

Storm Drainage Report

For
*21 Eastman Rd.,
Somerville, MA*



June 13, 2018

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Introduction

This report discusses the stormwater management system and analysis for the redevelopment at 21 Eastman Rd., in Somerville, MA.

The proposed redevelopment includes 2 residential units with a four car parking garage. The parcel is approximately 11,562 sf and is currently occupied by a small single family home. The new facility will be accessed from Eastman Rd.. New utilities are proposed to tie into the City's mains within Eastman Rd. The total disturbance is less than one acre; therefore, the NPDES General Permit is not required. The Stormwater Plan (attached) has been developed in accordance with the City's requirement to mitigate the difference between the 2 year existing conditions runoff and the 25 year proposed conditions.

Utilities

The proposed facility will have new utilities including, water, sewer and drainage, gas, electric and communications.

Water: A new 1.5" water service will extend from the main in Eastman Rd. to provide domestic water.

Sewer: A new 6" sewer service from the building will tie into the existing 6" service that is connected to the main in Eastwood Rd.

Electric/Telephone/Cable: New services to the facility will be via underground conduits from existing utility poles. Exact demarcations for these services will be per each private utility company.

Soil Evaluation

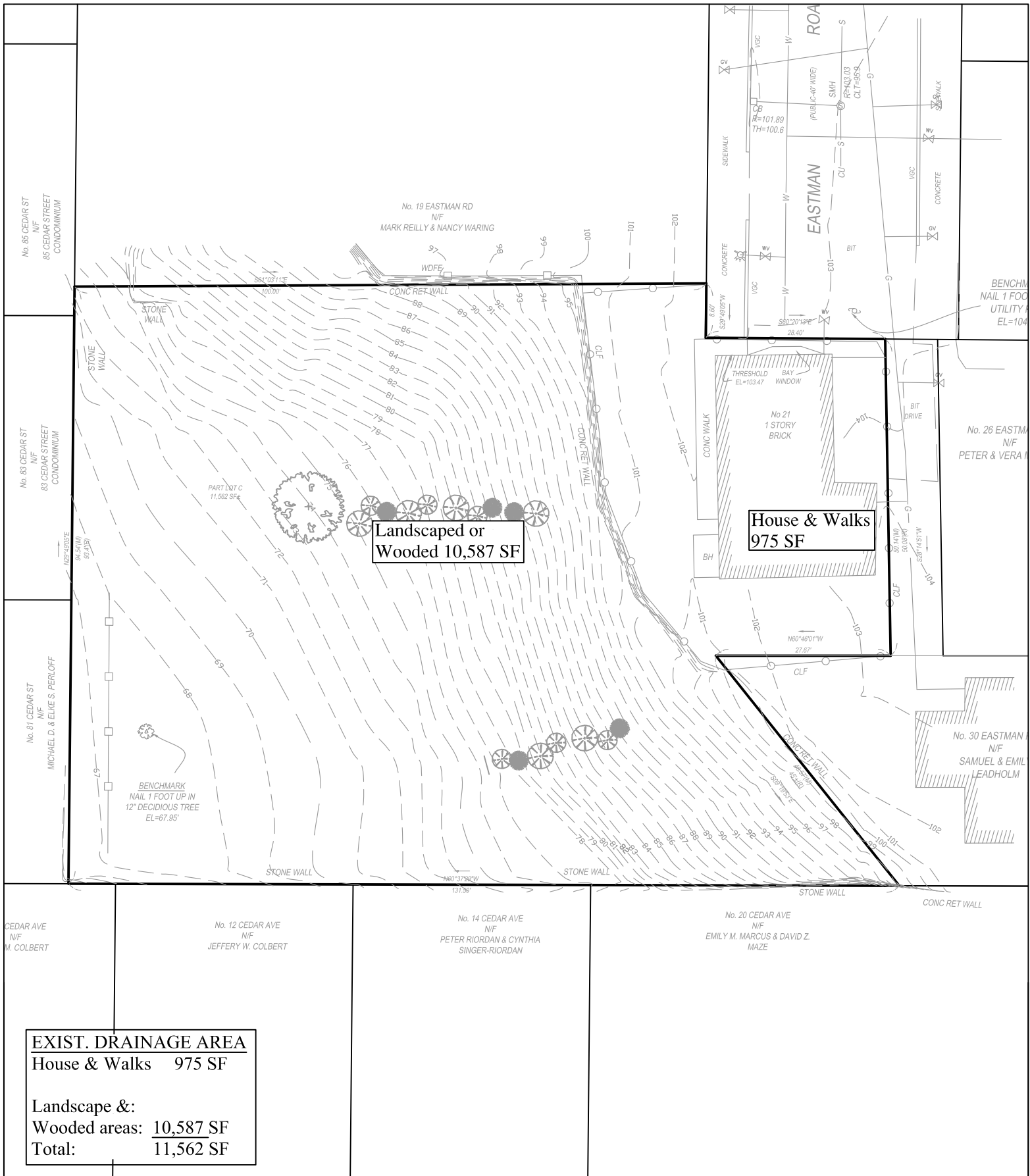
The Middlesex county soil survey lists this area as 626C – Newport - Urban Land. The soil description for Urban Land indicates a sandy loam material at the depth of the bottom of the infiltration system.

We do not anticipate any ground water issues or concerns.

For the purpose of the hydrocad analysis, we are assigning an exfiltration rate of 1.02 in/hr which is the Rawls rate for Sandy Loam (HSG B).

Stormwater Management

The new facility consists of one structure with several flat roof areas that will be pitched so that roof runoff is collected via area drains and piped internally to the proposed infiltration system. The small driveway area runoff will be collected via a trench drain and piped to a mini DMH with 2' sump for the removal of sediments and then directed to the infiltration system. The infiltration system consists of nine stormtech chambers embedded in a crushed stone bed. The system has been sized to store and infiltrate all runoff from the roof and driveway area for all storm events up to and including the 100 year (24 hour) event. These improvements along with the introduction of additional landscape features, will result in a decrease in both peak flows and volume (see attached sketches D-1 and D-2). The proposed storm water management system is



D-1

Existing Drainage Areas

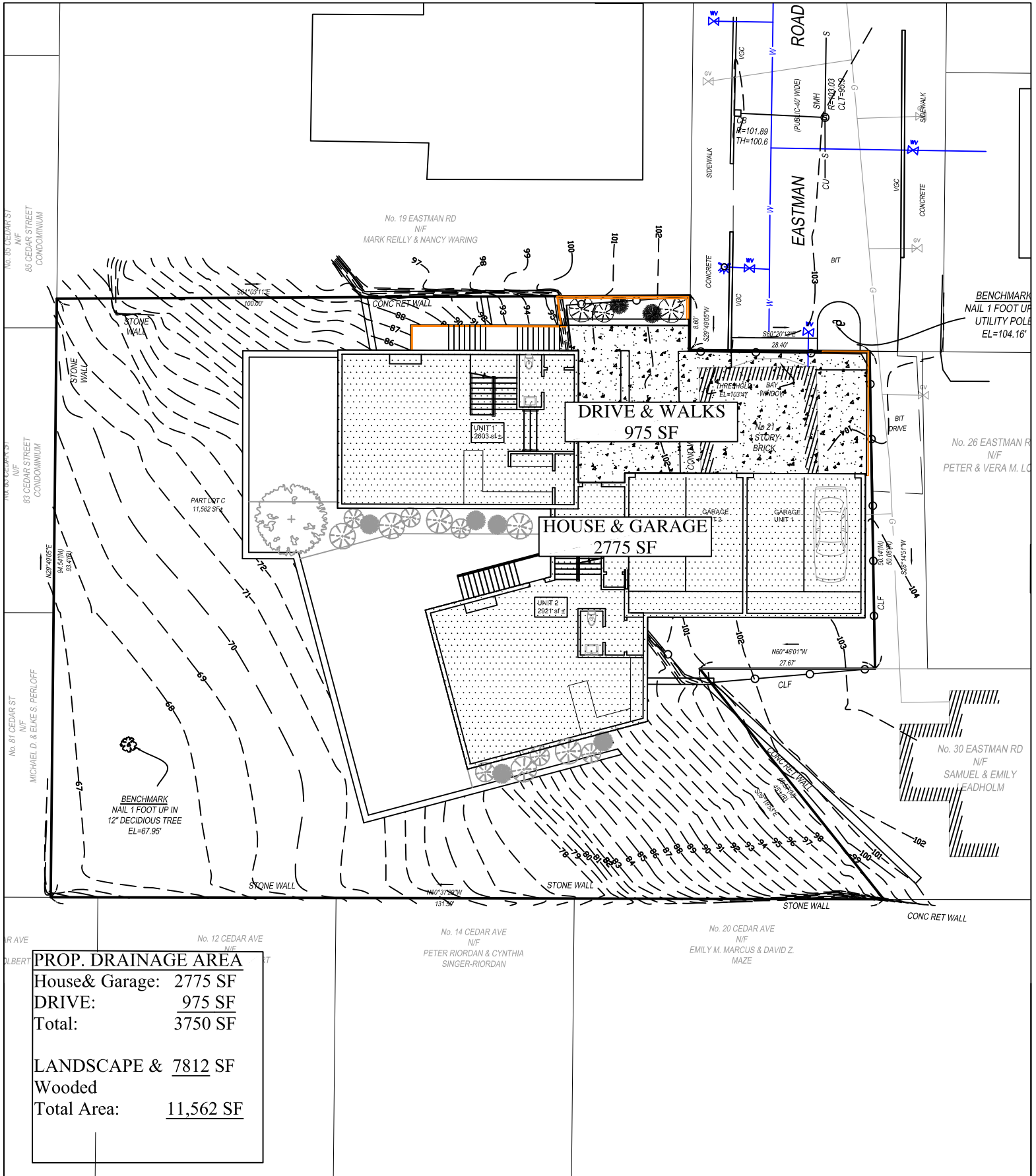
21 Eastman Rd.
Somerville, MA

Scale: 1=20'

Date: 6/13/18

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D-2

Proposed Drainage Areas

21 Eastman Rd.
Somerville, MA

Scale: 1"=20'

Date: 6/13/18

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designed to mitigate flow volumes and peak rates between the existing 2 yr (3.1") and proposed 25 yr (5.3" storm events).

Summary drainage calculations are provided below. The HyrdoCAD models are shown here for reference in comparing the 2 and 25 year events. The full reports are attached:

DRAINAGE CALCULATIONS

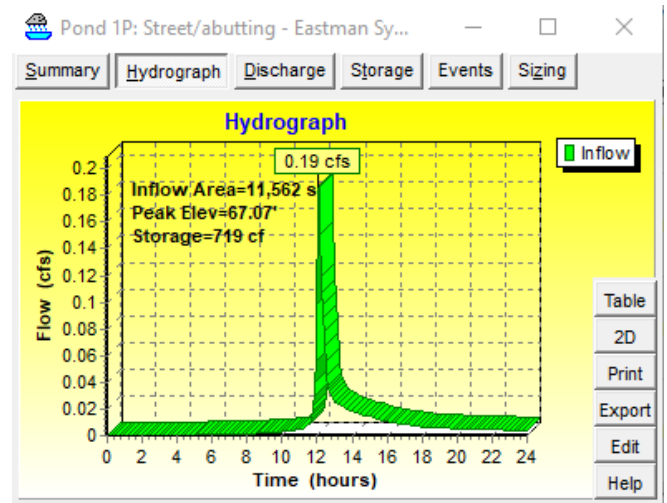
Storm drainage design - store the difference between the pre-construction 2 yr (3.1") 24 hour event and the post construction 25 yr (5.3") 24 hour event.

Existing & proposed ground surfaces are summarized on the D-1 & D-2 sheets below. There is an increase in impervious surfaces of approximately 2775 sf.

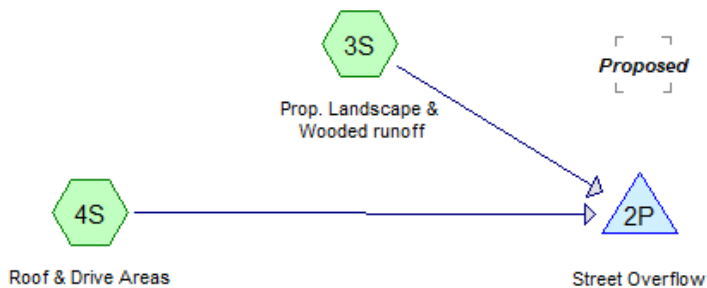
Existing Runoff



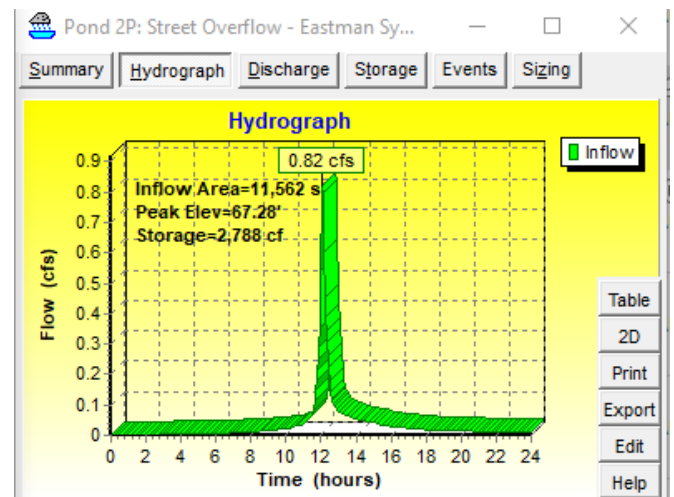
Runoff area is 11,562 sf
 2 yr Storm event:
 Volume 719 cf,
 Peak flow 0.19 cfs



Proposed Runoff (without mitigation)



Runoff area is 11,562 sf
14 Upham Avenue
Boston, MA 02125



25 yr Storm event:
Volume 2,788 cf,
Peak flow 0.82 cfs

Mitigation - Difference between the existing 2 yr and proposed 25 yr.

$2788 - 719 = 2069$ cf The required volume

Storage Provided:

System #1 1113 cf(available) Exfiltration (25 yr) 1038 cf

Total 2,151 cf Thus we exceed the required mitigation requirement of 2069 cf

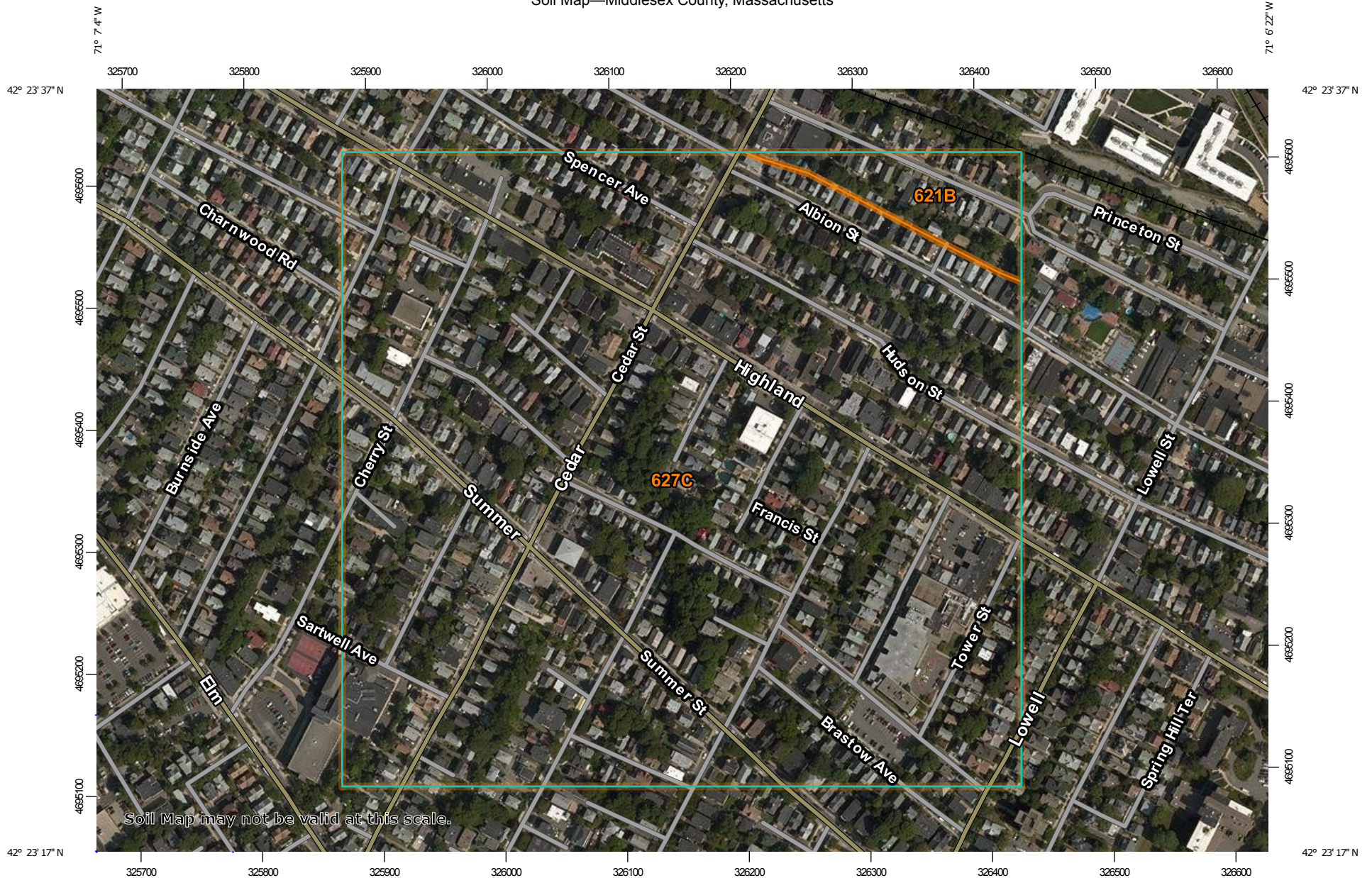
The following table summarizes the pre versus post runoff volumes and peak flows for storm events up to the 100 year.

Design Storm	Volume (cf)		Peak Flow (cfs)	
	Pre	Post	Pre	Post
2 year, 3.1"	719	357	0.19	0.09
10 year, 4.5"	1518	865	0.45	0.26
25 year, 5.3"	2047	1207	0.63	0.38
100 year, 6.5"	2906	1769	0.91	0.57

Conclusion

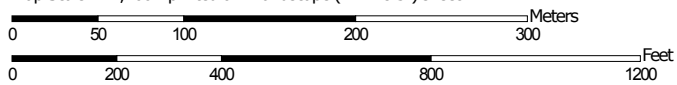
The proposed storm water management system provides onsite mitigation and improved landscaping. In doing so, it reduces runoff from the site in peak flow and in volume for all storm events when comparing pre construction conditions with post construction conditions.

Soil Map—Middlesex County, Massachusetts



Soil Map may not be valid at this scale.

Map Scale: 1:4,400 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

6/13/2018
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Middlesex County, Massachusetts

627C—Newport-Urban land complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9958

Mean annual precipitation: 45 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 145 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Newport and similar soils: 45 percent

Urban land: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newport

Setting

Landform: Drumlins, ridges, moraines

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Friable loamy basal till over dense loamy lodgment till derived from phyllite

Typical profile

H1 - 0 to 8 inches: channery fine sandy loam

H2 - 8 to 18 inches: channery silt loam

H3 - 18 to 24 inches: channery sandy loam

H4 - 24 to 65 inches: channery fine sandy loam

Properties and qualities

Slope: 8 to 20 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)

Depth to water table: About 18 to 21 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: D

Hydric soil rating: No

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Excavated and filled land

Minor Components

Udorthents, loamy

Percent of map unit: 10 percent

Hydric soil rating: No

Pittstown

Percent of map unit: 3 percent

Landform: Depressions, drumlins

Landform position (two-dimensional): Toeslope, backslope, shoulder

Landform position (three-dimensional): Base slope, nose slope, side slope

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

Paxton

Percent of map unit: 2 percent

Landform: Hillslopes

Landform position (two-dimensional): Backslope, summit

Landform position (three-dimensional): Head slope, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Data Source Information

Soil Survey Area: Middlesex County, Massachusetts

Survey Area Data: Version 17, Oct 6, 2017