

## WETLAND DELINEATION REPORT

### Connecticut College Mamacoke Brook Outfall Channel Stabilization and Restoration Waterford, Connecticut

February 6, 2026



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Town of Waterford, CT

Project #25201.01



**WETLAND DELINEATION REPORT  
CONNECTICUT COLLEGE MAMACOCKE BROOK OUTFALL CHANNEL STABILIZATION AND  
RESTORATION, WATERFORD, CT**

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**Certification of Wetland Delineation**

State jurisdictional wetlands and watercourses were delineated in accordance with the State of Connecticut Inland Wetlands and Watercourses Act (CGS 22a-36 to 22a-45 inclusive). Federal jurisdictional wetlands were delineated in accordance with U.S. Army Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1) and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (ERDC/EL TR-12-1) pursuant to Section 404 of the Federal Clean Water Act (33 U.S.C. 1344). To the best of my knowledge, the delineations depicted hereon are true and accurate.

The wetland and watercourses were delineated in accordance with applicable local, state and federal statutes, regulations and guidance. Classification and mapping of soils on site were conducted in a manner consistent with the U.S. Department of Agriculture Soil Survey Manual (Soil Science Division Staff, 2017). This delineation does not constitute an official wetland boundary until such time as it is accepted and approved by local, state or federal regulatory agencies.



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Joshua H. Wilson, PWS #1992  
Registered Soil Scientist

2/6/26

Date

## 1.0 INTRODUCTION

The Connecticut College Mamacoke Brook Outfall Channel Stabilization and Restoration (the Site) is along an intermittent channel extending from the culvert outfall east of CT Route 32, located at approximately 600 feet north of the intersection with Benham Avenue, to a culvert under a private railroad berm, approximately 0.3 miles east in Quaker Hill, Waterford (New London County, Connecticut) (Figure 1). The Site historically was an agricultural homestead site but is now mixed hardwood/softwood forest, hedgerow, open field and open water.

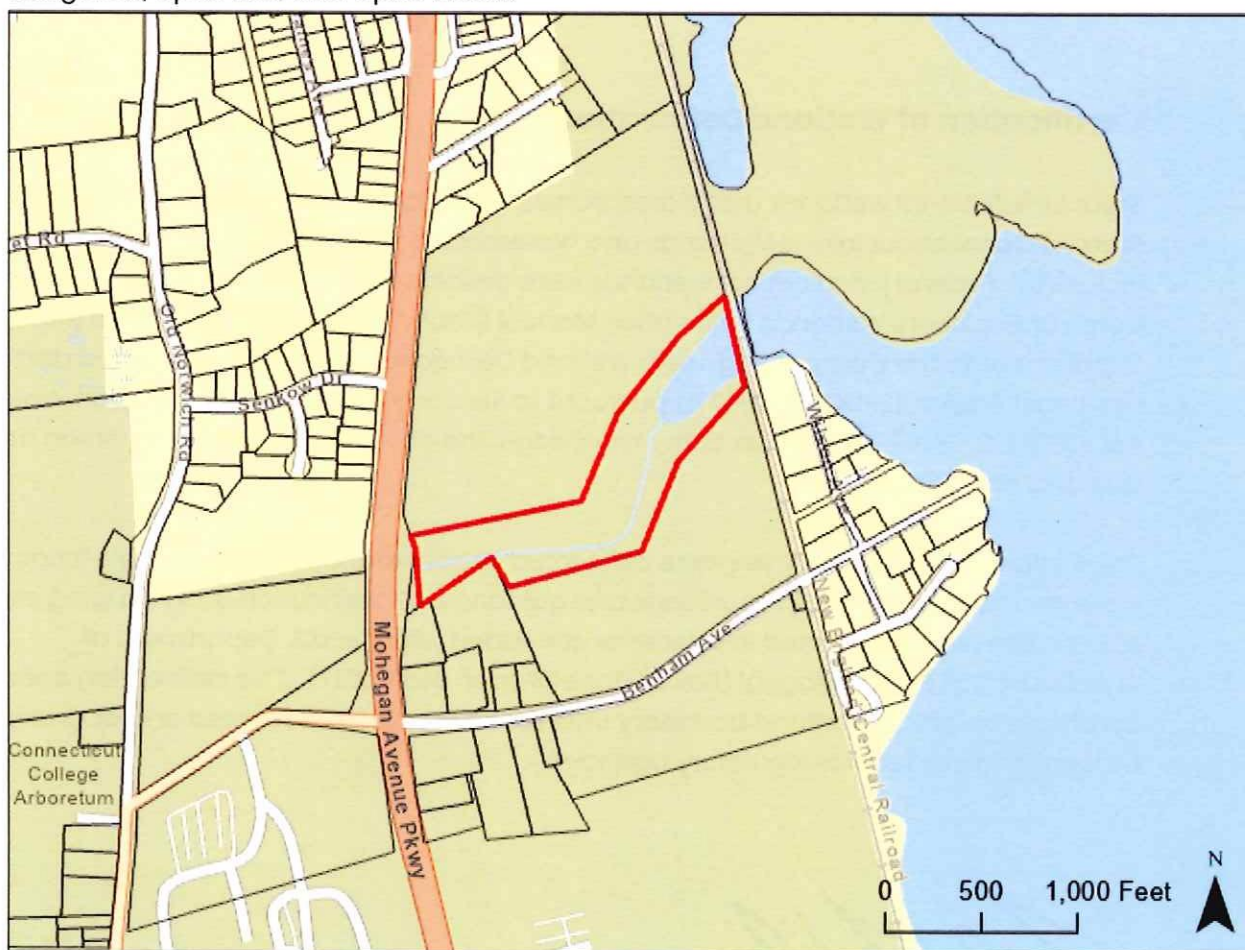


Figure 1 Site vicinity map.

### 1.1 Background

Connecticut College received grant funding for the stabilization and restoration of the Mamacoke Brook, which is located on Connecticut College Arboretum property between Route 32 and the Thames River. The Brook will be stabilized and restored as part of the Mamacoke Island Aquatic Habitat Resilience (MIAHR) Project, which also includes tidal

marsh restoration along the Thames River. The Brook is laterally and vertically unstable, with eroded banks 4-6 feet in height and deep channel incision along portions of its approximate 1,500-foot length. This instability is likely caused by concentrated stormwater flow contributions, a steeply sloped flow path, and a reduction in vegetation along portions of the channel. Consequently, this has resulted in channel enlargement and excessive sediment generation due to bank erosion. The proposed stream restoration will stabilize the flowpath, enhance the overall health and stability of the stream system, and reduce pollutant loading into the Thames River.

## 1.2 Objectives

The objective of this report is to describe any regulated jurisdictional wetlands within the Site project boundaries.

## **2.0 WETLAND DELINEATION**

### 2.1 Federal Jurisdictional Wetlands

#### 2.1.1 Regulatory Definition

The Army Corps of Engineers (Federal Register 1982) and the Environmental Protection Agency (Federal Register 1980) jointly define wetlands as:

*Those 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.*

Wetlands are generally identified and delineated through the positive evidence of the following diagnostic environmental characteristics: 1) hydrophytic vegetation, 2) hydric soil, and 3) evidence of hydrological indicators. The 1987 USACE Wetland Delineation Manual (*Technical Report Y-87-1*) and the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (ERDC/EL TR-09-19) provides the specific guidelines and methodology required to complete federal wetland delineations.

#### 2.1.2 Methodology

The 1987 USACE Wetlands Delineation Manual and the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*

provide definitions and guidelines pertaining to the diagnostic environmental characteristics: 1) hydrophytic vegetation, 2) hydric soil, and 3) hydrological indicators. These three characteristics were evaluated during the Onsite Inspection (Level 2) and using the methods for Routine Determinations, Comprehensive Determinations, Atypical Situations, and Problem Areas.

## 2.1.2.1 Hydrophytic Vegetation

Vegetation that occurs in wetlands or hydrophytic vegetation is defined by the USACE as:

*...the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present (USACE 1987:12).*

Whether the hydrophytic vegetation is prevalent in an area is dependent on the presence of dominate species comprising the plant community or communities that are typically adapted for life in saturated soil conditions (USACE 1987:13). Plant species are assigned a wetland by the US Fish and Wildlife Service's (USFWS) National Wetland Inventory (NWI) program. Plant species with an indicator status of obligate (OBL), facultative wetland (FACW) or facultative (FAC) are considered to be typically adapted for life in flooded or saturated conditions. The indicator status of vegetation identified in this survey follows the PLANTS Database (USDA, NRCS 2006):

- Obligate wetland (OBL) plants are species that occur almost exclusively in wetlands; Estimated probability of time is >99%
- Facultative wetland (FACW) plants are species that usually occur in wetlands; Estimated probability of time is 67%–99%
- Facultative wetland (FAC) plants are species that are equally likely to occur in wetlands or non-wetlands; Estimated probability of time is 34%–66%

Hydrophytic vegetation is considered to be a primary characteristic of a wetland when "more than 50 percent of the dominant species are OBL, FACW, or FAC" (USACE 1987:17). At an observation point in each wetland area, the dominate plant species were determined as those having the greatest relative basal area (woody overstory or tree layer), greatest height (wood understory or shrub layer), and greatest percentage of areal coverage (herbaceous understory or herb layer) (USACE 1987:53).

#### 2.1.2.2 Hydric Soils

Wetland or hydric soils are defined by the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) as:

*...a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part ((Federal Register, July 13, 1994; USDA-NRCS Hydric Soils Technical Note 1: Proper use of Hydric Soil Terminology).*

A soil is considered to be a wetland soil by the USACE when the "hydric soil supports hydrophytic vegetation and the area has indicators of wetland hydrology" (USACE 1987:21). Hydric soils are typically poorly and very poorly drained soils. They undergo chemical reactions and physical processes as a result of soil saturation and reducing conditions which differ from those found in upland soils.

#### 2.1.2.3 Wetland Hydrology

The USACE defines the term wetland hydrology as:

*...all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season (USACE 1987:28).*

Thus, "areas with evident characteristics for wetland hydrology are those where the presence of water has an overriding influence on the characteristics of vegetation" (USACE 1987:28). The criterion for hydrology consists of inundation or saturation "to the surface continuously for at least 5% of the growing season in most years (50% probability of recurrence)" (USACE 1987:30).

The presence of primary and secondary wetland hydrological indicators was noted at each observation point selected in the wetland area. The guidelines (USACE 1987:34) consider that "wetland hydrology is present when any of these primary indicators is present when combined with a hydrophytic plant community and hydric soils." Additionally, the USACE guides that "in the absence of a primary indicator, any two secondary indicators must be present to conclude that wetland hydrology is present."

### 2.1.3 Determination and Identification of Federal Wetlands

The determination and identification of federal wetlands used the methods for Routine Determinations, Comprehensive Determinations, Atypical Situations, and Problem Areas. Overall, the generalized methods (based on USACE 1987, Figure 16, pages 63–64) involve the following:

#### *A. Hydrophytic Vegetation (Step 13)*

- Characterize each plant community types (i.e. trees, saplings, shrubs, herbs, moss/lichens, and vines)
- Record USFWS NWI indicator status of dominant species
- Determine if more than 50 percent of the dominant species are OBL, FACW, or FAC

#### *B. Hydric Soils (Step 14)*

- Gather soil profile data by using a spade or auger to dig a soil pit
- Record soil profile data
- Document hydric soil indicators

#### *C. Wetland Hydrology (Step 15)*

- Observe the presence of primary hydrologic indicators
- Observe the presence of secondary hydrologic indicators

#### *D. Wetland Determination (Steps 16 and beyond)*

- Using the guidelines determine if hydrophytic vegetation is present based on "A"
- Using the guidelines determine if hydric soils are present based on "B"
- Using the guidelines determine if wetland hydrology is present based on "C"
- Make the wetland determination based on the following:
- A wetland exists if all three of the wetland criteria (vegetation, hydrology, and soils) exists for a observation point
- The observation point is not a wetland if one or more of the wetland criteria are absent
- For Atypical Situations or Problem Areas, all three wetland criteria may not be met. Consideration for modifications or disturbances should be considered and greater weight may be assigned to on criteria over the others.

### 2.2 Connecticut Jurisdictional Wetlands

A wetland, regulated under the Connecticut Inland Wetland and Watercourses Act, is, in general, defined as a soil that is saturated to within 20 inches of the surface during a portion of the growing season. These soils have redoximorphic features, a deficiency of oxygen near the surface, and/or ponded water during the growing season. They are

poorly drained, very poorly drained, alluvial, or fluvial as specified by the USDA Natural Resource Conservation Service (NRCS). Depth to seasonal high water table is determined by low-chroma mottling or wetness indicators. Hydric soils have a similar definition.

Watercourses are also regulated under the Connecticut Inland Wetland and Watercourses Act. Watercourses are rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs, and all other bodies of water including natural or artificial, vernal or intermittent, public or private. A defined permanent channel and bank, and the occurrence of two or more of the following characteristics delineate intermittent watercourses:

- Evidence of scour or deposits of recent alluvium or detritus
- Presence of standing or flowing water for a duration longer than a particular storm incident
- Presence of hydrophytic vegetation

## 2.3 Field Investigation

To prepare for the field investigation, the following current literature and mapping were reviewed:

- NRCS Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/>)
- USFWS Wetlands Online Mapper (<http://wetlandsfws.er.usgs.gov/>)
- *Keys to Soil Taxonomy*, Tenth Edition (Soil Survey Staff, 2006)
- *Soil Survey Manual* (Soil Survey Staff, 1993)

In September 2025, Biohabitats delineated the Federal and State wetlands on site. Soils were inspected on-site by a Biohabitats Soil Scientist using a soil auger or spade, digging at least 20 inches to view the soil profile at the observation point selected for each wetland area. Soil types were identified by observation of soil morphology (matrix color, mottle colors, mottle abundance/size/contrast, and soil texture/structure, etc.) using the terminology and abbreviations found in the "Field Book for Describing and Sampling Soils" (Schoneneberg et al., 2002). The hydric soil indicators and soils sections of the wetland determination form were completed using "Field Indicators for Identifying Hydric Soils in New England" (New England Hydric Soils Technical Committee 1998).

Wetland and watercourse (waterway) limits were demarcated (flagged) with pink surveyor's tape (hung from vegetation) or small flags (on wire stakes) labeled "WETLAND

DELINEATION" that were generally spaced at every 30 feet. Complete boundaries are located along the lines that connect sequentially numbered flags.

### **3.0 RESULTS OF THE WETLAND DELINEATION**

#### **3.1 US Fish and Wildlife Service National Wetland Inventory**

The USFWS NWI (Figure 2) maps wetlands based on analyses of reconnaissance level information on the location, type, and size of wetlands habitats such that they are accurate at the nominal scale of the 1:24,000 USGS quadrangle base map. Wetlands identified are based on the classification of Cowardin et al. (1979) and the letter and number codes used in that reference. Thus, the maps provide a planning tool to determining whether a site contains wetlands.

The USFWS identifies the wetlands occurring on-site as:

- Estuarine Intertidal Scrub-Shrub Broad-leaved Deciduous Irregularly Flooded Mesohaline (E2SS1P5)
- Estuarine Subtidal Unconsolidated Bottom Subtidal (E1UBL)

Use of this resource, however, does not take the place of on-site wetland delineation and evaluation. As part of the field investigation, wetland areas were identified, characterized as to their hydrophytic vegetation, hydric soils, and hydrological indicators and assigned a wetland classification based on this information.

#### **3.2 Natural Resource Conservation Service Soil Map**

Wetland soils are identified by soil scientists based on established hydric criterion and boundaries depicted on aerial photographs and are accurate at a scale of three acres. Thus, the maps provide a planning tool to determining whether a site contains wetlands. (Figure 2) The upstream limits of the project area are classified as Canton and Charlton soils (60D), a steep-sloped, well-drained soil. The majority of soils within the project area are classified as Sutton fine sandy loams (51B), which is a moderately well-drained soil typically found on hillslopes and classified as having high runoff potential. The northern side and downstream limits of the project area are Charlton-Chatfield complex (73E), a very rocky, well-drained soil found on 15 to 45 percent slopes. All of these soil classes are derived from granite, gneiss, and/or schist.



in the field and enumerated WA-1 to WA-35. A generalized description for each wetland and watercourse unit is provided below.

### 3.3.1 Wetland Unit A

Wetland Unit A is a freshwater nontidal scrub-shrub broad-leaved deciduous wetland present along the western edge of the salt pond impoundment at the eastern extent of the project area. This wetland is fed partially by a seep at the toe of slope to the west and the pond to the west and is characterized by shrub layer that is dominated by grey alder (*Alnus incana*) and spicebush (*Lindera benzoin*). The herb layer is dominated by common reed (*Phragmites australis*), skunk cabbage (*Symplocarpus foetidus*) and beggarsticks (*Bidens frondosa*). Hydric soils were encountered at the toe of the surrounding slope and the following indicators were met: stratified layers (A5), dark surface (S7), thin dark surface (S9). The wetland hydrology present in Wetland Unit A included primary indicators of surface water (A1), saturation (A3), sparsely vegetated concave surface (B8) and secondary indicators of drainage patterns (B10), dry season water table (C2), geomorphic position (D2) and the plant community passes the FAC neutral test (D5).

The upland conditions adjacent to Wetland Unit A consist of steep sideslopes of coarse material that drain well. Hillslope forests are dominated by American beech (*Fagus grandifolia*), black birch (*Betula lenta*), sugar maple (*Acer saccharum*) and black oak (*Quercus velutina*) species in the tree layer with the shrub layer dominated by burning bush (*Euonymus alatus*), maple leaved viburnum (*Viburnum acerifolium*), sassafras (*Sassafras albidum*), arrowwood (*Viburnum dentatum*) and barberry (*Berberis thunbergii*). The herb layer is composed of wintergreen (*Chimaphila maculata*), white wood aster (*Eurybia divaricate*), garlic mustard (*Alliaria petiolate*), woodland sedge (*Carex*, burnweed, and woodland sedge (*Carex sylvatica*) poison ivy (*Toxicodendron radicans*), Japanese honeysuckle (*Lonicera japonica*) and Asiatic bittersweet (*Celastrus orbiculatus*) vines. No wetland hydrology or vegetation was present and there were no hydric soil indicators present.

### 3.3.2 Watercourse A

The project site centers around Watercourse A (Mamacoke Brook) which is an intermittent channel that is laterally and vertically unstable, with eroded banks 4-6 feet in height and deep channel incision along portions of its approximate 1,500-foot length. sediment generation due to bank erosion.

#### **4.0 CONCLUSIONS**

This Wetland Survey and Evaluation has been prepared to determine the wetlands and watercourses occurring on the Connecticut College Arboretum property in Waterford, Connecticut. Two wetland and watercourse units were identified on the property in the area of USEPA and USACE interest.

#### **5.0 REFERENCES**

- Brinson, M.M. 1993. A Hydrogeomorphic Classification for wetlands, Wetlands Research Program Tech. Report WRP-DE-4, U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS.
- Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service, Biological Service Program. FWS/OBS-79/31. Washington, DC.
- Hagstrom, N.T., Humphreys, M., and Hyatt, W.A. 1994. A Survey of Connecticut Streams and Rivers—Lower Thames River, Pawcatuck River, and Easter Coastal Drainages. F-66-R-6: Progress Report, CT DEP Inland Fisheries, April 1, 1993–March 31, 1994, Hartford, CT.
- New England Hydric Soils Technical Committee. 1998. Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission, Lowell, Massachusetts.
- Schoenberger, P.J., D.A. Wysocki, E.C. Benham, and W.D. Broderson (editors). 2002. Field Book for Describing and Sampling Soils, Version 2.0. Natural Resource Conservation Service, National Soil Survey Center, Lincoln, NE.
- Soil Survey Staff. 2006. Keys to Soil Taxonomy, 10th ed. USDA–Natural Resources Conservation Service, Washington, DC.
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- United States Department of Agriculture (USDA). 1993. Soil Survey Manual, Handbook No. 18 U.S. Government Printing office. Washington, DC.



United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). 2006. PLANTS Database. <http://plants.usda.gov>, 30 October 2006. National Plant Data Center, Baton Rouge, LA 70874-4490 USA).



## **APPENDIX A – EXISTING CONDITIONS MAPPING**

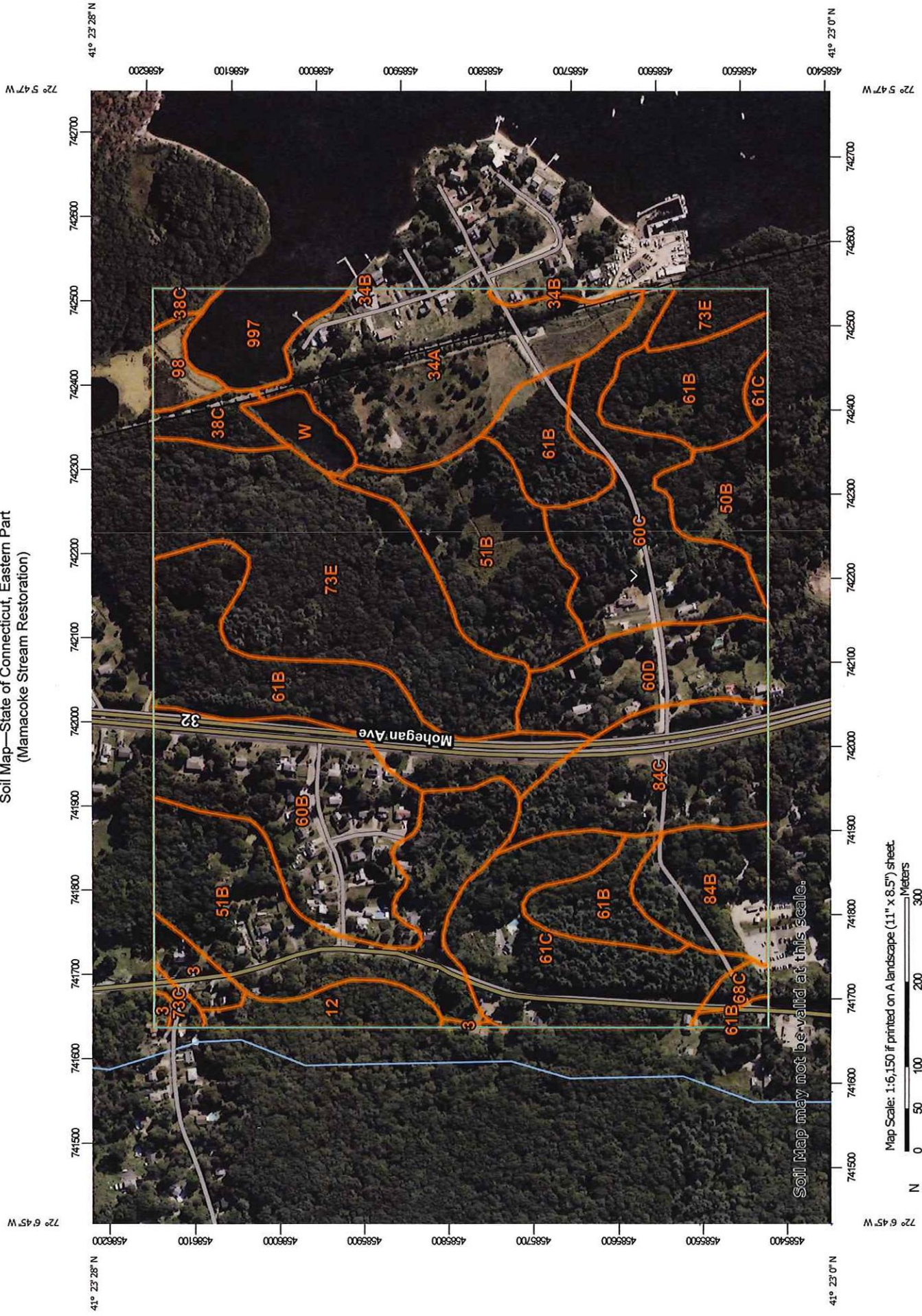
### **MAMACOCKE BROOK OUTFALL CHANNEL Waterford, Connecticut**



## **APPENDIX A – NRCS SOILS REPORT**

### **MAMACOCKE BROOK OUTFALL CHANNEL Waterford, Connecticut**

Soil Map—State of Connecticut, Eastern Part  
(Mamooke Stream Restoration)



Map Scale: 1:6,150 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## MAP LEGEND

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

## MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

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, Eastern Part

Survey Area Data: Version 2, Aug 30, 2024

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

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

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

| 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 | 1.7          | 1.1%           |
| 12              | Raypol silt loam, 0 to 3 percent slopes                                         | 2.8          | 1.7%           |
| 34A             | Merrimac fine sandy loam, 0 to 3 percent slopes                                 | 14.0         | 8.8%           |
| 34B             | Merrimac fine sandy loam, 3 to 8 percent slopes                                 | 0.5          | 0.3%           |
| 38C             | Hinckley loamy sand, 3 to 15 percent slopes                                     | 2.3          | 1.5%           |
| 50B             | Sutton fine sandy loam, 3 to 8 percent slopes                                   | 3.7          | 2.3%           |
| 51B             | Sutton fine sandy loam, 0 to 8 percent slopes, very stony                       | 23.9         | 15.1%          |
| 60B             | Canton and Charlton fine sandy loams, 3 to 8 percent slopes                     | 13.1         | 8.3%           |
| 60C             | Canton and Charlton fine sandy loams, 8 to 15 percent slopes                    | 10.9         | 6.9%           |
| 60D             | Canton and Charlton soils, 15 to 25 percent slopes                              | 6.9          | 4.4%           |
| 61B             | Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony         | 23.9         | 15.2%          |
| 61C             | Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony        | 11.2         | 7.1%           |
| 68C             | Narragansett silt loam, 3 to 15 percent slopes, extremely stony                 | 0.7          | 0.5%           |
| 73C             | Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky                  | 0.5          | 0.3%           |
| 73E             | Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky                 | 20.9         | 13.2%          |
| 84B             | Paxton and Montauk fine sandy loams, 3 to 8 percent slopes                      | 5.2          | 3.3%           |
| 84C             | Paxton and Montauk fine sandy loams, 8 to 15 percent slopes                     | 9.3          | 5.9%           |

| Map Unit Symbol             | Map Unit Name                                                        | Acres In AOI | Percent of AOI |
|-----------------------------|----------------------------------------------------------------------|--------------|----------------|
| 98                          | Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded | 1.4          | 0.9%           |
| 997                         | Thames silt loam, subtidal                                           | 3.6          | 2.3%           |
| W                           | Water                                                                | 1.6          | 1.0%           |
| Totals for Area of Interest |                                                                      | 158.0        | 100.0%         |



## **APPENDIX B – WETLAND DELINEATION FORMS**

### **MAMCOKE BROOK OUTFALL CHANNEL Waterford, Connecticut**

|                                                                                                                                                                              |                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>U.S. Army Corps of Engineers</b><br><b>WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region</b><br>See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R | <b>OMB Control #: 0710-0024, Exp: 9/30/2027</b><br><b>Requirement Control Symbol EXEMPT:</b><br><b>(Authority: AR 335-15, paragraph 5-2a)</b> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|

Project/Site: Mamacoque Brook Outfall Channel Stabilization & Restoration City/County: Waterford/New London Sampling Date: 09/12/2025  
Applicant/Owner: Connecticut College State: CT Sampling Point: Wet 1  
Investigator(s): B. Salladin Section, Township, Range: \_\_\_\_\_  
Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope %: 1  
Subregion (LRR or MLRA): LRR R Lat: -72.102159 Long: 41.388310 Datum: NAD83  
Soil Map Unit Name: Charlton-Chatfield complex NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No \_\_\_\_\_ (If no, explain in Remarks.)  
Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes x No \_\_\_\_\_  
Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

|                                                       |                                                             |
|-------------------------------------------------------|-------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <u>X</u> No _____ | Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ |
| Hydric Soil Present? Yes <u>X</u> No _____            | If yes, optional Wetland Site ID: _____                     |
| Wetland Hydrology Present? Yes <u>X</u> No _____      |                                                             |

Remarks: (Explain alternative procedures here or in a separate report.)

**HYDROLOGY**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Wetland Hydrology Indicators:</b><br><u>Primary Indicators (minimum of one is required; check all that apply)</u><br><u>X</u> Surface Water (A1) _____ Water-Stained Leaves (B9)<br>_____ High Water Table (A2) _____ Aquatic Fauna (B13)<br><u>X</u> Saturation (A3) _____ Marl Deposits (B15)<br>_____ Water Marks (B1) _____ Hydrogen Sulfide Odor (C1)<br>_____ Sediment Deposits (B2) _____ Oxidized Rhizospheres on Living Roots (C3)<br>_____ Drift Deposits (B3) _____ Presence of Reduced Iron (C4)<br>_____ Algal Mat or Crust (B4) _____ Recent Iron Reduction in Tilled Soils (C6)<br>_____ Iron Deposits (B5) _____ Thin Muck Surface (C7)<br>_____ Inundation Visible on Aerial Imagery (B7) _____ Other (Explain in Remarks)<br><u>x</u> Sparsely Vegetated Concave Surface (B8) | <u>Secondary Indicators (minimum of two required)</u><br>_____ Surface Soil Cracks (B6)<br><u>x</u> Drainage Patterns (B10)<br>_____ Moss Trim Lines (B16)<br><u>x</u> Dry-Season Water Table (C2)<br>_____ Crayfish Burrows (C8)<br>_____ Saturation Visible on Aerial Imagery (C9)<br>_____ Stunted or Stressed Plants (D1)<br><u>x</u> Geomorphic Position (D2)<br>_____ Shallow Aquitard (D3)<br>_____ Microtopographic Relief (D4)<br><u>X</u> FAC-Neutral Test (D5) |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                      |                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>Field Observations:</b><br>Surface Water Present? Yes <u>x</u> No _____ Depth (inches): <u>1.5</u><br>Water Table Present? Yes <u>x</u> No _____ Depth (inches): <u>16.8</u><br>Saturation Present? Yes <u>x</u> No _____ Depth (inches): <u>0</u><br>(includes capillary fringe) | <b>Wetland Hydrology Present?</b> Yes <u>X</u> No _____ |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION** – Use scientific names of plants.

Sampling Point: Wet 1

| Tree Stratum (Plot size: _____)                     | Absolute % Cover | Dominant Species? | Indicator Status |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
|-----------------------------------------------------|------------------|-------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------|-----------------------|-----------------|------------------------|------------------|-----------------------|-----------------|------------------------|-----------------|-----------------------|------------------|-------------------------------|----------------|--------------------------------------|--|
| 1. _____                                            | _____            | _____             | _____            | <b>Dominance Test worksheet:</b><br><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>6</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>8</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75.0%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 2. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 3. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 4. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 5. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 6. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 7. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| _____ = Total Cover                                 |                  |                   |                  | <b>Prevalence Index worksheet:</b><br><br><table style="width: 100%;"> <tr> <th style="width: 50%;">Total % Cover of:</th> <th style="width: 50%;">Multiply by:</th> </tr> <tr> <td>OBL species <u>43</u></td> <td>x 1 = <u>43</u></td> </tr> <tr> <td>FACW species <u>95</u></td> <td>x 2 = <u>190</u></td> </tr> <tr> <td>FAC species <u>15</u></td> <td>x 3 = <u>45</u></td> </tr> <tr> <td>FACU species <u>10</u></td> <td>x 4 = <u>40</u></td> </tr> <tr> <td>UPL species <u>20</u></td> <td>x 5 = <u>100</u></td> </tr> <tr> <td>Column Totals: <u>183</u> (A)</td> <td><u>418</u> (B)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A = <u>2.28</u></td> </tr> </table> | Total % Cover of: | Multiply by: | OBL species <u>43</u> | x 1 = <u>43</u> | FACW species <u>95</u> | x 2 = <u>190</u> | FAC species <u>15</u> | x 3 = <u>45</u> | FACU species <u>10</u> | x 4 = <u>40</u> | UPL species <u>20</u> | x 5 = <u>100</u> | Column Totals: <u>183</u> (A) | <u>418</u> (B) | Prevalence Index = B/A = <u>2.28</u> |  |
| Total % Cover of:                                   | Multiply by:     |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| OBL species <u>43</u>                               | x 1 = <u>43</u>  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| FACW species <u>95</u>                              | x 2 = <u>190</u> |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| FAC species <u>15</u>                               | x 3 = <u>45</u>  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| FACU species <u>10</u>                              | x 4 = <u>40</u>  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| UPL species <u>20</u>                               | x 5 = <u>100</u> |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| Column Totals: <u>183</u> (A)                       | <u>418</u> (B)   |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| Prevalence Index = B/A = <u>2.28</u>                |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| <b>Sapling/Shrub Stratum (Plot size: <u>15</u>)</b> |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 1. <u>Lindera benzoin</u>                           | <u>10</u>        | <u>Yes</u>        | <u>FACW</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 2. <u>Ligustrum vulgare</u>                         | <u>10</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 3. <u>Alnus incana</u>                              | <u>30</u>        | <u>Yes</u>        | <u>FACW</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 4. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 5. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 6. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 7. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| _____ = Total Cover                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| <b>Herb Stratum (Plot size: <u>5</u>)</b>           |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 1. <u>Phragmites australis</u>                      | <u>20</u>        | <u>Yes</u>        | <u>FACW</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 2. <u>Peltandra virginica</u>                       | <u>8</u>         | <u>No</u>         | <u>OBL</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 3. <u>Symplocarpus foetidus</u>                     | <u>15</u>        | <u>Yes</u>        | <u>OBL</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 4. <u>Bidens frondosa</u>                           | <u>15</u>        | <u>Yes</u>        | <u>FACW</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 5. <u>Pilea pumila</u>                              | <u>5</u>         | <u>No</u>         | <u>FACW</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 6. <u>Typha angustifolia</u>                        | <u>10</u>        | <u>No</u>         | <u>OBL</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 7. <u>Solidago gigantea</u>                         | <u>5</u>         | <u>No</u>         | <u>FACW</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 8. <u>Impatiens capensis</u>                        | <u>10</u>        | <u>No</u>         | <u>FACW</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 9. <u>Juncus effusus</u>                            | <u>5</u>         | <u>No</u>         | <u>OBL</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 10. <u>Boehmeria cylindrica</u>                     | <u>5</u>         | <u>No</u>         | <u>OBL</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 11. _____                                           | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 12. _____                                           | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| _____ = Total Cover                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| <b>Woody Vine Stratum (Plot size: <u>30</u>)</b>    |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 1. <u>Vitis riparia</u>                             | <u>5</u>         | <u>No</u>         | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 2. <u>Ampelopsis brevipedunculata</u>               | <u>20</u>        | <u>Yes</u>        | <u>UPL</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 3. <u>Toxicodendron radicans</u>                    | <u>10</u>        | <u>Yes</u>        | <u>FAC</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| 4. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |
| _____ = Total Cover                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |              |                       |                 |                        |                  |                       |                 |                        |                 |                       |                  |                               |                |                                      |  |

**Hydrophytic Vegetation Indicators:**  
1 - Rapid Test for Hydrophytic Vegetation  
X 2 - Dominance Test is >50%  
X 3 - Prevalence Index is ≤3.0<sup>1</sup>  
4 - Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)  
  
       Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)  
  
<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Vegetation Strata:**  
  
**Tree** – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.  
  
**Sapling/shrub** – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.  
  
**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.  
  
**Woody vines** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?**      Yes X      No \_\_\_\_\_

Remarks: (Include photo numbers here or on a separate sheet.)



|                                                                                                                                                                              |                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>U.S. Army Corps of Engineers</b><br><b>WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region</b><br>See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R | <b>OMB Control #: 0710-0024, Exp: 9/30/2027</b><br><b>Requirement Control Symbol EXEMPT:</b><br><b>(Authority: AR 335-15, paragraph 5-2a)</b> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|

Project/Site: Mamacoke Brook Outfall Channel Stabilization and Restoration City/County: Waterford/New London Sampling Date: 9/12/2025  
 Applicant/Owner: Connecticut College State: CT Sampling Point: Non-wet 1  
 Investigator(s): B. Salladin Section, Township, Range: \_\_\_\_\_  
 Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): convex Slope %: 25  
 Subregion (LRR or MLRA): LRR R Lat: -72.102159 Long: 41.388310 Datum: NAD83  
 Soil Map Unit Name: Charlton-Chatfield complex NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes x No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

|                                                                                                                                                         |                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes _____ No <u>X</u><br>Hydric Soil Present? Yes _____ No <u>X</u><br>Wetland Hydrology Present? Yes _____ No <u>X</u> | Is the Sampled Area within a Wetland? Yes _____ No <u>X</u><br>If yes, optional Wetland Site ID: _____ |
| Remarks: (Explain alternative procedures here or in a separate report.)                                                                                 |                                                                                                        |

**HYDROLOGY**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Wetland Hydrology Indicators:</b><br><u>Primary Indicators (minimum of one is required; check all that apply)</u><br>_____ Surface Water (A1) _____ Water-Stained Leaves (B9)<br>_____ High Water Table (A2) _____ Aquatic Fauna (B13)<br>_____ Saturation (A3) _____ Marl Deposits (B15)<br>_____ Water Marks (B1) _____ Hydrogen Sulfide Odor (C1)<br>_____ Sediment Deposits (B2) _____ Oxidized Rhizospheres on Living Roots (C3)<br>_____ Drift Deposits (B3) _____ Presence of Reduced Iron (C4)<br>_____ Algal Mat or Crust (B4) _____ Recent Iron Reduction in Tilled Soils (C6)<br>_____ Iron Deposits (B5) _____ Thin Muck Surface (C7)<br>_____ Inundation Visible on Aerial Imagery (B7) _____ Other (Explain in Remarks)<br>_____ Sparsely Vegetated Concave Surface (B8) | <u>Secondary Indicators (minimum of two required)</u><br>_____ Surface Soil Cracks (B6)<br>_____ Drainage Patterns (B10)<br>_____ Moss Trim Lines (B16)<br>_____ Dry-Season Water Table (C2)<br>_____ Crayfish Burrows (C8)<br>_____ Saturation Visible on Aerial Imagery (C9)<br>_____ Stunted or Stressed Plants (D1)<br>_____ Geomorphic Position (D2)<br>_____ Shallow Aquitard (D3)<br>_____ Microtopographic Relief (D4)<br>_____ FAC-Neutral Test (D5) |
| <b>Field Observations:</b><br>Surface Water Present? Yes _____ No _____ Depth (inches): _____<br>Water Table Present? Yes _____ No _____ Depth (inches): _____<br>Saturation Present? Yes _____ No _____ Depth (inches): _____<br>(includes capillary fringe)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Wetland Hydrology Present? Yes _____ No <u>X</u>                                                                                                                                                                                                                                                                                                                                                                                                              |
| Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:<br><br>Remarks:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**VEGETATION** – Use scientific names of plants.

Sampling Point: Non-wet 1

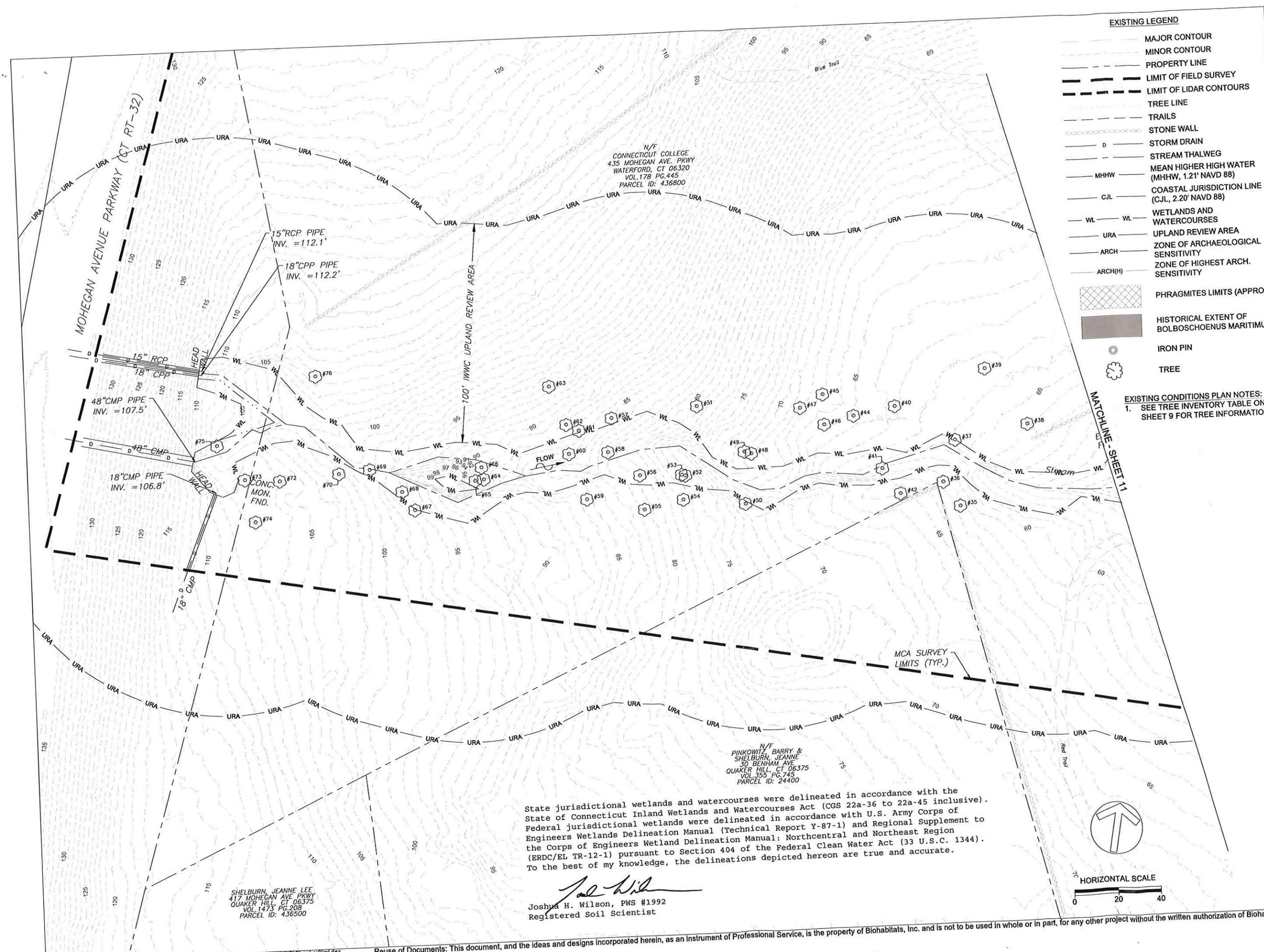
| Tree Stratum (Plot size: <u>30</u> )                 | Absolute % Cover | Dominant Species? | Indicator Status |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
|------------------------------------------------------|------------------|-------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------|----------------------|----------------|-----------------------|----------------|-----------------------|-----------------|-------------------------|------------------|-----------------------|------------------|-------------------------------|----------------|--------------------------------------|--|
| 1. <u>Quercus velutina</u>                           | <u>40</u>        | <u>Yes</u>        | <u>UPL</u>       | <b>Dominance Test worksheet:</b><br><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>11</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>9.1%</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 2. <u>Betula lenta</u>                               | <u>30</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 3. <u>Fagus grandifolia</u>                          | <u>25</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 4. <u>Acer saccharum</u>                             | <u>5</u>         | <u>No</u>         | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 5. _____                                             | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 6. _____                                             | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 7. _____                                             | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| <u>100</u> =Total Cover                              |                  |                   |                  | <b>Prevalence Index worksheet:</b><br><br><table style="width: 100%;"> <thead> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> </thead> <tbody> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>10</u></td> <td>x 3 = <u>30</u></td> </tr> <tr> <td>FACU species <u>125</u></td> <td>x 4 = <u>500</u></td> </tr> <tr> <td>UPL species <u>85</u></td> <td>x 5 = <u>425</u></td> </tr> <tr> <td>Column Totals: <u>220</u> (A)</td> <td><u>955</u> (B)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A = <u>4.34</u></td> </tr> </tbody> </table> | Total % Cover of: | Multiply by: | OBL species <u>0</u> | x 1 = <u>0</u> | FACW species <u>0</u> | x 2 = <u>0</u> | FAC species <u>10</u> | x 3 = <u>30</u> | FACU species <u>125</u> | x 4 = <u>500</u> | UPL species <u>85</u> | x 5 = <u>425</u> | Column Totals: <u>220</u> (A) | <u>955</u> (B) | Prevalence Index = B/A = <u>4.34</u> |  |
| Total % Cover of:                                    | Multiply by:     |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| OBL species <u>0</u>                                 | x 1 = <u>0</u>   |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| FACW species <u>0</u>                                | x 2 = <u>0</u>   |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| FAC species <u>10</u>                                | x 3 = <u>30</u>  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| FACU species <u>125</u>                              | x 4 = <u>500</u> |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| UPL species <u>85</u>                                | x 5 = <u>425</u> |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| Column Totals: <u>220</u> (A)                        | <u>955</u> (B)   |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| Prevalence Index = B/A = <u>4.34</u>                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| <b>Sapling/Shrub Stratum (Plot size: <u>15</u> )</b> |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 1. <u>Euonymus alatus</u>                            | <u>20</u>        | <u>Yes</u>        | <u>UPL</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 2. <u>Viburnum acerifolium</u>                       | <u>15</u>        | <u>Yes</u>        | <u>UPL</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 3. <u>Berberis thunbergii</u>                        | <u>10</u>        | <u>No</u>         | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 4. <u>Sassafras albidum</u>                          | <u>10</u>        | <u>No</u>         | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 5. _____                                             | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 6. _____                                             | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 7. _____                                             | _____            | _____             | _____            | <b>Hydrophytic Vegetation Indicators:</b><br><br><u>1</u> - Rapid Test for Hydrophytic Vegetation<br><u>2</u> - Dominance Test is >50%<br><u>3</u> - Prevalence Index is ≤3.0 <sup>1</sup><br><u>4</u> - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><br><u>Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)</u><br><br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.                                                                                                                                                                                                 |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| <u>55</u> =Total Cover                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| <b>Herb Stratum (Plot size: <u>5</u> )</b>           |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 1. <u>Eurybia divaricata</u>                         | <u>10</u>        | <u>Yes</u>        | <u>UPL</u>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 2. <u>Alliaria petiolata</u>                         | <u>10</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 3. <u>Carex sylvatica</u>                            | <u>5</u>         | <u>No</u>         | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 4. <u>Erechtites hieracifolius</u>                   | <u>10</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 5. _____                                             | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 6. _____                                             | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 7. _____                                             | _____            | _____             | _____            | <b>Definitions of Vegetation Strata:</b><br><br><b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.<br><br><b>Sapling/shrub</b> – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.<br><br><b>Herb</b> – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.<br><br><b>Woody vines</b> – All woody vines greater than 3.28 ft in height.                                                                                                                                                                                                                             |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 8. _____                                             | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 9. _____                                             | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 10. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 11. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 12. _____                                            | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| <u>35</u> =Total Cover                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| <b>Woody Vine Stratum (Plot size: _____ )</b>        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 1. <u>Toxicodendron radicans</u>                     | <u>10</u>        | <u>Yes</u>        | <u>FAC</u>       | <b>Hydrophytic Vegetation Present?</b> Yes _____      No <u>X</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 2. <u>Celastrus orbiculatus</u>                      | <u>10</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 3. <u>Lonicera japonica</u>                          | <u>10</u>        | <u>Yes</u>        | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| 4. _____                                             | _____            | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |
| <u>30</u> =Total Cover                               |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |              |                      |                |                       |                |                       |                 |                         |                  |                       |                  |                               |                |                                      |  |

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: Non-wet 1

[illegible]



- EXISTING LEGEND**
- MAJOR CONTOUR
  - MINOR CONTOUR
  - PROPERTY LINE
  - LIMIT OF FIELD SURVEY
  - LIMIT OF LIDAR CONTOURS
  - TREE LINE
  - TRAILS
  - STONE WALL
  - STORM DRAIN
  - STREAM THALWEG
  - MEAN HIGHER HIGH WATER (MHHW, 1.21' NAVD 88)
  - COASTAL JURISDICTION LINE (CJL, 2.20' NAVD 88)
  - WETLANDS AND WATERCOURSES
  - UPLAND REVIEW AREA
  - ZONE OF ARCHAEOLOGICAL SENSITIVITY
  - ZONE OF HIGHEST ARCH. SENSITIVITY
  - PHRAGMITES LIMITS (APPROX)
  - HISTORICAL EXTENT OF BOLBOSCHOENUS MARITIMUS
  - IRON PIN
  - TREE

**EXISTING CONDITIONS PLAN NOTES:**  
1. SEE TREE INVENTORY TABLE ON SHEET 9 FOR TREE INFORMATION.

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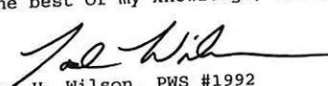
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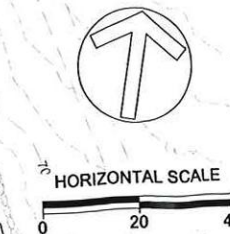
**MAMACOKE BROOK  
OUTFALL CHANNEL  
STABILIZATION AND  
RESTORATION**

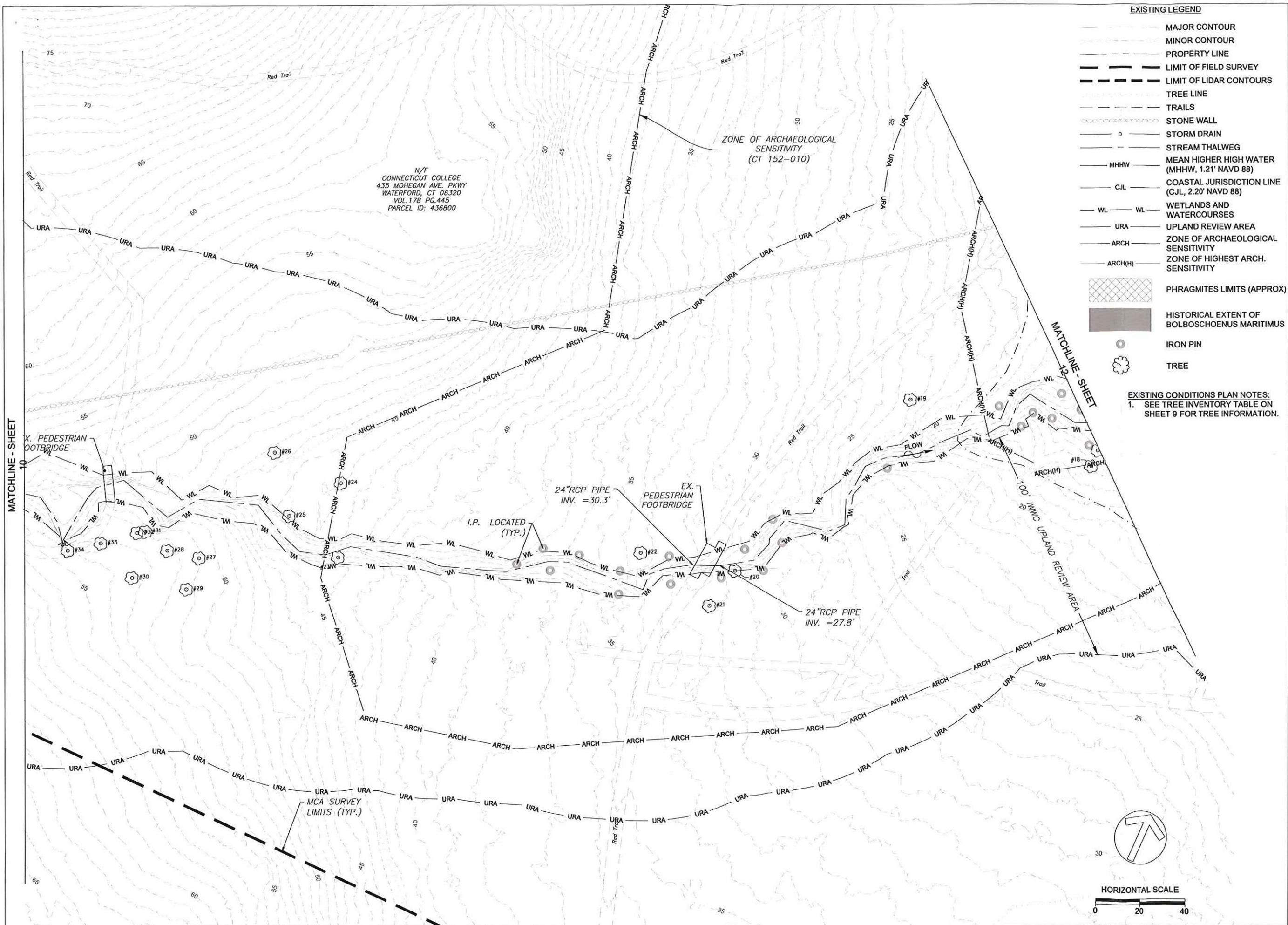
TITLE: **EXISTING CONDITIONS**

|                       |                      |
|-----------------------|----------------------|
| PROJECT NO.: 25201.01 | SCALE:               |
| SEAL:                 | BY: EB, TB CHECK: DS |
| DWG. NO.: 1 of 3      |                      |

State jurisdictional wetlands and watercourses were delineated in accordance with the State of Connecticut Inland Wetlands and Watercourses Act (CGS 22a-36 to 22a-45 inclusive). State of Connecticut Inland Wetlands and Watercourses were delineated in accordance with U.S. Army Corps of Federal jurisdictional wetlands were delineated in accordance with U.S. Army Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1) and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (ERDC/EL TR-12-1) pursuant to Section 404 of the Federal Clean Water Act (33 U.S.C. 1344). To the best of my knowledge, the delineations depicted hereon are true and accurate.

  
Joshua H. Wilson, PWS #1992  
Registered Soil Scientist





- EXISTING LEGEND**
- MAJOR CONTOUR
  - MINOR CONTOUR
  - PROPERTY LINE
  - LIMIT OF FIELD SURVEY
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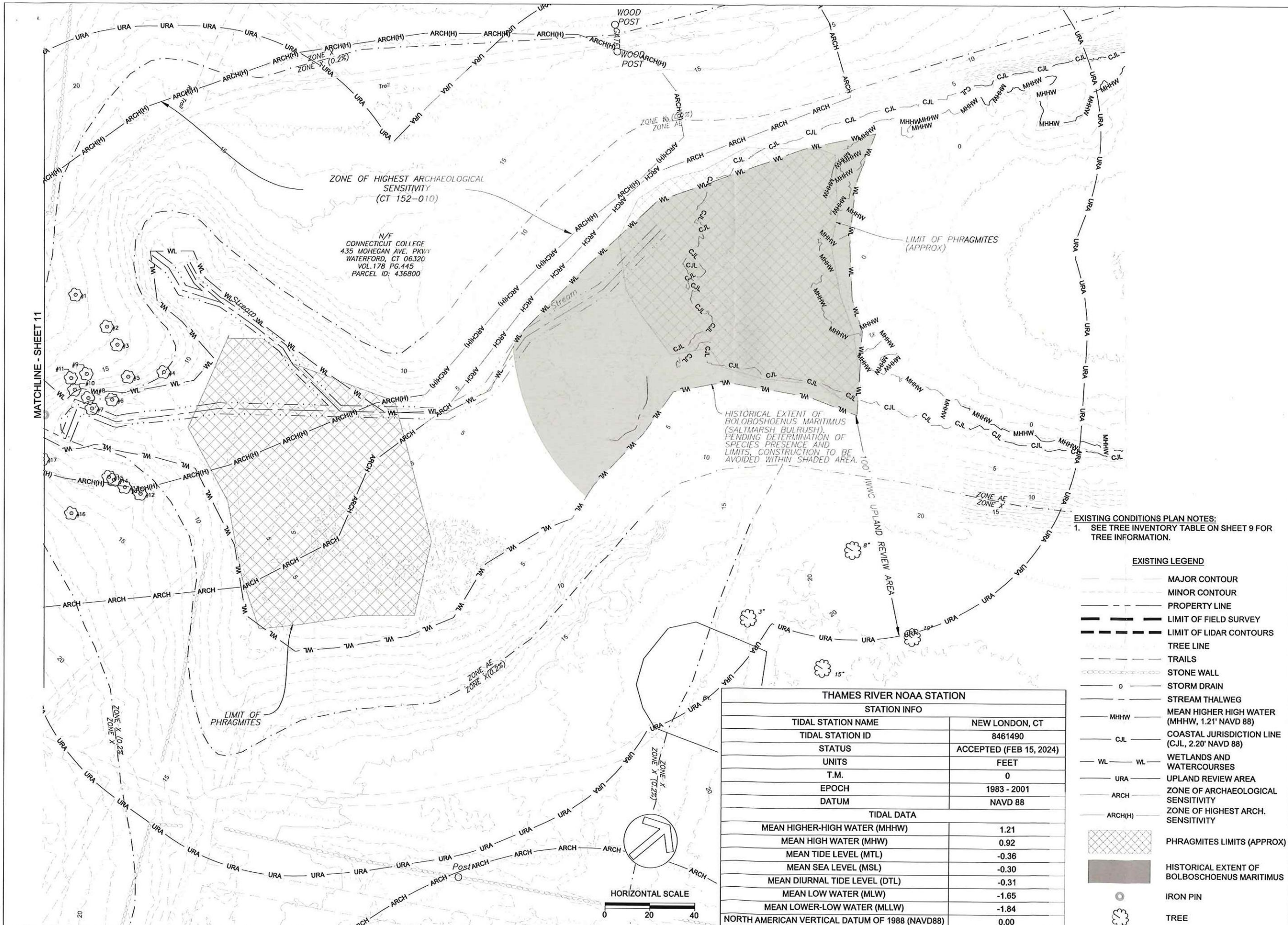
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## MAMACOKE BROOK OUTFALL CHANNEL STABILIZATION AND RESTORATION

## EXISTING CONDITIONS

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2 of 3



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OUTFALL CHANNEL  
STABILIZATION AND  
RESTORATION

TITLE:

EXISTING  
CONDITIONS

PROJECT NO.: 25201.01 SCALE:

BY: EB,TB CHECK: DS

SEAL:

DWG. NO.:

3 of 3

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