

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE  
PROPOSED SITE RESTORATION  
MONROE, CONNECTICUT

WETLAND & VERNAL POOL  
ASSESSMENT  
REPORT

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## 1.0 INTRODUCTION

William Kenny Associates LLC (WKA) has completed an assessment of the 52.93-acre property at 64 Cambridge Drive and 18.97-acre property at 4 Independence Drive in Monroe Connecticut to inventory and assess existing wetland and watercourse conditions and functions as compared to the reported conditions in 2014 and as they relate to the currently proposed site restoration activities. The following report includes the methods and results of this investigation, which included a wetland delineation, vernal pool assessment and additional site investigations. Wetland delineations were conducted by WKA in February of 2020 and site investigations and vernal pool assessments were conducted in March and April of 2020 and April of 2021. In addition to our field investigations, our assessment is based on a review of the project plans, environmental and engineering reports and vernal pool conservation guidelines. Proposed conditions were assessed based on a review of the *Proposed Site Restoration* drawings and the *Engineering Report*, prepared by Solli Engineering, dated May 5, 2021.

In summary, the proposed restoration plan will substantially restore the functions and values of onsite wetlands to a similar level compared to what was expected if the Town approved 2006 site development plan was fully implemented. The restoration plan includes activity to restore the impacted hydrologic conditions of the vernal pools, wetlands and watersheds and to restore forested areas within portions of the onsite Regulated Upland Review Areas (RURA) and vernal pool buffers. The hydrologic conditions of the wetlands will be restored to a level substantially similar to pre-development conditions. Portions of the previously cleared RURA adjacent to wetlands and other upland areas will be revegetated with native shade trees, flowering trees and meadow vegetation and will succeed into a forest over time. One relatively small area of filled wetlands in the northeastern portion of the site will be cleared of fill and existing structures to restore the wetland. A second relatively small area of RURA adjacent to wetlands in the southeastern portion of the site will be converted to wetlands.

## 2.0 SITE CONDITIONS & DEVELOPMENT HISTORY

The approximate 71.90-acre combined properties are located at 64 Cambridge Drive and 4 Independence Drive in Monroe, Connecticut. 4 Independence Drive is an 18.97-acre property in the northwest portion of the project site and 64 Cambridge Drive is a 52.93-acre property that bounds 4 Independence Drive to the east and south. Cambridge Drive is south of the site and Independence Drive is north of the site. Wetlands and watercourses on the properties were delineated by Environmental Planning Services LLC (EPS) in 2004 prior to quarry activities at the site.

In 2006, the Town of Monroe issued Planning and Zoning (P&Z) issued an approval for the development of two industrial buildings at 64 Cambridge Drive and 4 Independence Drive. The approval allowed for the alteration of the contributing watershed areas to the site. Since 2014, unapproved quarry activities dramatically altered the land and the contributing watershed areas to inland wetlands. The quarry activities significantly altered the shape and grade of the central portion of the property, extending from the northern site boundary to the southern site boundary, and encompasses approximately 39.03 acres (54 percent) of the site. Much of the altered land area, but not all, was approved in 2006 for some level of alteration. As of today, the conditions on the project site include a greater area of disturbance and a deeper excavation than what was referenced in the approved site plans. The land surface modifications have reduced the size of the watershed drainage areas for onsite wetlands by about 50 percent. The deepened excavation activity required pumps to remove water from the quarry and direct it toward a stormwater basin at 4 Independence Drive, which outflows to the west toward an onsite wetland. This pumping activity has effectively increased the watershed areas of Wetland 1. Quarry excavation and the pumping of water from one watershed to another, has resulted in significant changes to onsite wetlands. The remaining relatively undisturbed ecological communities at the project site include areas of upland and wetland forests to the west, east and south.

### 3.0 WETLAND CONDITIONS – PAST & PRESENT

#### 3.1.1 Inland Wetland & Watercourse Delineation

Four wetlands were identified and delineated onsite by EPS in 2004 and 2014 with little variation in the delineation results. These wetlands are identified as Wetlands 1 through 4 in Figure 1 of the EPS *Wetland Functions and Values and Vernal Pool Assessment: 64 Cambridge Drive & 4 Independence Drive, Monroe report*, dated May 30, 2014 (Appendix A). Wetland 1 encompasses the western portion of the properties, and Wetlands 2, 3 and 4 are located in the eastern portion. In 2020, WKA re-investigated the site and identified and delineated three wetlands, corresponding to the previously delineated Wetland 1, 2 and 4 (Appendix B). Wetland boundaries delineated by EPS and WKA all relatively correspond to the same boundaries with slight variations between based on differing professional judgement. Wetland 3 was not considered a to be a wetland in WKA's 2020 delineation, as wetland morphological features (i.e., the presence of a reduced or gleyed soil matrix) were not present. The quarry pit also had ponding surface water present in 2020. The feature meets the definition of a watercourse; however, WKA has not mapped it as such because it is a temporary construction feature. In 2021, WKA revisited the site and there were no measurable differences observed from the 2020 investigation.

#### 3.1.2 Hydrologic & Morphological Conditions

EPS characterized the hydrologic and vegetative characteristics of the wetland systems in their 2014 report. Wetland 1, which extends and flows north to south through the western portion of the project site, receives discharge from Pine Swamp north of the site. Wetland 1 discharges into the West Branch of the Pequonock River approximately 4,000 feet south of Cambridge Drive. During the 2014 EPS investigation, Wetland 2 extended and flowed south to north through the eastern portion of the project site and fed into Pine Swamp to the north. WKA's wetland delineation and site investigations of the properties indicated that the northern portion of Wetland 2 no longer connects to Pine Swamp north of the site and instead ends approximately 25 feet from the northern property line of 64 Cambridge Drive. This modification is due to construction activities that were approved by the Monroe IWC and that are for the extension of Independence Drive. Due to these activities, Wetland 2 now is classified as an

isolated system. Wetland 3, which was a relatively small isolated system in the eastern portion of the project site, was described in the 2014 report as being ‘deep and containing very dark tannic water’ and approximately 25 feet in diameter. No surface water was present in 2020 and 2021. Wetland 4, which extends and flows both south to north and north to south is located along the eastern border of the project site. The northern portion of this wetland feeds into Pine Swamp to the north and the southern portion of this wetland drains to the West Branch of the Pequonock River 3.3 miles south of the site. The West Branch of the Pequonock River drains to the Pequonock River.

### 3.1.3 Watershed Conditions

The site lies within two subregional watersheds, with the eastern portion of the property, including Wetlands 2 and 3, are within the Halfway River watershed, and the majority of the site, including Wetlands 1 and 4, are within the Pequonock River watershed. The drainage areas to Wetlands 2 and 3 have been noticeably altered as a result of onsite development. According to the *Engineering Report*, Wetland 2’s drainage area today is about 57 percent smaller than the conditions at the time of the 2006 approval. This reduction resulted in a drier wetland, as observed in our site investigations confirming that Wetland 2 is significantly drier than in the past. The same change was observed for Wetland 3. Surface water was not observed in Wetland 2 and 3 during any of the site investigations. Based on EPS historic data and the current vegetative, microtopographic and soil conditions, Wetland 2 should have been inundated up to 12 inches or more of water during the investigations. Due to the lack of poorly and very poorly drained soils at Wetland 3, the amount of drying was not as clear as it was for Wetland 2. The hydrologic conditions of Wetlands 1 and 4 have not been noticeably altered based on our 2020 site observations. Soil saturation and/or inundation was present in much of Wetland 1 and 4 during all of our site visits; however, in 2021, the area of ponded water within Wetland 1 was smaller than the ponded area observed in 2020.

### 3.1.4 Vegetative Conditions

The 2014 EPS report classified Wetlands 1, 2 and 4 as wooded swamps with red maple, American elm, yellow birch, green ash, ironwood and sweet gum trees. Spicebush, sweet pepperbush, winterberry, highbush blueberry, speckled alder, silky dogwood and northern arrow-

wood viburnum comprised the shrub community. Fox grape was the only noted vine species and skunk cabbage, tussock sedge, cinnamon fern, sensitive fern, Canadian mayflower and northern white violet comprised the groundcover throughout these wetland systems. Wetland 3 was classified by EPS as a classic vernal pool rather than a wooded swamp, due to it being a small isolated depression with no access to an input of surface water like the other systems onsite. Wetland 3 contained similar vegetation; however, the shrub layer was denser than the tree and groundcover species in this system.

### **3.2 Wetland & Watercourse Functional Capacity Comparison**

A comparison of the capacity of the onsite wetland and watercourse systems to perform typical wetland and watercourse functions was performed. The functional capacities of two development scenarios were compared and contrasted: the P&Z-approved 2006 development plan and the proposed restoration plan. This assessment was completed within the context of typical wetlands functions and values as established by Normandeau Associates, Inc. in the 1998 publication, *A Rapid Procedure for Assessing Wetland Functional Capacity*.

Our assessment of wetland conditions is based on our 2020 and 2021 evaluation of onsite wetlands and based on the assessment completed by EPS in 2014. The 2014 EPS report characterized the functions and values of the onsite wetlands using *The Highway Methodology Workbook Supplement, Wetland Functions and Values: A Descriptive Approach* (1995) issued by the United States Army Corps of Engineers New England District as their basis for evaluating wetlands. This method includes the analysis of societal values such as recreation, education and aesthetic quality. The two methods assess similar common wetland functions.

The assessment revealed that the wetland functions will improve the functional capacity of wetlands from what would be expected if the 2006 approved site plan had been fully developed. A summary of this evaluation is presented in the table below.

**Table One: Wetlands & Watercourses Functional Capacity Assessment: 2006-Approved versus 2021-Proposed Conditions**

WETLAND FUNCTIONS	RELATIVE CAPACITY TO PERFORM FUNCTION		FUNCTIONAL DETAILS
	Approved Functions	Proposed Functions	
<b>WETLAND 1</b>			
1. Modification of Groundwater Discharge	HIGH	HIGH	<i>Unchanged</i> - The capacity of the wetland to influence the amount of water moving from ground water to surface water is not expected to be altered.
2. Modification of Groundwater Recharge	LOW	LOW	<i>Unchanged</i> - The capacity of the wetland to influence the amount of water moving from surface water to ground water is not expected to be altered.
3. Storm and Flood Water Storage	HIGH	HIGH	<i>Unchanged</i> - The capacity of the wetland to store floodwater is not expected to be altered.
4. Modification of Water Quality	HIGH	HIGH	<i>Unchanged</i> - The capacity of the wetland to modify water quality is not expected to be altered.
5. Export of Detritus	MODERATE	MODERATE	<i>Unchanged</i> - The capacity of the wetland to export organic detritus from the wetland to the adjacent and downstream aquatic ecosystems is not expected to be altered.
6. Contribution to Abundance and Diversity of Wetland Flora	HIGH	HIGH	<i>Unchanged</i> - The wetland's capacity to contribute to the abundance and diversity of wetland flora is not expected to be altered.
7. Contribution to Abundance and Diversity of Wetland Fauna	HIGH	HIGH	<i>Unchanged</i> - The wetland's capacity to contribute to the abundance and diversity of wetland fauna is not expected to be altered.
<b>WETLAND 2</b>			
1. Modification of Groundwater Discharge	HIGH	HIGH	<i>Unchanged</i> - The capacity of the wetland to influence the amount of water moving from ground water to surface water is not expected to be altered.
2. Modification of Groundwater Recharge	LOW	LOW	<i>Unchanged</i> - The capacity of the wetland to influence the amount of water moving from surface water to ground water is not expected to be altered.

3. Storm and Flood Water Storage	<i>HIGH</i>	<i>HIGH</i>	<i>Unchanged</i> - The capacity of the wetland to store floodwater is not expected to be altered.
4. Modification of Water Quality	<i>HIGH</i>	<i>HIGH</i>	<i>Unchanged</i> - The capacity of the wetland to modify water quality is not expected to be altered.
5. Export of Detritus	<i>MODERATE</i>	<i>MODERATE</i>	<i>Unchanged</i> - The capacity of the wetland to export organic detritus from the wetland to the adjacent and downstream aquatic ecosystems is not expected to be altered.
6. Contribution to Abundance and Diversity of Wetland Flora	<i>HIGH</i>	<i>HIGH</i>	<i>Unchanged</i> - The wetland's capacity to contribute to the abundance and diversity of wetland flora is not expected to be altered.
7. Contribution to Abundance and Diversity of Wetland Fauna	<i>MODERATE</i>	<i>HIGH</i>	<i>Improved</i> - The wetland's capacity to contribute to the abundance and diversity of wetland fauna will be improved through the restoration activity that will change a non-functioning vernal pool to a functioning vernal pool.

**WETLAND 3 (WKA does not consider this area to be a wetland)<sup>1</sup>**

1. Modification of Groundwater Discharge	<i>LOW</i>	<i>LOW</i>	<i>Unchanged</i> - The capacity of the area formerly known as Wetland 3 to influence the amount of water moving from ground water to surface water is not expected to be altered.
2. Modification of Groundwater Recharge	<i>MODERATE-LOW</i>	<i>MODERATE-LOW</i>	<i>Unchanged</i> - The capacity of the area formerly known as Wetland 3 to influence the amount of water moving from surface water to ground water is not expected to be altered.
3. Storm and Flood Water Storage	<i>LOW</i>	<i>LOW</i>	<i>Unchanged</i> - The capacity of the area formerly known as Wetland 3 to store floodwater is not expected to be altered.
4. Modification of Water Quality	<i>LOW</i>	<i>LOW</i>	<i>Unchanged</i> - The capacity of the area formerly known as Wetland 3 to modify water quality is not expected to be altered.
5. Export of Detritus	<i>LOW</i>	<i>LOW</i>	<i>Unchanged</i> - The capacity of the area formerly known as Wetland 3 to export organic detritus from the wetland to the adjacent and downstream aquatic ecosystems is not expected to be altered.
6. Contribution to Abundance and Diversity of Wetland Flora	<i>MODERATE-LOW</i>	<i>MODERATE-LOW</i>	<i>Unchanged</i> - The capacity of the area formerly known as Wetland 3 to contribute to the abundance and diversity of wetland flora is not expected to be altered.

<sup>1</sup> The WKA investigations showed this area is no longer a wetland. However, its ability as an upland to function at levels found in both wetlands and uplands will persist due to its landform characteristics and vegetation.

7. Contribution to Abundance and Diversity of Wetland Fauna	<b>MODERATE-LOW</b>	<b>MODERATE-LOW</b>	<b>Unchanged</b> - The capacity of the area formerly known as Wetland 3 to contribute to the abundance and diversity of wetland fauna is not expected to be altered.
<b>WETLAND 4</b>			
1. Modification of Groundwater Discharge	<b>HIGH</b>	<b>HIGH</b>	<b>Unchanged</b> - The capacity of the wetland to influence the amount of water moving from ground water to surface water is not expected to be altered.
2. Modification of Groundwater Recharge	<b>LOW</b>	<b>LOW</b>	<b>Unchanged</b> - The capacity of the wetland to influence the amount of water moving from surface water to ground water is not expected to be altered.
3. Storm and Flood Water Storage	<b>HIGH</b>	<b>HIGH</b>	<b>Unchanged</b> - The capacity of the wetland to store floodwater is not expected to be altered.
4. Modification of Water Quality	<b>HIGH</b>	<b>HIGH</b>	<b>Unchanged</b> - The capacity of the wetland to modify water quality is not expected to be altered.
5. Export of Detritus	<b>MODERATE</b>	<b>MODERATE</b>	<b>Unchanged</b> - The capacity of the wetland to export organic detritus from the wetland to the adjacent and downstream aquatic ecosystems is not expected to be altered.
6. Contribution to Abundance and Diversity of Wetland Flora	<b>HIGH</b>	<b>HIGH</b>	<b>Unchanged</b> - The wetland's capacity to contribute to the abundance and diversity of wetland flora is not expected to be altered.
7. Contribution to Abundance and Diversity of Wetland Fauna	<b>HIGH</b>	<b>HIGH</b>	<b>Unchanged</b> - The wetland's capacity to contribute to the abundance and diversity of wetland fauna is not expected to be altered.

## 4.0 VERNAL POOL CONDITIONS – PAST & PRESENT

### 4.1.1 Vernal Pool 2014 Conditions

According to the 2014 EPS report, each wetland system supported vernal pool species (see ‘Figure 2’ in Appendix A for additional information). The pools in Wetlands 1, 2 and 4 supported breeding and development of the vernal pool obligate wood frogs (*Lithobates sylvaticus*) and spotted salamanders (*Ambystoma maculatum*) in the 2014 survey. Wetland 3 contained amphibian vernal pool indicator species in the 2004 survey, but no amphibian indicator species were observed in the 2014 survey. Fairy shrimp (*Anostraca sp.*) were observed during the 2014 study and follow-up surveys were recommended to re-assess the pool for amphibian obligate species due to this observation. Vernal Pool 2 was considered to be the most productive pool onsite, as greater than 100 egg clutches of wood frog and/or spotted salamander egg masses were observed. In addition to obligate vernal pool species observed onsite, several facultative vernal pool species such as spring peeper (*Pseudacris crucifer*), four-toed salamander (*Hemidactylium scutatum*) and grey treefrog (*Hyla versicolor*) were observed in or adjacent to vernal pools. Spring peepers, four-toed salamanders and grey treefrogs will use vernal pool systems for their breeding but are not confined to such systems as wood frogs and spotted salamanders for their development and are therefore registered as a facultative species.

### 4.1.2 Vernal Pool 2020 & 2021 Conditions

WKA conducted a vernal pool assessment in March and April 2020 and April 2021 in accordance with the Connecticut Association of Wetland Scientists’ (CAWS) Vernal Pool Monitoring Program protocol. Monitoring was conducted on March 12 and 17 and April 1 and 6, 2020 and April 14, 2021. Each vernal pool previously identified in EPS’s 2014 report was investigated for vernal pool obligate species. Table 2 provides a summary of critical pool characteristics, as defined by Calhoun and Klemens (2002), that were assessed during our investigation.

Vernal Pool 1, located within the southern portion of Wetland 1, was identified as a ‘cryptic’ vernal pool by EPS in 2014. In 2020, the pool did not support breeding of vernal pool obligate species; however, in 2021, breeding was observed. No egg clutches of wood frog nor spotted salamanders were identified during 2020 and no fairy shrimp were identified within the

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pool. Additionally, small warm water fish were observed within the vernal pool. The presence of finfish within a vernal pool system indicates that the pool may not have served as adequate habitat for vernal pool obligate species breeding, due to the predation of eggs and larvae by fish. Depth of water within the pool ranged from four to twenty inches during the initial investigation and three to thirteen inches during the subsequent. The decrease in water depth within the vernal pool is likely due to evaporation, as consecutive warm days with no precipitation preceded the subsequent investigation. The substrate of the pool is deep mud/muck, approximately 30 inches deep or more within the central portions of the pool. Surface algae, deep water and turbidity caused by disturbing the pond substrate while conducting investigations moderately impair visibility of egg clutches within this pool. Spring peepers were heard chorusing during both 2020 investigations, and green frogs (*Lithobates clamitans*), common musk turtle (*Sternotherus odoratus*) and mallards (*Anas platyrhynchos*) were observed during the subsequent investigation. Green frogs and musk turtles will prey upon amphibian eggs, and therefore, like finfish, lowers the likelihood that this system served as vernal pool habitat in the 2020 season. In 2021, both wood frog and spotted salamander egg masses were observed in the pool. The depth and area of surface water appeared to be less than the conditions present in the 2020 investigations. The decrease in water likely helped to support breeding and viability in 2021.

Vernal Pools 2 and 3 were inactive in 2020 and 2021 due to the absence of surface water within the vernal pools during investigations. Vernal Pool 2 includes a portion of Wetland 2 and Vernal Pool 3 encompassed the entirety of the formerly identified Wetland 3 (not a wetland per WKA field observations). Due to the lack of surface water within these systems, these wetlands cannot function as vernal pools. The lack of water within a vernal pool system eliminates its function as a breeding area, as surface water is needed to be held within these pools for a long enough time to facilitate amphibian breeding and development (three to six months).

Vernal Pool 4 is located within the northern portion of Wetland 4 and was the only vernal pool identified by EPS that served as amphibian breeding habitat in 2020 and 2021. In 2020, approximately 30 clutches of intact wood frog eggs and three clutches of intact spotted salamander eggs were identified within the central portion of Vernal Pool 4. Fairy shrimp were discovered during the initial investigation of this pool but were absent during the subsequent survey. No finfish were observed within the pool. Depth of water within the pool ranged from four to eight inches depending on location. The substrate of the pool is leaf litter. Surface algae

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is low throughout the pool and does not impair visual identification. Spring peepers were heard chorusing during both investigations of this pool. Wood frog tadpoles and spotted salamander egg masses were also observed in 2021. The pool conditions and characteristics were similar to the 2020 investigation.

**Table Two: Vernal Pool 2020 & 2021 Conditions**

<b>POOL OR TERRESTRIAL HABITAT CONDITIONS</b>	<b>VERNAL POOL ID</b>			
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<i>State-listed Species Present or Breeding in the Vernal Pool</i>	No	No	No	No
<i>Two or More Vernal Pool Indicator Species Breeding in the Vernal Pool</i>	No/ Yes <sup>1</sup>	No	No	Yes
<i>25 or More Egg Masses (Regardless of Species) Present in the Pool by the End of the Breeding Season</i>	No	No	No	Yes

<sup>1</sup>Two Vernal Pool Indicator Species were not observed in 2020 but were observed in 2021.

#### 4.2 Vernal Pool Assessment Comparison

EPS’ 2014 report characterized all vernal pools onsite to be of exceptional quality (despite the absence of observed vernal pool indicator species in Vernal Pool 3). Vernal Pool 2 was described as the most productive with significant breeding choruses being overheard during surveying and large quantities of egg clutches being identified. WKA’s investigations indicated that only Vernal Pool 1 and 4 remain a productive habitat for vernal pool obligate species. Vernal Pools 2 and 3 no longer provide habitat for obligate vernal pool amphibians or fairy shrimp, as there was no standing water present at the time of investigation.

## 5.0 POTENTIAL IMPACT EVALUATION

### 5.1 Proposed Restoration Activities

The proposed restoration activities involve a five-year plan to restore the site to conditions similar or substantially the same as the 2006 approved application. This will be achieved through filling the quarry to restore the 2006-approved contributing watershed areas and rehydrate the wetlands and vernal pools, reforesting the portions of the RURA adjacent to wetland edges and within vernal pool buffers with native trees, shrubs and groundcovers and through the restoration and creation of two small wetland areas (less than 1,500 square feet each). Rehydration activity will be accomplished via irrigation and via the restoration of a portion of the Wetland 2 watershed. In April 2021, the IWC approved wetland irrigation activity to rehydrate Wetland 2 by pumping water from an onsite well. In the long-term, this and the restoration of a portion of the watershed will substantially restore the hydrology in the wetland to pre-development conditions and will allow for a substantial improvement to the functional capacity of Vernal Pool 2. The site will be regraded to create two pads, a northern pad located on 4 Independence Drive and a southern pad located on 64 Cambridge Drive. The northern pad will fill the quarry and raise the elevation to approximately 461.00 feet. This activity will restore the watershed patterns for Wetland 2 to the conditions similar to those approved in 2006. The southern pad will be slightly elevated from the existing condition. The existing improvements at the southern end of the property will be maintained during construction activity and an approximate 425-foot drive is proposed to access the site. The drive results in an increase of 0.32 acres of impervious surface area onsite. Three stormwater basins will be constructed to manage stormwater runoff quality and quantity from the drive and future developments. The stormwater basins will also be utilized as temporary sediment traps during construction activity. In the northern portion of the site, the existing Town of Monroe stormwater basin will be maintained and improved and the access road will be restored. Five additional temporary sediment traps are proposed in the northern portion of the site to provide soil erosion and sediment control during construction activity.

In addition to the rehydration activity, one relatively small area of filled wetlands in the northeastern portion of the site will be cleared of fill and existing structures to restore the wetland. A second relatively small area of wetland will be created within the RURA adjacent to

wetlands in the southeastern portion of the site. For each area, invasive vegetation will be removed and a three-year monitoring and maintenance plan is included for the control of invasive vegetation following project completion. Following land disturbance activity throughout the site, the previously cleared land within portions of the RURA and other upland areas will be revegetated with native meadow vegetation and trees and allowed to succeed into a forest over time. The reforestation activity will also restore habitat in the onsite vernal pool envelopes and critical terrestrial habitats.

## 5.2 Potential Impacts & Mitigation

Land development has the potential to directly and indirectly cause impacts to wetlands and watercourses during and after construction from activities such as vegetation clearing, soil filling, excavation, or pollution of stormwater. For this investigation, a comparison of the approved conditions in the 2006 IWC Permit, the present conditions of the developed site and the proposed conditions of the new project will be assessed in regard to the impacts they had or will have toward onsite wetlands and watercourses.

### 5.2.1 Potential Direct Wetland Impacts

The 2006 approval plans indicated no potential for direct long- or short-term impacts to wetlands and watercourses onsite. The limit of disturbance (LOD) for site development was outside of onsite wetlands and watercourse and outside the RURA. No construction was to take place within wetlands, and as such, no long- or short-term direct impacts were anticipated.

Other than restoration activities, the current project proposes no direct long- or short-term adverse impacts to inland wetlands or watercourses on or off the site as no activities are planned within the inland wetland and watercourse systems. In the northeastern portion of Wetland 2, approximately 1,200 square feet of filled wetlands will be restored through the removal of fill and structures. Invasive vegetation will be removed and native wetland shrubs and trees are proposed to revegetate the wetland area. In the southeastern portion of the site, approximately 1,400 square feet of RURA adjacent to Wetland 4 will be converted into wetlands vegetated with native wetland shrubs and groundcover plants. For each area, a three-year monitoring and maintenance plan is included for the control of invasive vegetation following project completion. Additional details will be provided to ensure the long-term function of the proposed wetland

area and to provide sufficient protection to the adjacent wetland area during restoration activity. Additionally, throughout project activity, the approved wetland irrigation activity will continue during construction activity to rehydrate Wetland 2 and Vernal Pool 2 from the south in the short-term.

### **5.2.2 Potential Indirect Wetland Impacts During Construction**

During construction, wetlands and watercourses can be indirectly impacted from sediment laden water from the site construction activities. The 2006 approval included a soil erosion and sediment control plan. Since 2006, the implementation and management of soil erosion and sediment control measures have prevented many instances of indirect impacts. However, some impacts from soil erosion and sedimentation have occurred. The 2020 investigation of the project site identified areas where sedimentation occurred within onsite wetlands, primarily Wetland 1 and 2, via stormwater runoff. However, this sedimentation does not appear to be substantially affecting the functions and values of the wetlands. The sedimentation is less a few inches deep and is in only few, relatively small locations.

The proposed project includes a robust and extensive soil erosion and sediment control plan that will be incorporated during site restoration activities. Control measures includes eight temporary sediment traps and two sediment basins throughout the site to capture and contain sediment, in addition to silt fencing, temporary diversion swales, anti-tracking pads at construction entrances, dust control, riprap stabilization and inlet protection. The control measures are detailed in the *Proposed Site Restoration* drawings and will be installed and maintained in accordance with the *CT DEEP 2002 Guidelines for Soil Erosion and Sediment Control*. Monitoring and maintenance of these measures will be critical to ensure their effectiveness. They will be installed and maintained by the contractor and inspected by a qualified and approved site monitor.

### **5.2.3 Potential Indirect Wetland Impacts After Construction**

In the long-term and if not properly mitigated, wetlands and watercourses can be indirectly adversely impacted by stormwater runoff that flows from structures, pavement and vegetated surfaces. As originally approved in 2006, the majority of stormwater runoff from the developed portions of the project site would be directed south towards a series of sedimentation

traps and north towards a low-lying area where it is dewatered to a filter bag located to the west of Wetland 1. This northern system was observed to be functional during the 2020 investigation.

The proposed project improves onsite stormwater management capabilities. The 425-foot proposed drive will result in an approximate 0.32-acre increase in impervious coverage onsite. The proposed project includes a stormwater management system designed in accordance with the standards set by the *Town of Monroe MS4 Stormwater Management Plan* and the *CT DEEP 2004 Stormwater Quality Manual*. Three stormwater basins are proposed in the southern portion of the site to collect, detain and treat stormwater runoff from the proposed drive and have been sized to accommodate future development. In the event these systems reach capacity in a significant event, pipes will direct water to riprap energy dispersal pads which will decrease the velocity of stormwater and prevent soil erosion within the wetland buffers.

In addition to managing the flow rates and quality of stormwater runoff, the proposed stormwater management system is designed to restore pre-development hydrologic conditions in the onsite wetlands as well as restoring the watershed areas to the conditions approved in 2006. According to the 2006 approval, dewatering impacts were approved by the IWC and the project was approved to alter hydrologic conditions onsite; however, not to the extent observed in current conditions. As detailed in the *Engineering Report*, the existing contributing watershed areas are approximately 52 percent smaller than those approved in 2006. The proposed project will substantially restore the watersheds to the 2006 approved conditions. This will be achieved through filling the quarry and site grading changes that will direct water to the Wetland 2. More water will be directed to the wetland as a result of grading in the northeastern portion of the site. This activity, combined with the approved wetland irrigation activity, will restore hydrologic conditions to pre-development conditions. The grading activity will provide hydration in the north portion of the wetlands and the long-term use of the pump will hydrate the southern portion of the wetlands. Rehydration activity for Wetland 2 will also result in the rehydration of Vernal Pool 2.

Wetland and watercourse buffers are important to maintain as they help bioremediate pollutants, provide habitat for and fauna that utilize vernal pools, wetland and upland areas. The 2006 site development plan includes buffers that were more than 50 feet wide. However, the current the existing site disturbance activity is closer to onsite wetlands than proposed with the

2006 plan, specifically Wetland 2. The existing site disturbance extends into the vernal pool envelope and critical terrestrial habitat for Vernal Pool 2. The proposed project includes expanding the vegetated wetland buffers from the current conditions and will restore critical portions of the vernal pool envelope for Vernal Pool 2. The restored areas will be planted with native trees, shrubs and groundcovers restoring the naturalized wetland buffers. By increasing the size of the wetland buffers, the potential to treat stormwater entering the wetland through biofiltration is improved. Additionally, increasing the buffer will increase the naturalized habitat within vernal pool envelopes and critical terrestrial habitats which will provide vernal pool protection and habitat for vernal pool obligate species use outside of the breeding season.

## 7.0 CONCLUSION

Based on our investigation and assessment of onsite inland wetlands and watercourses systems and vernal pools at 64 Cambridge Drive and 4 Independence Drive in Monroe, Connecticut, we conclude that the proposed restoration of the site will substantially restore the functions and values of onsite wetlands that we expect would be present if the 2006 Town approved site development plan was fully implemented. The restoration plan includes activity to restore the impacted hydrologic conditions of the vernal pools, wetlands and watersheds and to restore forested areas within portions of the onsite RURA and vernal pool buffers. One small area of wetlands will be restored and another small area of wetlands will be created. Both areas will be revegetated with native wetland plants and a three-year invasive management plan will monitor and control invasive vegetation following project completion.

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**APPENDIX A:**  
**EPS Wetland Functions & Values & Vernal Pool Assessment:**  
**64 Cambridge Drive & 4 Independence Drive, Monroe**

**Wetland Functions and Values and Vernal Pool Assessment**  
64 Cambridge Drive and 4 Independence Drive, Monroe

*Submitted To:*

Kevin Solli, P.E.  
Solli Engineering  
523 Pepper Street  
Monroe, CT 06468

*Completion Date:*

May 30, 2014

## 1.0 INTRODUCTION

This report documents the results of investigations conducted by Environmental Planning Services (EPS) of wetlands located at 64 Cambridge Drive and 4 Independence Drive in Monroe (the “site” hereinafter, see Figure 1). Field visits were conducted on April 9, 17, 18, 20 and 21, 2014, by an EPS Registered Soil Scientist and Certified Professional Wetland Scientist in order to delineate site wetlands, gather data on wetland functions and values and investigated site wetlands for the presence of breeding activity by vernal pool indicator species. These survey dates coincided with the active breeding period of vernal pool indicator species, during which amphibians in amplexus, breeding choruses, salamander spermatophore and amphibian egg masses are typically observable.

The site was also part of a comprehensive wetland and biological survey conducted by EPS in 1998, 2002 and 2003 on behalf of Cambridge Investments, LLC during the development of the Pepper Street Business Park. Biological data collected during that previous survey was used to inform and supplement the findings of this report.

## 2.0 WETLANDS

Four wetlands occur on the site as illustrated on Figure 1 and summarized in Table 1. One of the four wetlands (Wetland 3) is small (<1/2 acre) and isolated; the other three are large headwater wetlands contiguous with upper perennial stream systems.

*Table 1: Site wetlands by number, delineation sequence, habitat type and watershed location*

Wetland	Flag Numbers	Habitat Type	Local-Subregional Watershed
1	1-133, 1X-35X	Wooded swamp, cryptic vernal pool	West Branch Pequonnock River – Pequonnock River
2	36X-149X	Wooded swamp, cryptic vernal pool	Pine Swamp-Halfway River
3	233X/252X	Vernal pool (classic)	Isolated
4	1Y-70Y, 150X-232X	Wooded swamp, cryptic vernal pool	Pine Swamp-Halfway River and West Branch Pequonnock River – Pequonnock River

Site wetlands lie in two watersheds, with Wetland 2 and the northern portion of Wetland 4 draining north into Pine Swamp, a tributary to the Halfway River. Wetland 1 and the southern portion of Wetland 4 drain south into the West Branch of the Pequonnock River. General characteristics of the four wetlands are described below:

Wetland 1: a large seasonally-flooded to seasonally-saturated wooded swamp with an unnamed 1<sup>st</sup>-order (a.k.a. headwater) perennial stream embedded within the southern end of the wetland. Wetland 1 drains south to the West Branch of the Pequonnock River. The wetland lies in a broad drainageway west of the existing site work and east of Enterprise Drive. There is an embedded (a.k.a. cryptic) vernal pool in the southern portion of the wetland. Wetland 1 is hydrologically contiguous with Wetland 4. The wetland is fragmented by Cambridge Drive which is the access road to the ongoing site work, and the road

construction coupled with the mining activities has resulted in sediment deposition in the wetland in areas immediately adjacent to the existing crossing. Wind-blown fines from mining activity were also present, coating vegetation and the ground surface.

Wetland 2: a headwater wooded swamp with intermittent stream, flowing north into Pine Swamp. The wetland contains embedded “cryptic” vernal pools, hummocky microtopography and a dense shrub layer. Wetland 2 is hydrologically connected to Wetland 4 offsite to the north. Despite the close proximity of the ongoing site work, no significant wetland disturbance was observed. The vegetation and ground in the southern portion of the wetland was coated with wind-blown fines from mining activity.

Wetland 3: an isolated, seasonally-flooded and deeply ponded wooded swamp and vernal pool. Portions of the wetland have a dense shrub layer. The wetland lies in a confined basin situated between Wetlands 2 and 4 and likely has a perched water table.

Wetland 4: a large wooded swamp that lies on a watershed divide, with the northern portions of the wetland draining north to Pine Swamp and the southern portions of the wetland draining south into the West Branch of the Pequonnock River. The wetland includes intermittent channels at both the northern and southern ends, and areas of the wetland have a dense shrub layer. The northern portion of the wetland contains an embedded vernal pool.

### **3.0 WETLAND VEGETATION**

Wetlands consist of palustrine forested wetlands or “wooded swamps”. Vegetation consists of Red Maple (*Acer rubrum*) with American Elm (*Ulmus americana*), Yellow Birch, Green Ash (*Fraxinus pensylvanica*), Ironwood, and Black Gum (*Nyssa sylvatica*) in the tree layer. The shrub layer is mostly moderately dense to dense except for some ponded wet depressions and vernal pools where the shrub layer is restricted to the edges and hummocks. The shrub layer consists predominantly of Spicebush (*Lindera benzoin*), Sweet Pepperbush (*Clethra alnifolia*), Winterberry (*Ilex verticillata*), and Highbush Blueberry (*Vaccinium corymbosum*) with Speckled Alder (*Alnus rugosa*), Silky Dogwood (*Comus amomum*) and Northern Arrow-wood (*Viburnum recognitum*). The scattered vine layer is chiefly Fox Grape. The herb layer is relatively dense except for streambeds and ponded areas and consists primarily of Skunk Cabbage (*Symplocarpus foetidus*), Tussock Sedge (*Carex stricta*), Cinnamon Fem (*Osmunda cinnamomea*), Sensitive Fem (*Onoclea sensibilis*) with Canada Mayflower and Northern White Violet (*Viola pa/lens*).

### **4.0 UPLAND VEGETATION**

Upland vegetation consists of mixed hardwood forest. The tree canopy is nearly continuous and the average diameter at breast height of less than one foot. Dominant tree species are Black Birch (*Betula lenta*), Yellow Birch (*Betula lutea*), White Oak (*Quercus alba*), Scarlet Oak (*Quercus coccinea*), Black Oak (*Quercus velutina*), Ironwood (*Carpinus caroliniana*) with American Beech (*Fagus grandifolia*) and Shagbark Hickory (*Carya ovata*). The vine layer is mostly Fox Grape. The shrub layer is relatively open with scattered, low-growing thickets of Black Huckleberry (*Gaylussacia baccata*), Early Lowbush Blueberry (*Vaccinium vacil/ans*), and Maple-leaved Viburnum (*Viburnum acerifolium*). The open herb layer consists mainly of Canada Mayflower (*Maianthemum canadense*), Pennsylvania Sedge (*Carex pensylvanica*), Hay-

scented Fern (*Dennstaedtia punctiloba*), Tree Clubmoss (*Lycopodium obscurum*), Trailing Clubmoss (*Lycopodium complanatum*), Poison Ivy, Virginia Creeper, and White Wood Aster (*Aster divaricatus*).

## 5.0 VERNAL POOL SURVEY RESULTS

Four vernal pools occur on the site as noted on Figure 2. Pools 1, 2 and 4 were identified as vernal pools in the previous study, and they each continue to support two indicator species, wood frog (*Rana sylvatica*) and spotted salamander (*Ambystoma maculatum*). The most productive pool observed was Pool 2, as this pool had a robust wood frog breeding chorus and large numbers of both wood frog and spotted salamander egg masses (>100) were observed.

Pool 3 was identified as a vernal pool in the previous study of the overall Pepper Street Business Park development, as it contained breeding by indicator amphibians. However, no amphibian breeding was observed during this survey. Due to the deep, very dark tannic water, egg masses may have been overlooked, and follow-up dip-net surveys are recommended in June. One uncommon invertebrate indicator species, fairy shrimp (*Anostraca sp.*), was observed. Based on the hydrology, the presence of fairy shrimp, the past EPS survey data, and its proximity to Pools 2 and 4 we believe it is highly likely that Pool 3 continues to support breeding of indicator amphibians, at least during some years.

One facultative species, the spring peeper (*Pseudacris crucifer*) was observed in or adjacent to all vernal pools. Other facultative species present on the site as observed in the previous survey are four-toed salamander (*Hemidactylium scutatum*) and gray treefrog (*Hyla versicolor*).

In order to assess these pools qualitatively, the methodology described in *Best Development Practices: Conserving Pool Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States* (Calhoun and Klemens, 2002) was used. This assessment methodology utilizes a three-tiered rating system, with the tier designation determined by examining the biological value of the pool in conjunction with the condition of the habitat surrounding the pool, which is the area used by vernal pool amphibians during the non-breeding season (Calhoun and Klemens, 2002, p. 9). The higher the species diversity and abundance coupled with an unfragmented forested corridor surrounding the pool, the higher the tier rating. Pools 1, 2 and 4 meet the *biological* criteria of a Tier I or highest quality pool (BDP, p 9, Section A). This is due to the fact that they all contained breeding by both wood frogs and spotted salamanders.

Although no breeding amphibians were observed in Pool 3 it was also considered a Tier I pool due to the presence of fairy shrimp (an indicator species) and the presence of breeding amphibians during the previous survey. Additionally, the pool had suitable hydrology and showed no signs of disturbance from the previously observed condition. The deep tannic water easily obscures egg masses and the early-season survey period did not allow for larval observations. Should a follow-up dip-netting survey be conducted, it has a high likelihood of yielding amphibian larvae. If amphibians proved to be absent, a possible scenario is that this pool is used for breeding by amphibians periodically as opposed to annually, as is sometimes the case when multiple pools occur close together on an interconnected landscape (i.e., meta-population dynamics).

Analysis of the landscape condition (BDP, p. 9, Section B) would be required to complete the full BDP analysis and this was not conducted as it was beyond the scope of this assessment. A preliminary review of 2012 aerial photography suggests that there is sufficient forestland surrounding the pools to classify them all as Tier I pools.

## 6.0 NATURAL DIVERSITY DATABASE REVIEW & STATE-LISTED SPECIES

The Connecticut Department of Energy and Environmental Protection's Natural Diversity Database program represents current documented data showing the known locations of any state or federally listed endangered, threatened or special concern species or areas designated as "significant natural communities". The most recent maps, dated December, 2013 were reviewed. No natural diversity database records occur on the site. Based on field surveys conducted previously, one state-listed species of special concern, the eastern box turtle (*Terrapene c. carolina*) is known to occur in the vicinity of the site. A single female turtle was observed on June 21, 2002, prior to the development of Pepper Street Business Park. The turtle was located within habitat now occupied by Enterprise Drive and commercial buildings. Our field surveys were conducted too early in the season (prior to May) to observe active box turtles, but suitable habitat exists throughout the site.

## 7.0 WETLAND FUNCTIONS AND VALUES ASSESSMENT

Over the last three decades, ecologists, wetland scientists, biologists, hydrologists, and environmental engineers have recognized not all wetlands perform the same functions, or provide the same values for their various functions.

There are many methods of evaluating wetlands and these methods have often chosen different parameters to evaluate. This study uses *The Highway Methodology Workbook Supplement, Wetland Functions and Values: A Descriptive Approach* (1995) issued by the US Army Corps of Engineers New England District (ACOE NED). This evaluation provides a qualitative approach in which wetland functions can be considered principal, secondary, or unlikely to be provided at a significant level. Functions and values can be principal if they are an important physical component of a wetland ecosystem (function only), and/or are considered of special value to society, from a local, regional, and/or national perspective. The ACOE NED recommends that wetland values and functions be determined through "best professional judgment" based on a qualitative description of the physical attributes of wetlands and the functions and values exhibited.

The Highway Methodology recognizes the following 13 separate wetland functions and values: groundwater recharge/discharge, floodwater storage, fish and shellfish habitat, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, sediment/shoreline stabilization, wetland wildlife habitat, recreational value, educational/scientific value, uniqueness, visual/aesthetic quality and threatened and endangered species habitat.

The degree to which a wetland provides each of these functions is determined by one or more of the following factors: landscape position, substrate, hydrology, vegetation, history of disturbance, and size. Each wetland may provide one or more of the listed functions at significant levels.

The determining factors that affect the level of function provided by a wetland can often be broken into two categories. The *effectiveness* of a wetland to provide a specified function is generally dependent on factors within the wetland whereas the *opportunity* to provide a function is often influenced by the wetland's position in the landscape as well as adjacent land uses. Functions and values are summarized in Table 2 and discussed in Section 7.1.

Table 2: Summary of wetland functions and values, Cambridge and Independence Drive

Wetland	Groundwater Recharge/Discharge	Sediment/Shoreline Stabilization	Floodflow Alteration	Fish & Shellfish Habitat	Sediment/Toxicant/Pathogen Retention	Nutrient Removal/Attenuation	Production Export	Wildlife Habitat	Recreation	Educational/Scientific Value	Uniqueness/Heritage	Visual Quality/Aesthetics	Listed Species Habitat
Wetland 1	P	U	P	U	P	P	S	P	U	S	S	S	U
Wetland 2	P	U	P	U	P	P	S	P	U	S	S	S	U
Wetland 3	U	U	U	U	U	U	S	P	U	S	S	S	U
Wetland 4	P	U	P	U	P	P	S	P	U	S	S	S	U
<u>Suitability</u> P = principal function S = secondary function U = function unlikely to be provided at a significant level													

## 7.1 Wetland Functions and Values Discussion

Wetlands 1, 2 and 4 are all large, long-hydroperiod headwater wetlands located in the upper portions of the watershed, and therefore they play an important role in floodwater storage. These three wetlands also provide significant pollutant (e.g., sediment) and nutrient capture and attenuation function. Wetland wildlife habitat was identified as a principal function for all wetlands due to the fact that they provide breeding habitat for obligate vernal pool wildlife. With the exception of wetland wildlife habitat function, the overall functions and values provided by Wetland 3 are limited due to its small size and the fact that it is isolated (physically and hydrologically) from other wetlands.

The functions and values of Wetlands 1, 2 and 4 have been diminished slightly, but not adversely, as a result of the development of the Business Park and ongoing site work. That development resulted in forest fragmentation, reduced wetland connectivity and loss of habitat in the wetland buffer (i.e., uplands surrounding the wetlands), with the primary result being a reduction in wildlife habitat function with limited diminution of other functions. The diminished wildlife value is attributable to the scale of development and the loss of habitat connectivity rather than direct loss of wetland habitat, and is not unique but commensurate with other developments of this scale.

The ongoing site work (and unpaved access road) have resulted in the deposition of water-borne and wind-blown sediment in the lower portions of Wetland 1 (adjacent to Cambridge Drive) and the southern portions of Wetland 4. These discharges were discrete rather than large scale and have not resulted in a loss of total wetland area. No deliberate, machine-deposited fill was observed. Comparing the previously delineated wetland boundary with the recently delineated wetland boundary confirms that these boundaries are fundamentally the same (see “Wetland Comparison Plan”, sheet C-2, prepared by Solli Engineering, dated 5/30/14). Most importantly, there has been no significant adverse impact on these wetlands. They remain high functioning and important resources in the Halfway River and West Branch Pequonnock River watersheds.

**FIGURES 1 and 2**

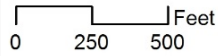


**FIGURE 1**  
**Location Map**  
**Cambridge &**  
**Independance Dr**  
**Monroe, CT**

 Study Area

2012 aerial photograph (source: USDA) illustrating the extent of the study area, with wetland numbers indicated in yellow. Streams are indicated in blue. This map is intended for general planning purposes only. It contains no authoritative data.

SCALE

 Feet

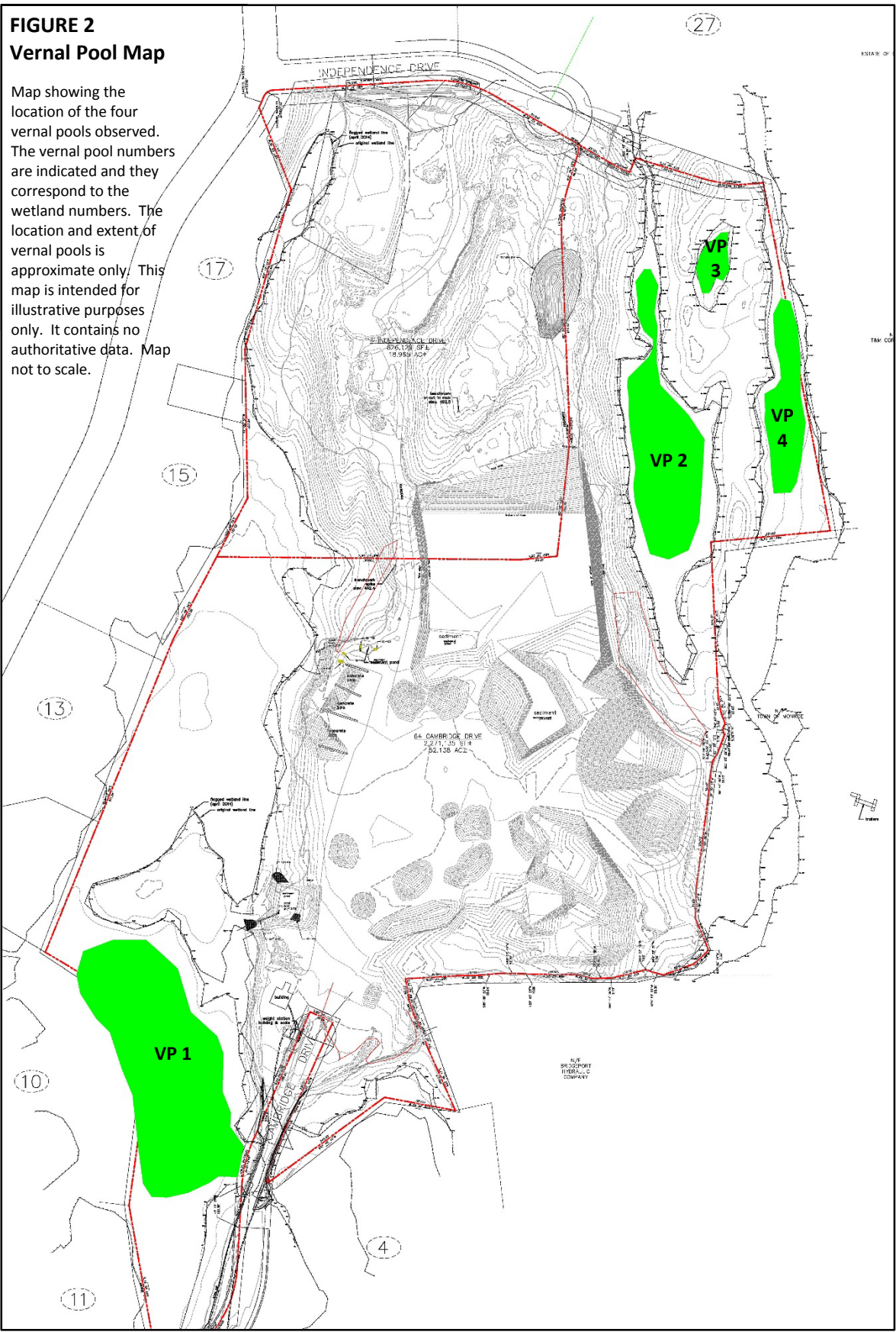
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Environmental Planning Services  
 89 Belknap Road  
 West Hartford, CT 06117  
 860-236-1578  
 www.epsect.com

**FIGURE 2**  
**Vernal Pool Map**

Map showing the location of the four vernal pools observed. The vernal pool numbers are indicated and they correspond to the wetland numbers. The location and extent of vernal pools is approximate only. This map is intended for illustrative purposes only. It contains no authoritative data. Map not to scale.



**APPENDIX B:**

**WKA Delineation Report:  
64 Cambridge Drive & 4 Independence Drive,  
Monroe, Connecticut**

February 12, 2020

Mr. Arnold Karp  
Karp Associates, Inc.  
16 Cross Street  
New Canaan, CT 06840

Re: Wetland and Watercourse Delineation  
64 Cambridge Drive & 4 Independence Drive, Monroe, Connecticut

Dear Mr. Karp:

As requested, we visited the referenced properties to determine the presence or absence of wetlands and/or watercourses, to demarcate (flag) the boundaries of wetlands and watercourses identified, and to identify onsite soil types. This letter includes the methods and results of our investigations, which we completed, January 31, February 3 and February 12, 2020. In summary, three inland wetland and watercourse systems were identified and delineated. The systems, which are located in the northeastern portion of the property and along the western and southern property boundaries, are forested wetlands.

### ***Regulatory Definitions***

The Inland Wetlands and Watercourses Act (Connecticut General Statutes §22a-38) defines inland wetlands as “land, including submerged land...which consists of any soil types designated as poorly drained, very poorly drained, alluvial, and floodplain.” Watercourses are defined in the act as “rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, vernal or intermittent, public or private, which are contained within, flow through or border upon the state or any portion thereof.” The Act defines Intermittent Watercourses as having a defined permanent channel and bank and the occurrence of two or more of the following characteristics: A) evidence of scour or deposits of recent alluvium or detritus, B) the presence of standing or flowing water for a duration longer than a particular storm incident, and C) the presence of hydrophytic vegetation.

### ***Methodology***

A second order soil survey in accordance with the principles and practices noted in the USDA publication *Soil Survey Manual* (1993) was completed at the subject site. The classification system of the National Cooperative Soil Survey was used in this investigation. Soil map units identified at the project site generally correspond to those included in the *Soil Survey of the State of Connecticut* (USDA 2005).

Wetland determinations were completed based on the presence of poorly drained, very poorly drained, alluvial, or floodplain soils and submerged land (e.g. a pond). Soil types were identified by observation of soil morphology (soil texture, color, structure, etc.). To observe the morphology of the property's soils, test pits and/or borings (maximum depth of two feet) were completed at the site.

Intermittent watercourse determinations were made based on the presence of a defined permanent channel and bank and the occurrence of two or more of the following characteristics: A) evidence of scour or deposits of recent alluvium or detritus, B) the presence of standing or flowing water for a duration longer than a particular storm incident, and C) the presence of hydrophytic vegetation.

Wetland boundaries were demarcated (flagged) with pink surveyor's tape (hung from vegetation) or small flags (on wire stakes) labeled "William Kenny Associates" that are generally spaced a maximum of every 50 feet. Complete boundaries are located along the lines that connect these sequentially numbered flags. The wetland boundaries are subject to change until adopted by local, state, or federal regulatory agencies.

### ***Results***

The approximate 72.1-acre commercial properties are located at 64 Cambridge Drive and 4 Independence Drive in Monroe, Connecticut. Cambridge Drive borders the southern property boundary and Independence Drive borders the northern property boundary. Property improvements include several buildings and paved and unpaved drives and access and stockpile areas. The majority of the property is unvegetated. The vegetative cover in the southwestern, northeastern and central-western portions of the property and along the southern, southeastern and northwestern boundaries is a broadleaved deciduous forest. A meadow is present in the northwestern corner of the property. During the review, the sky was partly cloudy to cloudy and air temperatures were in the 30's ° F to 40's ° F.

Three inland wetland and watercourse systems were identified and delineated. The systems, which are located in the northeastern portion of the property and along the western and southern property boundaries, are forested wetlands. Wetland soils are primarily poorly drained fine sandy loams that formed from glacial till deposits. The approximate locations of the systems are shown on the attached map. The boundaries of the systems were marked at the site with flags numbered 1 to 44A, 20 to 98, 100 to 261, 280 to 304, 310 to 313, 320 to 357 and 360 to 364.

Seven soil map units were identified on the property (three wetland and four upland). Each map unit represents a specific area on the landscape and consists of one or more soils for which the unit is named. Other soils (inclusions that are generally too small to be delineated separately) may account for 10 to 15 percent of each map unit. The mapped units are identified in the following table by name

and symbol and typical characteristics (parent material, drainage class, high water table, depth to bedrock, and slope). These characteristics are generally the primary characteristics to be considered in land use planning and management. A description of each characteristic and their land use implications follows the table. A complete description of each soil map unit can be found in the *Soil Survey of the State of Connecticut* (USDA 2005), and at <https://soilseries.sc.egov.usda.gov/osdname.aspx>. During the review, there was no soil frost and no snow cover. The upland soil was moist and the wetland soil was wet to inundated.

<u>Map Unit</u> <u>Sym.</u>	<u>Name</u>	<u>Parent Material</u>	<u>Slope (%)</u>	<u>Drainage Class</u>	<u>High Water Table</u>			<u>Depth To Bedrock (in)</u>
					<u>Depth (ft)</u>	<u>Kind</u>	<u>Mos.</u>	
<b><u>Upland Soil</u></b>								
50	Sutton fine sandy loam	Loose Glacial Till	3-8	Moderately Well Drained	1.5-3.5	Apparent	Nov-Apr	>60
60	Canton and Charlton Fine sandy loam	Loose Glacial Till	0-15	Well Drained	>6.0	--	--	>60
		Loose Glacial Till	0-15	Well Drained	>6.0	--	--	>60
303	Pits	Properties and characteristics are variable						
308	Udorthents, Smoothed	Excavated or Filled Soil (>2 feet)	0-45	Well Drained to Somewhat Poorly Drained	1.5->6.0	Apparent	Nov-May	>60
<b><u>Wetland Soil</u></b>								
3	Ridgebury	Compact Glacial Till	0-8	Poorly Drained	0.0-1.5	Perched	Nov-May	>60
	Leicester	Loose glacial Till	0-3	Poorly Drained	0.0-1.5	Apparent	Nov-May	>60
	Whitman extremely stony fine sandy loam	Compact Glacial Till	0-3	Very Poorly Drained	0.0-1.5	Perched	Sep-Jun	>60
4	Leicester fine sandy loam	Loose glacial Till	0-3	Poorly Drained	0.0-1.5	Apparent	Nov-May	>60
17	Timakwa Natchaug Soils	Organic Material	0-2	Very Poorly Drained	+1-1.0	Apparent	Oct-Jun	>60

Parent material is the unconsolidated organic and mineral material in which soil forms. Soil inherits characteristics, such as mineralogy and texture, from its parent material. Glacial till is unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice. Glacial outwash consists of gravel, sand, and silt, which are commonly stratified and deposited by glacial melt water. Alluvium is material such as sand, silt, or clay, deposited on land by streams. Organic deposits consist of decomposed plant and animal parts.

A soil's texture affects the ease of digging, filling, and compacting and the permeability of a soil. Generally sand and gravel soils, such as outwash soils, have higher permeability rates than most glacial till soils. Soil permeability affects the cost to design and construct subsurface sanitary disposal facilities and, if too slow or too fast, may preclude their use. Outwash soils are generally excellent sources of natural aggregates (sand and gravel) suitable for commercial use, such as construction sub base material. Organic layers in soils can cause movement of structural footings. Compacted glacial

till layers make excavating more difficult and may preclude the use of subsurface sanitary disposal systems or increase their design and construction costs if fill material is required.

Generally, soils with steeper slopes increase construction costs, increase the potential for erosion and sedimentation impacts, and reduce the feasibility of locating subsurface sanitary disposal facilities.

Drainage class refers to the frequency and duration of periods of soil saturation or partial saturation during soil formation. Seven classes of natural drainage classes exist. They range from excessively drained, where water is removed from the soil very rapidly, to very poorly drained, where water is removed so slowly that free water remains at or near the soil surface during most of the growing season. Soil drainage affects the type and growth of plants found in an area. When landscaping or gardening, drainage class information can be used to assure that proposed plants are adapted to existing drainage conditions or that necessary alterations to drainage conditions (irrigation or drainage systems) are provided to assure plant survival.

High water table is the highest level of a saturated zone in the soil in most years. The water table can affect the timing of excavations; the ease of excavating, constructing, and grading; and the supporting capacity of the soil. Shallow water tables may preclude the use of subsurface sanitary disposal systems or increase design and construction costs if fill material is required.

The depth to bedrock refers to the depth to fixed rock. Bedrock depth affects the ease and cost of construction, such as digging, filling, compacting, and planting. Shallow depth bedrock may preclude the use of subsurface sanitary disposal systems or increase design and construction costs if fill material is required.

### ***Conclusions***

Today, we investigated the properties at 64 Cambridge Drive and 4 Independence Drive in Monroe, Connecticut and identified and delineated three inland wetland and watercourse systems. Thank you for the opportunity to assist you. If you should have any questions or comments, please do not hesitate to contact us.

Sincerely,

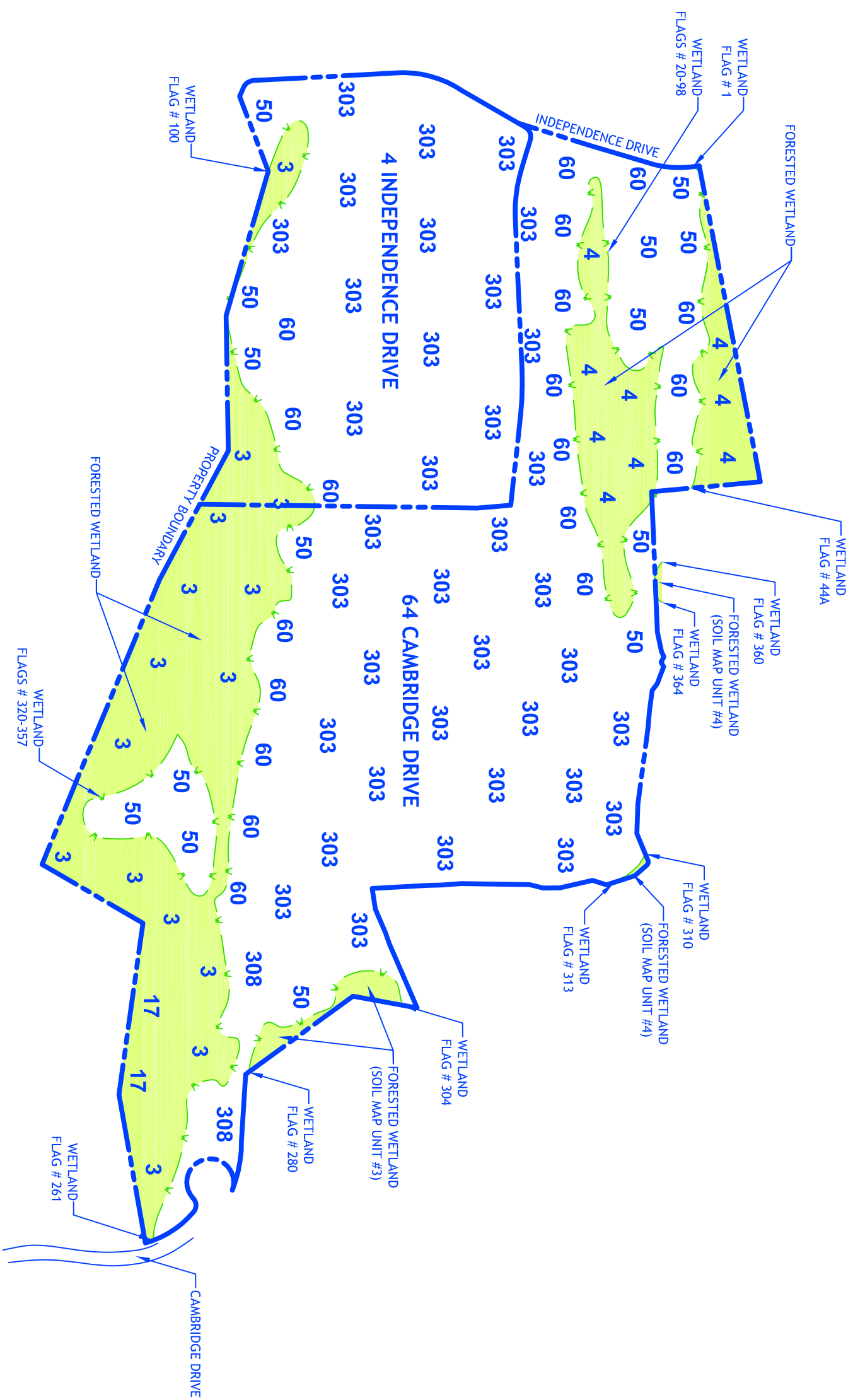
A handwritten signature in cursive script that reads "William L. Kenny". The signature is written in black ink and is positioned below the word "Sincerely,".

William L. Kenny, PWS, PLA  
Soil Scientist

Enclosure

**SOIL LEGEND:**

- UPLAND:**  
 50 SUTTON FINE SANDY LOAM  
 60 CANTON AND CHARLTON FINE SANDY LOAM  
 303 PITS  
 308 UDORTHERNTS, SMOOTHED
- WETLAND:**  
 3 RIDGEBURY, LEICESTER AND WHITMAN SOILS  
 4 LEICESTER FINE SANDY LOAM  
 17 TIMAKVA NATCHAUG SOILS



- NOTES:**
- INFORMATION SHOWN ON THIS DRAWING, INCLUDING THE WETLAND BOUNDARY, IS APPROXIMATE. THE BOUNDARY IS NOT A SURVEYED REPRESENTATION OF WHAT WAS FIELD MARKED (FLAGGED).
  - WETLAND AND SOIL INFORMATION PROVIDED BY WILLIAM KENNY ASSOC. OTHER INFORMATION TAKEN FROM A DRAWING PREPARED BY ACCURATE.
  - LAND SURVEYING:  
 50, 60 303, 308, 3, 4 AND 17 ARE SOIL MAPPING UNIT SYMBOLS. SEE WETLAND DELINEATION REPORT FOR THE SOIL MAP UNIT NAMES AND ADDITIONAL RELATED INFORMATION.

I CERTIFY THAT THIS WETLAND MAP  
 SUBSTANTIALLY REPRESENTS THE SOILS  
 AND WETLANDS MAPPED IN THE FIELD

*William L. Kenny*  
 WILLIAM L. KENNY, SOIL SCIENTIST

**WILLIAM KENNY  
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**WETLAND & WATERCOURSE MAP**

**64 CAMBRIDGE DRIVE &  
 4 INDEPENDENCE DRIVE  
 MONROE, CONNECTICUT**

SCALE: NOT TO SCALE  
 DATE: FEBRUARY 12, 2020

Ref. No. 4414

