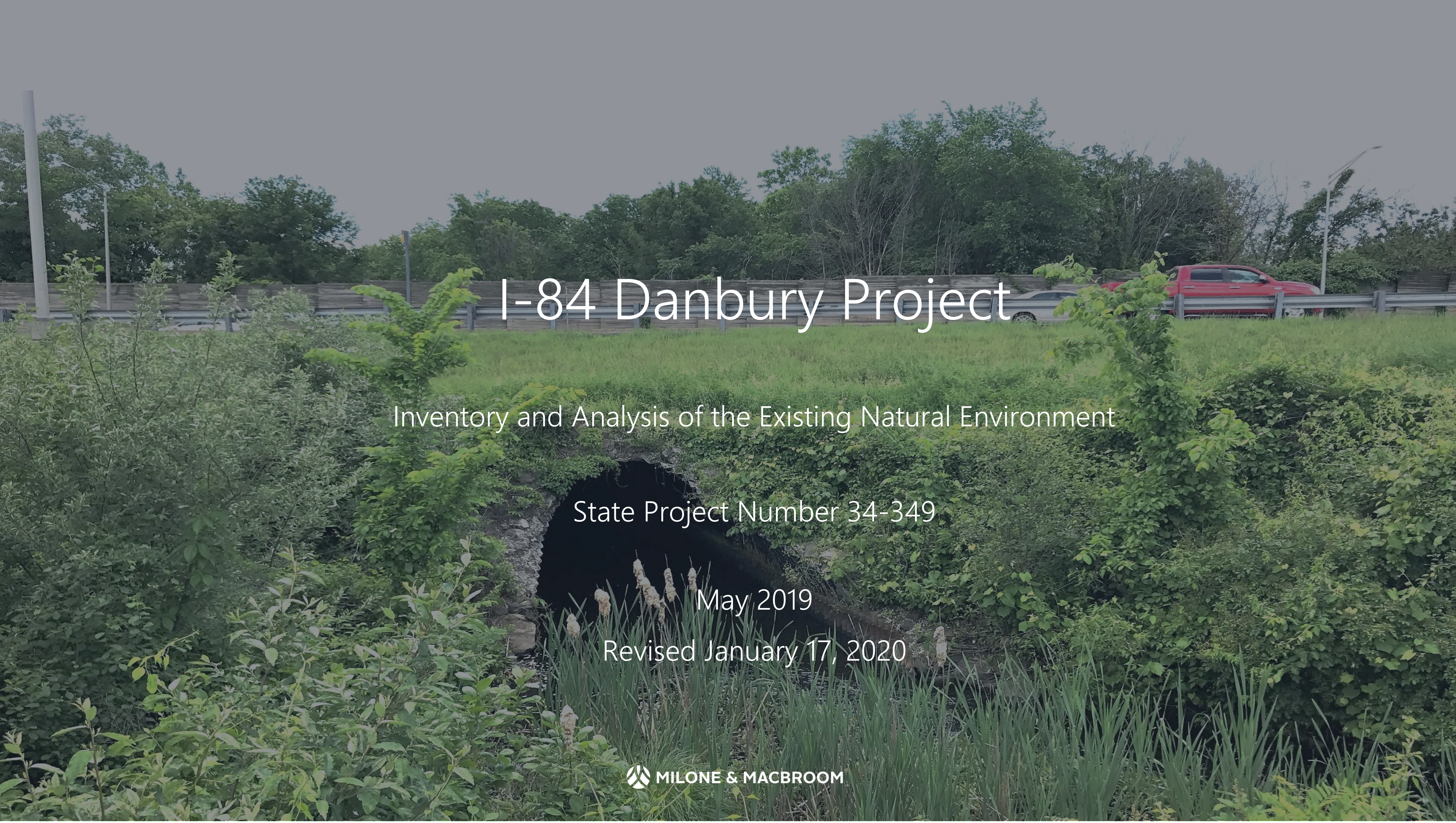
Appendix G Inventory and Analysis of the Existing Natural Environment

I-84 Danbury PEL Study

Prepared for: The Connecticut Department of Transportation

August 2025

I-84 Danbury



I-84 Danbury Project

Inventory and Analysis of the Existing Natural Environment

State Project Number 34-349

May 2019

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MILONE & MACBROOM

I-84 Danbury Project

CONNECTICUT DEPARTMENT OF TRANSPORTATION

Prepared for:

The Connecticut Department of Transportation

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1.0 Introduction

This assessment provides background information regarding the natural environment of a ±6-mile segment of the Interstate 84 (I-84) highway corridor primarily within the city of Danbury in western Connecticut, herein referred to as the Project Area, which encompasses short segments of State Route 7 (SR 7). The natural environment analysis was completed at two levels of detail within and surrounding the Project Area. Within the Primary Assessment Area (PAA), specific field tasks and detailed site investigations were undertaken, including graphical delineation of wetlands and watercourses; assessment of wetland ecology; water quality sampling; and analysis of terrestrial resources and wildlife habitat. The PAA includes land within 200 feet of the I-84 and SR 7 rights-of-way. A larger Natural Environment Study Area (NESA) has also been defined to include the highway corridor to the east and west of the Project Area as well as land within 0.5 miles north and south of I-84, and SR 7. In the NESA, macroscale analyses were conducted utilizing available resource area mapping of soils, geology, hydrology, and land use. The PAA comprises 2.26 square miles while the NESA occupies 16.74 square miles (Figure 1). The purpose of this assessment was to identify and evaluate the existing natural environment in order to establish baseline conditions from which to evaluate potential transportation improvements within the I-84 Danbury Project Area.

PAA field investigations were completed in winter and spring 2017, spring 2018, and spring 2019. These investigations were conducted on foot, and observations were made while walking in identified locations to assess critical habitats (i.e., wetlands, watercourses, and significant topographic features). These investigations revealed the presence of 53 wetland and watercourse systems located within 12 primary watercourse catchments and eight primary terrestrial resource units. Water quality sampling was also conducted at selected locations.

Terrestrial resources were mapped within the NESA using remote sensing data and are reflective of the developed landscape. Ecological classification nomenclature was derived using descriptions presented in the New York Natural Heritage Program *Ecological Communities of New York State*. This classification guide provides a thorough identification of "Cultural Terrestrial Resources" that exist within a developed landscape. Given the significant percentage of the study area that is comprised of these resources in addition to the proximity of the project to the New York state border, this classification was deemed to be appropriately robust and applicable to existing conditions in the I-84 Danbury corridor. Using this community system, primary terrestrial resources in the NESA include the following:

1. pavement and urban structure – supportive of residential, commercial, and industrial land use
2. brushy cleared land
3. woodland – upland and wetland, including woodland edge
4. railroad corridors
5. construction stockpile
6. pavement and mowed lawn
7. mowed lawn with trees
8. croplands

The I-84 and SR 7 highway corridor through the NESA traverses a variety of underlying geologic formations, watersheds, and ecological community types, including wetlands and waterways. The existing natural environment is defined by the interaction between the engineered environment and abutting natural systems. A complete description of the wetland and watercourse environment, terrestrial resources, water quality characterization, surficial geology, and critical habitats within the PAA and NESA follows.

2.0 Landscape Position

2.1 Landscape Setting

Located in southwestern Connecticut immediately east of the New York state line, the Project Area encompasses approximately 6 miles of the I-84 and SR 7 corridor in the northwestern portion of Fairfield County. The majority of the land use within the NESA is heavily developed with residential, commercial, institutional, and industrial uses. Additional uses include an airfield, railroads, interstate infrastructure, and managed open space, including cemeteries and golf courses.

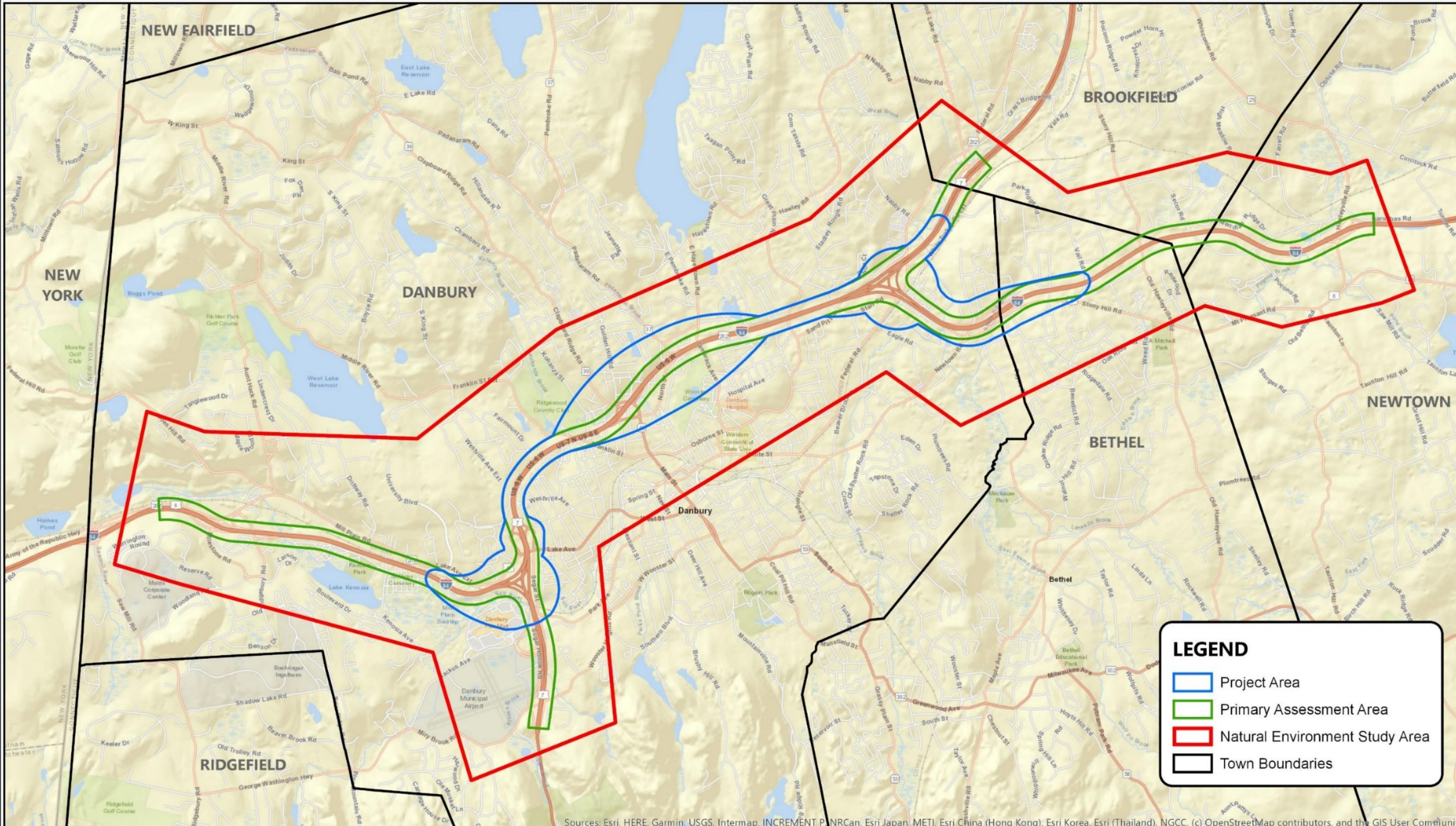
The Project Area is located within the Housatonic River watershed. Surface water within the NESA reaches the Housatonic River within two primary tributaries: the Still River and Pond Brook though a small portion of the central Project Area drains to the Housatonic River via the Candlewood Lake complex. The Still River drains land in the western portion of the NESA while Pond Brook carries flow from the eastern portion of the NESA. Both tributaries flow north to their confluence with the Housatonic River. These watercourses, their tributaries, and associated wetland complexes parallel I-84 across most of the NESA. Numerous wetland and watercourse crossings occur within the corridor and flow through the developed landscape. A complete description of watercourses and subcatchments within the PAA is provided in Section 3.0.

The NESA commences approximately 1,500 feet east of the New York/Connecticut state line and extends east between Exit 1 and Exit 9 on I-84. This area also includes the intersection of SR 7 between Exits 3 and 11. The NESA covers approximately 11.5 linear miles along I-84 and extends between approximately 0.5 and 1.2-miles perpendicularly north and south of I-84. The majority of the NESA is located within the city of Danbury, Connecticut, with the remainder extending east into neighboring towns. Along I-84, the NESA extends 1.3 miles along the northern corner of the town of Bethel, 0.4 miles in Brookfield, and 1.5 miles in Newtown. Along SR 7, the NESA extends 0.5 miles northeast over the Danbury city line to Brookfield.

The NESA is located within Western Upland physiography in Connecticut (Dowhain and Craig, 1976). This map unit occupies the land area west of the Connecticut River valley. Within the Western Upland, three subunits exist: Northwest Highlands, Southwest Hills, and Coastal Slope. The NESA is located within the Southwest Hills region and is comprised of two primary subsegments that are delineated based on bedrock geology: Southern Marble Valley and Southwest Hills. The Southern Marble Valley occupies the central portion of the NESA and is primarily located within the Still River corridor.

2.2 Surficial Geology and Bedrock Composition

The surficial geology within the Project Area is shaped by Quaternary glaciation deposits that range in materials from thin till to the stratified sands and gravel deposited by glacial outwash. Glacial till is unsorted material of various sizes (clay particles to boulders) and shapes transported and deposited by glacial ice. Two major types of till are possible: lodgement and ablation. Lodgement includes compacted layers that usually begin 20 to 30 inches below the surface and continue with depth. Due to the compacted layers, groundwater may intermittently perch directly above these restrictions. Ablation till is deposited by melting ice at the margins of the glacier and does not include compacted layers. Generally, glacial till is found in the uplands and is dominated by ablation till that overlays bedrock while glacial alluvium (sand and gravel) and lacustrine sands, silts, and clays are found in the lower-lying areas and cover till and bedrock.



I-84 Danbury Project

FIGURE 1: NATURAL ENVRIONMENT STUDY AREAS

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Date: 5/30/2019

Data Sources:
Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, METI, NGCC

SCALE IN FEET
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More recent Cenozoic organic deposits are also present in certain areas within the NESA and overlay glacial deposits. The Mill Plain Swamp and Bound Brook Swamp are examples of these features. Surficial materials consist of glacial till over much of the vegetated areas (Figure 2).

The Project Area spans a variety of bedrock formations. Bedrock geology is characterized by ridges of gneiss and granite gneiss, which are interrupted by lower valleys of marble or metamorphosed sedimentary limestone and/or dolomite. The western Project Area, from roughly Exit 2-A/B to Exit 3, is supported by bedrock formations of schist and marble. Continuing east, from Exit 3 to just west of Exit 7, the bedrock is dominated by granitic gneiss, marble, and schist. The eastern extent of the Project Area, from Exit 7 to the east, reflects a mixture of schist and gneiss. Bedrock is generally more than 6 feet below the ground surface within the Project Area.

Several wetland and watercourse complexes, including the Still River, can be found at lower elevations within the NESA. The topographic differences are influenced by downcutting of erodible calcareous marble through persistent hydrology. Stockbridge marble is characteristic of this region, in contrast to bedrock in other parts of Connecticut. The alkaline bedrock influences the chemistry of the adjacent stream and wetland systems, generally, results in higher total dissolved solid loads, and creates unique habitat conditions for flora and fauna.

2.3 Soils and Topography

Natural Resources Conservation Service (NRCS) soil survey mapping depicts a variety of soils within the NESA (Figure 3). Soils along and adjacent to the existing highway right-of-way and in developed areas are largely mapped as Udorthents, Urban Land, and Urban Land Complexes and are defined as human-altered soils reflective of the high degree of development. Mapped hydric soils, indicators of the potential presence of wetlands, are largely coincident with mapped wetland areas within the PAA. In the NESA, mapped hydric soils were identified as potential wetland systems. Hydric soils are comprised of poorly drained tills and very poorly drained organics as well as alluvial and/or floodplain soils associated with the Still River.

Topography within the highway right-of-way is largely a gentle gradient. Within the NESA, the difference between high and low elevations is approximately 200 feet, with ridge tops occurring near 700 feet and primary riparian corridors at around 500 feet above mean sea level. Generally, land slopes to the east and north within the Still River corridor. A divide occurs east of SR 7, and topography slopes to the north within the Pond Brook watershed.

2.4 Prime Farmland

The amount of land that can economically produce sustained high yields of crops and thus is suitable for farming is limited by soil quality, growing season, and moisture supply. Such farmland is a limited resource important to food security and long-range needs for food and fiber for the nation. For this reason, the NRCS and other federal, state, and local government organizations have inventoried land that is best suited to farming to help guide land use decisions. Areas with soils that may yield a high abundance of crops are classified as "prime farmland." The edaphic conditions have a unique combination of physical and chemical characteristics, such as being all or mostly free of rocks, limited erosivity, suitable salinity and pH, located in an area with a favorable growing season and temperatures, and having a suitable and dependable water supply. Notably, in order to be considered prime farmland, an area must already be cultivated or be able to transition to cultivation from uses such as pasture or forestland. Land that has already become urban or built up is no longer considered prime farmland even if underlying soils and other characteristics would otherwise make it so. Land that does not meet the criteria for prime farmland but is still of value for farming at a state level may be classified as "farmland of statewide importance."

Approximately 1,688 acres of prime farmland soils and 1,927 acres of farmland soils of statewide importance are mapped within the NESA. Most of these mapped units have been urbanized, predominantly for residential land uses, and thus are not currently suitable farmland. Less than 450 acres of mapped farmland soils are currently undeveloped within the NESA and therefore may be potentially viable farmland. Most of this land is scattered in small (<20 acres), isolated patches rather than contiguous larger tracts. Potentially viable farmland is located in pockets throughout the NESA, including areas north of I-84 Exit 2, south of Exit 3, and south of Exit 6. Additionally, potentially viable farmland exists east of SR 7 northbound near Exit 11 (Figure 3).

3.0 Landform and Drainage

3.1 Introduction

The NESA lies within a diverse hydrologic landscape reflective of the glaciated northeast. Variation in bedrock composition between erodible marble and metamorphic gneiss has contributed to the shape of the landscape amidst the perennial fluvial hydrology. Numerous watercourse crossings comprised of 12 distinct subcatchments to the Still River and Pond Brook occur within the I-84 transportation corridor (Table 3-1). Typically conveyed via box culverts, the watercourse crossings transport surface waters north and south of I-84 as well as east and west of SR 7 over the length of the NESA. For long stretches of roadway, watercourses and associated wetland complexes meander through and parallel the highway corridor. Stream segments and associated wetlands of the Still River, Penny Ericsson Brook, Beaver Brook, Broad Swamp Brook, Kohanza Brook, and Pond Brook all flow adjacent to I-84. These dynamic streams and riparian wetlands exist amidst the highly developed environment of the highway, urban and suburban land use, active rail lines of the Housatonic Railroad, industrial activities, and open space (Figures 4A, 4B, and 4C). In addition to wetlands and watercourses located within the PAA, numerous small catchments to the primary tributaries – Still River and Pond Brook – exist, as well as the smaller Candlewood Lake catchment (Table 3-2).

TABLE 3-1
Watercourse Crossings within the Natural Environment Study Area

Watercourse	Crossing Location	Watershed (Subbasin)
Still River	I-84 east of Exit 2A	Still River (6600-01)
Still River	Route 7 South, south of I-84	Still River (6600-01)
Lees Pond Brook	Route 7 South, west of Lees Pond	Still River (6600-03)
Boggs Pond Brook	I-84 east of Exit 5	Still River (6602-00)
Padanaram Brook	I-84 east of Exit 6	Still River (6603-00)
Beaver Brook	I-84 west of Route 7 divide	Still River (6600-05)
Beaver Brook	I-84 south of Route 7 divide	Still River (6600-05)
Still River	Route 7 North, east of I-84 divide	Still River (6600-00)
West Brook	Local road north of Route 7 North west of Exit 11	Still River (6600-07)
East Brook	Local road north of Route 7 North east of Exit 11	Still River (6600-08)
Still River	I-84 west of Exit 8	Still River (6600-00)
Stony Hill Brook	I-84 east of Exit 8	Still River (6606-04)
Pond Brook	I-84 west of Exit 9	Pond Brook (6018-00)

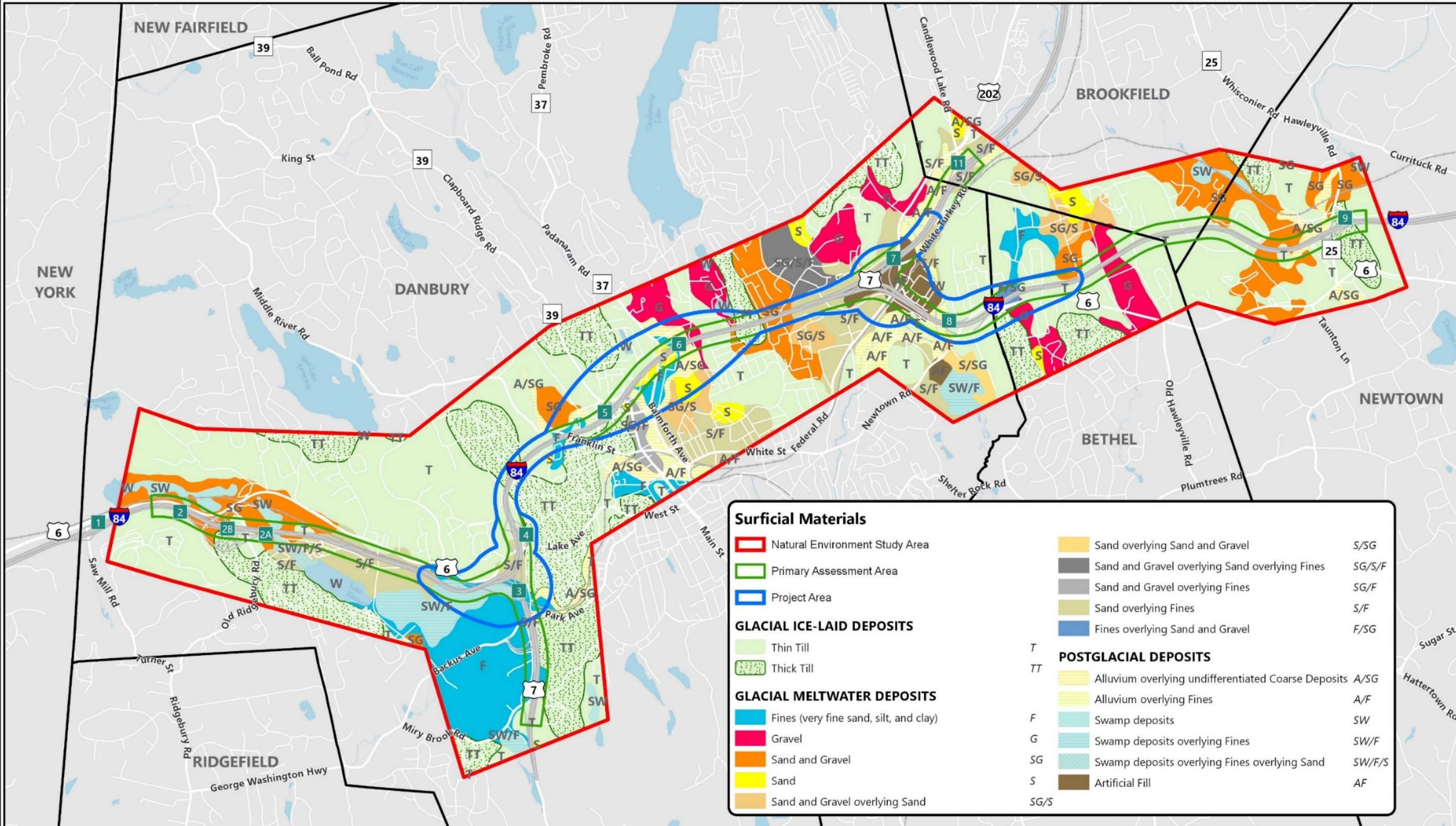

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FIGURE 2: SURFICIAL MATERIALS

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Date: 5/30/2019

Data Sources:
USGS, CT DEEP

SCALE IN FEET
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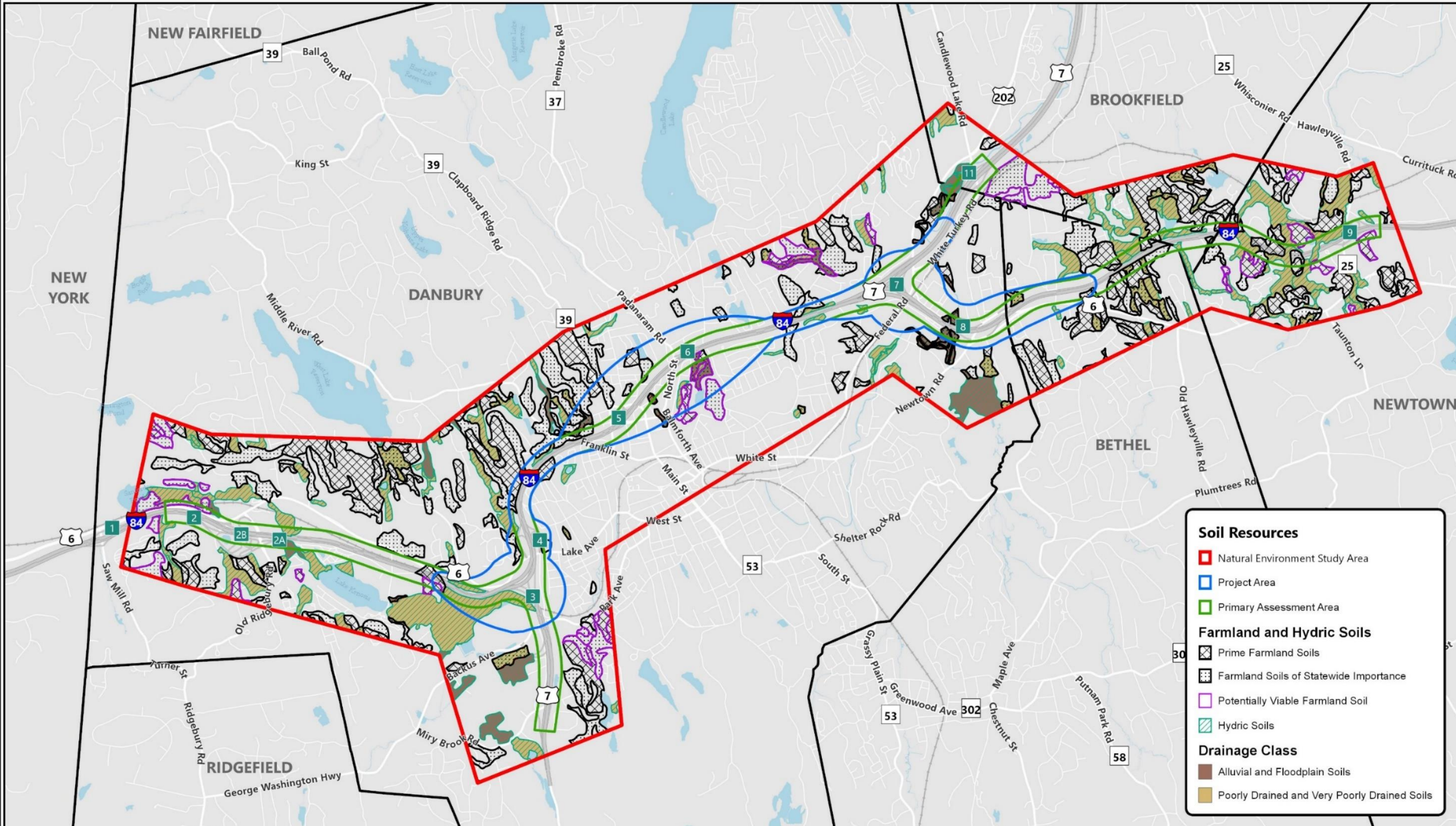

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FIGURE 3: SOIL RESOURCE MAP

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Date: 5/30/2019

Data Sources:
Land use data based on MMI analysis of assessor's data provided by the City of Danbury, Town of Bethel, Town of Brookfield and Town of Newtown.
Soil data provided by the State of CT DEEP

SCALE IN FEET
0 2,000 4,000

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TABLE 3-2
Watersheds within the Natural Environment Study Area

Watershed	Subregional Watershed	Subregional Watershed Size (sq. mi)[1]	Local Drainage Basin	Subbasin Size (square miles)[2]
Still River	Still River (6600)	9.64	Still River (6600-00)	4.18
			Lake Kenosia (6600-01)	2.93
			Kissen Brook (6600-02)	0.44
			Lees Pond Brook (6600-03)	0.35
			Parks Pond Brook (6600-04)	0.07
			Great Plain Brook (6600-05)	0.81
			Beaver Brook (6600-06)	0.25
			West Brook (6600-07)	0.19
			East Brook (6600-08)	0.04
			6600-09	0.38
	Boggs Pond Brook (6602)	1.71	Kohanza Brook (6602-00)	0.99
			Boggs Pond Brook (6602-02)	0.72
	Miry Brook (6601)	0.36	Miry Brook (6601-00)	0.33
	Padanaram Brook (6603)	0.91	Padanaram Brook (6603-00)	0.71
			Penny & Ericson Brook	0.11
			Cemetery Brook	0.09
	Limekiln Brook (6606)	1.74	Limekiln Brook (6606-00)	0.39
			Dibbles Brook (6606-03)	0.37
			Stony Hill Brook (6606-04)	0.98
Pond Brook	Pond Brook (6018)	2.20	Pond Brook (6018-00)	0.79
			Pogond Brook (6018-02)	0.48
			6018-03	0.45
			6018-04	0.43
Candlewood Lake	Candlewood Lake (6400)	0.18	Kellners/Smiths Pond (6400-00)	0.18

[1] Watershed size specific to catchment area within NESA
[2] Subbasin size refers to catchment within NESA.

3.2 Exit 2-B to Route 7

Drainage features between Exit 2-B and SR 7 are shown on Figure 4-A.

Still River
The Still River is a tributary to the Housatonic River in western Connecticut. The river headwaters occur near the New York border with Danbury and flow out of Sanfords Pond, north of I-84 and Exit 2-B. In total, the Still River is 25.4 miles long and has a drainage area of 85 square miles, 9.64 square miles of which are within the NESA boundary. Within the NESA, the Still River flows south beneath I-84 and east to Lake Kenosia, which terminates at Kenosia Avenue. The Still River then meanders through the emergent wetlands of Mill Plain Swamp within 100 feet of the southern road line of I-84 for approximately 1.5 miles to SR 7. The river narrows and flows east beneath SR 7 and then flows approximately 1 mile downstream to Oil Mill Pond. Here, the Still River is channelized amidst dense development. Parks Pond Brook empties into the Still River just west of the City of Danbury rail station. The Still River confluences with Boggs Pond Brook and flows south out of the NESA. The Still River and associated wetlands occupy a significant land area south of I-84 between Exits 2 and 6. In contrast, Boggs Pond Brook originates in the northwestern portion of the NESA and drains the area north of I-84 between Exits 4 and 5 until it ultimately drains to the Still River.

3.3 SR 7 South and I-84 Connection

Drainage features between SR 7 South and the I-84 connection are shown on Figure 4-A.

The NESA extends 1.1 miles south of SR 7 to the southern terminus of Old Sugar Hollow Road. Wetlands and watercourse systems parallel Route 7 and flow to the Still River east of Mill Plain Swamp and the Danbury Fair Mall. Kissen Brook exists to the west of Route 7 in this area while Lees Pond Brook is located east of SR 7. Lees Pond Brook empties into Kissen Brook just north of the Danbury Municipal Airport and flows 2,000 feet north to empty into the Still River, south of the railroad line. This particular area is quite complex due to the number of watercourse connections and the extent of wetland areas in concert with the highly engineered environment comprised of the presence of the railroad, the highway interchanges between SR 7 and I-84, and the location of the Danbury Fair Mall.

3.4 Exit 3 to Exit 7

Drainage features between Exit 3 and Exit 7 are shown on Figure 4-B.

Boggs Pond Brook and Padanaram Brook
Boggs Pond Brook drains a 1.71-square-mile area[3] within the west-central portion of the NESA. Originating north of I-84, Boggs Pond Brook commences at the outlet of Boggs Pond and drains through West Lake Reservoir and Ridgewood Country Club Pond to the south and east. Kohanza Brook confluences with Boggs Pond Brook within Ridgewood Country Club Pond. Boggs Pond Brook is culverted beneath I-84 adjacent to Exit 5 and flows south to confluence with Padanaram Brook at Rowan Street.

[3] Though a surficial outlet is not apparent, Lake Wackawana is a small open water body located in the Boggs Pond Brook subcatchment.

Padanarum Brook drains a 0.91-square mile watershed between Boggs Pond Brook and Kellners Pond. Padanaram Brook is surfically expressed for much of its length before being piped beneath Henry Abbott Technical High School. The pipe outlet is coincident with the confluence with Penny & Ericson Brook, which drains an approximately 0.11-square miles in the NESA study area. Following this connection, the brook flows south beneath I-84, east of Exit 6. Approximately 1,500-feet south of the interstate, Padanarum Brook joins the Cemetery Pond Brook, which originates at the outlet of Cemetery Pond. Padanaram Brook continues to flow south to confluence with Kohanza Brook and eventually empty into the Still River south of the railroad and west of the Danbury Rail Station.

Within this portion of the NESA, surface water patterns are complex due to the number of watercourses in this area, dense urban landscape, and fixed transportation corridors comprised of interstate highway and interchanges in addition to railroad infrastructure. The wetland resources associated with Boggs Pond Brook, Padanaram Brook, and their tributaries are generally comprised of linear watercourses with narrow adjacent wetland systems, which exist in contrast to the broad floodplain wetlands and meanders of the Still River west of this area. In some areas, these stream channels are manipulated and modified to accommodate flows within the developed landscape.

East of the Still River and Boggs Pond Brook, a drainage divide exists. North of I-84 for a distance of 1,800 feet between Exits 6 and 7, a small watershed drains to Keller's Pond, which flows north to Candlewood Lake. East of this small catchment lies the Beaver Brook watershed, which is comprised of Beaver Brook, drainage from Great Plain Brook north of I-84, and the west branch of Beaver Brook south of I-84. The West Branch Beaver Brook carries surface water parallel and in close proximity – within 250 feet – to I-84 for approximately 0.85 miles. Drainage from Boggs Pond Brook proper flows beneath I-84 north of Starr Road to empty into West Branch Beaver Brook, which flows east to the Still River confluence at Exit 7, east of the intersection of I-84 and SR 7 and adjacent to the Housatonic Rail Line.

3.5 SR 7 North and I-84 Connection

Drainage features between SR 7 North and the I-84 connection are shown on Figure 4-C.

Adjacent to the SR 7 interchange, a number of watershed connections[4] occur, and many of these watercourse connections exist within the I-84 and SR 7 interchange. As described previously, the Still River confluences with Beaver Brook here, following the connection. In addition, the Still River collects drainage from Limekiln Brook approximately 300 feet downstream south of the connection with Beaver Pond Brook. Limekiln Brook primarily drains land area located southeast of the I-84 and SR 7 intersection. However, this watercourse also receives discharge from Stony Hill Brook, which occupies a catchment area north of I-84. Stony Hill Brook originates north of I-84 and drains a small area west of Vail Road. The Stony Hill Brook wetland corridor contains a variety of wetland systems ranging from an excavated pond to larger forested wetland complexes adjacent to the highway. Drainage from Stony Hill Brook flows west and south and is conveyed beneath I-84 adjacent to Exit 8. Approximately 800 feet south of I-84, Stony Hill Brook connects with Limekiln Brook, which flows north 800 feet to connect with the Still River.

The Still River meanders beneath I-84 and SR 7 and begins to flow north[5] toward its eventual discharge to the Housatonic River in New Milford, Connecticut. Adjacent to the Route 7 connection, the Still River lies west of Route 7 although the stream is conveyed east beneath the roadway and then flows back west near the northern extent of the study area at Grays Bridge Road. Drainage from East Brook and West Brook discharges to the west bank of the Still River west of the highway at Exit 11. In this portion of the NESA, the Still River is a meandering stream within broad emergent floodplain wetlands. Organic parent material soils support these wetland systems. The flow path of the Still River has been modified over time to accommodate both highway and local roadway alignments. Relict stream segments exist as wetlands east of SR 7 while the Still River lies west of the highway near Old Grays Bridge Road. In total, the Still River subregional basins within the NESA measure 14.36 square miles of the total 16.74-square-mile project area, or 86 percent of this area.

3.6 East of Exit 8

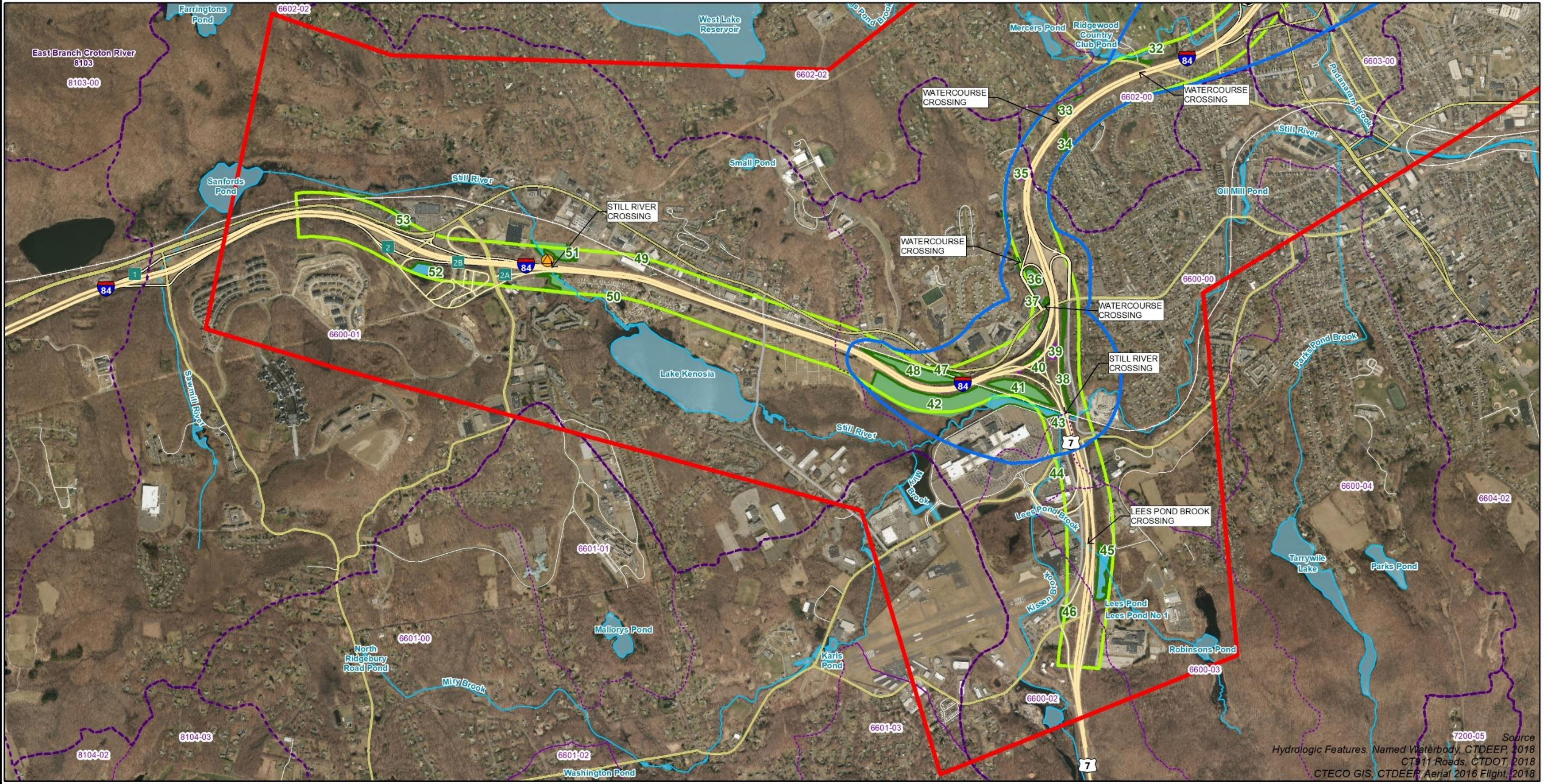
Drainage features east of Exit 8 are shown on Figure 4-C.

A drainage divide occurs east of Exit 8. Here, surficial discharge exists within the Pond Brook watershed in contrast to the Still River watershed located west of Exit 8. Pond Brook flows northeast to empty into the Housatonic River within Lake Lillinonah, approximately 13 miles downstream from the confluence with the Still River and the Housatonic River at Lover's Leap in New Milford. Pond Brook is comprised of several small watersheds that drain land north and south of I-84. In this portion of the NESA, the density of land use is decreased, and the area is moderately settled, primarily with residential land use. Resultantly, wetland systems are comprised of broad forested and emergent palustrine environments as opposed to manipulated and channelized features although these wetlands are still located in close proximity to the highway. Small stream corridors interconnect these larger wetland systems. Drainage is conveyed beneath I-84 in pipes and box culverts in a few locations within the Pond Brook watershed extending to the eastern terminus of the NESA at Exit 9. Though these resources exist adjacent to the highway, the functional capacity of the Pond Brook wetlands is high due to persistent hydrology, areal extent, variable topography, and dominance of native vegetation. North of I-84, Bound Swamp Brook originates in a large red maple swamp, Bound Swamp, adjacent to Secor Road in Newtown. South of the swamp, Bound Brook is confined to a rocky watercourse channel and flows south beneath the highway. The stream flows parallel to the interstate for approximately 500 feet and is collected in a pipe to return north of I-84 adjacent to Meriden Ridge Road. The stream continues east through man-made ponds and emergent wetlands to connect to Pond Brook west of Exit 9 and 400 feet north of the highway.

South of I-84, the Pond Brook headwaters exist at the outlet of Taunton Pond in Newtown. Pond Brook confluences with a tributary, Pogond Brook, 200 feet south of the highway, west of Pocono Road. Pond Brook flows north beneath I-84 west of Exit 9. In total, Pond Brook drains 2.20 square miles of land within the NESA.

[4] Watershed connections refers to the confluence of stream segments within a larger catchment area. For example, the confluence of Beaver Brook and Still River is a watershed connection, as well as Limekiln Brook and Stony Hill Brook to the Still River. These smaller subbasin connections drive much of the hydrology of these areas and are evidenced by the numerous subbasin streams within the NESA (Table 3-2).

[5] The NESA extends 1.6 miles north on Route 7 from the I-84 intersection.



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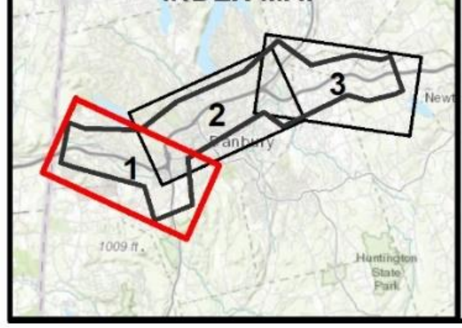

I-84 Danbury Project

FIGURE 4A: WETLANDS AND WATERCOURSES OVERVIEW

5/22/2019
Danbury, Newtown, Brookfield, Connecticut
Page 1 of 3

STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION

0 100 200 Feet

1 inch = 1,873 feet

LEGEND

- Project Area
- Natural Environment Study Area
- WQ Sampling Location
- Sub-Regional Drainage Basins
- Local Drainage Basins
- Named Waterbodies
- Primary Assessment Area

DELINEATED WETLANDS

- Federal (ACOE)
- State(CTWET)
- Federal (ACOE)
- State (CTWET)
- Open Water (OHW)
- Localbasins_WDL

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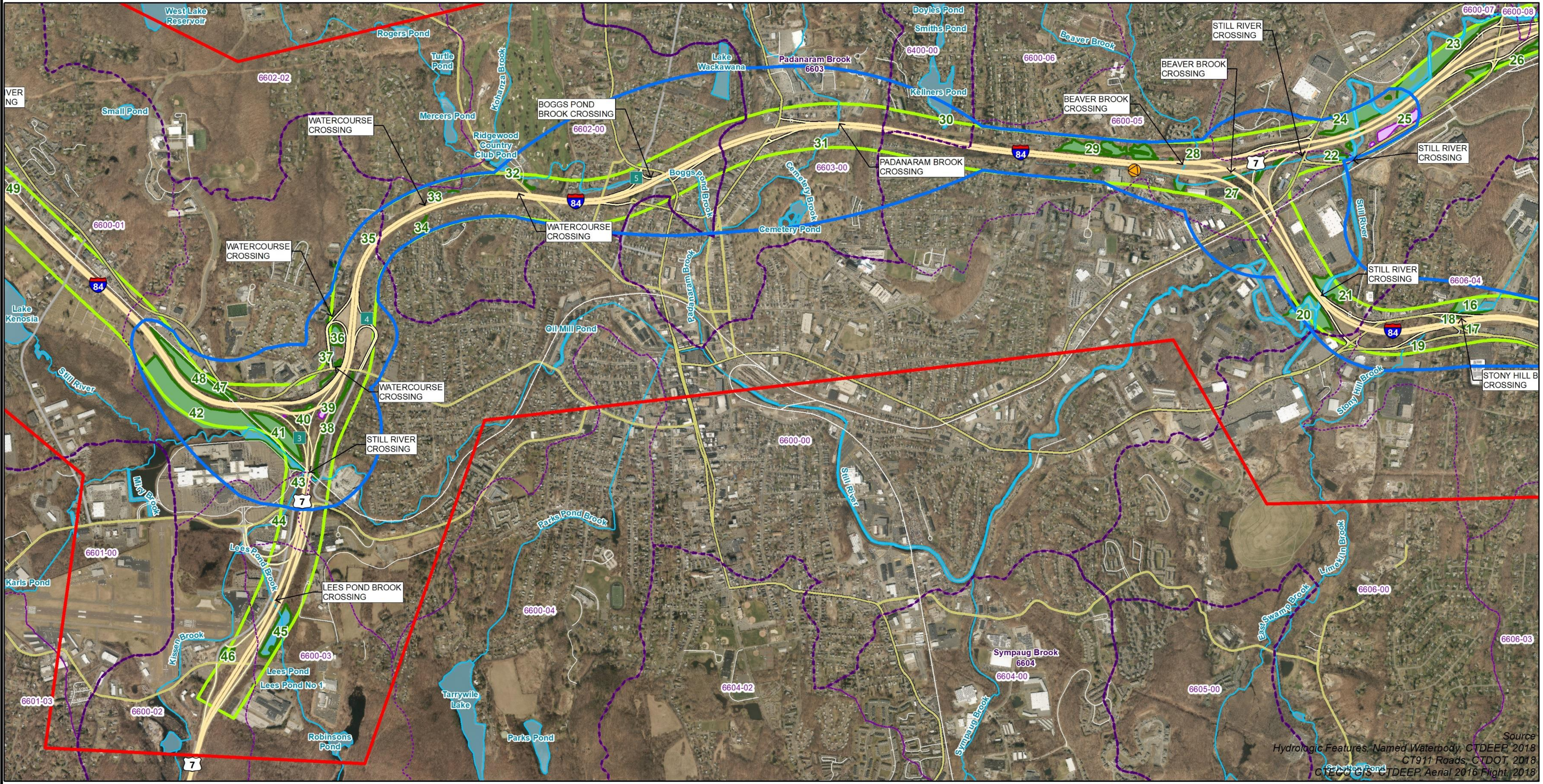

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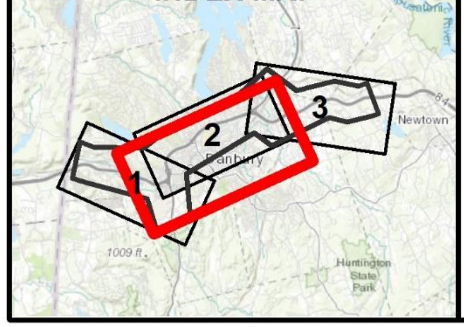
INDEX MAP



I-84 Danbury Project

FIGURE 4B: WETLANDS AND WATERCOURSES OVERVIEW

5/22/2019
Danbury, Newtown, Brookfield, Connecticut
Page 2 of 3

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

0 100 200 Feet
1 inch = 1,873 feet

LEGEND

- Project Area
- Natural Environment Study Area
- WQ Sampling Location
- Sub-Regional Drainage Basins
- Local Drainage Basins
- Named Waterbodies
- Primary Assessment Area

DELINEATED WETLANDS

- Federal (ACOE)
- State(CTWET)
- Federal (ACOE)
- State (CTWET)
- Open Water (OHW)
- Localbasins_WDL

I-84 Danbury Project

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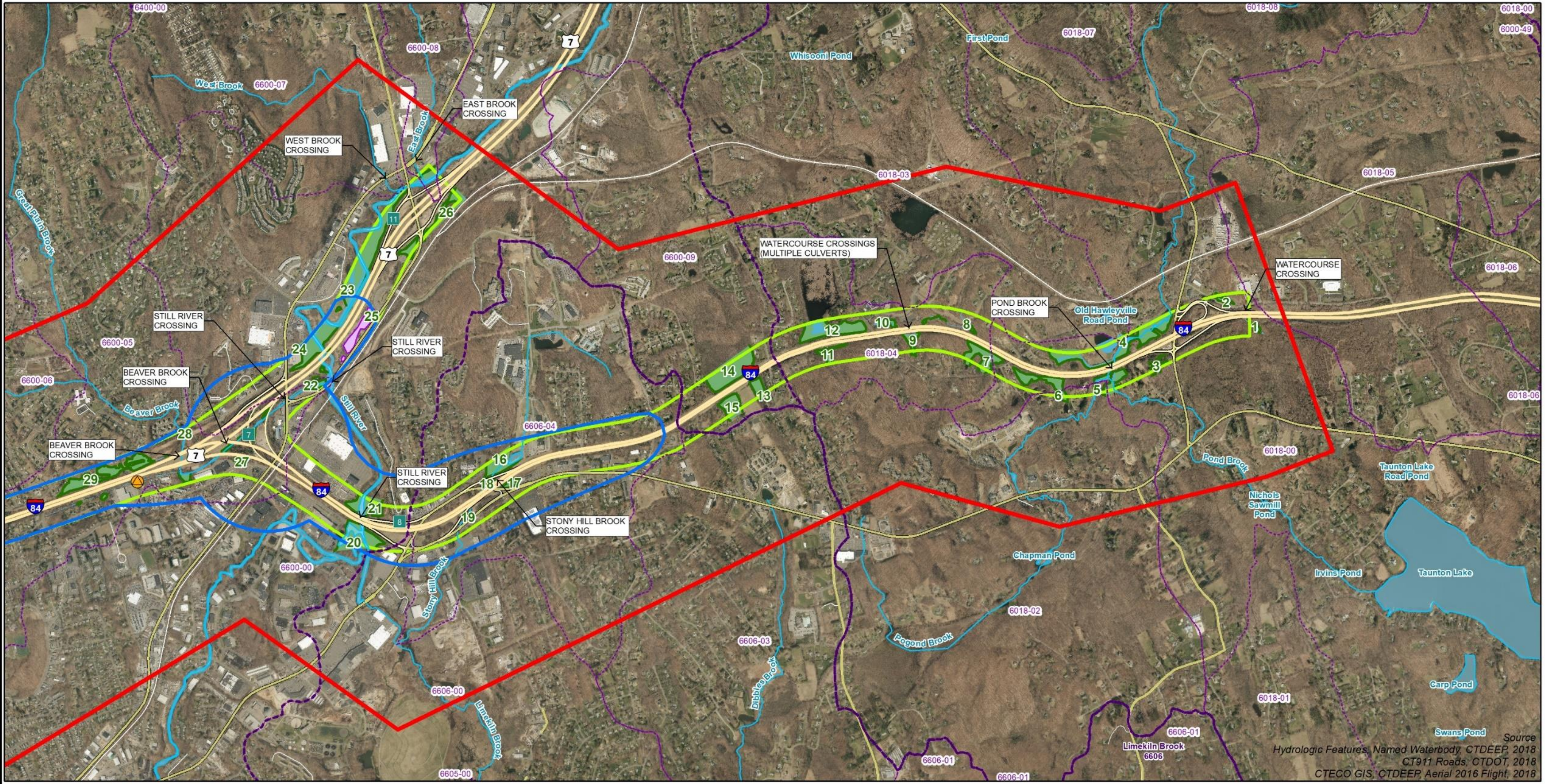

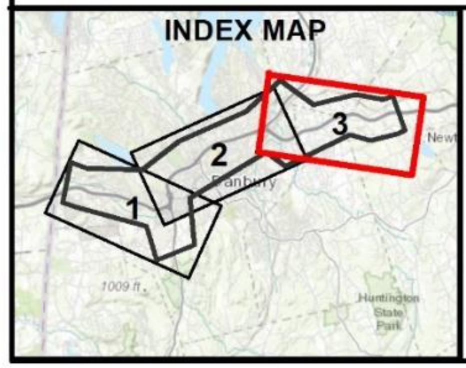

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FIGURE 4C: WETLANDS AND WATERCOURSES OVERVIEW

5/22/2019

Danbury, Newtown, Brookfield, Connecticut

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STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

0 100 200 Feet

1 inch = 1,873 feet

LEGEND

- Project Area
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4.0 Terrestrial Resources

Terrestrial resources in the NESA have been mapped by ecological community, which is defined as a common physical environment shared by an assemblage of plants and animals that interact with each other and their surroundings. Ecological communities can be natural or defined by human activity. The majority of the NESA is comprised of a built environment dominated by cultural terrestrial resources. Land use is varied and is comprised of residential, commercial, institutional, recreational, and municipal interests. Given the dominance of engineered structures in the NESA, terrestrial resources were mapped utilizing standardized nomenclature developed by the New York Natural Heritage Program *Ecological Communities of New York State* – Second Edition – March 2014. This document provides comprehensive identifiers for terrestrial resources including cultural resources or those affected by human inhabitation. Given the nature of the NESA and the proximity to New York state, this community classification system is pertinent to the evaluated area. However, some modifications of the terrestrial communities were developed herein to further discern differences within the NESA. For example, specific forest and/or woodland areas were not mapped due to the scale of site assessments within the NESA and concurrent lack of refinement of canopy composition and/or hydrologic regime. These areas are described generally as "woodland-upland and wetland." In general, terrestrial communities are defined by vegetation and substrate composition evaluated through disturbance regime.

Eight ecological communities were identified (Figure 5):

1) *Pavement/Urban Structure*
Pavement/urban structure is composed of paved roads and the exterior surfaces of metal, wood, or concrete structures such as buildings and bridges within the NESA. The highway right-of-way; streets; and commercial, industrial, and dense residential areas within the NESA fall into this community type. Plants adapted to live on hard surfaces, including lichens and mosses, or animals that are tolerant of human activity and can live in cracks, nooks, and crannies, including bats, insects, and some roosting birds may be found here. This community has been mapped in the densely developed portions of the NESA that support residential, commercial, and industrial uses.

2) *Railroad*
Railroad is characterized by a permanent right-of-way with steel rails fixed to wood ties and laid on a gravel roadbed. Vegetation along railroads tends to be sparse and rooted in the gravel substrate and is commonly composed of invasive weeds. Characteristic plants include spotted knapweed (*Centaurea maculosa*), downy chess (*Bromus tectorum*), cypress spurge (*Euphorbia cyparissias*), and crownvetch (*Securigera varia*). Rail lines within the NESA include commercial and passenger rail cars. The Danbury rail station is located within the NESA, south of I-84, adjacent to the Still River, and east of the Danbury Fair Mall.

3) *Construction and Mining Stockpiles*
Construction and mining stockpiles are areas where soil from construction work and/or road maintenance materials have been recently deposited. There is little, if any, vegetation. Land in the NESA characteristic of construction and mining stockpiles includes staging areas within active construction sites and gravel and construction material operations. Contractor yards and material processing areas were identified and have been mapped as this terrestrial resource.

4) *Brushy Cleared Land*
Brushy cleared land is composed of former forest, woodland, or shrubland that has been cleared by machinery. Vegetation is patchy, with scattered herbs, shrubs, and tree saplings. The amount of vegetative cover depends on soil fertility and the length of time since the land was cleared. Brushy cleared land in the NESA includes edges throughout the NESA, cleared areas in the median, and land along the edges of the highway right-of-way.

5) *Mowed Lawn and Mowed Lawn with Trees*
Mowed lawn with trees is found on recreational, institutional, or commercial land on which the groundcover is dominated by clipped grasses and forbs, with the presence of trees and often ornamental or native shrubs. Animals such as the gray squirrel (*Sciurus carolinensis*), American robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), and northern mockingbird (*Mimus polyglottos*) may be found in this community. Mowed land with trees is found in the NESA in parks, golf courses, and cemeteries.

6) Pavement and Mowed Lawn
This small community is generally comprised of manicured herbaceous areas adjacent to pavement. In particular, the airfield in the southwestern portion of the NESA reflects this community. Smaller airfields such as this one may demonstrate the potential to provide some grassland habitat as management practices allow. These management considerations relate to meadow maintenance and proscription of mowing in certain times of the growing season. As such, this habitat is defined separately from the mowed lawns in adjacent parks and cemeteries.

7) *Cropland*
Agricultural fields planted in rows or field crops exist in isolated areas within the NESA primarily in the southwestern corridor. Though these areas comprise a relatively small proportion of the NESA, many croplands have been mapped by the Connecticut Department of Energy & Environmental Protection (CT DEEP) as farmlands of statewide importance.

8) *Woodland, Upland, and Wetland including Woodland Edge*
Woodland, upland, and wetland communities comprise the minimally managed natural communities within the NESA. Woodland describes communities with a canopy of trees of varying density that are structurally intermediate between forests and open canopy uplands. Upland describes nonwetland unwooded areas currently undisturbed by human development. Wetland communities are distinguished by hydrologic regime (frequency of flooding and how water moves through the system), substrate (hydric soils), and their plant composition (plants that are tolerant of soils that are saturated for a long period of time during the growing season). Collectively, these communities account for the unmaintained natural areas and are generally concentrated in the northern and eastern portions of the NESA.

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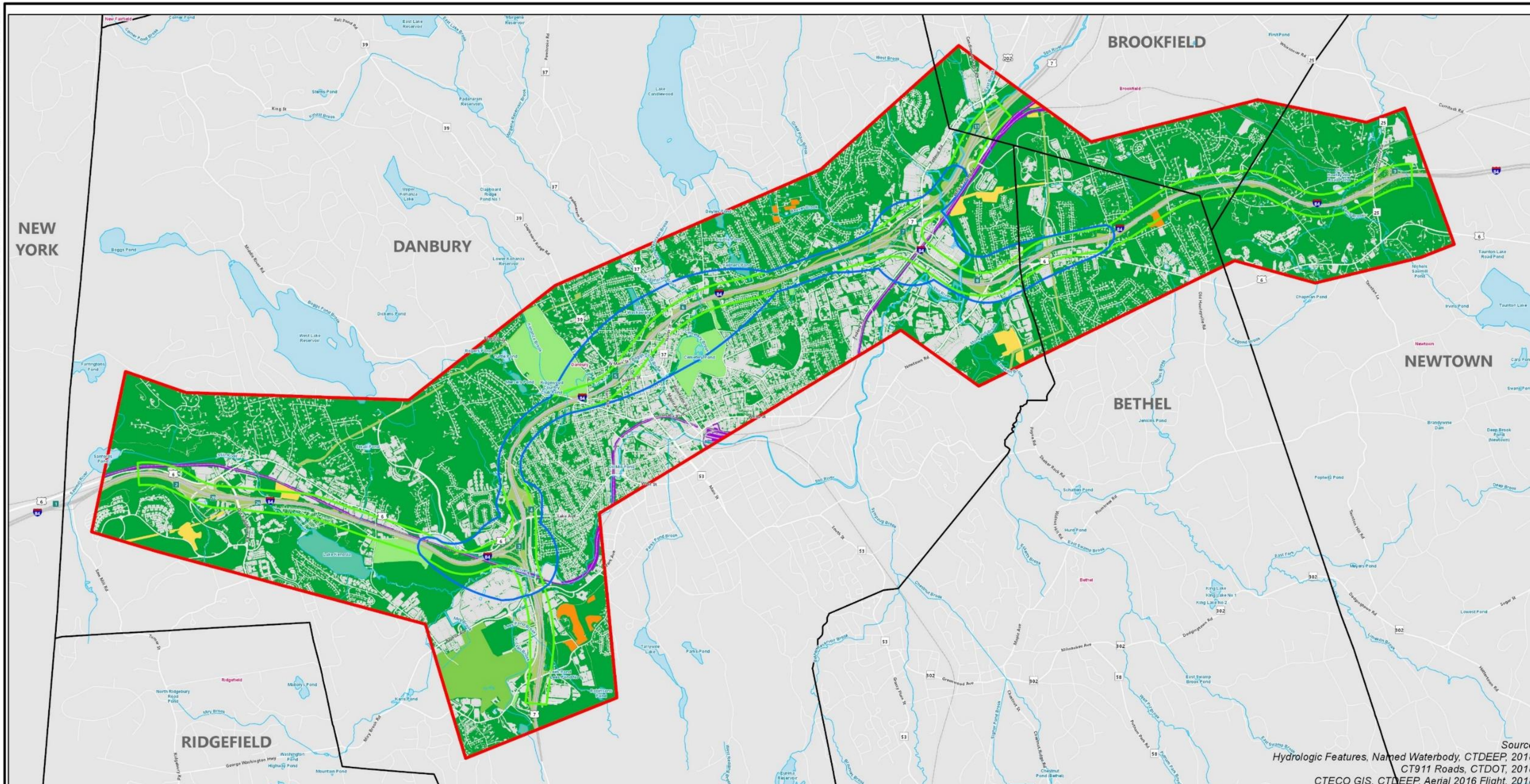

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FIGURE 5: TERRESTRIAL RESOURCES OVERVIEW

4/23/2019
Danbury, Newtown, Brookfield, Connecticut

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

0 2,000 4,000
Feet
1:44,000

LEGEND

- Natural Environment Study Area
- Primary Assessment Area
- Project Area
- Named Waterbodies

Terrestrial Resources: Land Classification

- Mowed Lawn and Trees
- Cropland
- Brushy Cleared Land
- Construction
- Pavement and Mowed Lawn
- Railroad
- Woodland\Upland\Wetland
- Urban Area and Pavement

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5.0 Aquatic Resources

Water resources within the NESA have been evaluated at the watershed level as described in detail in Section 3. The NESA is located in the Housatonic major watershed basin and contains subregional watersheds mapped by the state of Connecticut as 6400, 6600, 6601, 6602, 6603, 6606, and 6018 (Figures 4A, 4B, 4C; Tables 3-1 and 3-2). Review of United States Geological Survey (USGS) quadrangle maps and CT DEEP hydrography Geographic Information System (GIS) mapping for stream classifications shows a progression from first- to fourth-order streams within the NESA.

5.1 Navigable Waterways

Per Section 10, Rivers and Harbors Act of 1899 (33 United States Code [USC] § 401 and § 403) and as defined in 33 Code of Federal Regulations (CFR) § 329, *navigable Waters of the United States* are those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean high water line and/or those waters that are presently used or have been used in the past or may be susceptible to use for interstate or foreign commerce. Connecticut General Statutes (CGS) Chapter 263 § 15 defines navigable waterways as "waters which are physically capable of supporting water-borne traffic, and subject to the ebb and flow of the tide." This term should not be confused with the term *waters of the United States* (below). Given the presence of dams on the Housatonic River downstream of the NESA, none of the identified watercourses are considered navigable waterways.

The United States Coast Guard makes navigability determinations regarding specific waterways or portions of waterways in order to determine its jurisdiction under 33 CFR 2.36(a). These waters include the territorial seas of the United States and all internal waters of the United States that are subject to tidal influence and internal waters determined to be navigable waters of the United States.

Waters of the United States is a broader term that includes navigable waters and all their tributaries, adjacent wetlands, and other waters or wetlands where degradation or destruction could affect interstate or foreign commerce. Permits are required for the discharge of dredged or fill material in these waters pursuant to Section 404 of the federal Clean Water Act (CWA).

Regulatory jurisdiction of each of the delineated wetlands in the NESA has been assessed. Most of the wetlands and watercourses in the NESA are considered federally jurisdictional due to their connection to Waters of the United States. However, none of the delineated watercourses are considered navigable due to the geographic position of the NESA, distance to tidally influenced waters, and presence of dams on the Housatonic River.

5.2 Fisheries Species

Fisheries species data from the *Survey of Connecticut Streams and Rivers* (Hagstrom, et al., 1992) and the Fish Community Data Viewer developed by the CT DEEP and the University of Connecticut Center for Land Use Education and Research (CLEAR) was used to assess the fisheries species present in the NESA. Primary fish species found in watercourses within the NESA are documented in these data (Table 5-1). In general, the presence of fisheries species is a sign that conditions in the waterbodies are capable of supporting the food and habitat necessary for fish.

TABLE 5-1
Fisheries Species in NESA Watercourses

	Beaver Brook	Kohanza Brook	Limekiln Brook	Padanaram Brook	Still River	Stony Hill Brook	West Brook	Kenosia Lake
Alewife (*Alosa pseudoharengus*)								X
Brown Bullhead (*Ameiurus nebulosus*)								X
Black Crappie (*Pomoxis nigromaculatus*)								X
Bluegill Sunfish (*Lepomis macrochirus*)		X	X	X	X			X
Brook Trout – Stocked (*Salvelinus fontinalis*)	X							
Brook Trout – Wild (*Salvelinus fontinalis*)	X	X	X	X	X	X	X	
Blacknose Dace (*Rhinichthys atratulus*)	X	X	X	X	X	X	X	
Common Carp (*Cyprinus carpio*)								X
Channel Catfish (*Ictalurus punctatus*)								X
Cutlips Minnow (*Exoglossum maxillingua*)			X					
Creek Chub (*Semotilus atromaculatus*)	X	X		X		X	X	
Common Shiner (*Luxilus cornutus*)				X	X			
Golden Shiner (*Notemigonus crysoleucas*)				X				X
Longnose Dace (*Rhinichthys cataractae*)	X	X	X	X	X	X		
Largemouth Bass (*Micropterus salmoides*)		X	X	X	X			X
Pumpkinseed (*Lepomis gibbosus*)		X						X
Rock Bass (*Ambloplites rupestris*)		X						X
Redfin Pickerel (*Esox americanus*)			X		X			X
Redbreast Sunfish (*Lepomis auritus*)					X			X
Smallmouth Bass (*Micropterus dolomieu*)								X
Tessellated Darter (*Etheostoma olmstedi*)		X	X	X	X			X
White Perch (*Morone americana*)								X
White Sucker (*Catostomus commersonii*)	X	X	X	X	X		X	X
Yellow Bullhead (*Ameiurus natalis*)			X	X				X
Yellow Perch (*Perca flavescens*)								X

5.3 Macroinvertebrates

Macroinvertebrates are organisms that lack spines and are large enough to be seen through direct observation, i.e. without a microscope, such as insects in their larval or nymph form, crayfish, clams, snails, and worms. Most macroinvertebrates live a portion of their life cycle attached to submerged rocks, logs, and vegetation and are affected by the physical, chemical, and biological conditions of the waters they inhabit. As such, aquatic macroinvertebrates are good indicators of water quality. Because macroinvertebrates are unable to escape pollution, their presence and condition can be an indicator of short- and long-term pollution events as well as cumulative impacts of pollution. Some are more sensitive to pollution than others, meaning that a site inhabited only or primarily by organisms that can tolerate pollution and lacking pollution-sensitive organisms is likely polluted or degraded. In addition, because they are a critical part of the stream's food web, macroinvertebrates can be an indicator of habitat loss not detected by traditional water quality assessments.

Macroinvertebrate sampling data from the CLEAR Fish Community Data Viewer was used to identify macroinvertebrate species present in the NESA. The number of sampling sites within the NESA was limited, with one location on Kohanza Brook and three on the Still River. Per the data collected by others, most taxa found within these surface waters are moderately tolerant (Table 5-2) of pollution vectors. These data indicate that sampled portions of the Still River and Kohanza Brook allow a wide range of macroinvertebrate habitat. This observation is consistent with identified field conditions, which reflect a variety of habitat conditions within the developed landscape.

TABLE 5-2
Macroinvertebrates Observed in NESA Watercourses

Order (Common Name)	Taxon	Tolerance	Still River	Kohanza Brook
Beetles	*Elmidae*	Moderate	X	X
	Hydrophilidae	Moderate	X	
	Psephenidae	Moderate	X	X
Caddisflies	*Helicopsychidae*	Low	X	X
	Hydropsychidae	Moderate	X	X
	Hydroptilidae	Moderate	X	X
	Rhyacophilidae	Very Low	X	
Crayfish	*Cambaridae*	Moderate	X	
Dragon/Damselflies	*Gomphidae*	Low	X	X
Dobsonflies	*Corydalidae*	Moderate	X	X
Mayflies	*Baetidae*	Moderate	X	X
	Ephemerellidae	Low	X	X
	Heptageniidae	Moderate	X	
Scuds	*Gammaridae*	Moderate	X	
Snails	*Ancylidae*	Moderate	X	
Sowbugs	*Asellidae*	High	X	
Stoneflies	*Perlodidae*	Low	X	X
True Flies	*Chironomidae*	Moderate	X	X
	Empididae	Moderate	X	X
	Tipulidae	Low	X	X
	Simuliidae	Moderate	X	

5.4 Water Quality

Surface Water Quality

The CWA is the primary federal law that protects surface waters in the United States. In authorizing the act, Congress declared a national goal of "water quality, which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water," popularly referred to as the "fishable/swimmable" requirement. The State of Connecticut adopted Water Quality Standards (WQS) as required under Section 22a-426 of the CGSs to accomplish this and other water quality goals. The Connecticut WQS classifies state waters based upon water quality classification, numeric or narrative criteria for various parameters, and designated uses that should be supported by the water body.

TABLE 5-3
Water Quality of Watercourses in NESA

Watercourse	Water Quality
Still River	AA/A/B
Lees Pond Brook	A
Boggs Pond Brook	A
Padanaram Brook	A
Beaver Brook	A
West Brook	A
East Brook	A
Stony Hill Brook	A
Pogond Brook	A
Kohanza Brook	A
Limekiln Brook	B
Pond Brook	A

Still River Water Quality

The Still River is classified as Class A water, meaning its designated uses include habitat for fish and other aquatic life and wildlife, potential drinking water supplies, recreational use, and water supply for industry and agriculture. CT DEEP assesses whether state waters meet the designated uses by categorizing them into levels of support (i.e., fully supporting, not supporting, insufficient information, or not assessed), which characterizes whether or not the water is suitable for that use (Figure 6). The CT DEEP 2016 *Integrated Water Quality Report* identifies the portion of the Still River from the confluence with Padanaram Brook until the confluence with the Housatonic River – stream segments CT6600-00-00 to CT6600-00-05 – as insufficient to support aquatic life use and recreation. These segments are included in the Connecticut 303(d) list of impaired waterbodies, which requires that each state identify and prioritize the water quality of limited waterbodies and develop Total Maximum Daily Loads (TMDLs) or other management actions to improve water quality.

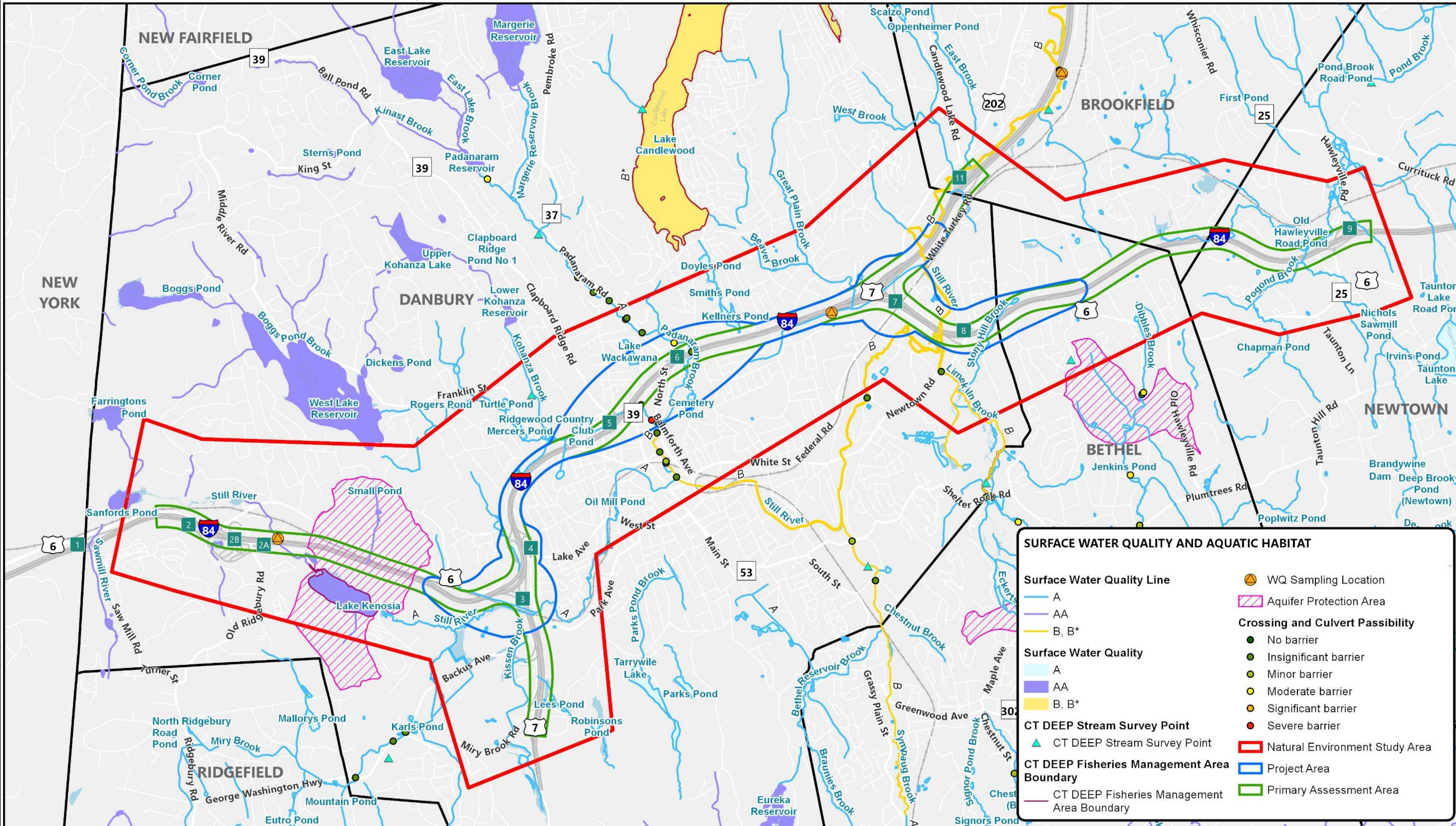

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FIGURE 6: SURFACE WATER QUALITY AND AQUATIC HABITAT

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Date: 5/30/2019

Data Sources:
DEMHS CTE911 Roads

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Water Quality Sampling

Three water quality sampling locations were established in the NESA. Water quality sampling locations 1 and 2 are located on mapped class AA and A streams, respectively, while location 3 is located on a stream reach mapped with a surface water quality rating of B and thus is unable to support aquatic life and recreation as a primary function (Figure 6).

Water quality sampling was conducted on May 10, 2018, in three locations. Sampled parameters included standard water quality measures, including dissolved oxygen, temperature, conductivity, turbidity, and pH. Levels of dissolved oxygen were sufficient to support fish and aquatic macroinvertebrates and were at supersaturation in one location. The underlying marble bedrock geology in the sampling areas was evident in the water chemistry. Conductivity, a measure of the ability of water to pass an electrical current, is an indicator of the presence of inorganic dissolved solids such as chloride, nitrate, sulfate, and phosphate anions or sodium, magnesium, calcium, iron, and aluminum cations. In areas of marble bedrock, conductivity and pH levels are higher compared with other bedrock lithologies due to total dissolved solid contributions from the erosive alkaline calcium carbonate ($CaCO_3$). Locations 1 and 2 were located in marble bedrock areas while location 3 was set in a gneiss-dominated geology. These factors are reflected in the water quality data (Table 5-4).

TABLE 5-4
Direct Sampling Water Quality Data

Location	Dissolved Oxygen		Temperature	Conductivity	Temperature-Corrected Conductivity	Salinity	Turbidity	pH
	(%)	(mg/L)	(°C)	(µS/cm)	(µS/cm)	(ppt)	(NTU)	
1	92.8	9.22	16.0	483	585	0.3	1.21	8.31
2	102.4	10.23	15.0	902	1115	0.6	1.00	9.05
3	98.5	9.41	17.4	535	626	0.3	2.64	5.81

Notes: Water quality sampling was conducted on May 10, 2018. Locations 1 and 2 were located in marble bedrock areas while location 3 was set in a gneiss-dominated geology.
mg/L = milligrams per Liter µS/cm = microsiemens per centimeter NTU = Nephelometric Turbidity Unit °C = degrees Centigrade
ppt = parts per thousand

5.5 Proximity to Public Drinking Water Supplies

In accordance with Sections 22a-354c and 22a-354z of the CGSs, active public water supply wells located in stratified drift that service more than 1,000 people must have Aquifer Protection Areas (APA) delineated. Land use regulations are established in such areas to minimize the potential for contamination of the related wellfield. These regulations restrict development of certain new land use activities that store, handle, or dispose of hazardous materials (particularly those that could potentially discharge to the ground and contaminate groundwater) and require existing regulated land uses to register and follow best management practices.

One APA exists within the I-84 corridor, APA A-72, an approximately 659-acre area located in and around Lake Kenosia and managed by the Danbury Water Department (Figure 6). The APA does not cross the Project Area boundary as it extends northeast between Exits 2-A and 3 along I-84 toward West Lake Reservoir and the southeast past Lake Kenosia toward the Danbury Municipal Airport. Any regulated actions conducted within the APA may require a permit from the City of Danbury.

5.6 Stormwater Management

The impervious surfaces of roadways and associated infrastructure in the urban Danbury area generate stormwater runoff during and after precipitation events. Stormwater treatment measures within the I-84 highway system along the project corridor are characterized by overland flow and ditch drainage features that discharge to wetlands adjacent to the right-of-way. These drainage features and adjacent wetlands provide opportunities for renovation of stormwater via mechanisms such as retention, detention, and/or infiltration as well as assimilation of nutrients by vegetation.

6.0 Wetlands

Wetlands and watercourses were graphically delineated within the Connecticut Department of Transportation (CTDOT) right-of-way area. Wetland and watercourse areas were determined based on definitions provided in the Connecticut Inland Wetland and Watercourse Act at 22a-25-34, inclusive and the federal definitions provided in Section 404 of the CWA. Fifty-three wetlands and/or watercourse systems were identified based on these morphological characteristics and range in composition from small intermittent watercourses to large emergent wetland corridors. Accordingly, each wetland provides a unique ability to contribute to basic wetland functions based upon physical composition such as size, hydrology, and landscape position as well as biological attributes such as vegetative structure. Wetland functionality for each wetland and watercourse system within the right-of-way was assessed in the field. Functionalities have been tabulated, and the identified wetlands were further described by applying descriptors based on Cowardin nomenclature (Table 6-1).

The types and functions of wetlands can be understood and classified in a variety of ways. One way is a system developed by Cowardin et al., described in *Classification of Wetlands and Deepwater Habitats of the United States*. The Cowardin system is used by the U.S. Fish & Wildlife Service (USFWS) for the National Wetlands Inventory and classifies wetlands by their position in the landscape, hydrologic regime, and vegetation. This hierarchically divided system begins with five major wetland types: marine, tidal, lacustrine, palustrine, and riverine. Most of these types are then divided into subsystems based on hydrology or position, and all are divided into classes based on substrate material, flooding regime, or in some cases on vegetative life form (e.g., aquatic bed). Wetlands can be further divided into dominance types based on what plant or animal forms are dominant, and some classifications may also have additional modifiers for specific conditions such as chemistry or physical modification by humans or animals. In addition, the regulatory jurisdiction of each wetland was tabulated. Within the study area, the primary distinction between wetlands and watercourses protected under federal and state wetland regulations compared with those identified as protected under state jurisdiction only is connective hydrology. Wetlands and watercourses that are hydrologically isolated from other wetland systems but contain poorly drained, very poorly drained, and/or alluvial soils have been identified as state wetland systems.

Potential wetland systems within the NESA were identified using data from NRCS soil mapping and the National Wetland Inventory (NWI). The mapping tools may be used for generalized locations of wetland systems but would not supplant site-specific assessment to verify wetland resource boundaries. These mapping tools identified wetlands and watercourses present throughout the NESA. The majority of wetlands identified with these mapping tools are comprised of areas of poorly drained soils with limited additional wetlands mapped by the NWI.

Wetland Classifications

Per USFWS wetland classification system described in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin, et al., 1979), five wetland types exist within the study area as follows:

1. Palustrine forested wetlands with broad-leaved deciduous trees (PFBLD)
2. Palustrine forested scrub shrub wetlands with broad-leaved deciduous shrubs (PSSBLD)
3. Palustrine emergent wetlands that are persistent (PEWP)
4. Lacustrine littoral emergent wetlands that are persistent (LLEWP)
5. Palustrine wetlands with unconsolidated bottom (PUB)

Wetlands were found along or adjacent to the Still River and Pond Brook and within other subwatersheds within the NESA, such as Beaver Brook, Boggs Pond Brook, Kissen Brook, Limekiln Brook, Lees Pond Brook, Pogond Brook, Pond Brook, and Stony Hill Brook (Figures 7, 8A, 8B, and 8C).

Wetlands and watercourses are generally accepted as performing certain hydrologic and ecological functions that provide social and economic values important enough to merit protection through regulation under local, state, and federal law. The biophysical elements (e.g., landscape position, geology, hydrology, substrate, and vegetation) of wetlands determine their functions and to what capacity they are performed. The functions they provide and the capacity of those functions vary from wetland to wetland. In order to better understand these differences as they relate to the wetlands within the delineated corridor, an evaluation of functions and values was completed for each of the wetlands located within the PAA. The delineated wetlands were assessed to determine their capacity to provide the following eight wetland functions:

- Groundwater Recharge/Discharge
- Floodflow Alteration
- Fish and Shellfish Habitat
- Sediment/Toxicant/Pathogen Retention
- Nutrient Removal/Retention/Transformation
- Production Export
- Sediment/Shoreline Stabilization
- Wildlife Habitat

In addition, each wetland area was evaluated for its potential to contribute to wetland values. Wetland values are identified as properties of wetlands that have tangible societal values. The five values identified are the following:

- Recreation
- Education/scientific value
- Uniqueness/heritage
- Visual quality/aesthetics
- Threatened or endangered species

The evaluation completed for this project was based on the identified wetland functions and values as presented in the United States Army Corps of Engineers (USACE) *Highway Methodology Supplement*. This method assesses the relative importance of the wetlands for performing functions and provides a logical framework for observations, a structure for standardizing results, and a basis for achieving repeatable results among users. The results of the completed assessment for each wetland are provided in Table 6-1.

The classification system was utilized to evaluate the functionality relative to the biophysical characteristics of the wetlands, which is primarily a function of landscape position and associated hydrology. Though differing cover types may be found within each of the delineated wetland areas, the functionality of the wetlands was assessed from a broader "macro scale" perspective, and each wetland was evaluated as a whole as opposed to segmenting it into smaller cover type parts. The small shifts in vegetative cover types over relatively small areal extents within each wetland do not affect the overall functioning of the wetlands as much as the location and associated hydrologic position of the wetland.

The following is a general description of each function and value. The capacity for the on-site wetlands to perform the wetland function and values varies from wetland to wetland and from function to function. The differences are due to natural (hydrogeomorphic) and human (i.e., past and current land use activities) conditions. For the purposes of this evaluation, the capacity of each wetland was analyzed relative to its primary functions and values.

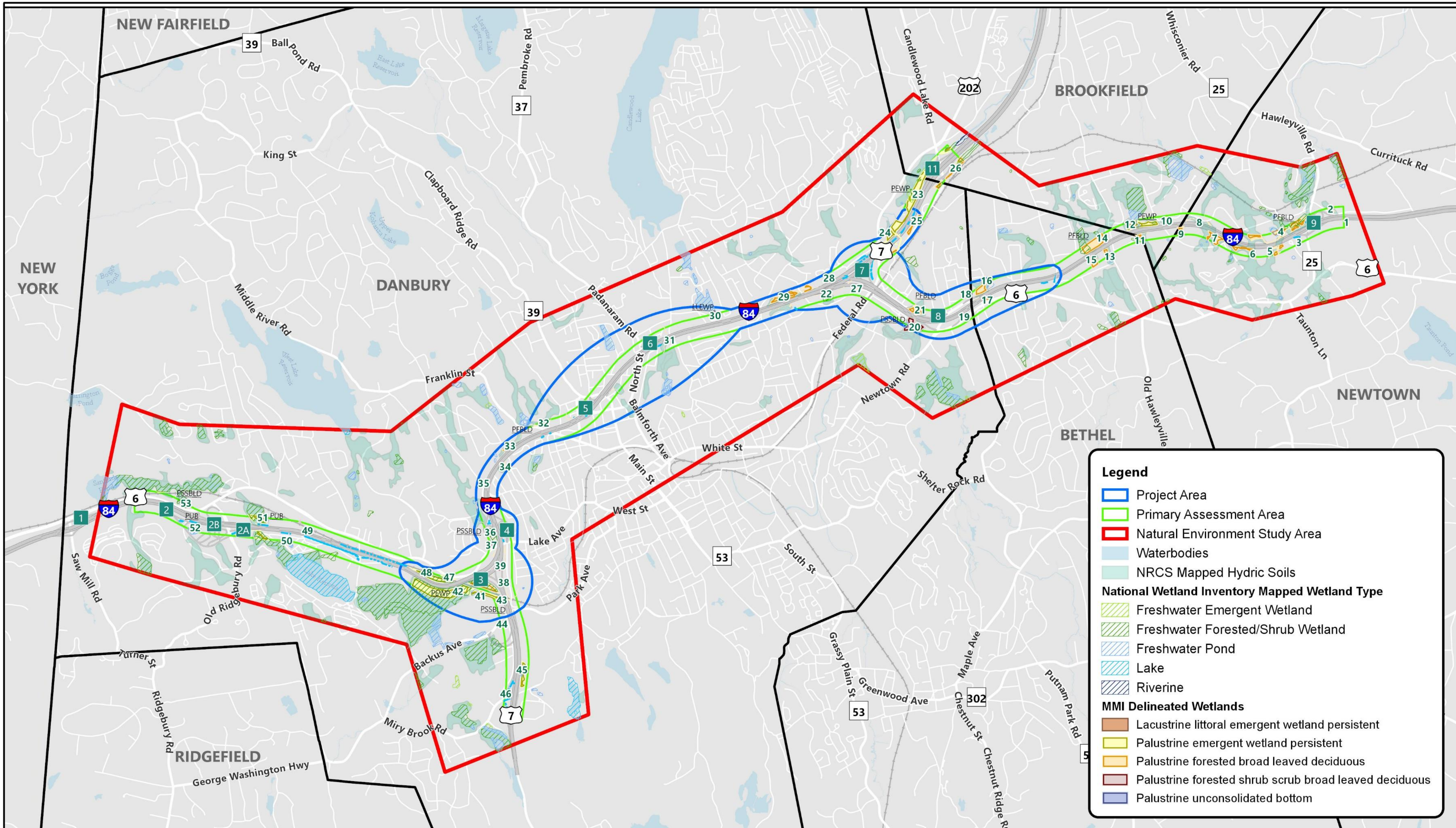
<u>Modification of Groundwater Recharge/Discharge</u>:
Modification of groundwater discharge is the capacity of a wetland to influence the amount of water moving from the ground to the surface. Typically, a perennial inlet and outlet indicates that a wetland is directly linked with the regional water table and has a high capacity to perform this function. This can affect groundwater and surface water supplies and recreational activities.

Modification of groundwater recharge is the capacity of a wetland to influence the amount of surface water moving to groundwater aquifers and thereby affecting public and private groundwater supplies. The subsoil and location of a site play a significant role in the ability for wetlands to modify groundwater recharge. With the exception of slope wetlands, all wetlands have some capacity to contribute to this function. Poorly developed or no microrelief is an indication that the water table is below the substrate of a wetland for most of the growing season and that groundwater recharge is occurring. Wetlands with perennial outlets are discharge areas and cannot be recharge areas, even seasonally.

<u>Floodflow Alteration</u>:
Floodflow alteration is the capacity of a wetland to detain or retain stormwater on its surface. This benefits society by preventing storm damage and the loss of life and property. All wetlands, except slope wetlands, have some capacity to contribute to this function.

<u>Fish and Shellfish Habitat</u>:
Fish and shellfish habitat relates to the effectiveness of seasonal or permanent waterbodies to provide fish and shellfish habitat. Characteristics of seasonal and permanent waterbodies such as adjacent land use and cover type factor into the ability of the wetland to provide finfish and shellfish habitat. Additionally, the type of hydrologic regime, such as lentic or lotic waterbodies, and the relative size of the wetland are considered when assessing functionality.

<u>Sediment/Toxicant/Pathogen Retention</u>:
Sediment/toxicant/pathogen retention relates to the renovation of water quality through the removal of suspended and dissolved solids from surface water and dissolved solids from groundwater. These suspended and dissolved constituents may be converted into other chemical forms, i.e., oxidized or reduced, plant or animal biomass, or gases. This function may contribute to societal values related to public water supply, recreation, and aesthetics. The primary mechanisms for the removal of suspended solids are sedimentation and filtration. Dissolved constituents can be removed or made unavailable for downstream plant use via adsorption and absorption by soil particles, uptake by vegetation, loss to the atmosphere by microbiological processes, or a combination of the three. Flow characteristics and residence time are the primary wetland characteristics affecting the ability of a wetland to perform this function.



I-84 Danbury Project

FIGURE 7: MAPPED AND DELINEATED WETLAND AREAS

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Date: 1/15/2020

Data Sources:
Land use data based on MMI analysis of assessor's data provided by the City of Danbury, Town of Bethel, Town of Brookfield and Town of Newtown.
Soil data provided by the State of CT DEEP

SCALE IN FEET
0 2,000 4,000

For general planning purposes only. Deliniations may not be exact

MILONE & MACBROOM

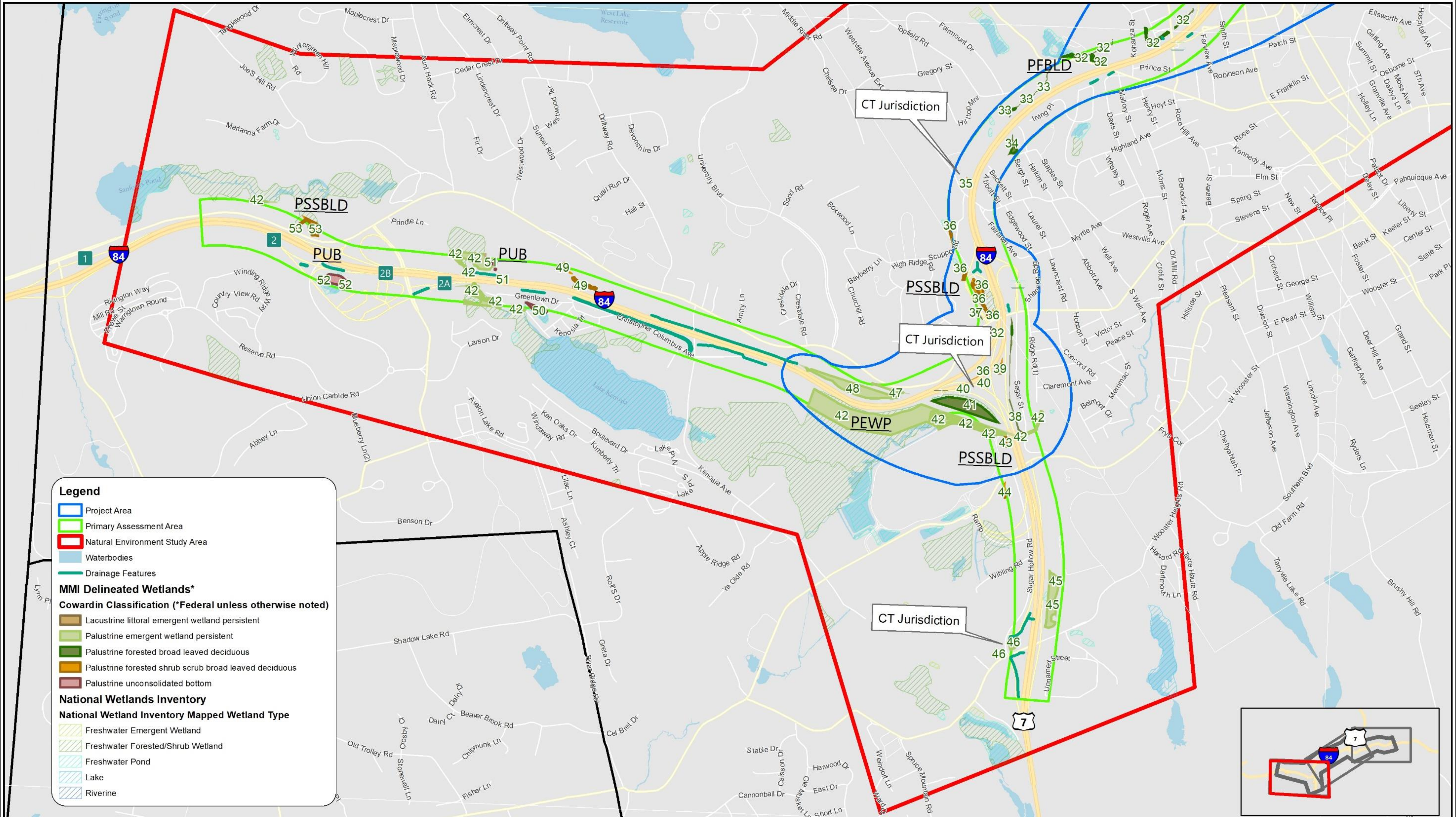


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FIGURE 8A: DELINEATED WETLAND AREAS

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Date: 5/30/2019

Data Sources:
DEMHS CTE911 Roads

SCALE IN FEET
0 1,000 2,000

For general planning purposes only. Deliniations may not be exact

MILONE & MACBROOM

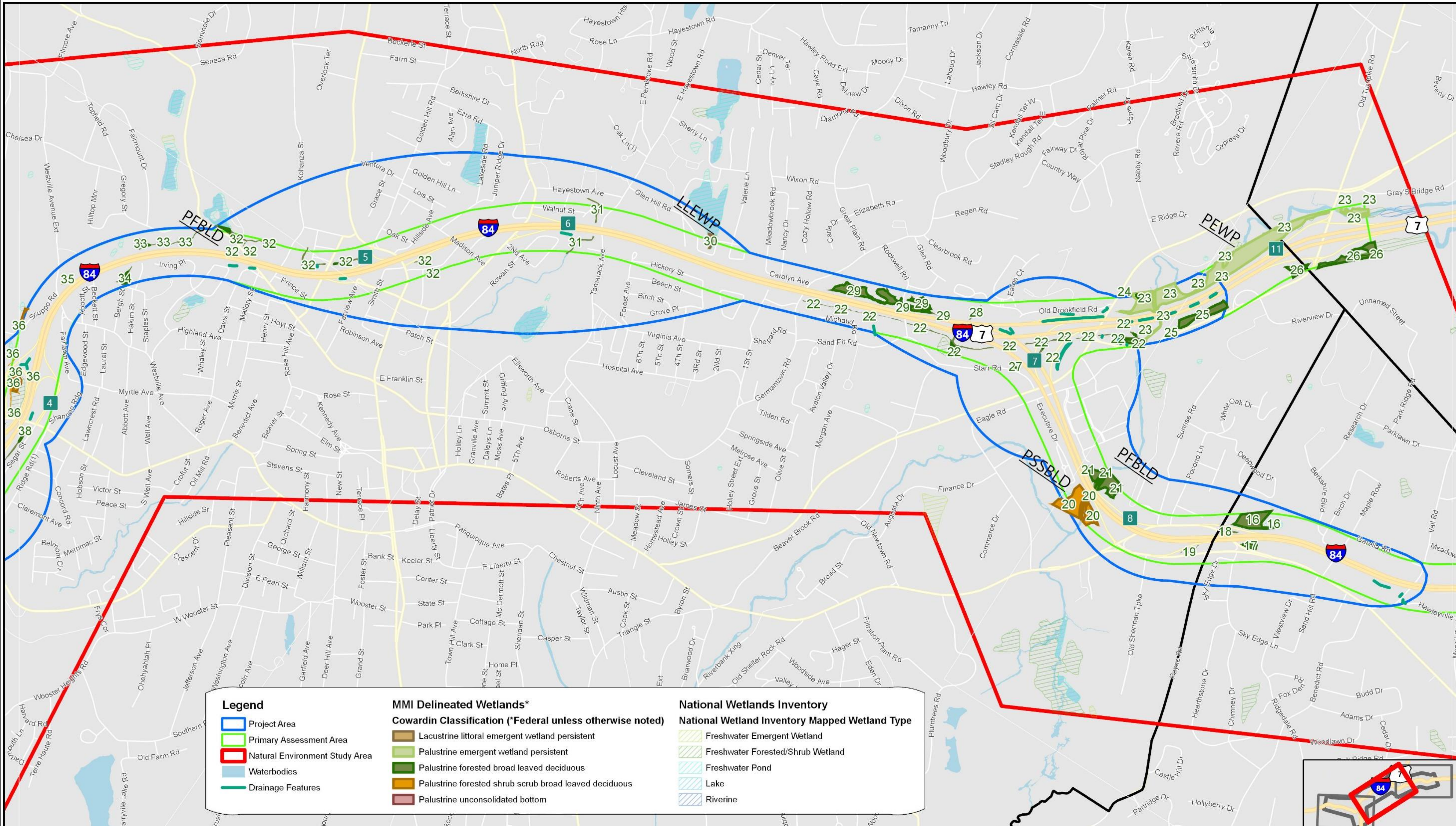

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FIGURE 8B: DELINEATED WETLAND AREAS

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Date: 5/30/2019

Data Sources:
DEMHS CTE911 Roads

SCALE IN FEET
0 1,000 2,000

For general planning purposes only. Delineations may not be exact

MILONE & MACBROOM

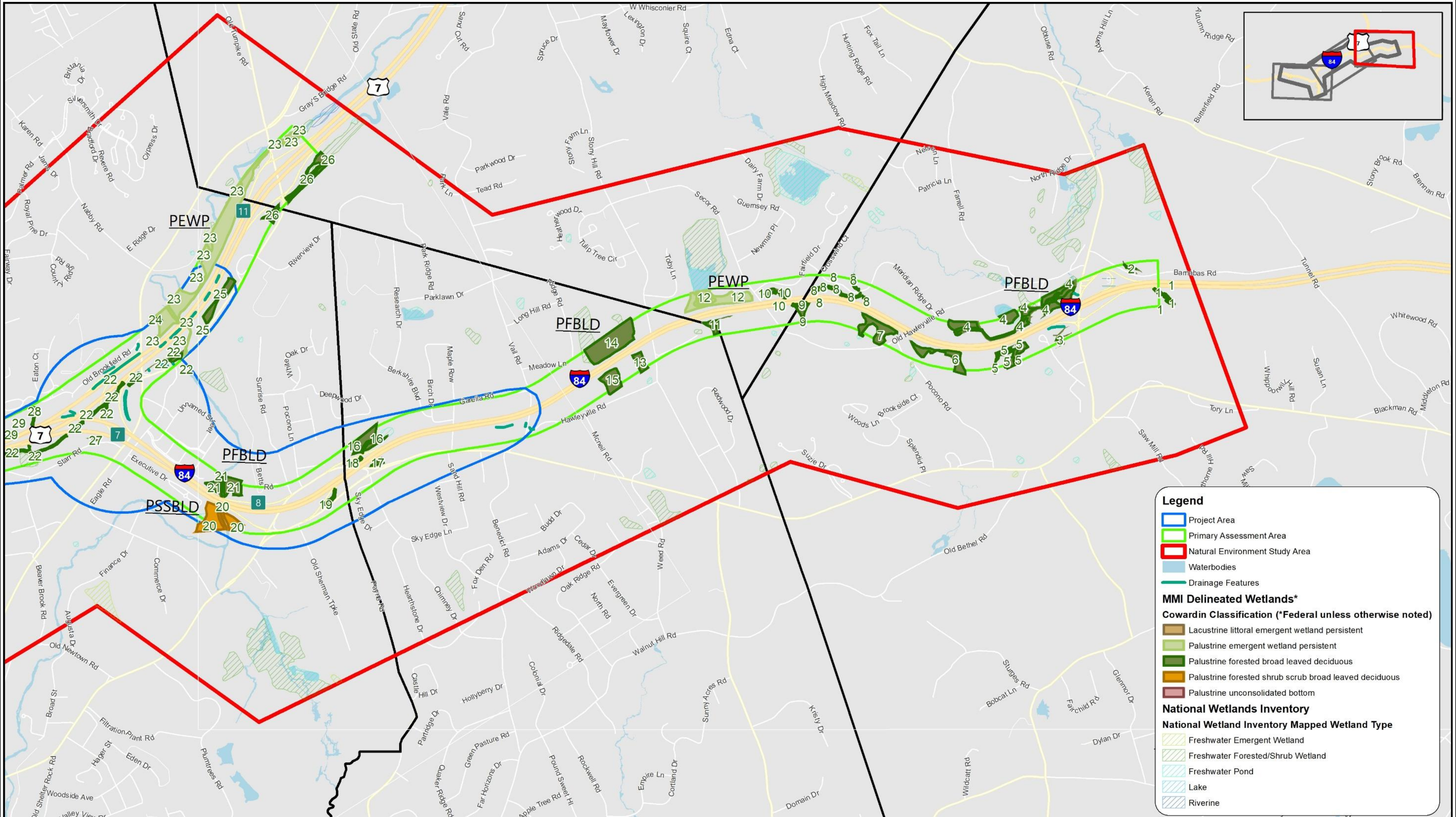

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FIGURE 8C: DELINEATED WETLAND AREAS

STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION

Date: 5/30/2019

Data Sources: *DEMHS CTE911 Roads*

SCALE IN FEET

0 1,000 2,000

For general planning purposes only. Delineations may not be exact

MILONE & MACBROOM

Nutrient Removal/Retention/Transformation:
This function relates to the effectiveness of a wetland to prevent adverse effects of eutrophication to aquifers and surface water bodies. The ability of a wetland to provide this function is directly related to the landscape position of the wetland, abutting land uses, and the cover type of the wetland. All vegetated wetlands demonstrate the potential to bioassimilate nutrients. Wetlands with no permanent outlet demonstrate a high potential to provide nutrient removal.

Production Export:
Production export refers to the ability of the wetland to produce and export dissolved and particulate organic particles to downstream aquatic ecosystems to serve as an energy source, to support their food chain, or both. Society may value this function as it relates to food web support and ultimately nature research and education, recreation (e.g., hunting and fishing), and the type and density of fauna supported by the wetland. The structure and composition of the wetland's vegetation affect the production of detritus, and the degree of the wetland's surface water connection with a stream, river, or lake affects the transport of detritus. An increase in the productivity and diversity of an ecological community generally equates to a greater capacity to perform this function. Based on hydrogeomorphic conditions, riverine wetlands have the greatest potential for export of detritus due to an unrestricted outlet. Depressional and flat wetlands or wetlands with no outlet have the least potential because of their greater potential to retain suspended sediments.

Sediment/Shoreline Stabilization:
This function relates to the ability of the wetland to prevent erosion by stabilizing stream banks and shorelines. A component of this function relates to the ability of the wetland to prevent adverse impacts on upland areas by minimizing erosion. This wetland function relates to the ability of the wetland to stabilize shorelines in concert with other measurable wetland functions such as nutrient removal and wildlife habitat. To this end, engineered fill slopes adjacent to waterbodies may provide some shoreline stabilization but would not provide any other function.

Wildlife Habitat:
Contribution to abundance and diversity of wetland vegetation is related to the number and type of hydrophytic plants that a wetland can produce and support. Society may value this function as it relates to environmental research and education, recreation, the type and density of fauna supported by the wetland, and production of harvestable goods. Because wetlands support plant species that occur in wetter and dryer (upland) habitats and species that grow only in wetland habitats (poorly drained and very poorly drained soils), most wetlands have a high capacity to contribute to the abundance and diversity of vegetation and concurrently the potential to provide wildlife habitat opportunities. The primary variables affecting a wetland's capacity to perform this function are its plant species diversity, its vegetation density and dominance, its water regime diversity, and its juxtaposition to other wetlands.

Contribution to abundance and diversity of wetland fauna is the capacity of a wetland to support large and/or diverse populations of animal species that spend part or all of their life cycle in wetlands – either an individual wetland or a system or network of wetlands. Society may value this function as it relates to environmental research and education, recreation, aesthetics, and providing a source of food. A wetland's water regime is the primary factor affecting this function as it largely controls the dominant vegetation type present and influences the animal movement to and within the wetland for food, cover, and breeding areas. Other factors affecting the capacity of a wetland to contribute to the abundance and diversity of wetland fauna are the structure and composition of the vegetation community and the juxtaposition of the wetland to other habitat types (e.g., another wetland, upland forest, farm field, surface waterbody, etc.).

Education/Scientific:
This value relates to the effectiveness of the wetland as an area for research or a place of study.

Uniqueness/Heritage:
This value pertains to the effectiveness of the wetland to provide special characteristics such as unusual aesthetic quality, archaeological sites, or historic events.

Visual Quality/Aesthetics:
This value ascribes import to the visual qualities of the wetland.

Threatened/Endangered Species Habitat:
This value relates to the ability of the wetland to provide habitat for endangered or threatened species. A number of areas within the wetland delineation corridor are mapped by CT DEEP as Natural Diversity Data Base (NDDB) areas. Resultantly, wetlands that are located within those mapped areas have been identified as providing endangered or threatened species habitat as a primary value. However, this designation is not the result of site-specific fieldwork but rather macroscale mapping by CT DEEP.

Discussion:
The primary functions and values of each of the delineated wetlands and watercourses within the PAA have been evaluated (Table 6-1). In addition to primary functions and values, the location of each wetland area within the subwatershed has been identified and mapped (Figures 8A, 8B, and 8C). Though each of the wetlands may have some ability to provide wildlife habitat, wildlife habitat has not been identified as a primary function of many of the delineated wetlands and watercourses due to the location of the wetlands adjacent to a transportation corridor. The exceptions to this are wetlands associated with the Pond Brook watershed. Wetlands located within mapped NDDB areas relate to a primary value of endangered/threatened species habitat. However, this designation is a result of macroscale mapping and not related to species encountered during the wetland delineation or specific characteristics of the delineated wetland.

The watershed, Cowardin classification, primary functions and values of the wetland based on field observations, and the regulatory jurisdiction of each wetland are summarized in Table 6-1.

TABLE 6-1
Delineated Wetland Characteristics, Functions, and Values

Wetland No.	Watershed	Cowardin Classification*	Primary Functions								Primary Values					Regulatory Jurisdiction
			Groundwater recharge/ discharge	Floodflow alteration	Fish/shellfish habitat	Sediment/ toxicant/ pathogen retention	Nutrient removal/ retention/ transformation	Production export	Sediment/ shoreline stabilization	Wildlife habitat	Recreation	Educational/ scientific value	Uniqueness/ heritage	Visual quality/ aesthetics	ES Threatened or endangered species	
1	Pond Brook	PFBLD	✓	✓				✓		✓						USACE/CT
2	Pond Brook	PFBLD	✓	✓				✓		✓						USACE/CT
3	Pond Brook	PFBLD	✓			✓	✓								ES	USACE/CT
4	Pond Brook	PFBLD	✓	✓	✓	✓	✓	✓	✓	✓					ES	USACE/CT
5	Pogond Brook/ Pond Brook	PFBLD	✓	✓	✓	✓	✓	✓		✓					ES	USACE/CT
6	Pond Brook	PFBLD	✓			✓	✓			✓					ES	USACE/CT
7	Pond Brook	PFBLD	✓			✓	✓			✓					ES	USACE/CT
8	Pond Brook	PFBLD	✓	✓	✓	✓	✓	✓		✓					ES	USACE/CT
9	Pond Brook	PFBLD	✓			✓	✓								ES	USACE/CT
10	Pond Brook	PFBLD	✓	✓	✓	✓	✓		✓						ES	USACE/CT
11	Pond Brook	PFBLD	✓			✓	✓								ES	USACE/CT
12	Pond Brook	PEWP	✓	✓	✓	✓	✓		✓	✓					ES	USACE/CT
13	Still River	PFBLD	✓			✓	✓			✓						USACE/CT
14	Still River	PFBLD	✓			✓	✓									USACE/CT
15	Still River	PFBLD	✓			✓	✓									USACE/CT
16	Stony Hill Brook	PFBLD	✓			✓	✓	✓								USACE/CT
17	Stony Hill Brook	PFBLD	✓					✓								ACOE/CT
18	Limekiln Brook	PFBLD	✓					✓								USACE/CT
19	Stony Hill Brook	PFBLD	✓					✓								USACE/CT
20	Still River	PSSBLD	✓	✓	✓	✓	✓	✓	✓						ES	USACE/CT
21	Still River	PFBLD	✓	✓	✓	✓	✓	✓		✓					ES	USACE/CT

* PFBLD – palustrine broad-leaved deciduous
PEWP – palustrine emergent wetland persistent
PSSBLD – palustrine scrub shrub broad-leaved deciduous
LLEWP – lacustrine littoral emergent wetland persistent
PUB – palustrine unconsolidated bottom

Wetland No.	Watershed	Cowardin Classification	Primary Functions								Primary Values					Regulatory Jurisdiction
			Groundwater recharge/ discharge	Floodflow alteration	Fish/shellfish habitat	Sediment/ toxicant/ pathogen retention	Nutrient removal/ retention/ transformation	Production export	Sediment/ shoreline stabilization	Wildlife habitat	Recreation	Educational/ scientific value	Uniqueness/ heritage	Visual quality/ aesthetics	Threatened or endangered species	
22	Beaver Brook	PFBLD	✓		✓	✓	✓	✓							ES	USACE/CT
23	Still River	PEWP	✓	✓	✓	✓	✓	✓	✓	✓					ES	USACE/CT
24	Still River	PFBLD	✓	✓	✓	✓	✓			✓					ES	USACE/CT
25	Still River	PFBLD	✓		✓	✓									ES	USACE/CT
28	West Branch Beaver Brook	PFBLD	✓			✓	✓	✓								USACE/CT
29	Beaver Brook	PFBLD	✓					✓							ES	USACE/CT
30	Candlewood Lake	LLEWP	✓	✓	✓	✓	✓		✓	✓						USACE/CT
31	Padanaram Brook	PFBLD	✓	✓				✓								USACE/CT
32	Boggs Pond Brook	PFBLD	✓	✓				✓								USACE/CT
33	Boggs Pond Brook	PFBLD	✓	✓				✓								USACE/CT
34	Boggs Pond Brook	PFBLD	✓			✓	✓									USACE/CT
35	Still River	PSSBLD	✓			✓	✓									CT
36	Still River	PSSBLD	✓			✓	✓	✓								USACE/CT
37	Still River	PFBLD	✓					✓								USACE/CT
38	Still River	PFBLD	✓					✓								USACE/CT
39	Still River	PSSBLD	✓			✓	✓									USACE/CT
40	Still River	PFBLD	✓			✓	✓									CT
41	Still River	PFBLD	✓			✓	✓								ES	USACE/CT
42	Still River	PEWP	✓	✓	✓			✓							ES	USACE/CT
43	Kissen Brook	PSSBLD	✓	✓				✓								USACE/CT
44	Kissen Brook	PSSBLD	✓	✓					✓							USACE/CT
45	Lees Pond Brook	PEWP	✓		✓	✓	✓									USACE/CT

* PFBLD – palustrine broad-leaved deciduous
PEWP – palustrine emergent wetland persistent
PSSBLD – palustrine scrub shrub broad-leaved deciduous
LLEWP – lacustrine littoral emergent wetland persistent
PUB – palustrine unconsolidated bottom

Wetland No.	Watershed	Cowardin Classification	Primary Functions								Primary Values					Regulatory Jurisdiction
			Groundwater recharge/ discharge	Floodflow alteration	Fish/shellfish habitat	Sediment/ toxicant/ pathogen retention	Nutrient removal/ retention/ transformation	Production export	Sediment/ shoreline stabilization	Wildlife habitat	Recreation	Educational/ scientific value	Uniqueness/ heritage	Visual quality/ aesthetics	Threatened or endangered species ES	
46	Kissen Brook	PEWP	✓			✓	✓									CT
47	Still River	PEWP	✓					✓							ES	USACE/CT
48	Still River	PEWP	✓			✓	✓								ES	USACE/CT
49	Still River	PSSBLD	✓			✓	✓									USACE/CT
50	Still River	PUB	✓			✓	✓									USACE/CT
51	Still River	PUB	✓			✓										USACE/CT
52	Still River	PUB	✓			✓	✓									USACE/CT
53	Still River	PSSBLD	✓			✓	✓									USACE/CT

* PFBLD – palustrine broad-leaved deciduous
PEWP – palustrine emergent wetland persistent
PSSBLD – palustrine scrub shrub broad-leaved deciduous
LLEWP – lacustrine littoral emergent wetland persistent
PUB – palustrine unconsolidated bottom

7.0 Critical Environmental Areas and Threatened and Endangered Species

7.1 Critical Environmental Areas

Consultation with the USFWS, Information for Planning and Consultation (IPaC) determined that there are no critical habitats within the jurisdiction of USFWS within the NESA. The CT DEEP maintains a NDDB of the approximate locations of endangered, threatened, and special concern species and significant natural communities in Connecticut based on data collected by CT DEEP staff, scientists, conservation groups, and landowners. Mapping from this database can be used as a prescreening tool to identify potential impacts on state-listed species on a site.

Several locations within the NESA are mapped by CT DEEP as NDDB (Figure 9). Within the NESA, these generally consist of wetland and watercourse corridors associated with Mill Plain Swamp, Pond Brook, and the Still River. The potential for this habitat is reflected in the wetland functional assessment, and these mapped areas are identified as providing endangered or threatened species habitat as a primary value. This designation is not the result of site-specific fieldwork but rather macroscale mapping by CT DEEP.

7.2 Threatened and Endangered Species

Consultation with USFWS returned a list of two animal species listed as "threatened" under the Endangered Species Act (16 U.S.C. 1531 et seq.) that may occur in the NESA and/or may be affected by the proposed project: the northern long-eared bat (*Myotis septentrionalis*) and the bog turtle (*Clemmys muhlenbergii*). Both species are also listed as "endangered" at the state level under the Connecticut Endangered Species Act (CGSs, Chapter 495). Additionally, four plant species listed as "special concern" under the Connecticut Endangered Species Act have the potential to occur in the NESA location and/or may be affected by the proposed project: hairy fruitsedge (*Carex trichocarpa*), Tuckerman's sedge (*Carex tuckermanii*), purple cress (*Cardamine douglassii*), and purple milkweed (*Asclepias purpurascens*).

<u>Northern Long-Eared Bat (Myotis septentrionalis)</u>
The northern long-eared bat is one of the species of bat most impacted by white-nose syndrome, a disease caused by the fungus *Pseudogymnoascus destructans*, which has killed millions of bats in North America. White-nose syndrome is the predominant threat to the species. The northern long-eared bat hibernates in caves and mines during the winter and roosts and forages in upland forested areas during summer. The winter hibernation needs of the bat are specific, and areas with such hibernacula are documented by the CT DEEP. The NESA is not in an area of concern for hibernacula habitat. Summer habitat is varied, and destruction of summer habitat is not a predominant threat to the species; therefore, there is no summer habitat designated as a critical habitat.

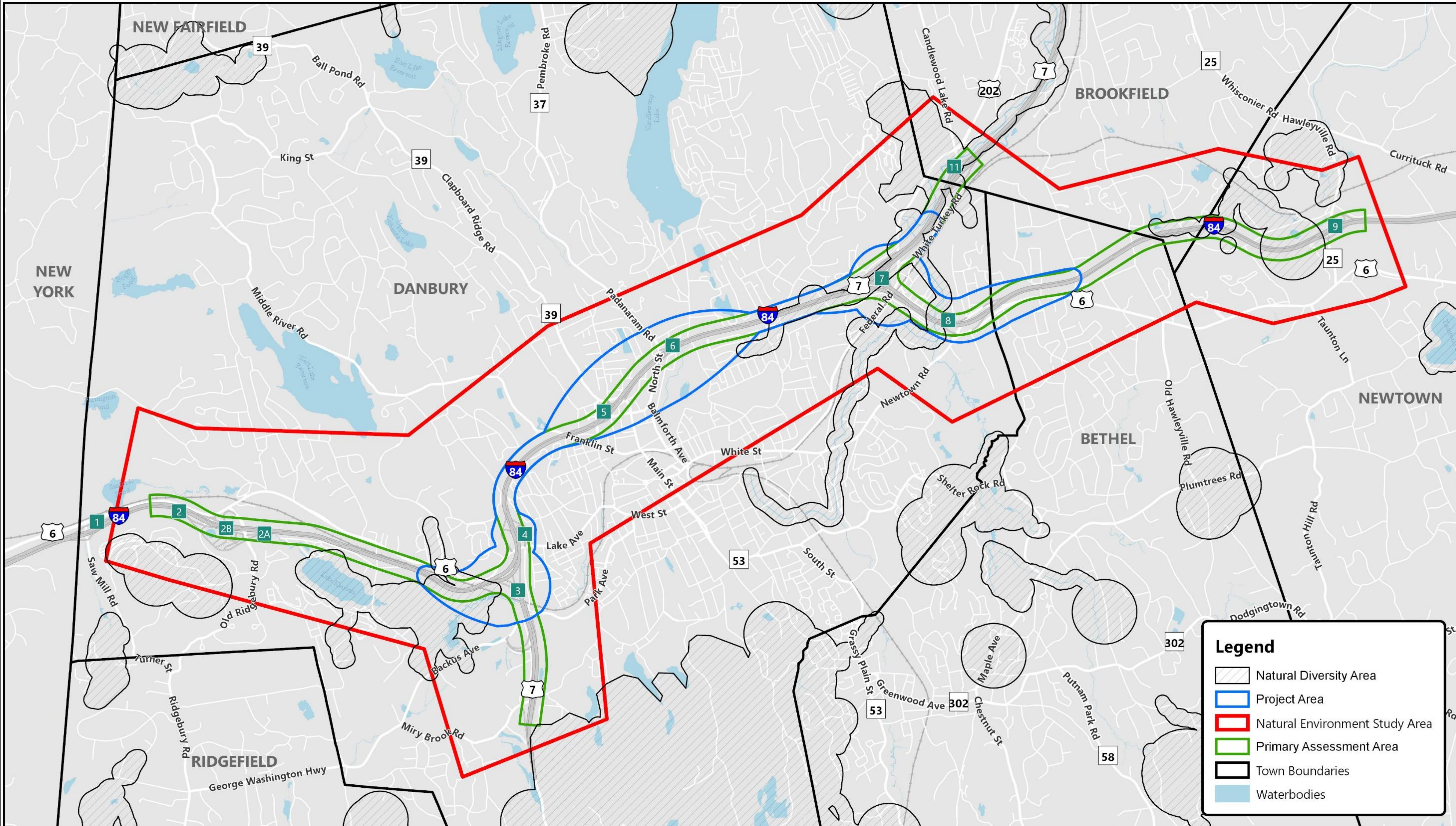
<u>Bog Turtle (Clemmys muhlenbergii)</u>
The bog turtle is both the smallest and least common turtle species found in Connecticut. Bog turtles live in calcareous wetlands, which are wetlands comprised of a bedrock geology comprised of calcium carbonate such as limestone or marble. In Connecticut, these calcareous wetlands occur in the western part of the state where there is appropriate underlying geology. Bog turtles has been historically documented in wetlands in Danbury (Figure 9).

<u>Hairyfruit Sedge (Carex trichocarpa)</u>
Hairyfruit sedge is a tall perennial herb with a maximum height of approximately 4 feet. It can spread rapidly via long rhizomes that produce large clonal colonies. This sedge grows primarily in wetland soils (wetland indicator status is OBL) with abundant organic matter and at least partial sunlight. It can be found in wet meadows, ditches, lake shores, and riverside floodplains, where hydrology is dominated by mineral-rich groundwater or floodwaters. Hairyfruit sedge provides a food source for various insects and ground cover for birds, snakes, amphibians, and small mammals. This plant is uncommon in Connecticut but is not immediately at risk of becoming threatened (state ranking of S3). Hairyfruit sedge is found across much of the northeastern and midwestern United States and Canada and is only listed as Special Concern and Threatened in Connecticut and Massachusetts, respectively.

<u>Tuckerman's Sedge (Carex tuckermanii)</u>
Tuckerman's sedge is a tall perennial herb with a maximum height of approximately 3 feet. This sedge grows primarily in wetland soils (wetland indicator status is OBL) with abundant organic matter and partial sunlight. It can be found in lake shores and riverside floodplains. Tuckerman's sedge provides a food source for various insects, birds, and occasionally turtles and mammals, as well as providing ground cover for these animals. This plant is rare to uncommon in Connecticut and is at risk for becoming threatened (state ranking of S2S3). Tuckerman's sedge is found across much of the northeastern and midwestern United States and Canada and is listed as endangered in several states.

<u>Purple Cress (Cardamine douglassii)</u>
Purple cress is a short perennial forb with a height of approximately 1 foot. This plant grows primarily in wetland soils but may also grow in uplands (wetland indicator status is FACW). It can be found in riverside floodplains, swamps, and forests. Purple cress blooms from March to April and provides a food source for various insects. This plant is rare to uncommon in Connecticut and is at risk for becoming threatened (state ranking of S2S3). Purple cress is found throughout most of eastern North America and is only listed as Special Concern and Endangered in Connecticut and Massachusetts, respectively.

<u>Purple Milkweed (Asclepias purpurascens)</u>
Purple milkweed is a tall perennial forb with a height of approximately 2 to 3 feet. This plant grows primarily in uplands but may be found in wetlands (wetland indicator status is FACU). Though it prefers partial sun and mesic conditions, purple milkweed can tolerate a range of light and moisture regimes. It can be found in forest edges, meadows and fields, and anthropogenically disturbed habitats. Purple milkweed grows rapidly during late spring and flowers from May to July. This plant provides a food source for various insects, including many butterfly species. This plant is rare to uncommon in Connecticut and is at risk for becoming threatened (state ranking of S2S3). Purple milkweed is found through eastern North America and the midwestern United States and is listed as Special Concern or Endangered in several states.



I-84 Danbury Project

FIGURE 9: NATURAL DIVERSITY DATABASE AREAS

STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION

Date: 5/30/2019

Data Sources: *DEMHS CTE911 Roads*

SCALE IN FEET
0 2,000 4,000

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7.3 Wildlife

The Project Area occupies approximately 6 miles of an interstate highway in western Connecticut. As such, wildlife habitat is limited based upon the existing disturbance vectors in this area. Because of these pressures, use by wildlife adjacent to the corridor is typically limited to generalists adapted to the sights and sounds of human activity.

Specific species with affinity for different ecological communities are described above. Habitat utilization is presumed by the presence of habitat suitable for use by wildlife. Primary wildlife habitat and wildlife corridors within the NESA appear to be offered by the wetland and watercourse systems and open spaces described above.

8.0 Conclusion

In summary, the Project Area along the I-84 and SR 7 highway corridor traverses a variety of underlying geologic formations, watersheds, and ecological community types, including wetlands and waterways. The existing natural environment in the NESA is defined by the interaction between the hardened built environments adjacent to natural and engineered ecosystems. Portions of certain stream corridors within the NESA demonstrate the potential to support state-listed flora and/or fauna as per CT DEEP NDDB mapping. Through detailed site investigation and macroscale mapping, 53 wetlands and watercourses and eight primary terrestrial communities were identified.

The intersections of SR 7 north and south with I-84 constitute regions of high natural resource concentration in the NESA. Both intersections contain crossings of the Still River and associated wetland systems, as well as mapped NDDB habitats. At the SR 7 south intersection, in the western portion of the NESA, Kissen Brook, Lees Pond Brook, and Miry Brook confluence with the Still River stream corridor. At the SR 7 north intersection, in the eastern portion of the NESA, Limekiln Brook, Stony Hill Brook, Beaver Brook, Great Plains Brook, West Brook, and East Brook confluence with the Still River stream corridor.

Watercourses and watersheds within the NESA have been mapped and quantified. As available, fisheries and macroinvertebrate data – collected through State of Connecticut databases – have been provided. Similarly, water quality classifications of mapped streams have been identified. Water quality sampling data inform baseline conditions. In general, each of the delineated wetlands and watercourses demonstrate the potential to contribute to basic wetland functions. The functional capacity is variable and dependent on size of the resource, hydrologic support, vegetative assemblage and nexus to existing disturbances. Given the landscape position of the delineated resources adjacent to the highway corridor, the systems demonstrate limited potential for wildlife habitat. However, other wetland functions, such as flood flow attenuation, groundwater recharge and discharge, nutrient assimilation, and production export exist at a moderate to high capacity, in large part due to the geology and topography of the contributing watersheds. All of the delineated wetlands demonstrate capacity for restoration, which may be addressed through activities such as hydrologic conveyance improvements, removal of non-native vegetation, or stormwater improvements.