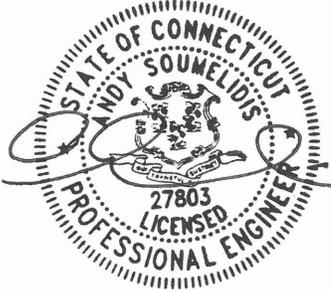


<p>STORMWATER MANAGEMENT</p> <p>REPORT</p> <p>for</p> <p>6 Manitou Court</p> <p>Westport, CT</p> <p>May 12, 2020</p> <p>Rev. August 28, 2020</p>	
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Narrative:

The owner of 6 Manitou Court, Westport, CT proposes to elevate, renovate, and construct an addition to an existing single-family residence, expand an existing driveway, and construct a new patio, pervious driveway and related improvements on a previously developed property. Improvements are limited to the areas related to the construction of the above-listed structures and lawn areas as shown on the site plans prepared by LANDTECH.

The property is 1.297± acres in size up to Mean High Water, it is located to the south of the intersection of Manitou Court and Manitou Road. The property is bordered by Saugatuck River to the west.

The NRCS soils map shows the site to be mainly Charlton Chatfield complex, a well-drained soil in Hydrologic Soil Group B. The site also contains Hollis-Chatfield rock outcrop complex which is a poorly drained soil in Hydrologic Soil Group D. Deep test results confirm the hydrologic rating of this area. As per the Town of Westport Stormwater Drainage Design Standards, the proposed drainage systems shall be set no lower than elevation 5.0. No infiltration volume was used in sizing the proposed pervious driveway for the required water quality volume but a percolation test was performed in the vicinity of the proposed driveway (1" in 10 min.). It is assumed that the underlying soils will allow the detained stormwater to infiltrate within 72 hours, per CT DEEP guidance (requires a 0.02"/hour infiltration rate).

The property drains to the Saugatuck River, therefore, no reduction of the discharge rate for the 25-year storm event is proposed, only water quality for the proposed impervious areas. For the purposes of determining the water quality volume the property has been split into 3 subareas. Water quality drainage area 1 includes a portion of the driveway and pervious driveway will be routed through a portion of the proposed pervious driveway via sheet flow. Water quality drainage area 2 includes the remainder of the driveway and pervious driveway, enclosed bridge and a portion of the proposed addition and will be routed through a portion of the proposed pervious driveway via sheet flow, collection piping and roof leaders. As an additional measure a 4 ft downstream defender will be added with a sediment storage capacity of 0.7 cubic yards and a continuous oil storage capacity of 70 gallons. The downstream defender will further separate sediments and hydrocarbons from the runoff prior to discharge into the Saugatuck River. The downstream defender has been sized for the water quality flow.

Water quality drainage area 3 which includes the remainder of the proposed addition will discharge via collection piping and roof leaders to a proposed gravel trench which will overflow using a concrete lip and drain into the Saugatuck River matching existing conditions.

There is an existing catch basin located along the existing driveway that will be rerouted to discharge to a splash pad under the proposed reconstructed deck. The pervious pavement will overflow to the rerouted pipe and discharge to the splash pad which will then drain to the Saugatuck River matching existing

conditions. The existing residence to be elevated and the wood deck to be renovated are existing impervious areas that are to remain and have not been modeled for water quality.

The proposed pervious driveway and gravel trench have all been sized based on the required water quality volume for each area. Water quality volume (WQv) calculations are attached herewith and made part of this report.

Table 1 summarizes the required and proposed water quality volumes.

TABLE 1 – TOTAL WATER QUALITY VOLUME (WQv)		
	PRE-DEV/ REQUIRED	POST DEV/ PROVIDED
WATER QUALITY-DA-1	359.37 CF	388.80 CF
WATER QUALITY-DA-2	306.01 CF	324.80 CF
WATER QUALITY-DA-3	113.80 CF	120.39 CF
TOTAL WQv	779.18 CF	833.99 CF
WATER QUALITY FLOW (25 YEAR STORM)	1.6 cfs	3.0 cfs

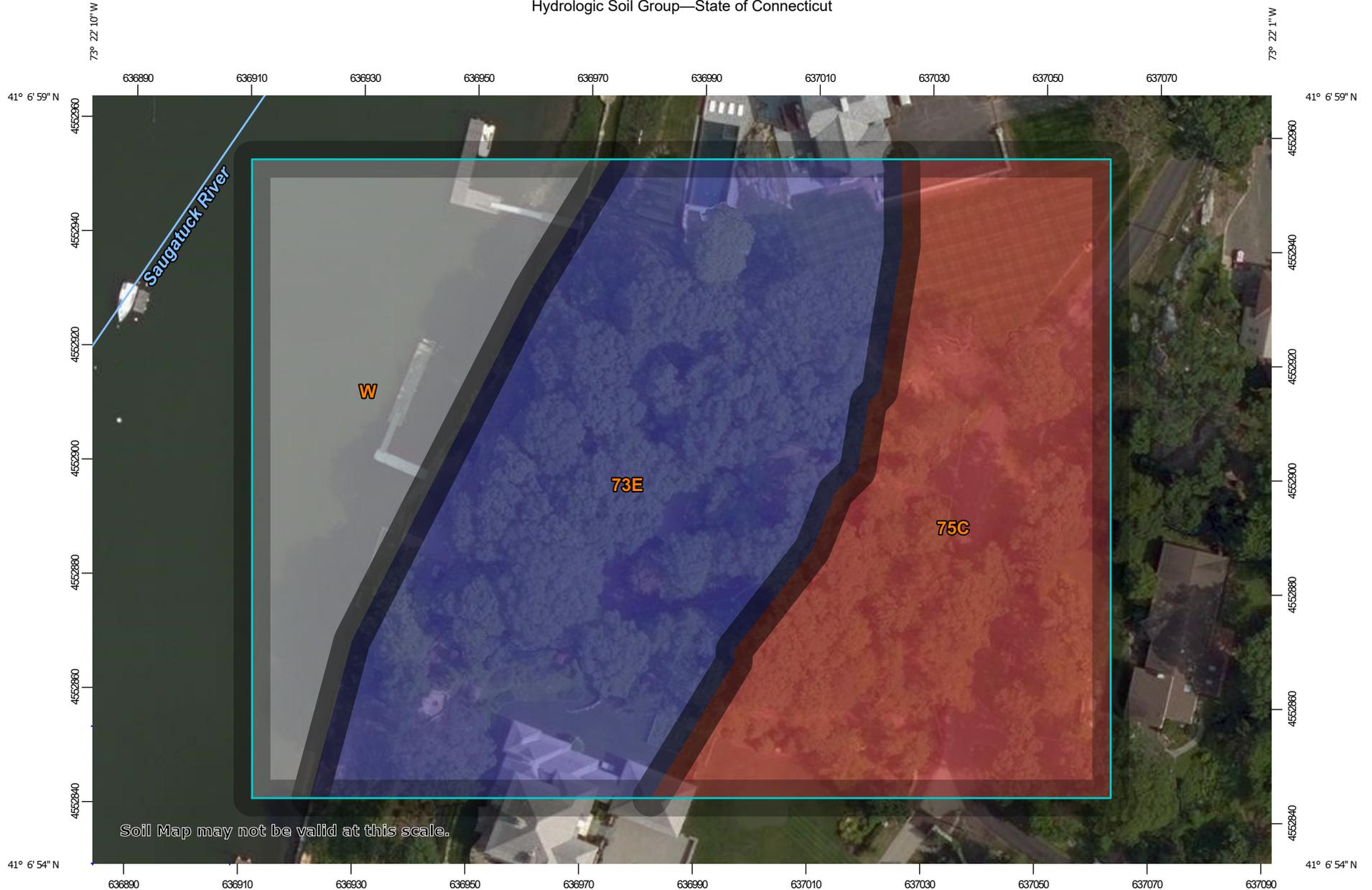
It is our professional opinion that upon construction of the proposed improvements, water quality will be improved in accordance with the rules and regulations of the Town of Westport.

Exhibits:

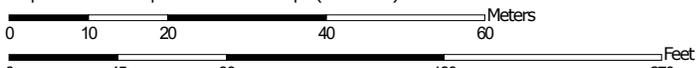
- NRCS Soils Report;
- Water Quality Volume (WQv) Calculations;

NRCS Soils Report

Hydrologic Soil Group—State of Connecticut



Map Scale: 1:948 if printed on A landscape (11" x 8.5") sheet.



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



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
 Survey Area Data: Version 19, Sep 13, 2019

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

Date(s) aerial images were photographed: Jul 21, 2014—Aug 27, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	B	1.8	43.9%
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	D	1.4	34.1%
W	Water		0.9	22.0%
Totals for Area of Interest			4.2	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Water Quality Volume Calculations

Project: **6 Manitou Court**
Westport, CT

By: **SM**
Checked: **AS**

Date: **5/12/2020**
Revised:

1. Water Quality Volume Drainage Area 1

a. Compute volumetric runoff coefficient, R

$$R = 0.05 + 0.009(I)$$

Proposed

Total Drainage Area, <i>A</i>	0.378	acres
Total Proposed Impervious Area	0.089	acres
Percentage of Impervious Area, <i>I</i>	23.5%	
Runoff Coefficient, <i>R</i>	0.262	

b. Compute water quality volume, WQV

$$WQV = [(1")(R)(A)]/12$$

Total Project Area, <i>A</i>	0.378	acres	
Runoff Coefficient, <i>R</i>	0.262		
Water Quality Volume, <i>WQV</i>	0.008	acre-foot	
Water Quality Volume, <i>WQV</i>	359.37	cf	<i>Required</i>

Water Quality Provided:

Porous Asphalt Volume

Driveway Cross	
Sectional Area=	18 sf
Avg. Driveway Length=	54 ft
Voids=	40%
=	388.8 cf

Total WQV Provided	388.80	cf	<i>Provided</i>
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Water Quality Volume provided > required

Project: **6 Manitou Court**
Westport, CT

By: **SM**
Checked: **AS**

Date: **5/12/2020**
Revised: **7/23/2020**

1. Water Quality Volume Drainage Area 2

a. Compute volumetric runoff coefficient, R

$$R = 0.05 + 0.009(I)$$

Proposed

Total Drainage Area, <i>A</i>	0.318	acres
Total Proposed Impervious Area	0.076	acres
Percentage of Impervious Area, <i>I</i>	23.9%	
Runoff Coefficient, <i>R</i>	0.265	

b. Compute water quality volume, WQV

$$WQV = [(1")(R)(A)]/12$$

Total Project Area, <i>A</i>	0.318	acres	
Runoff Coefficient, <i>R</i>	0.265		
Water Quality Volume, <i>WQV</i>	0.007	acre-foot	
Water Quality Volume, <i>WQV</i>	306.01	cf	<i>Required</i>

Water Quality Provided:

Porous Asphalt Volume

Driveway Cross	
Sectional Area=	14 sf
Driveway Length=	58 ft
Voids=	40%
=	324.8 cf

Total WQV Provided	324.80	cf	<i>Provided</i>
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Water Quality Volume provided > required

Project: **6 Manitou Court**
Westport, CT

By: **SM**
Checked: **AS**

Date: **5/12/2020**
Revised: **7/23/2020**

1. Water Quality Volume Drainage Area 3

a. Compute volumetric runoff coefficient, R

$$R = 0.05 + 0.009(I)$$

Proposed

Total Drainage Area, <i>A</i>	0.033	acres
Total Proposed Impervious Area	0.033	acres
Percentage of Impervious Area, <i>I</i>	100.0%	
Runoff Coefficient, <i>R</i>	0.950	

b. Compute water quality volume, WQV

$$WQV = [(1")(R)(A)]/12$$

Total Project Area, <i>A</i>	0.033	acres
Runoff Coefficient, <i>R</i>	0.950	
Water Quality Volume, <i>WQV</i>	0.003	acre-foot
Water Quality Volume, <i>WQV</i>	113.80	cf <i>Required</i>

Water Quality Provided:

Gravel Trench Area Volume

15" Pipe Storage

Pipe Cross Section Area=	1.227	sf
Pipe Length=	44	ft
=	53.99	cf

 Trench Area= 110 sf

 Stone Depth= 2 ft

 Trench Volume= 220 cf

 Gravel Volume
(Trench Vol.-Pipe Vol.)= 166.01 cf

 Voids= 40%

 = 66.40 cf

Total WQV Provided	120.39	cf	<i>Provided</i>
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Water Quality Volume provided > required