam 6 inches thick. The subsoil from 6 to 23 inches is grayish brown, mottled fine sandy loam. The substratum from 26 to 60 inches or more is dark yellowish brown, mottled, friable, gravelly fine sandy loam.

**Whitman fine sandy loam (3).** This series, which is some Connecticut counties is only mapped in complex with the Ridgebury and Leicester series, consists of deep, very poorly drained soils formed in a coarse-loamy mantle underlain by firm, compact glacial till on uplands. They are nearly level and gently sloping soils on till plains, low ridges and drumloidal landforms. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. Typically these soils have a black fine sandy loam surface layer 8 inches thick. The mottled subsoil from 8 to 15 inches is gray sandy loam. The mottled substratum from 15 to 60 inches is firm, olive gray to gray dense glacial till.

Any accompanying soil logs and soil maps, and the on-site soil investigation narrative are in accordance with the taxonomic classification of the National Cooperative Soil Survey of the USDA Natural Resource Conservation Service, and with the Connecticut Soil Legend (DEP Bulletin No.5, 1983), as amended by USDA-NRCS. Jurisdictional wetland boundaries were delineated pursuant to the Connecticut General Statutes (CGS Sections 22a-36 to 22a-45), as amended. The site investigation was conducted and/or reviewed by the undersigned Registered Soil Scientist(s) [registered with the Society of Soil Scientists of Southern New England (SSSSNE) in accordance with the standards of the Federal Office of Personnel Management].

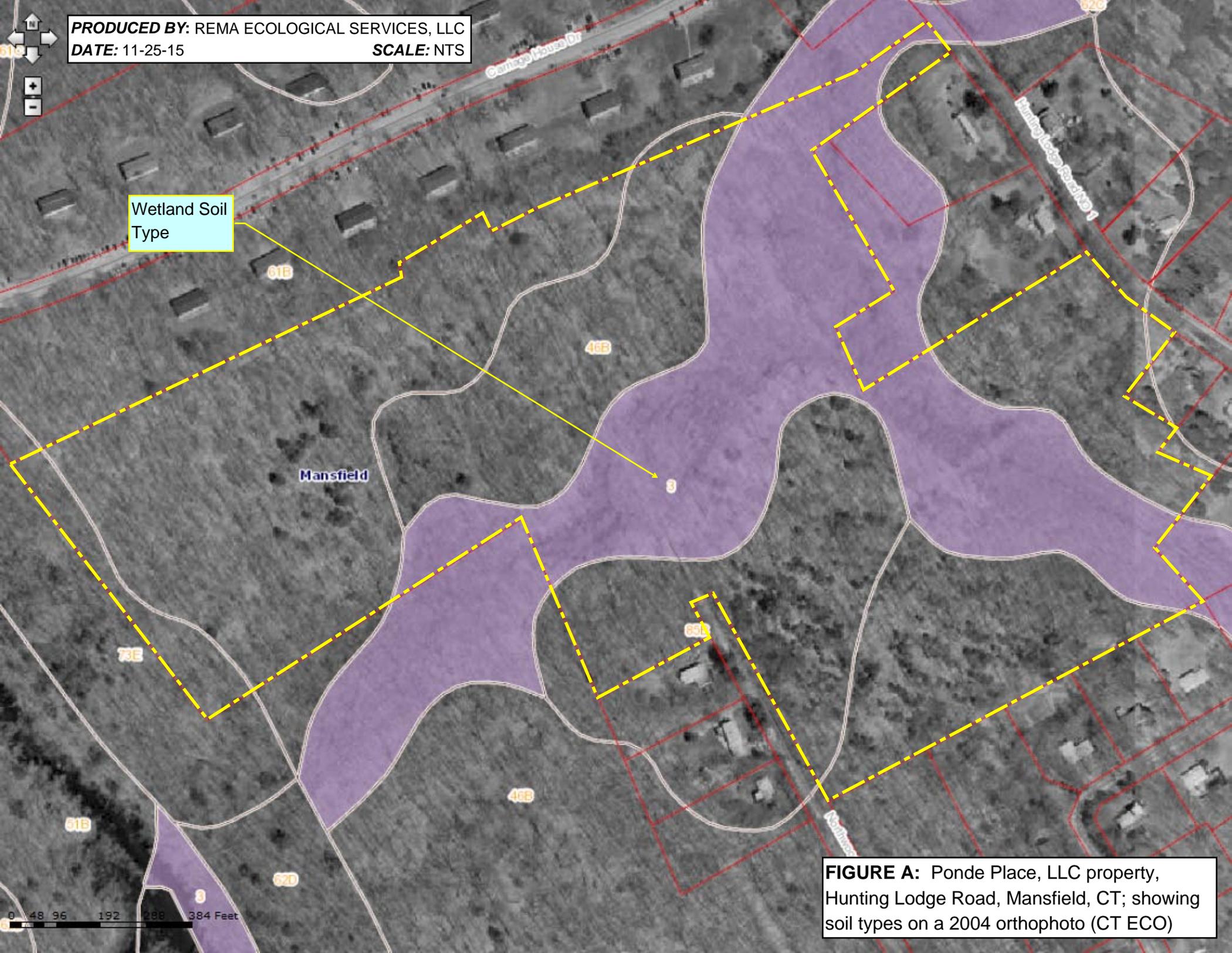
Respectfully submitted,

**REMA ECOLOGICAL SERVICES, LLC**



George T. Logan, MS, PWS, CSE  
Registered Soil Scientist, Professional Wetland Scientist  
Field Investigator/Senior Reviewer

Wetland Soil  
Type

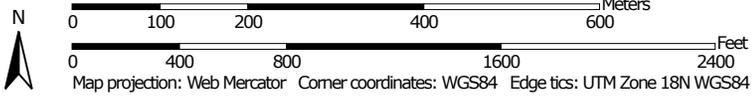


**FIGURE A:** Ponde Place, LLC property, Hunting Lodge Road, Mansfield, CT; showing soil types on a 2004 orthophoto (CT ECO)

Soil Map—State of Connecticut  
(Proposed Storrs Lodges, Hunting Lodge Road, Mansfield, CT)



Map Scale: 1:8,550 if printed on A landscape (11" x 8.5") sheet.



## 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



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### 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—May 12, 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
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	46.6	14.4%
29A	Agawam fine sandy loam, 0 to 3 percent slopes	2.2	0.7%
46B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	62.2	19.2%
51B	Sutton fine sandy loam, 2 to 8 percent slopes, very stony	17.9	5.5%
60B	Canton and Charlton soils, 3 to 8 percent slopes	18.0	5.6%
60C	Canton and Charlton soils, 8 to 15 percent slopes	4.1	1.3%
61B	Canton and Charlton soils, 3 to 8 percent slopes, very stony	58.0	17.9%
61C	Canton and Charlton soils, 8 to 15 percent slopes, very stony	25.2	7.8%
62C	Canton and Charlton soils, 3 to 15 percent slopes, extremely stony	7.3	2.2%
62D	Canton and Charlton soils, 15 to 35 percent slopes, extremely stony	28.2	8.7%
73C	Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky	24.0	7.4%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	10.5	3.2%
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes	5.3	1.7%
84C	Paxton and Montauk fine sandy loams, 8 to 15 percent slopes	0.9	0.3%
85B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes, very stony	9.2	2.9%
85C	Paxton and Montauk fine sandy loams, 8 to 15 percent slopes, very stony	0.1	0.0%
302	Dumps	2.1	0.7%
W	Water	1.8	0.5%
<b>Totals for Area of Interest</b>		<b>323.5</b>	<b>100.0%</b>