Notice of Intent

Mattapan Station Drainage Improvements

Boston, MA

PREPARED FOR

Massachusetts Bay Transportation Authority
10 Park Plaza
Boston, MA 02116

PREPARED BY

101 Walnut Street
PO Box 9151
Watertown, MA 02471
617.924.1770

November 2022

November 30, 2022

Ref: 14841.18

Kate Oetheimer, Executive Director
Boston Conservation Commission
1 City Hall Square
Room 709
Boston, MA 02201

RE: Notice of Intent: Massachusetts Bay Transportation Authority Mattapan Station Drainage Improvements

Dear Executive Director Oetheimer and Commissioners,

On behalf of the Applicant, Massachusetts Bay Transportation Authority (MBTA), Vanasse Hangen Brustlin, Inc. (VHB) is submitting the enclosed Notice of Intent (NOI) for proposed work to resurface the existing pavement, convert a narrow strip of gravel lot to pavement, and perform associated stormwater management improvements (the Project) at the MBTA Mattapan Station located at Blue Hill Avenue, Boston, Massachusetts (the Project Site). The existing pavement within the station's bus loop is currently in poor condition and in need of repair. This NOI is being filed under the Massachusetts Wetlands Protection Act (WPA) (MGL c.131, §40) and its implementing regulations (310 CMR 10.00). In accordance with Massachusetts General Law (M.G.L.) Chapter 161A Section 3(i), the MBTA is not subject to local zoning regulations and bylaws.

The full scope of work is described in the attached Notice of Intent Narrative. Portions of the Project Site are in proximity to resource areas subject to the jurisdiction of the WPA, including Bank, Bordering Land Subject to Flooding (BLSF), Land Under Waterbodies and Waterways (LUWW), and Riverfront Area. The WPA establishes a 100-foot buffer zone to Bank and a 25-foot Riverfront area in Boston, Massachusetts. The Project only proposes work within the 100-foot buffer zone.

In compliance with the WPA, notification to abutters regarding this NOI has been made by certified return receipt mail. A copy of the abutter notification form and a list of abutters are enclosed as part of the NOI. The MBTA is not subject to WPA filing fees. However, in the spirit of cooperation, a check in the amount of $387.50 made payable to the City of Boston has been included with this submission for the City share of the WPA filing fee.

Please advertise this matter for public hearing at the Commission's next scheduled meeting. Should you have any questions concerning this submittal, or require additional information please contact me at 617-607-6310 or tdonovan@vhb.com.

Engineers | Scientists | Planners | Designers

101 Walnut Street
PO Box 9151
Watertown, Massachusetts 02471
P 617.924.1770
F 617.924.2286

Sincerely,

Taylor Donovan

Taylor Donovan
Environmental Scientist

cc: Massachusetts Bay Transportation Authority
DEP Northeast Regional Office

Table of Contents

Notice of Intent Forms

- WPA Form 3
- Fee Transmittal Form
- Copy of Filing Fee Check

Notice of Intent Figures

- Figure 1 – USGS Map
- Figure 2 – Aerial Map
- Figure 3 – NHESP Map
- Figure 4 – FEMA Map

Notice of Intent Forms

- WPA Form 3
- Fee Transmittal Form
- Copy of Filing Fee Check

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 3 - Notice of Intent
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File #:
eDEP Transaction #:1432191
City/Town:BOSTON

A.General Information

1. Project Location:

a. Street Address	MATTAPAN STATION BLUE HILL AVE		
b. City/Town	BOSTON	c. Zip Code	02126
d. Latitude	42.26756N	e. Longitude	71.09124W
f. Map/Plat #	N/A	g.Parcel/Lot #	1800003000

2. Applicant:

☐ Individual ☑ Organization

a. First Name	TESS	b.Last Name	PAGANELLI		
c. Organization	MASSACHUSETTS BAY TRANSPORTATION AUTHORITY				
d. Mailing Address	10 PARK PLAZA, SUITE 6720				
e. City/Town	BOSTON	f. State	MA	g. Zip Code	02116
h. Phone Number	617-549-4357	i. Fax		j. Email	tpaganelli@mbta.com

3.Property Owner:

☐ more than one owner

a. First Name		b. Last Name			
c. Organization	MASSACHUSETTS BAY TRANSPORTATION AUTHORITY				
d. Mailing Address	10 PARK PLAZA, SUITE 6720				
e. City/Town	BOSTON	f.State	MA	g. Zip Code	02116
h. Phone Number		i. Fax		j.Email	

4.Representative:

a. First Name	TAYLOR	b. Last Name	DONOVAN		
c. Organization	VHB				
d. Mailing Address	101 WALNUT STREET PO BOX 9151				
e. City/Town	WATERTOWN	f. State		g. Zip Code	02471
h.Phone Number	617-607-6310	i.Fax		j.Email	tdonovan@vhb.com

5.Total WPA Fee Paid (Automatically inserted from NOI Wetland Fee Transmittal Form):

a.Total Fee Paid	0.00	b.State Fee Paid	0.00	c.City/Town Fee Paid	0.00

6.General Project Description:

THE PROJECT PROPOSES RESURFACING THE EXISTING PAVEMENT AND PERFORMING ASSOCIATED STORMWATER MANAGEMENT IMPROVEMENTS AT THE MBTA MATTAPAN STATION LOCATED AT BLUE HILL AVENUE, IN BOSTON, MASSACHUSETTS. A FULL DESCRIPTION OF WORK IS INCLUDED IN THE ATTACHED NOI NARRATIVE.

7a.Project Type:

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Limited Project Driveway Crossing
4. ☐ Commercial/Industrial
5. ☐ Dock/Pier
6. ☐ Utilities
7. ☐ Coastal Engineering Structure
8. ☐ Agriculture (eg., cranberries, forestry)

9. ☑ Transportation 10. ☐ Other

7b.Is any portion of the proposed activity eligible to be treated as a limited project subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☐ Yes ☑ No If yes, describe which limited project applies to this project:
2. Limited Project

8.Property recorded at the Registry of Deeds for:

a.County:	b.Certificate:	c.Book:	d.Page:
SUFFOLK		N/A	N/A

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1.Buffer Zone & Resource Area Impacts (temporary & permanent):

☑ This is a Buffer Zone only project - Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.

2.Inland Resource Areas: (See 310 CMR 10.54 - 10.58, if not applicable, go to Section B.3. Coastal Resource Areas)

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Bank	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☐ Land under Waterbodies and Waterways	1. Square feet	2. square feet
	3. cubic yards dredged	
d. ☐ Bordering Land Subject to Flooding	1. square feet	2. square feet
	3. cubic feet of flood storage lost	4. cubic feet replaced
e. ☐ Isolated Land Subject to Flooding	1. square feet	
	2. cubic feet of flood storage lost	3. cubic feet replaced

f. ☐ Riverfront Area

1. Name of Waterway (if any)

2. Width of Riverfront Area (check one)
☐ 25 ft. - Designated Densely Developed Areas only
☐ 100 ft. - New agricultural projects only
☐ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project
square feet

4. Proposed Alteration of the Riverfront Area:

a. total square feet	b. square feet within 100 ft.	c. square feet between 100 ft. and 200 ft.

5. Has an alternatives analysis been done and is it attached to this NOI? ☐ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☐ Yes ☐ No

3.Coastal Resource Areas: (See 310 CMR 10.25 - 10.35)

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under	Land under the ocean below,
b. ☐ Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. ☐ Barrier Beaches	Indicate size under Coastal Beaches and/or Coatstal Dunes, below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab, crea.
i. ☐ Land Under Salt Ponds	1. square feet	
	2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above	
	1. cubic yards dredged	
l. ☐ Land Subject to Coastal Storm Flowage	1. square feet	

4.Restoration/Enhancement

☐ Restoration/Replacement

If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please entered the additional amount here.

a. square feet of BVW	b. square feet of Salt Marsh

5.Projects Involves Stream Crossings

☐ Project Involves Streams Crossings

If the project involves Stream Crossings, please enter the number of new stream crossings/number of replacement stream crossings.

a. number of new stream crossings

b. number of replacement stream crossings

C. Other Applicable Standards and Requirements

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage of Endangered Species program (NHESP)?

a. ☐ Yes ☑ No

If yes, include proof of mailing or hand delivery of NOI to:
Natural Heritage and Endangered Species
Program
Division of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

b. Date of map:FROM MAP VIEWER

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18)....

c. Submit Supplemental Information for Endangered Species Review * (Check boxes as they apply)

1.☐ Percentage/acreage of property to be altered:

(a) within Wetland Resource Area — percentage/acreage

(b) outside Resource Area — percentage/acreage

2.☐ Assessor's Map or right-of-way plan of site

3.☐ Project plans for entire project site, including wetland resource areas and areas outside of wetland jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

a.☐ Project description (including description of impacts outside of wetland resource area & buffer zone)

b.☐ Photographs representative of the site

c.☐ MESA filing fee (fee information available at: http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/mass-endangered-species-act-mesa/mesa-fee-schedule.html)
Make check payable to "Natural Heritage & Endangered Species Fund" and **mail to NHESP** at above address

*Projects altering **10 or more acres** of land, also submit:*

d.☐ Vegetation cover type map of site

e.☐ Project plans showing Priority & Estimated Habitat boundaries

d. OR Check One of the following

1.☐ Project is exempt from MESA review. Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/eea/agencies/dfg/dfw/laws-regulations/cmr/321-cmr-1000-massachusetts-endangered-species-act.html#10.14; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2.☐ Separate MESA review ongoing.

a. NHESP Tracking Number

b. Date submitted to NHESP

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review...

2. For coastal projects only, is any portion of the proposed project located below the mean high waterline or in a fish run?
a. ☑ Not applicable - project is in inland resource area only
b. ☐ Yes ☐ No

If yes, include proof of mailing or hand delivery of NOI to either:

South Shore - Cohasset to Rhode Island, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 S. Rodney French Blvd
New Bedford, MA 02744

North Shore - Hull to New Hampshire:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930

If yes, it may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional office.

3. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

a. ☐ Yes ☑ No

If yes, provide name of ACEC (see instructions to WPA Form 3 or DEP Website for ACEC locations). **Note:** electronic filers click on Website.

b. ACEC Name

4. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?
a. ☐ Yes ☑ No

5. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L.c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L.c. 130, § 105)?
a. ☐ Yes ☑ No

6. Is this project subject to provisions of the MassDEP Stormwater Management Standards?
a. ☑ Yes, Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol.2, Chapter 3)
2. ☐ A portion of the site constitutes redevelopment
3. ☐ Proprietary BMPs are included in the Stormwater Management System

b. ☐ No, Explain why the project is exempt:

1. ☐ Single Family Home

2. ☐ Emergency Road Repair

3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department by regular mail delivery.

1. USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the ☑ Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)
2. Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland ☑ [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.
3. Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s). ☐ Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.
4. List the titles and dates for all plans and other materials submitted with this NOI.
☑

a. Plan Title:	b. Plan Prepared By:	c. Plan Signed/Stamped By:	c. Revised Final Date:	e. Scale:
MATTAPAN STATION PARKING LOT DRAINAGE IMPROVEMENTS	VHB	RACHEL LUNA	10/31/22	1" = 20'

5. If there is more than one property owner, please attach a list of these property owners not listed on this form.
☐

6. Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.
☐

7. Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.
☐

8. Attach NOI Wetland Fee Transmittal Form.
☑

9. Attach Stormwater Report, if needed.
☑

E. Fees

1. Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

375060	10/26/22
2. Municipal Check Number	3. Check date
N/A	
4. State Check Number	5. Check date
Vanasse Hangen Brustlin, Inc.	
6. Payer name on check: First Name	7. Payer name on check: Last Name

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

1. Signature of Applicant	2. Date
3. Signature of Property Owner(if different)	4. Date
Taylor Donovan	11/22/22
5. Signature of Representative (if any)	6. Date

For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:

If the applicant has checked the "yes" box in Section C, Items 1-3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 3 - Notice of Wetland FeeTransmittal Form
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File #:
eDEP Transaction #:1432191
City/Town:BOSTON

A. Applicant Information

1. Applicant:

a. First Name	TESS	b.Last Name	PAGANELLI		
c. Organization	MASSACHUSETTS BAY TRANSPORTATION AUTHORITY				
d. Mailing Address	10 PARK PLAZA, SUITE 6720				
e. City/Town	BOSTON	f. State	MA	g. Zip Code	02116
h. Phone Number	6175494357	i. Fax		j. Email	tpaganelli@mbta.com

2.Property Owner:(if different)

a. First Name		b. Last Name			
c. Organization	MASSACHUSETTS BAY TRANSPORTATION AUTHORITY				
d. Mailing Address	10 PARK PLAZA, SUITE 6720				
e. City/Town	BOSTON	f.State	MA	g. Zip Code	02116
h. Phone Number		i. Fax		j.Email	

3. Project Location:

a. Street Address	MATTAPAN STATION BLUE HILL AVE	b. City/Town	BOSTON

Are you exempted from Fee? ☐ (YOU HAVE SELECTED 'YES')

Note: Fee will be exempted if you are one of the following:

- City/Town/County/District
- Municipal Housing Authority
- Indian Tribe Housing Authority
- MBTA

State agencies are only exempt if the fee is less than $100

B. Fees

Activity Type	Activity Number	Activity Fee	RF Multiplier	Sub Total

City/Town share of filling fee	State share of filing fee	Total Project Fee
$0.00	$0.00	$0.00

Notice of Intent Figures

\\vhb\gis\proj\Wat-TE\14841.18 Mattapan Prkg Drainage\Project

0 300 600 1200 Feet

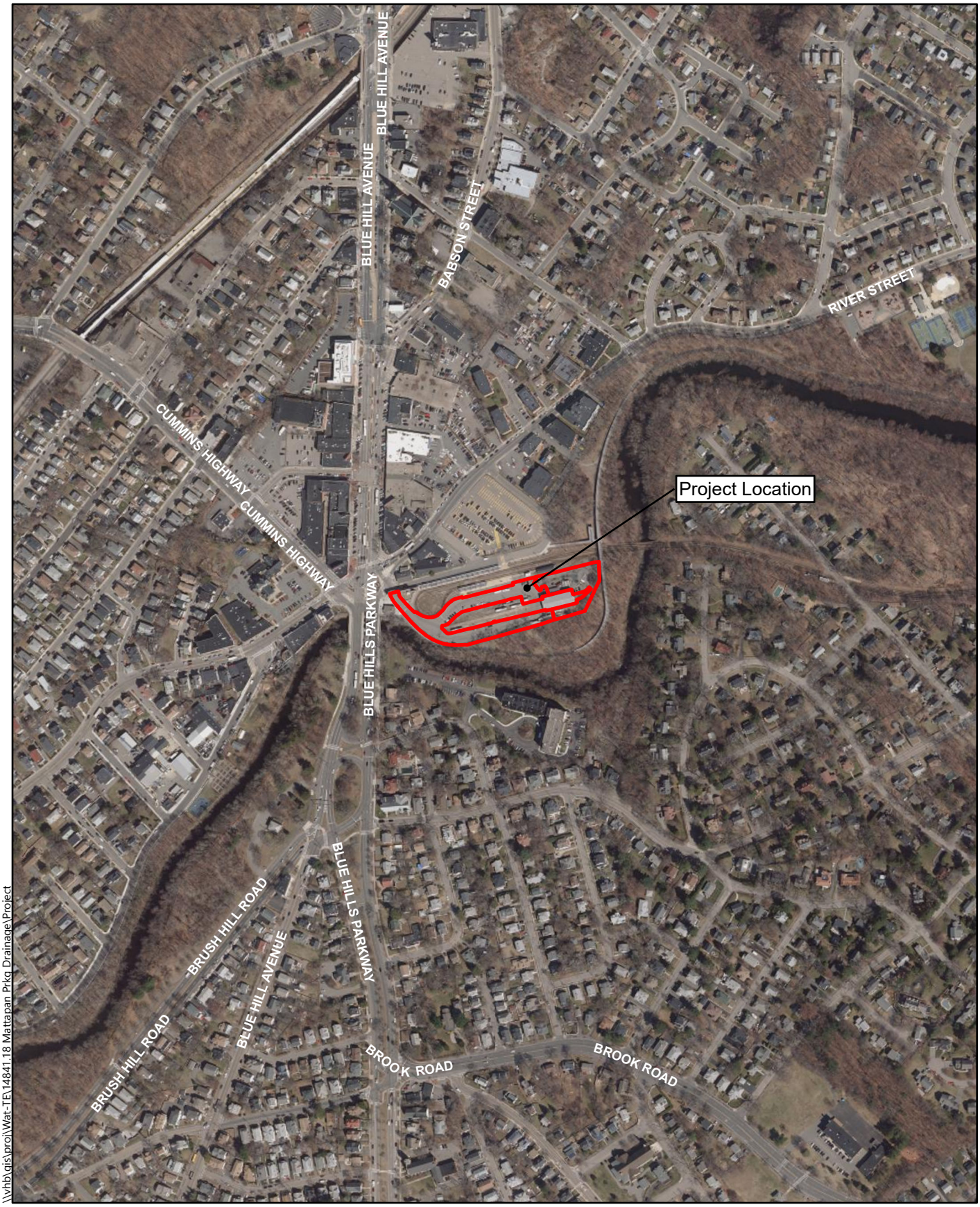
MBTA Mattapan Station Drainage Improvements | Boston, MA

Legend

Project Limits

Figure 1 - USGS Locus Map

Source Info: USGS, MassGIS, VHB



\\vhb\gis\proj\Wat-TE\14841.18 Mattapan Prkg Drainage\Project

0 250 500 1000 Feet

MBTA Mattapan Station Drainage Improvements | Boston, MA

Legend

Project Limits

Figure 2 - Aerial Map

Source Info: USGS, MassGIS, VHB

\\vhb\gis\proj\Wat_TF\14841.18 Mattapan Prkg Drainage\Project

0 175 350 700 Feet

MBTA Mattapan Station Drainage Improvements | Boston, MA

Legend

- Project Boundary
- NHESP Priority Habitats of Rare Species - None Present
- NHESP Estimated Habitats of Rare Wildlife - None Present
- NHESP Potential Vernal Pools - None Present
- NHESP Certified Vernal Pools - None Present

Figure 3 - NHESP Map
Source Info: USGS, MassGIS, VHB

0 150 300 600 Feet

MBTA Mattapan Station Drainage Improvements | Boston, MA

Legend

- Project Limits
- AE: 1% Annual Chance of Flooding, with BFE
- Area Not Included

Figure 4 - FEMA Map

Source Info: USGS, MassGIS, VHB

Attachment A
Notice of Intent Narrative

- Introduction
- Site Description
- Work Description
- Mitigation Measures
- Regulatory Compliance
- Summary

Attachment A - Notice of Intent Narrative

This Notice of Intent (NOI) is filed pursuant to the Massachusetts Wetlands Protection Act (WPA) (MGL Chapter 131, Section 40[1]) and its implementing regulations (310 CMR 10.00[2]). In accordance with Massachusetts General Law (M.G.L.) Chapter 161A Section 3(i), the Massachusetts Bay Transportation Authority is not subject to local zoning regulations and bylaws. This narrative describes wetland resource areas associated with the Project Site, the proposed work, impacts to wetland resource areas, mitigation measures, and how the Project meets the performance standards of the WPA. Refer to the accompanying Project plans included as Attachment E (bound separately) for a layout and details of the Project components.

Introduction

The Applicant, Massachusetts Bay Transportation Authority (MBTA), is proposing to resurface existing pavement, extend a narrow strip of pavement, and perform associated stormwater management improvements (the Project) at the MBTA Mattapan Station located at Blue Hill Avenue, Boston, Massachusetts (the Project Site). The existing pavement within the station's bus loop is currently in poor condition and in need of repair. The observed pavement degradation appears likely due to inadequate drainage on the Project Site. The Project is set up as a Base Bid and an Additive Bid Alternate to prioritize the pavement repair. In the event the Project cannot fund the Additive Bid Alternate, the Project will move forward as Base Bid Only.

Wetland resource areas in the vicinity of the Project Site subject to the jurisdiction of the WPA include Bank, Land Under Waterbodies and Waterways (LUWW), Bordering Land Subject to Flooding (BLSF), and Riverfront Area (RA). These resource areas are all associated with the Neponset River. As defined in the WPA, the RA for the City of Boston extends only 25 feet from a river's mean annual high-water line (MAHW). No resource areas are present within the limits of the Project Site. The WPA also establishes a 100-foot buffer zone to Bank, which extends onto the southwestern corner of the Project Site. The Project will result only in temporary and permanent alterations within the 100-foot buffer zone to Bank; no temporary or permanent impacts to wetland resources are proposed.

[1] Massachusetts General Laws, 1972. Title XIX, Chapter 131, Section 40: Removal, fill, dredging or alteration of land bordering waters.

[2] MassDEP, 2017. Commonwealth of Massachusetts Regulations, 310 CMR 10.00: Wetlands Protection.

Base Bid

The Base Bid consists of mill and overlay of the majority of the existing pavement, full depth reconstruction at the south of the property where the pavement degradation is most severe, paving a narrow strip of existing gravel, and installing drainage infiltration trenches to treat contributing impervious area. The Base Bid will alter a total of 0.34 acres, including existing impervious pavement and grass and gravel.

Additive Bid Alternate

The Additive Bid Alternate consists of full depth pavement to replace the existing gravel laydown areas adjacent to existing the garage. All of the Additive Bid Alternate work is located outside of jurisdictional resource areas and buffer zones. Stormwater Control Measures (SCMs) are proposed to treat additional pavement per the Stormwater Standards. The Additive Bid Alternate will alter a total of 0.40 acres of existing gravel surface lot.

Wetland resource areas will be protected from impacts during construction through the implementation of an erosion and sedimentation control program. This program includes provisions to minimize areas of disturbance through phasing and sequencing, limit erosion through stabilization, and prevent sediment from leaving the site by installing structural controls. Runoff generated from the project will be collected and treated in accordance with design guidelines[4] developed by Department of Environmental Protection (DEP) and standards contained in the WPA Regulations.

Refer to the Project Plans (Attachment E) for a complete description of the proposed Project.

Site Description

Mattapan Station consists of a dual Bus Depot and Train Station, the last stop on the Mattapan Line. For the purposes of this NOI, the Project Site includes both the Base Bid and Additive Bid Alternate work, on an approximately 5.11-acre parcel of land located at Blue Hill Ave, in Boston, Massachusetts (See Figure 1 USGS Map and Figure 2 Aerial Map). The Project Site is previously developed, with most of the property consisting of existing pavement. There are a few small areas of maintained lawn amidst the pavement and adjacent railroad tracks. A narrow strip of vegetation, mainly herbaceous species and shrubs, follows the outside edge of the existing fence line.

The Project parcel is bounded by commercial buildings to the north, the major intersection of Blue Hill Parkway, River Street, and Cummins Highway to the west, and forested areas and the Neponset River to the south and east. The parcel includes railroad tracks for the MBTA Red Line along the northern side and through the center of the Project Site, a maintenance garage located on the eastern side of the Project Site, and a gravel driveway and parking lots located north, east, and south of the existing garage. The Project Site lies within the Neponset watershed.

[4] DEP, 2008. *Massachusetts Stormwater Handbook.*

The Neponset River is located adjacent to the Project Site. The river flows southeast along the southern side of the Project Site and then curves to the north, following the eastern side of the Project Site. A paved pedestrian way (the Neponset Trail) is located between the southern edge of the Project Site and the northern Bank of the Neponset River.

According to the most recently available data provided by the Massachusetts Natural Heritage and Endangered Species Program[5] (NHESP), no portion of the Project Site is within Priority Habitat of Rare Species or Estimated Habitat of Rare Wildlife, and there are no Certified or Potential vernal pools in the vicinity of the Project Site (Figure 3). The most recently issued Flood Insurance Rate Map (FIRM)[6] for the area produced by the Federal Emergency Management Agency (FEMA) indicates that no portion of the Project Site is within the mapped Zone AE floodplain (Figure 4, FIRM Panel #25025C 0089 J). South of the Project Site, areas in the 100-year Floodplain—regulated as BLSF—are mapped at elevation 26 feet NAVD88.

The Project Site is not located within an Area of Critical Environmental Concern (ACEC)[7] or an area designated as an Outstanding Resource Water (ORW)[8]. The Natural Resources Conservation Service (NRCS) soil survey[9] has mapped the surface soils within the Project Site as primarily Urban land, 0 to 15 percent slopes (602), with sandy Udorthents (653) along the eastern, western, and southern sides of the Project Site.

Wetland resource areas near the Project Site are described below.

Wetland Resource Areas

Wetland resource areas in the vicinity of the Project Site were delineated on August 8, 2022 by environmental scientists with VHB in accordance with methods developed by the DEP[10] and the U.S. Army Corps of Engineers[11]. The following sections of this narrative describe the wetlands and identify the resource area that is regulated under the WPA Regulations (310 CMR 10.00). The resource area and its buffer zones are depicted on the attached Project Plans (Attachment E).

The resource areas identified near the Project Site subject to state regulations under the WPA include Bank, BLSF, and RA. These resource areas are defined under the WPA (310 CMR 10.00) as follows:

- **Bank**: As defined at 310 CMR 10.54 (2), *"a Bank is the portion of the land surface which normally abuts and confines a water body … The upper*

[5] NHESP, 2021. *Massachusetts Natural Heritage Atlas. 15th Edition*.

[6] Federal Emergency Management Agency, National Hazard Flood Layer, Digital Flood Insurance Rate Map (DFIRM); FIRM Panel #25025C 0089 J.

[7] Massachusetts Executive Office of Energy and Environmental Affairs, 2009.

[8] DEP, 2010. Designated Outstanding Resource Waters of Massachusetts.

[9] Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey.

[10] DEP, 1995. Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act.

[11] USACE, 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0.

boundary of Bank is the first observable break in slope or the mean annual flood level, whichever is lower."

- **LUWW:** As defined at 310 CMR 10.56 (2), LUWW is *"land beneath any creek, river, stream, pond or lake. Said land may be composed of organic muck or peat, fine sediments, rocks or bedrock … The boundary of LUWW is the mean annual low water level."*
- **Bordering Land Subject to Flooding (BLSF):** As defined by 310 CMR 10.57 (2)(a), BLSF is *"an area with low, flat topography adjacent to and inundated by flood waters rising from creeks, rivers, streams, ponds, or lakes. It extends from the banks of these waterways and water bodies; where a bordering vegetated wetland occurs, it extends from said wetland … The boundary of BLSF is the estimated maximum lateral extent of flood water which will theoretically result from the statistical 100-year frequency storm."* Areas identified by FEMA to be within the 100-year floodplain are regulated as BLSF.
- **Riverfront Area (RA)**: As defined by 310 CMR 10.58 (a)(3), RA is *"the area of land between a river's mean annual high-water line measured horizontally outward from the river and a parallel line located 200 feet away, except that the parallel line is located:*

    a. 25 feet away in Boston"

The delineated resource areas near the Project Site are summarized in the table below and described in more detail in the following sections of this attachment.

Table 1 Delineated Resource Areas

Wetland Name	Flag Numbers	Resource Type	Description
Neponset River	BF1-100 to BF1-122	Bank, LUWW, BLSF, RA	R2UBH riverine habitat with steep banks and a primarily sandy and muddy substrate.

Wetland Types: LUWW = Land Under Waterways; RA = Riverfront Area; R2UBH = (R) Riverine system, (2) lower perennial, (UB) unconsolidated bottom, (H) permanently flooded
Source: VHB, 2022.

Neponset River

The Neponset River is a perennial waterway that flows south of the Project Site and east of Route 28 before discharging into the Dorchester Bay. The river is classified as an R2UBH riverine habitat. The river channel is well defined on both sides and has a stony bottom. Southwest of the Project Site, the northern Bank is steep and comprised of a boulder retaining wall. Moving east along the River, the Bank becomes more gradually sloped and densely vegetated. The riparian zone north of the Bank includes vegetated areas leading upslope to the Neponset Trail boardwalk and paved pathway. Dominant vegetation along the Bank includes Norway maple (*Acer platanoides)*, and black locust (*Robinia pseudoacacia)*. Common wetland vegetation present includes American elm (*Ulmus americana*) and silver maple (*Acer saccharinum*). Common upland vegetation includes northern catalpa (*Catalpa speciosa),* poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), and multiflora rose (*Rosa multiflora).*

Other invasive species present include tree of heaven (*Ailanthus altissima)* and Asian bittersweet (*Celastrus orbiculatus)*. The northern Bank of the Neponset River was demarcated with flags BF1-100 to BF1-122.

Bordering Land Subject to Flooding

According to FEMA Flood Insurance Rate Map (FIRM) panel #25025C0089J for Suffolk County, Massachusetts, effective March 5, 2016, no portion of the Project Site is currently within the AE zone floodplain (Figure 4). The base flood elevation as determined from the FEMA Flood Insurance Study (FIS) is 26 feet NAVD88 on the Project Site. BLSF is generally comprised of vegetated bank moving east along the Neponset River. A boulder retaining wall is also located within BLSF to the southwest of the Project Site.

Riverfront Area

The Riverfront Area extends 25 feet north of the MAHW/Bank line of the Neponset River and does not extend onto the Project Site. The RA transitions from a sparsely vegetated slope southwest of the Project Site to a densely vegetated upland including the Neponset Trail east along the River.

Buffer Zone

The WPA regulations (310 CMR 10.02(2)(b)) establish a 100-foot buffer zone from the limits of Bank of the Neponset River as described above. Within the Project Site, the buffer zone consists of a paved and gravel driveway and parking lot, the Neponset Trail boardwalk and paved pathway, and forested upland along the western and southern sides of the Project Site.

Work Description

The purpose of the Project is to resurface the existing, degraded driveway and parking lot and improve associated stormwater management features on the Project Site. As proposed in the Base Bid work, the driveway and parking lot will be improved by resurfacing the existing degraded surfaces on the western, northern, and southern portions of the Project Site with mill and overlay. Full depth reconstruction will take place within the southernmost paved parking area, where pavement degradation is most severe. Proposed full depth reconstruction within the southern parking area includes extending pavement to the existing fence within an existing gravel area, removing a cement wall beyond the fence, and minor clearing and grubbing. This work will result in the conversion of approximately 500 sf of existing gravel into pavement.

The proposed Additive Bid Alternate work includes full depth pavement in the existing gravel parking area, located on the eastern side of the Project Site. Minor fill and regrading will take place throughout the existing gravel and paved areas. This work is not located within jurisdictional resource areas or the 100-foot buffer zone.

A stormwater management system will be installed to channel runoff to the southern and eastern sides of the Project Site through a combination of subsurface and aboveground features. Existing subsurface features will be improved through slip-lining, and two stone drainage infiltration trenches will be installed on the southern side of the Project Site to improve stormwater quality. As a result, approximately 700 sf of existing pervious gravel areas will be converted to the pervious infiltration trench. A third subsurface infiltration system is proposed on the eastern side of the Project Site. Additional details can be found in the accompanying Stormwater Report (Attachment D).

Work in Wetland Resource Areas

There will be no temporary or permanent impacts to wetland resource areas from the proposed maintenance Project. Work within buffer zone is described below.

Work in Buffer Zone

The WPA-regulated 100-foot buffer zone to Bank extends onto previously developed portions of the Project Site. Proposed temporary work within the 100-foot buffer zone consists of mill and overlay, a small portion of full depth reconstruction, removal of an existing cement wall, and minor clearing and grubbing and fill and regrading. All proposed mill and overlay and the majority of full depth reconstruction in the buffer zone is within the pre-existing paved driveway and parking lot. Permanent alteration within the 100-foot buffer zone is limited to a narrow strip of proposed pavement and installation of a stone swale BMP. This work fully complies with the WPA as demonstrated in the Regulatory Compliance section of this NOI.

Mitigation Measures

A suite of mitigation measures is proposed to prevent short- and long-term impacts to wetland resource areas and compensate for direct disturbances. Mitigation measures proposed for this project include an erosion and sedimentation control program, which will include structural and non-structural practices.

Erosion and Sediment Control

An erosion and sedimentation control program will be implemented to minimize temporary impacts to wetland resource areas during the construction phase of the project. The program incorporates Best Management Practices (BMPs) specified in guidelines developed by the DEP[12] and the U.S. Environmental Protection Agency (EPA)[13].

Proper implementation of the erosion and sedimentation control program will:

[12] DEP, 1997. *Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas: A Guide for Planners, Designers, and Municipal Officials*.

[13] EPA, 2007. *Interim Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites*. Office of Water. Report EPA 833-R-060-04.

- minimize exposed soil areas through sequencing and temporary stabilization;
- place structures to manage stormwater runoff and erosion; and
- establish a permanent vegetative cover or other forms of stabilization as soon as practicable.

Non-Structural Practices

Non-structural practices to be used during construction include temporary stabilization, temporary seeding, permanent seeding, pavement sweeping and dust control. These practices will be initiated as soon as practicable in appropriate areas at the Project Site.

Temporary Stabilization

Any areas of exposed soil or stockpiles that will remain inactive for more than 14 days will be covered with a layer of straw mulch applied at a rate of 90 pounds per 1,000 square feet. The mulch will be anchored with a tacking coat (non-tar) applied by a hydroseeded. Steeper slopes (greater than 10 percent) will be covered with a bonded fiber matrix (EcoAegis® or similar) according to the recommendations provided by the manufacturer.

Temporary Seeding

If conditions allow, a temporary vegetative cover will be established on areas of exposed soils (including stockpiles) that remain unstabilized for a period of more than 60 days. The seeded surfaces will be covered with a layer of straw mulch or bonded fiber matrix as described above. The seed mix shall include a blend of rapid germinating grasses that are indigenous to eastern Massachusetts.

Permanent Seeding

Upon completion of final grading, any areas not covered by pavement, other forms of stabilization, or other methods of landscaping will be seeded with a native pollinator/conservation seed mix.

Dust Control

The erosion and sediment control program includes provisions to minimize the generation of dust during dry and windy conditions. When necessary, larger areas of exposed soil will be wetted to prevent wind borne transport of fine-grained sediment. Enough water shall be applied to wet the upper 0.5 inches of soil. The water will be applied as a fine spray to prevent erosion. A water truck will be kept on the property (or at a nearby location) to facilitate this practice.

Structural Practices

Structural erosion and sedimentation controls to be used on the site include barriers, stabilized construction exists, catch basin inlet protection and dewatering filters.

Erosion Control Barriers

Prior to any ground disturbance, an approved erosion control barrier will be installed at the downgradient limit of work. As construction progresses, additional barriers will be installed around the base of stockpiles and other erosion prone areas. The barriers will be entrenched into the substrate to prevent underflow.

If sediment has accumulated to a depth which impairs proper functioning of the barrier, it will be removed by hand or by machinery operating upslope of the barriers. This material will be either reused at the Site or disposed of at a suitable offsite location. Any damaged sections of the barrier will be repaired or replaced immediately upon discovery.

Stabilized Construction Exits

Stone anti-tracking pads will be installed at each access point to the work area to prevent the offsite transport of sediment by construction vehicles. The stabilized construction exits will be at least fifty feet long and will consist of a 4-inch thick layer of crushed stone (1.5 to 2.5 inches in diameter). The stone will be placed over a layer of non-woven filter fabric. The anti-tracking pads will remain in place until a binder coat of pavement has been established on paved surfaces.

Catch Basin Inlet Protection

The inlets of existing and proposed catch basins will be protected from sediment inflow during the work period by surrounding them with a barrier of staked straw bales or by installing Silt Sacks®. If straw bales are used, a layer of non-woven filter fabric shall be placed beneath the grate of each basin. If sediment has collected behind the barrier or in the Silt Sack® to a point where it impairs proper functioning, it will be removed and will be either reused onsite or disposed of at a suitable offsite location.

Stormwater Management

Runoff generated from impervious surfaces will be collected and managed in accordance with the DEP Stormwater policy. Full details on the proposed system (including supporting calculations) are included in the accompanying Stormwater Management Report (Attachment D). Compliance with the 10 stormwater management standards cited in Section 310 CMR 10.05(6)(k) of the WPA Regulations is evaluated in the Regulatory Compliance section of Attachment D.

Regulatory Compliance

The proposed Project includes work in the WPA-regulated 100-foot buffer zone to Bank. In accordance with Massachusetts General Law (M.G.L.) Chapter 161A Section 3(i), the Massachusetts Bay Transportation Authority is not subject to local zoning regulations and bylaws. The Project includes erosion and sediment controls and aims to protect the interests of the WPA.

WPA Buffer Zone

The buffer zone is not a resource area and, therefore, work within a buffer zone is not governed by specific regulatory performance standards. In general, work within a buffer zone is permissible when said work has been designed, or can be conditioned, such that there will be no impact on the downgradient wetland resource area(s) being buffered. As stated in 310 CMR 10.53(1) of the WPA regulations:

For work in Buffer Zone subject to review under 310 CMR 10.02(2)(b)3., the Issuing Authority shall impose conditions to protect the interests of the Act identified for the adjacent Resource Area… The Issuing Authority may consider the characteristics of the buffer zone, such as the presence of steep slopes, that may increase the potential for adverse impacts on resource areas. Conditions may include limitations on the scope and location of work in the buffer zone as necessary to avoid alteration of resource areas. The Issuing Authority may require erosion and sedimentation controls during construction, a clear limit of work, and the preservation of natural vegetation adjacent to the Resource Area and/or other measures commensurate with the scope and location of the work within the Buffer Zone to protect the interests of the Act.

The proposed Project has been designed to address these considerations. Measures have been incorporated into the Project design to ensure that work will be done in a manner that prevents impacts to downgradient wetland resources. A clear limit of work will be identified, and erosion and sedimentation control measures will be installed throughout the Project Site. All of the proposed work is located within the previously developed buffer zone. Temporary disturbance in vegetated areas within the buffer zone will be restored in place and seeded with a native seed mix prior to the completion of the Project. Additionally, the installation of a stone swale BMP within the buffer zone will result in an improvement to stormwater quality on the Project Site.

Summary

The Applicant is proposing to pave a degraded gravel driveway and parking lot along with associated stormwater management improvements at the MBTA Mattapan Station located at 500 River Street in Boston, Massachusetts.

As proposed, the Project will result in temporary and permanent alterations within the previously disturbed 100-foot buffer zone to Bank. The Project will not result in any temporary or permanent impacts to resource areas. The Project has been designed in compliance with the WPA. Downgradient wetland resource areas will be protected from impacts during construction through the implementation of an erosion and sedimentation control program.

The Applicant respectfully requests that the Boston Conservation Commission find these measures are protective of the interests identified in the WPA and issue an Order of Conditions approving the work described in this NOI and shown on the accompanying plans.

Attachment B
Abutter Information

- Affidavit of Service
- Notice to Abutters
- Babel Notice
- Certification of Translation
- List of Abutters

City of Boston
Environment

CITY of BOSTON
Conservation Commission

AFFIDAVIT OF SERVICE
FOR ABUTTER NOTIFICATION

Under the Massachusetts Wetlands Protection Act
and Boston Wetlands Ordinance

I, Taylor Donovan, hereby certify under pains and penalties of perjury that that at least one week prior to the public hearing, I gave notice to abutters in compliance with the second paragraph of Massachusetts General Laws Chapter 131, section 40, and the DEP Guide to Abutter Notification dated April 8, 1994, in connection with the following matter:

A Notice of Intent was filed under the Massachusetts Wetlands Protection Act and/or the Boston Wetlands Ordinance by VHB for Massachusetts Bay Transportation Authority located at 500 River Street, Boston, MA 02126.

The Abutter Notification For, the list of abutters to whom it was given, and their addresses are attached to this Affidavit of Service.

Taylor Donovan
Name

11/29/2022
Date

City of Boston Environment

CITY of BOSTON Conservation Commission

NOTIFICATION TO ABUTTERS
BOSTON CONSERVATION COMMISSION

In accordance with the Massachusetts Wetlands Protection Act, Massachusetts General Laws Chapter 131, Section 40, and the Boston Wetlands Ordinance, you are hereby notified as an abutter to a project filed with the Boston Conservation Commission.

AMassachusetts Bay Transportation Authority has filed a Notice of Intent with the Boston Conservation Commission seeking permission to alter an Area Subject to Protection under the Wetlands Protection Act (General Laws Chapter 131, section 40) and/or the Boston Wetlands Ordinance.

B. The address of the lot where the activity is proposed is Mattapan Station, Blue Hill Avenue, Boston, MA 02126.

C. The project involves Improvements to the existing gravel parking lot and driveway along with associated stormwater management improvements.

D. Copies of the application may be obtained by contacting the Boston Conservation Commission at **CC@boston.gov**.

E. Copies of the application may be obtained from Taylor Donovan by contacting them at tdonovan@vhb.com or 617.607.6310 between the hours of 9 am to 5 pm, Monday to Friday.

F. In accordance with the Chapter 107 of the Acts of 2022, the public hearing will take place **virtually** at https://zoom.us/j/6864582044. If you are unable to access the internet, you can call 1-929-205-6099, enter Meeting ID 686 458 2044 # and use # as your participant ID.

G. Information regarding the date and time of the public hearing may be obtained from the **Boston Conservation Commission** by emailing **CC@boston.gov** or calling **(617) 635-3850** between the hours of **9 AM to 5 PM, Monday through Friday.**

NOTE: Notice of the public hearing, including its date, time, and place, will be published at least five (5) days in advance in the **Boston Herald.**

NOTE: Notice of the public hearing, including its date, time, and place, will be posted on www.boston.gov/public-notices and in Boston City Hall not less than forty-eight (48) hours in advance. If you would like to provide comments, you may attend the public hearing or send written comments to CC@boston.gov or Boston City Hall, Environment Department, Room 709, 1 City Hall Square, Boston, MA 02201

NOTE: If you would like to provide comments, you may attend the public hearing or send written comments to CC@boston.gov or Boston City Hall, Environment Department, Room 709, 1 City Hall Square, Boston, MA 02201

NOTE: You also may contact the Boston Conservation Commission or the Department of Environmental Protection Northeast Regional Office for more information about this application or the Wetlands Protection Act. To contact DEP, call: the Northeast Region: (978) 694-3200.

NOTE: If you plan to attend the public hearing and are in need of interpretation, please notify staff at CC@boston.gov by 12 PM the day before the hearing.

NOTIFICACIÓN PARA PROPIETARIOS Y/O VECINOS COLINDANTES
COMISIÓN DE CONSERVACIÓN DE BOSTON

De conformidad con la Ley de protección de los humedales de Massachusetts, el Capítulo 131, Sección 40 de las Leyes Generales de Massachusetts y la Ordenanza sobre los humedales de Boston, por la presente queda usted notificado como propietario o vecino colindante de un proyecto presentado ante la Comisión de Conservación de Boston.

A. **La Autoridad del Transporte de la Bahía de Massachusetts (MBTA)** ha presentado una solicitud a la Comisión de Conservación de Boston pidiendo permiso para modificar una zona sujeta a protección en virtud de la Ley de protección de los humedales (Leyes generales, capítulo 131, sección 40) y la Ordenanza sobre los humedales de Boston.

B. La dirección del lote donde se propone la actividad es **Mattapan Station, Blue Hill Avenue, Boston, MA, 02126.**

C. El proyecto consiste en **mejoras en el estacionamiento de grava y su acceso, conjuntamente con las mejoras asociadas en el manejo de las aguas pluviales**.

D. Se pueden obtener copias del Aviso de Intención comunicándose con la Comisión de Conservación de Boston en CC@boston.gov.

E. Las copias de la notificación de intención pueden solicitarse a **Taylor Donovan escribiendo a tdonovan@vhb.com o llamando al 617.607.6310** entre las 9 a. m. y 5 p. m.**, de lunes a viernes.**

F. De acuerdo con el Decreto Ejecutivo de le Mancomunidad de Massachusetts que suspende ciertas disposiciones de la Ley de reuniones abiertas, la audiencia pública se llevará a cabo virtualmente en https://zoom.us/j/6864582044. Si no puede acceder a Internet, puede llamar al 1-929-205- 6099, ingresar ID de reunión 686 458 2044 # y usar # como su ID de participante.

G. La información relativa a la fecha y hora de la audiencia pública puede solicitarse a la **Comisión de Conservación de Boston** por correo electrónico a **CC@boston.gov** o llamando al **(617) 635-4416** entre las **9 AM y las 5 PM, de lunes a viernes.**

NOTA: La notificación de la audiencia pública, incluida su fecha, hora y lugar, se publicará en el **Boston Herald** con al menos cinco (5) días de antelación.

NOTA: La notificación de la audiencia pública, incluida su fecha, hora y lugar, se publicará en www.boston.gov/public-notices y en el Ayuntamiento de Boston con no menos de cuarenta y ocho (48) horas de antelación. Si desea formular comentarios, puede asistir a la audiencia pública o enviarlos por escrito a CC@boston.gov o al Ayuntamiento de Boston, Departamento de Medio Ambiente, Sala 709, 1 City Hall Square, Boston, MA 02201.

NOTA: También puede comunicarse con la Comisión de Conservación de Boston o con la Oficina Regional del Noreste del Departamento de Protección Ambiental para obtener más información sobre esta solicitud o la Ley de Protección de Humedales. Para comunicarse con el DEP, llame a la Región Noreste: (978) 694-3200.

NOTA: si tiene previsto asistir a la audiencia pública y necesita servicios de interpretación, sírvase informar al personal en CC@boston.gov antes de las 12 PM del día anterior a la audiencia.

City of Boston
Environment

CITY of BOSTON
Conservation Commission

AVI POU PWOPRIYETÈ KI GEN PWOPRIYETE KOLE AK LÒT YO BOSTON CONSERVATION COMMISSION (KOMISYON KONSÈVASYON BOSTON)

Annakò avèk Lwa sou Pwoteksyon Zòn Imid nan Massachusetts (Massachusetts Wetlands Protection Act), Lwa Jeneral Massachusetts (Massachusetts General Laws) Chapit 131, Seksyon 40, ak Òdinans sou Zòn Marekaj nan Boston (Boston Wetlands Ordinance), n ap avize w antanke yon pwopriyetè ki gen pwopriyete kole ak lòt yo e ki asosye ak yon pwojè ki anrejistre avèk Boston Conservation Commission (Komisyon Konsèvasyon Boston) an.

A. Yon Administrasyon Transpò Massachusetts Bay depoze yon aplikasyon avèk Komisyon Konsèvasyon Boston (Boston Conservation Commission) kote l ap mande pèmisyon pou modifye yon Zòn ki Ka Sijè a Pwoteksyon anba Lwa pou Pwoteksyon Zòn Marekaj (Wetlands Protection Act) (Lwa Jeneral Chapit 131, seksyon 40) ak Òdinans sou Zòn Imid nan Boston (Boston Wetlands Ordinance) yo.

B. Adrès sit kote aktivite y ap pwopoze a ye a se Mattapan Station, Blue Hill Avenue, Boston, MA 02126**.**

C. Pwojè a gen ladan amelyorasyonnanpakin gravye ki la déjà ak antre ki toutolon avèk amelyorasyon jesyon dlo tanpèt asosye.

D. Ou ka jwenn kopi Avi Entansyon yo lè ou kontakte Komisyon Konsèvasyon nan Boston sou CC@boston.gov.

E. Ou ka jwenn kopi Avi Dentansyon an nan men Taylor Donovan depi ou kontakte li nan tdonovan@yhb.com oswa 617-6076310 ant 9am ak 5 pm, lendi-vandredi**.**

F. An akò avèk Chapit 107 nan Zak 2022 yo, odyans piblik la pral fèt vityèlman sou sit entènèt sa https://zoom.us/j/6864582044. Si ou pa gen aksè a entènèt, ou ka patisipe nan telefòn. Rele (929) 205-6099, antre nimewo reyinyon an: 686 458 2044 # epi itilize # kòm ID patisipan ou.

G. Ou ka jwenn enfòmasyon konsènan dat ak lè odyans piblik la nan men Taylor Donovan **Boston Conservation Commission (Komisyon Konsèvasyon Boston)** lè w voye yon imèl nan tdonovan@vhb.com oswa lè w rele nan **(617) 635-4416** ant **9 AM a 5 PM, Lendi jiska Vandredi.**

REMAKE: Y ap pibliye avi sou odyans piblik la, ansanm ak dat la, lè a ak ki kote l ap fèt, omwen senk (5) jou davans nan **Boston Herald**.

REMAKE: Y ap pibliye avi sou odyans piblik la, ansanm ak dat la, lè a ak ki kote l ap fèt, sou www.boston.gov/public-notices ak nan Meri Boston (Boston City Hall) pa mwens ke karantuit (48) èdtan davans. Si w ta renmen pataje kòmantè w yo, ou kapab patisipe nan odyans piblik la oswa voye kòmantè w yo alekri nan CC@boston.gov oswa nan Boston City Hall, Environment Department, Room 709, 1 City Hall Square, Boston, MA 02201

REMAKE: Ou kapab kontakte Boston Conservation Commission (Komisyon Konsèvasyon Boston) oswa Biwo Rejyonal Nòdès Depatman Pwoteksyon Anviwònman an pou plis enfòmasyon sou aplikasyon sa a oswa sou Lwa sou Pwoteksyon Zòn Imid yo (Wetlands Protection Act). Pou kontakte Depatman Pwoteksyon Anviwònman an (DEP), rele Rejyon Nòdès la nan: (978) 694-3200.

REMAKE: Si w gen lentansyon ale nan odyans piblik la e ou bezwen sèvis entèpretasyon, tanpri avize manm pèsonèl yo nan CC@boston.gov avan 12 PM (Midi) jou anvan odyans lan.

BABEL NOTICE

English:

IMPORTANT! This document or application contains **important information** about your rights, responsibilities and/or benefits. It is crucial that you understand the information in this document and/or application, and we will provide the information in your preferred language at no cost to you. If you need them, please contact us at cc@boston.gov or 617-635-3850.

Spanish:

¡IMPORTANTE! Este documento o solicitud contiene **información importante** sobre sus derechos, responsabilidades y/o beneficios. Es fundamental que usted entienda la información contenida en este documento y/o solicitud, y le proporcionaremos la información en su idioma preferido sin costo alguno para usted. Si los necesita, póngase en contacto con nosotros en el correo electrónico cc@boston.gov o llamando al 617-635-3850.

Haitian Creole:

AVI ENPÒTAN! Dokiman oubyen aplikasyon sa genyen **enfòmasyon ki enpòtan** konsènan dwa, responsablite, ak/oswa benefis ou yo. Li enpòtan ke ou konprann enfòmasyon ki nan dokiman ak/oubyen aplikasyon sa, e n ap bay enfòmasyon an nan lang ou prefere a, san ou pa peye anyen. Si w bezwen yo, tanpri kontakte nou nan cc@boston.gov oswa 617-635-3850.

Traditional Chinese:

非常重要！這份文件或是申請表格包含關於您的權利，責任，和／或福利的重要信息。請您務必完全理解這份文件或申請表格的全部信息，這對我們來說十分重要。我們會免費給您提供翻譯服務。如果您有需要請聯系我們的郵箱 cc@boston.gov 電話# 617-635-3850..

Vietnamese:

QUAN TRỌNG! Tài liệu hoặc đơn yêu cầu này chứa **thông tin quan trọng** về các quyền, trách nhiệm và/hoặc lợi ích của bạn. Việc bạn hiểu rõ thông tin trong tài liệu và/hoặc đơn yêu cầu này rất quan trọng, và chúng tôi sẽ cung cấp thông tin bằng ngôn ngữ bạn muốn mà không tính phí. Nếu quý vị cần những dịch vụ này, vui lòng liên lạc với chúng tôi theo địa chỉ cc@boston.gov hoặc số điện thoại 617-635-3850.

Simplified Chinese:

非常重要！这份文件或是申请表格包含关于您的权利，责任，和／或福利的重要信息。请您务必完全理解这份文件或申请表格的全部信息，这对我们来说十分重要。我们会免费给您提供翻译服务。如果您有需要请联系我们的邮箱 cc@boston.gov 电话# 617-635-3850.

CITY of BOSTON

Cape Verdean Creole:

INPURTANTI! Es dukumentu ó aplikason ten **informason inpurtanti** sobri bu direitus, rasponsabilidadis i/ó benefísius. Ê krusial ki bu intendi informason na es dukumentu i/ó aplikason ó nu ta da informason na língua di bu preferênsia sen ninhun kustu pa bó. Si bu prisiza del, kontata-nu na cc@boston.gov ó 617-635-3850.

Arabic:

مهم! يحتوي هذا المستند أو التطبيق على معلومات مهمة حول حقوقك ومسؤولياتك أو فوائدك. من الأهمية أن تفهم المعلومات الواردة في هذا المستند أو التطبيق. سوف نقدم المعلومات بلغتك المفضلة دون أي تكلفة عليك. إذا كنت في حاجة إليها، يرجى الاتصال بنا على cc@boston.gov أو 617-635-3850.

Russian:

ВАЖНО! В этом документе или заявлении содержится **важная информация** о ваших правах, обязанностях и/или льготах. Для нас очень важно, чтобы вы понимали приведенную в этом документе и/или заявлении информацию, и мы готовы бесплатно предоставить вам информацию на предпочитаемом вами языке. Если Вам они нужны, просьба связаться с нами по адресу электронной почты cc@boston.gov, либо по телефону 617-635-3850.

Portuguese:

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CITY of BOSTON

Certification of Translation

COUNTY OF SUFFOLK
COMMONWEALTH OF MASSACHUSETTS

October 27, 2022

This is to certify that the **yellow-highlighted text within the translation** is, to the best of my knowledge and belief, a true and accurate translation from English into Spanish of the attached document:

Spanish Abutter Notification Form_Blank.docx

Linguistic Systems, Inc. adheres to an ISO-certified quality management system that ensures best practices are always followed in the selection of linguists skilled in both the languages and subject matters necessary for every translation.

Jessica Riley
Project Manager
Linguistic Systems

Certification of Translation

COUNTY OF SUFFOLK
COMMONWEALTH OF MASSACHUSETTS

October 27, 2022

This is to certify that the **yellow-highlighted text within the translation** is, to the best of my knowledge and belief, a true and accurate translation from English into Haitian Creole of the attached document:

Haitian Creole Abutter Notification Form Fillable_2022.docx

Linguistic Systems, Inc. adheres to an ISO-certified quality management system that ensures best practices are always followed in the selection of linguists skilled in both the languages and subject matters necessary for every translation.

Jessica Riley
Project Manager
Linguistic Systems

City of Boston Environment

CITY of BOSTON Conservation Commission

NOTIFICATION TO ABUTTERS
BOSTON CONSERVATION COMMISSION

In accordance with the Massachusetts Wetlands Protection Act, Massachusetts General Laws Chapter 131, Section 40, and the Boston Wetlands Ordinance, you are hereby notified as an abutter to a project filed with the Boston Conservation Commission.

A Massachusetts Bay Transportation Authority has filed a Notice of Intent with the Boston Conservation Commission seeking permission to alter an Area Subject to Protection under the Wetlands Protection Act (General Laws Chapter 131, section 40) and/or the Boston Wetlands Ordinance.

B. The address of the lot where the activity is proposed is Mattapan Station, Blue Hill Avenue, Boston, MA 02126.

C. The project involves Improvements to the existing gravel parking lot and driveway along with associated stormwater management improvements.

D. Copies of the application may be obtained by contacting the Boston Conservation Commission at **CC@boston.gov**.

E. Copies of the application may be obtained from Taylor Donovan by contacting them at tdonovan@vhb.com or 617.607.6310 between the hours of 9 am to 5 pm, Monday - Friday.

F. In accordance with the Chapter 107 of the Acts of 2022, the public hearing will take place **virtually** at https://zoom.us/j/6864582044. If you are unable to access the internet, you can call 1-929-205-6099, enter Meeting ID 686 458 2044 # and use # as your participant ID.

G. Information regarding the date and time of the public hearing may be obtained from the **Boston Conservation Commission** by emailing **CC@boston.gov** or calling **(617) 635-3850** between the hours of **9 AM to 5 PM, Monday through Friday.**

NOTE: Notice of the public hearing, including its date, time, and place, will be published at least five (5) days in advance in the **Boston Herald.**

NOTE: Notice of the public hearing, including its date, time, and place, will be posted on www.boston.gov/public-notices and in Boston City Hall not less than forty-eight (48) hours in advance. If you would like to provide comments, you may attend the public hearing or send written comments to CC@boston.gov or Boston City Hall, Environment Department, Room 709, 1 City Hall Square, Boston, MA 02201

NOTE: If you would like to provide comments, you may attend the public hearing or send written comments to CC@boston.gov or Boston City Hall, Environment Department, Room 709, 1 City Hall Square, Boston, MA 02201

NOTE: You also may contact the Boston Conservation Commission or the Department of Environmental Protection Northeast Regional Office for more information about this application or the Wetlands Protection Act. To contact DEP, call: the Northeast Region: (978) 694-3200.

NOTE: If you plan to attend the public hearing and are in need of interpretation, please notify staff at CC@boston.gov by 12 PM the day before the hearing.

OBJECTID	PID	FULL_ADDRESS	CITY	ZIPCODE	OWNER	ADDRESSEE	MAIL_ADDRESS	MAIL_CS	STATE	MAIL_ZIPC
113617	1800005000	GILLESPIES LA	MATTAPAN	2126	COMMWLTH OF MASS		GILLESPIE LANE	MATTAPAN	MA	2126
63782	1801688000	897 CUMMINS HW	MATTAPAN	2126	CH OF THE HOLY SPIRIT		897 CUMMINS HWY	MATTAPAN	MA	2126
9725	1801024000	1618 1634 BLUE HILL AV	MATTAPAN	2126	NISSON IRVING L TRS	C/O M DANA & SONS INC	1340 CENTRE ST #101	NEWTON	MA	2459
97666	1801141001	1659 1665 BLUE HILL AV	MATTAPAN	2126	MB1 LLC A MASS LLC		1450 COMMONWEALTH AV	BRIGHTON	MA	2135
45427	1800004000	510 HF500 RIVER ST	MATTAPAN	2126	DLSL REALTY LLC		510 HF RIVER ST	MATTAPAN	MA	2126
157028	1800003000	BLUE HILL AV	MATTAPAN	2126	MASS BAY TRANSP AUTH		BLUE HILL AVE	MATTAPAN	MA	2126
165309	1800013000	RIVERBANK PL	MATTAPAN	2126	COMMWLTH OF MASS		RIVERBANK PL	MATTAPAN	MA	2126
1402	1800010000	7 RIVERBANK PL	MATTAPAN	2126	CATO-LOUIS CASSANDRA M		7 RIVERBANK PL	MATTAPAN	MA	2126
166460	1801140000	1641 1649 BLUE HILL AV	MATTAPAN	2126	LEE JACK		1645 BLUE HILL AV	MATTAPAN	MA	2126
116673	1800002000	BLUE HILL AV	MATTAPAN	2126	COMMWLTH OF MASS		BLUE HILL AVE	MATTAPAN	MA	2126
19679	1801138001	10 FAIRWAY ST	MATTAPAN	2126	TEN FAIRWAY LLC MASS LLC	C/O DANE SHULMAN ASSOC LLC	1629 BLUE HILL AVE	MATTAPAN	MA	2126
54580	1800008000	442 RIVER ST	MATTAPAN	2126	RIVERBANK REALTY LLC	C/O RIVER BANK REALTY LLC	116 HIGHVIEW ST	WESTWOC	MA	2090
45973	1801014000	459 RIVER ST	MATTAPAN	2126	CITY OF BOSTON		RIVER	MATTAPAN	MA	2126
153366	1801135000	1667 1671 BLUE HILL AV	MATTAPAN	2126	LOMBARDI JOSEPH	C/O JOSEPH LOMBARDI	810 S LAKE DR	E DUBLIN	GA	31027
19077	1801164000	RIVER ST	MATTAPAN	2126	COMMWLTH OF MASS		RIVER	MATTAPAN	MA	2126
72994	1801163001	530 522 RIVER ST	MATTAPAN	2126	522 RIVER MATTAPAN LLC		44 SCHOOL ST, UNIT SUITE 3	BOSTON	MA	2108
171894	1801136000	926 CUMMINS HW	MATTAPAN	2126	A F CUMMINS REALTY LLC	C/O LE PARC PROPERTY MGMT	113-25 QUEENS BLVD #102	FOREST HII	NY	11375
36188	1801686000	CUMMINS HW	MATTAPAN	2126	CHURCH OF HOLY SPIRIT		CUMMINS HWY	MATTAPAN	MA	2126
22340	1801020000	477 479 RIVER ST	MATTAPAN	2126	SPYRIDOPOULOS VIRGINIA		87 FRANKLIN AV	QUINCY	MA	2170
139725	1801023000	1636 1644 BLUE HILL AV	MATTAPAN	2126	KRASNER BERNARD TS	C/O WALCOTT CORPORATION	1050 COMMONWEALTH AV	BOSTON	MA	2215
148499	1801022000	493 495 RIVER ST	MATTAPAN	2126	MLSLEE LLC		1646 BLUE HILL AV	MATTAPAN	MA	2126
32134	1801687000	RIVER ST	MATTAPAN	2126	CHURCH OF HOLY SPIRIT		RIVER	MATTAPAN	MA	2126
80752	1801163000	532 542 RIVER ST	MATTAPAN	2126	JAMROCK REALTY LLC		542 532 RIVER ST	MATTAPAN	MA	2126
51173	1800001000	1674 1680 BLUE HILL AV	MATTAPAN	2126	COMMONWEALTH OF MASS	C/O RALPH SHIPPEE	25442 GALASHIELDS CIRCLE	BONITA SP	FL	34134
22056	1800003001	1672 BLUE HILL AV	MATTAPAN	2126	FOTOPOULOS NICHOLAS		17 BROOK RD	MILTON	MA	2186
125184	1801141000	1651 BLUE HILL AV	MATTAPAN	2126	IVANV LLC		201 MANCHESTER ST	DORCHEST	MA	2126
68931	1801139000	1633 1639 BLUE HILL AV	MATTAPAN	2126	HAPPY REALTY TRUST		1633 BLUE HILL AVE	MATTAPAN	MA	2126

Attachment C
Photographic Log

NO. 1 / 8/8/2022

DESCRIPTION

View of the northern bank of the Neponset River facing north, located west of the Project Site.

NO. 2 / 8/8/2022

DESCRIPTION

View of Neponset River below Route 28 facing west, located west of the Project Site.

NO. 3 / 8/8/2022

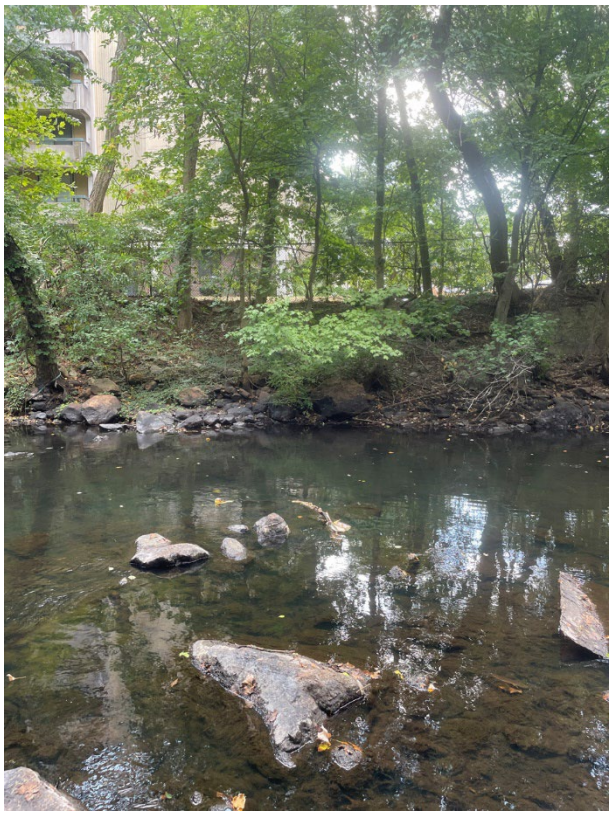
DESCRIPTION

View of the northern bank of the Neponset River facing north, located southwest of the Project Site.

NO. 4 / 8/8/2022

DESCRIPTION

View of the Neponset River facing southeast, located southwest of the Project Site.



NO. 5 / 8/8/2022

DESCRIPTION

View of the southern bank of the Neponset River facing south, located south of the Project Site.

NO. 6 / 8/8/2022

DESCRIPTION

View of the northern bank of the Neponset River facing east, located south of the Project Site.

NO. 7 / 8/8/2022

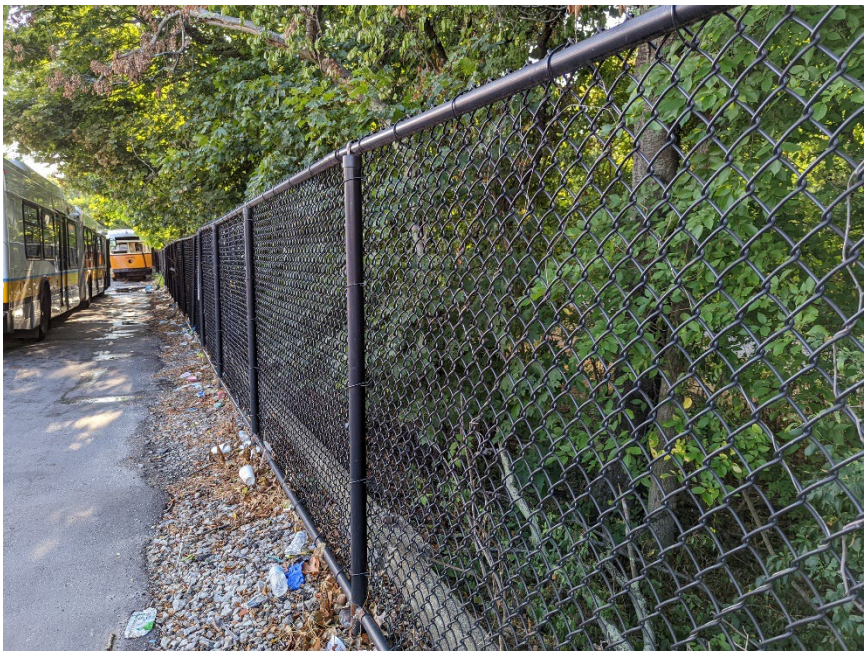
DESCRIPTION

View of drainage pipe facing west, located southeast of the Project Site.

NO. 8 / 8/8/2022

DESCRIPTION

View of drainage pipe facing south, located southeast of the Project Site.



NO. 9 / 8/8/2022

DESCRIPTION

View of existing edge of pavement facing east, located on the southern side of the Project Site.

NO. 10 / 8/8/2022

DESCRIPTION

View of the existing parking area and edge of pavement facing east, located on the southern side of the Project Site.

NO. 10 / 8/8/2022

DESCRIPTION

View of existing gravel lot facing east, located on eastern side of the Project Site.

Attachment D
Stormwater Report (bound separately)

Attachment E
Project Plans (bound separately)

Mattapan Station Drainage Improvements

Boston, MA

PREPARED FOR

10 Park Plaza
Boston, MA 02116

PREPARED BY

101 Walnut Street
PO Box 9151
Watertown, MA 02471
617.924.1770

October 2022

Table of Contents

List of Figures

List of Tables

Attachments

1

Introduction

This Stormwater Management Report has been prepared to demonstrate compliance with the Massachusetts Stormwater Management Standards (the Stormwater Standards) in accordance with the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00) and Water Quality Certification Regulations (314 CMR 9.00). Appendix A includes a completed Massachusetts Department of Environmental Protection (MassDEP) Checklist for Stormwater Report, stamped by a Massachusetts registered professional engineer.

2

Project Summary

The Applicant, Massachusetts Bay Transit Authority (MBTA), is proposing to resurface the pavement at the existing Mattapan Station (the Project) located in Boston, MA. Mattapan Station consists of a dual Bus Depot and Train Station, the last stop on the Mattapan Line. The Project is bounded by commercial buildings to the north, the major intersection of Blue Hill Parkway, River Street, and Cummins Highway to the west, and forested areas and the Neponset River to the south and east. The Project parcel is approximately 5.1 acres and includes railroad tracks along the northern and central portions of the site, a maintenance garage located on the eastern side of the Project, and a gravel driveway and parking lots located north, east, and south of the existing garage. The Project lies within the Neponset watershed.

Due to the proximity of the Neponset River, there are wetland resource areas near the Project. The nearby resource areas consist of Bordering Land Subject to Flooding (BLSF) as identified by FEMA as the 100-year floodplain, a 25-foot Riverfront Area (RA), and a 100-foot Buffer Zone.

The current condition of the pavement is in disrepair. The observed pavement degradation appears likely due to inadequate drainage on the site. The Project is set up as a Base Bid and an Additive Bid Alternate to prioritize the pavement repair. In the event the Project cannot fund the Additive Bid Alternate, the Project will move forward as Base Bid Only.

Base Bid

The Base Bid consists of mill and overlay of the majority of the pavement, full depth reconstruction at the south of the property where the pavement degradation is most severe, and a drainage infiltration trench to treat contributing impervious area. The Base Bid will disturb a total of 0.34 acres. The Base bid is considered a redevelopment and is required to comply to the Stormwater Standards 2 through 6 to the maximum extent practicable.

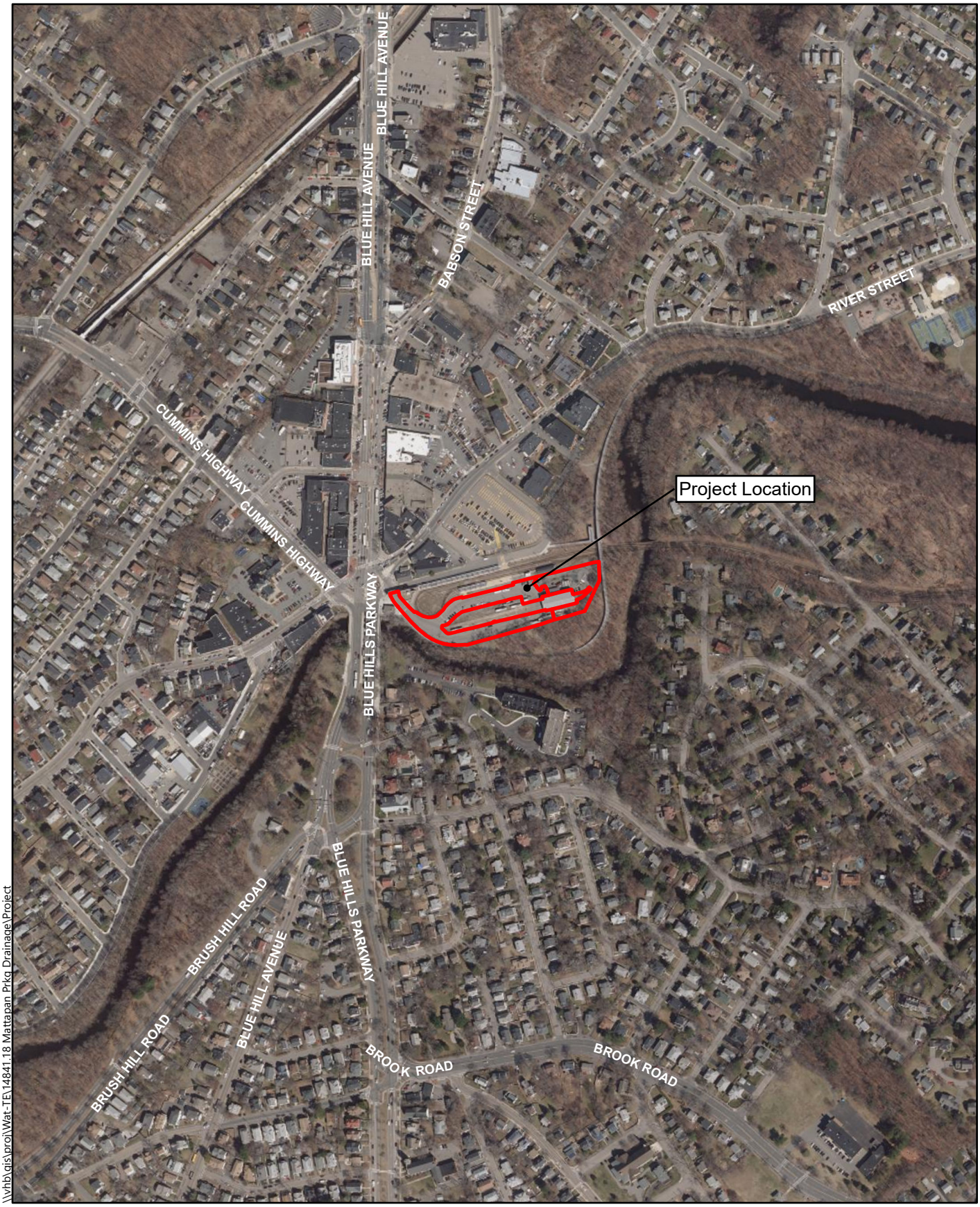
Addititve Bid Alternate

The Additive Alternate consists of full depth pavement to replace the existing gravel laydown areas adjacent to the garage. Stormwater Control Measures (SCMs) are proposed to treat additional pavement per the Stormwater Standards. The Additive Bid Altnerate will disturb a total of 0.40 acres.

The following Stormwater Report and calculations assume the Addiditive Bid Alternate will be included in construction.

See Figure 1 for the Project Locus Map.

Figure 1 Locus Figure



0 250 500 1000 Feet

MBTA Mattapan Station Drainage Improvements | Boston, MA

Legend

Project Limits

FIGURE 1 - LOCUS

Source Info: USGS, MassGIS, VHB

3

Existing Conditions

The Project is currently completely impervious, consisting of degraded hot mix asphalt pavement, concrete sidewalk, and hard packed gravel laywdown/stockpile/parking areas. Beyond the property fence is the Neponset River and Neponset River Trail, which consists of forested vegetation. The Project is located within the Neponset River Watershed. The Project site topography is relatively flat, pitching towards the Neponset River. There are three catch basins on the property that collect runoff and convey stormwater to the 12-inch trunk line that runs through the property. The 12-inch trunk line also conveys stormwater from offsite. There is a water quality unit located on the downstream end of the 12-inch trunk line prior to its outfall location to the Neponset River. The southern portion of the site originally consisted of a drainage swale that was eventually paved over and not in use.

There is one existing design point for stormwater on the Project site. Design Point 1 (DP-1) is the Neponset River. DP-1 receives overland runoff from the Project site as well as point source discharge from the existing 12-inch pipe that conveys the closed drainage from the Project site.

Table 1 presents the existing drainage areas and their design points.

Table 1 Existing Drainage Areas

Drainage Area	Design Point	Area (acres)	Curve Number
EX-SWALE	DP-1	0.97	97
EX-SITE	DP-1	4.51	97

Key features in and around the project area include 25-foot Riverfront Area, 100-foot buffer zone, and 100-year floodplain (Bordering Land Subject to Flooding) at Elevation 26 are shown on Figures 2 through 4.

The Project isn't located within the 100-year floodplain as shown on the FEMA Flood Insurance Rate Map (FIRM) Panel #25025C 0089J included in Appendix B.

Review of the NRCS Soil Survey map of the project area identified primarily Urban land, 0 to 15 percent slopes (602), HSG Unknown, with sandy Udorthents (653), HSG A, along the eastern, western, and southern sides of the site and are shown on Figure 3. On-site subsurface investigations were performed on 11/1. The test pits on the site indicate the soil to be sandy loam and loamy sand.

Appendix B provides detailed soils information, including the NRCS soil survey data for the project area and results of on-site subsurface investigations.

Figure 2 Existing Drainage Patterns

FIGURE 2
EXISTING DRAINAGE AREAS
MATTAPAN MBTA, MA

N

LEGEND

- SUBCATCHMENT DRAINAGE AREA DESIGNATION (1-1)
- POND (1)
- REACH (1)
- DESIGN POINT (1)
- DRAINAGE AREA BOUNDARY
- FLOW LINE
- 100' BUFFER — 100' BUFFER ZONE
- ZONE AE 100-YEAR FLOODPLAIN (26FT)
- 25'RA — 25' RIVERFRONT AREA
- PROPOSED LIMIT OF WORKS

EX-SITE

EX-SWALE

DP-1

DP-1

NEPONSET RIVER

NEPONSET RIVER

ZONE AE 100-YEAR
FLOODPLAIN (26ft)

100' BUFFER

100' BUFFER (AE)

25' RA

25' RA (AE)

BF1-101 BF1-108 BF1-109 BF1-110 BF1-111 BF1-112 BF1-113 BF1-114 BF1-115 BF1-116 BF1-117 BF1-118

60 0 60 120

SCALE IN FEET

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Figure 3 NRCS Soils Information

FIGURE 3
HYDROLOGIC SOIL CONDITIONS
MATTAPAN MBTA, MA

N

LEGEND

- DRAINAGE AREA BOUNDARY
- NRCS HYDROLOGIC SOIL GROUP A
- NRCS HYDROLOGIC SOIL GROUP – UNKNOWN
- 100' BUFFER — 100' BUFFER ZONE
- ZONE AE 100–YEAR FLOODPLAIN (26FT)
- 25'RA — 25' RIVERFRONT AREA
- PROPOSED LIMIT OF WORKS

ZONE AE 100-YEAR FLOODPLAIN (26FT)

60 0 60 120

SCALE IN FEET

\\vhb.com\gbl\proj\Wat-TE\14841.18 Mattapan Prkg Drainage\tech\Stormwater Calcs\Figure_3.dwg

4

Proposed Conditions

The Project includes mill and overlay of the existing bus loop, full depth pavement reconstruction, and three stormwater control measures (SCMs). The southern portion of the bus loop is to be re-graded to have positive drainage towards the infiltration trench beyond the fence.

Table 3 provides a breakdown of the impervious area for the Project.

Table 3 Impervious Area

Condition	Impervious Area (sq. ft)
Existing	54,800
Proposed	78,568
Net	+23,768*

** The increase in impervious consists of the Additive Bid Alternate only. No increase in impervious is proposed for the Base Bid.*

The proposed design maintains existing drainage and grading patterns to the maximum extent possible. The existing closed drainage system is to remain. A portion of the existing closed drainage is proposed to be slip-lined to reinforce the integrity of the system.

Three Stormwater Control Measures (SCMs) are proposed to treat runoff from impervious area. Based on the subsurface investigation and infiltration testing, an infiltration rate of 0.52 in/hour is used for the design of the SCMs adjacent to the fenceline and an infiltration rate of 2.41 in/hour is used for the SCM within the new paved area.

Infiltration Trench #1 is a 300-foot infiltration trench running parallel to the southern fence. The infiltration trench consists of a 1-foot deep grassed swale on a bed of 6-feet wide by 3.5-feet deep crushed stone with an embedded 12-inch perforated PVC pipe. The infiltration trench is proposed with small area drain structure with an outlet pipe sized to control the flow as it discharges to the closed drainage system. The trench is sized to treat the required water quality volume (WQV) and recharge volume (ReV) consisting of the impervious area contributing to the SCM. During storm events greater than the WQV and ReV, the infiltration trench will overflow via the outlet pipe and to the site's closed drainage. During larger storm events, the trench may overflow overland towards the Neponset River (DP-1).

Infiltration Trench #2 is a 70-foot infiltration trench running parallel to the southwestern fence. The infiltration trench consists of a 1-foot deep grassed swale on a bed of 6-feet wide

by 3.5-feet deep crushed stone with a 12-inch pipe embedded. The trench is sized to treat the required water quality volume (WQV) and recharge volume (ReV). During storm events greater than the WQV and ReV, the infiltration trench will overland towards the Neponset River (DP-1).

Infiltration System #3 is a subsurface infiltration system consisting of rows of 12-inch perforated HDPE pipe in bed of stone. The infiltration SCM is proposed with small outlet control structure to control the flow as it discharges to the closed drainage system. The trench is sized to treat the required water quality volume (WQV) and recharge volume (ReV). During storm events greater than the WQV and ReV, the infiltration system will overflow to the outlet pipe and to the site's closed drainage towards the Neponset River (DP-1).

A portion of the proposed work is to occur within the 100-foot buffer zone. No work for the project is to take place within the 25-foot Riverfront Area. The work within the 100-foot buffer zone consists of mill and overlay, a portion of full depth pavement reconstruction and the installation of the proposed SCM.

Table 4 presents the proposed drainage areas and their characteristics under proposed conditions. Figure 4 shows proposed drainage patterns and drainage area delineations by design point.

Table 4 Proposed Drainage Areas

Drainage Area	Design Point	Area (acres)	Curve Numbers
PR-BID-ALT-S	DP-1	0.21	98
PR-BID-ALT-N	DP-1	0.33	98
PR-SITE	DP-1	3.96	97
PR-SWALE	DP-1	0.97	97

See Figure 4 for proposed drainage areas and proposed SCMs by design point.

Figure 4 Proposed Drainage Patterns

FIGURE 4
PROPOSED DRAINAGE AREAS
MATTAPAN MBTA, MA

N

INFILTRATION SYSTEM #03

12-INCH OUTFALL

INFILTRATION TRENCH #02

INFILTRATION TRENCH #01

NEPONSET RIVER

ZONE AE 100-YR FLOODPLAIN (26FT)

NEPONSET RIVER

PR-SITE

PR-SWALE

PR-BID-ALT-N

PR-BID-ALT-S

3P

2P

1P

DP-1

DP-1

DP-1

LEGEND

- 1-1 SUBCATCHMENT DRAINAGE AREA DESIGNATION
- 1 POND
- 1 REACH
- 1 DESIGN POINT
- DRAINAGE AREA BOUNDARY
- FLOW LINE
- 100' BUFFER — 100' BUFFER ZONE
- ZONE AE 100-YEAR FLOODPLAIN (26FT)
- 25'RA — 25' RIVERFRONT AREA
- PROPOSED LIMIT OF WORKS

60 0 60 120

SCALE IN FEET

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5

Impaired Waters and TMDLs

As described under the Proposed Conditions section, the Project will discharge to the Neponset River. The Neponset River is impaired based on the MassDEP Year 2016 Integrated List of Waters, also known as the 303(d) list.

Table 6 lists the receiving water body that is impaired and if the water body has a TMDL.

Table 6 Impaired Waters and TMDL Information

Water Body	303(d) Category	303(d) Impairments	TMDL	TMDL Pollutant	TMDL Report Name
MA73-03	5	Debris, Trash, DDT in Fish Tissue, Dissolved Oxygen, Enterococcus,Escherichia Coli (E. Coli), Fecal Coliform, Flocculant Masses, Metals, Oil And Grease, PCBs In Fish Tissue, Polychlorinated Biphenyls (PCBs), Scum/Foam	Yes	Fecal Coliform Bacteria	Final Total Maximum Daily Loads of Bacteria for Nepsonset River Basin CN 121.0

See Standard 4 in Section 6 below for more water quality calculations and discussion.

6

Stormwater Management Standards

As demonstrated below, the proposed Project complies with the MassDEP Stormwater Management Standards (the Standards). The Project is a redevelopment due to maintenance of an existing MBTA Station pavement and is required to meet the Stormwater Standards 2 through 6 to the maximum extent practicable (MEP).

Standard 1: No New Untreated Discharges

No new stormwater outfalls are proposed for the Project.

Standard 2: Peak Rate Attenuation

The Project is considered a redevelopment and required to meet this standard to the maximum extent practicable. However, the Project has been designed to comply with Standard 2. This project reduces post-development peak runoff rates to below pre-development peak runoff rates for the 2-year, 10-year, and 100-year 24-hour design storm events based on NOAA Atlas 14 precipitation data as shown in Table 8.

Table 8 Rainfall Depths (in)

Design Storm Event	Rainfall Depth (in)
2-year	3.38
10-year	5.30
100-year	8.33

Table 9 provides a summary of peak rates for each design point under existing and proposed conditions. Appendix D provides computations and supporting information regarding the hydraulic and hydrologic modeling.

Table 9 Peak Discharge Rates (cfs)

	Existing			Proposed		
Design Point	2-year	10-year	100-year	2-year	10-year	100-year
DP-1: Neponset River	18.8	29.8	47.2	16.9	28.6	45.3

Standard 3: Recharge

The Project is considered a redevelopment and required to meet this standard to the maximum extent practicable. However, the Project has been designed to comply with Standard 3. The stormwater management design recharges the required recharge volume to groundwater.

Table 10 provides the required recharge volum, and Table 11 provides the recharge volumes proposed for each SCM.

Table 10 Required Recharge Volume

	HSG A	HSG B	HSG C	HSG D	Total
Impervious Area (sq. ft.)	78,568*				78,568
Target depth, F (in)	0.60	0.35	0.25	0.10	-
Required Recharge Volume, ReV (cf)	3,928				3,928
Capture Area Adjustment (cf)					**4,666**

**HSG group for the site is unknown. HSG A was used as a conservative assumption to ensure recharge volume is met.*

Table 11 Provided Recharge Volume for Each SCM

	Total
Infiltration Trench #1	3,562
Infiltration Trench #2	804
Infiltration System #3	1,357
Total Provided Recharge Volume, ReV (cf)	**5,723**

The infiltration SCMs are designed to drain completely within 72 hours.

Appendix B provides soil evaluation information (including the geotechnical report if applicable), and Appendix C provides computations, drawdown calculations, and supporting information regarding recharge.

Standard 4: Water Quality Treatment

The Project has been designed to comply with Standard 4. Stormwater control measures have been sized to treat the required water quality volume (WQV) and provide the required pollutant load removal. The Project:

- Achieves 80% TSS reduction through treatment of the WQV equal to 1.0 inch times the new impervious area within the project limits, based on MassDEP TSS removal rates as defined in the Massachusetts Stormwater Handbook.
- Treats existing impervious area to the MEP by infiltration trenches and subsurface infiltration systems.
- Improves existing conditions through treating existing untreated pavement.

Table 12 shows the WQV to be treated be each SCM, based on incoming impervious area. Note, no change to impervious area between existing and proposed conditions is proposed.

Table 12 WQV at Each SCM

SCM	Imp. area (sf)	WQ runoff depth required (in)	WQ volume required (cf)	WQ volume provided (cf)
Infiltration Trench #1 (PR-SWALE)	42,380	1.0	3,532	3,562
Infiltration Trench #2 (PR-BID-ALT-S)	9,192	1.0	766	804
Infiltration System #3 (PR-BID-ALT-N)	14,756	1.0	1,230	1,357

Appendix C provides the MassDEP TSS Removal Calculation Worksheets.

Standard 5: Land Uses with Higher Potential Pollutant Loads

The Project Site is a maintenance facility for the MBTA and contains a garage where maintenance activities occur. Since the activities with potential pollutant loads per 310 CMR 22 are conducted in the covered garage, the Project does not have Land Uses with Higher Potential Pollutant Loads and Standard 5 does not apply.

Standard 6: Critical Areas

Standard 6 does not apply to the Project. There are no Critical Areas near the project area.

Standard 7: Redevelopment

The Project is a redevelopment project as it includes repaving the existing MBTA Station. The Project is required to comply with Stormwater Standards 2 through 6 to the maximum extent practicable and to fully comply with Stormwater Standards 1, 7, 8, 9, and 10.

Standard 8: Erosion and Sediment Control

The implementation of erosion and sediment (E&S) controls during construction is considered a standard practice for all MBTA projects. E&S controls will be installed before any land disturbance begins for the Project and will remain in place for the duration of the Project. The E&S controls for the Project are shown on the project plans and include sediment control barriers and siltsacks at inlets.

Standard 9: Operation and Maintenance Plan

Appendix E includes the O&M Plan for this project.

Standard 10: Prohibition of Illicit Discharges

Illicit Discharge Statement

The project's stormwater management system, as shown on the plans submitted with this report, have been designed in full compliance with Standard 10. The project area does not have any known illicit connections. Any illicit connections to the stormwater management system found in the project limit of work during construction will be removed and/or resolved through MassDOT's Illicit Discharge Detention and Elimination (IDDE) Program. The Long-Term Pollution Prevention Plan, provided in Appendix E, includes measures to prevent illicit discharges.

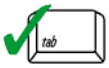
Appendix A: MassDEP Checklist for Stormwater Report

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Memorandum ~~Report~~, including the soil evaluation, ~~computations~~, Long-term Pollution Prevention Plan, ~~the Construction Period Erosion and Sedimentation Control Plan (if included),~~ the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Memorandum ~~Report~~ accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

11/30/2022

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☒ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☒ Other (describe): Infiltration Trench

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☐ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☐ Soil Analysis provided.

☐ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☐ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

☐ Site is comprised solely of C and D soils and/or bedrock at the land surface

☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000

☐ Solid Waste Landfill pursuant to 310 CMR 19.000

☒ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☐ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet ~~and a mounding analysis is provided.~~

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Memorandum and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

☒ The ½" or 1" Water Quality Volume or

☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs) – (N.A.)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the Long-Term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas – (N.A.)

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Memorandum & NOI.

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

☐ Limited Project

☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.

☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area

☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff

☐ Bike Path and/or Foot Path

☐ Redevelopment Project

☒ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☒ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. ~~The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.~~

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☐ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☒ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☐ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

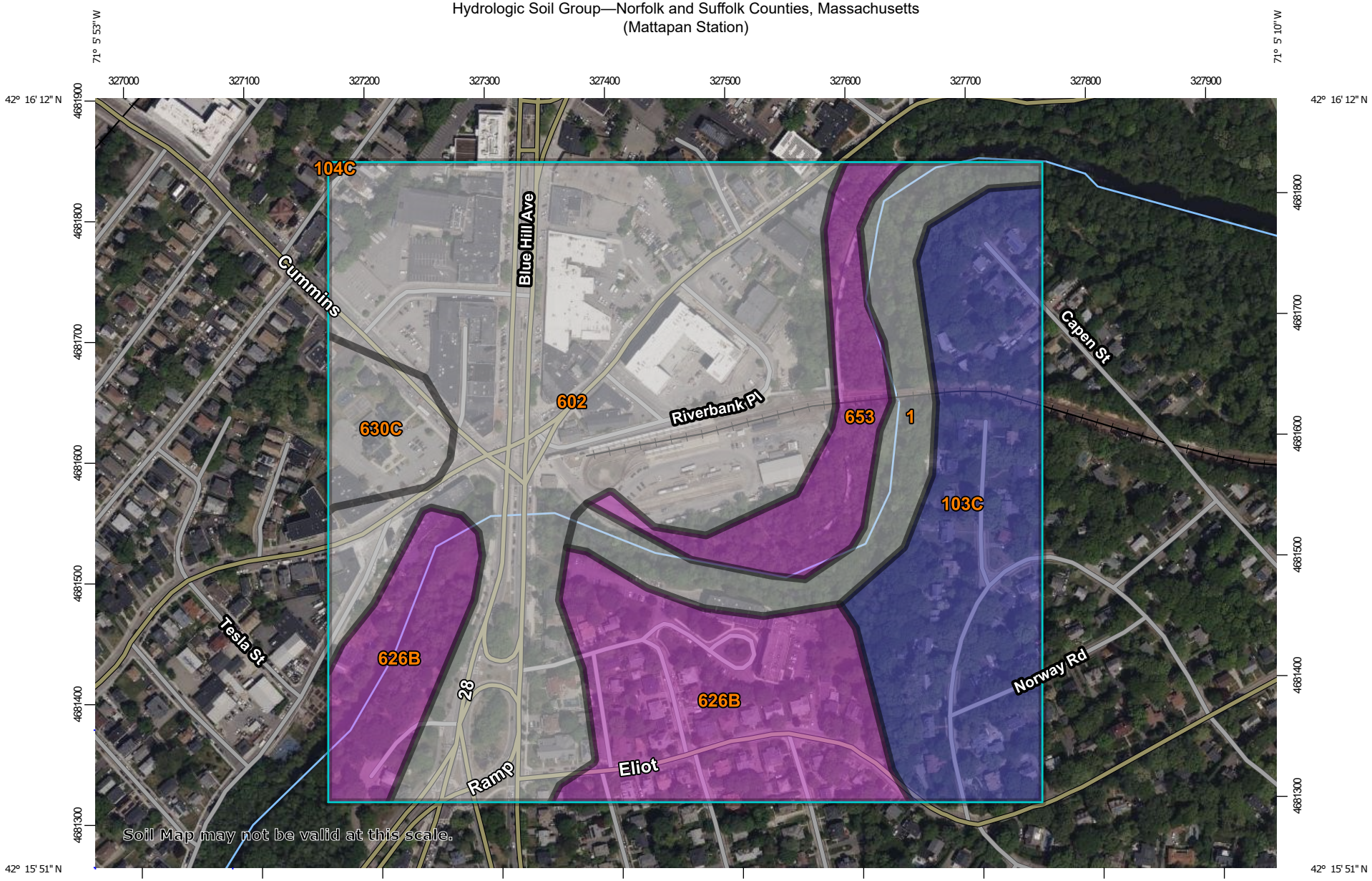
☒ An Illicit Discharge Compliance Statement is ~~attached;~~ *included in the Stormwater Report Narrative*.

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

Appendix B: Soils and FEMA Information

- NRCS Soil Survey Information
- On-Site Subsurface Investigations
- FEMA Flood Insurance Rate Map (FIRM)

Hydrologic Soil Group—Norfolk and Suffolk Counties, Massachusetts
(Mattapan Station)



Map Scale: 1:4,490 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N 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 1:25,000.

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: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 18, Sep 9, 2022

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		6.4	8.2%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	B	14.3	18.3%
104C	Hollis-Rock outcrop-Charlton complex, 0 to 15 percent slopes	D	0.0	0.0%
602	Urban land, 0 to 15 percent slopes		34.9	44.7%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	15.0	19.2%
630C	Charlton-Hollis-Urban land complex, 3 to 15 percent slopes		2.7	3.4%
653	Udorthents, sandy	A	4.8	6.2%
Totals for Area of Interest			**78.1**	**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

November 16, 2022
Project No. 100449.000

Rachel Luna, PE
Water Resources Engineer
Vanasse Hangen Brustlin, Inc.
101 Walnut Street, PO Box 9151
Watertown, MA 02472-4026
P 617.607.2162
rluna@vhb.com

Re: Geotechnical Report
MBTA Mattapan Station Parking Lot Drainage
Boston, Massachusetts
MBTA Contract No. Z94Ps08 – Task Order 18

Dear Ms. Luna,

Nobis Engineering, Inc. (Nobis) d/b/a Nobis Group® has prepared this geotechnical report summarizing the results of our subsurface explorations for the proposed parking lot pavement rehabilitation and permitting at the existing Massachusetts Bay Transportation Authority (MBTA) Mattapan Bus Facility, located in Boston, Massachusetts. This geotechnical report summarizes the results of the subsurface explorations performed at the site, and presents geotechnical recommendations to assist Vanasse Hangen Brustlin, Inc. (VHB) with their pavement rehabilitation design for the site.

Our services were performed in general accordance with our revised proposal dated May 5, 2022 and the executed subconsultant task authorization dated June 30, 2022. This report is subject to the limitations in **Appendix A**. The elevations in this report reference the North American Vertical Datum of 1988 (NAVD 88).

PROJECT DESCRIPTION

The project is located at 500 River Street in Boston, Massachusetts. The general site location is illustrated on the attached **Figure 1**. The site is currently developed with an existing one-story

structure having an overall area of approximately 6,000 square feet, multiple railroad tracks, two (2) train station platforms, and driveway areas and parking lots located across the majority of the site. The existing Mattapan Station was upgraded in the early 2000s. Nobis understands the bus loop and parking lot are in need of pavement rehabilitation and drainage improvements including proposed stormwater infiltration structures. A view of the site, facing west from the location of test boring NB-3 is shown in **Photo 1**.

Photo 1: View of MBTA Mattapan Station Parking lot, from boring location NB-3.

SITE CONDITIONS

The site topography is generally level with a slightly sloped grade downward from west to east from approximately El. 37 feet at the western portion of the site to approximately El. 30 feet on the eastern portion of the site. The area of proposed development is generally level and ranges from approximately El. 37 to 33 feet. Numerous overhead utility wires are present parallel to the railroad tracks and train station platforms and several existing underground utilities are present throughout the site including water and gas.

SUBSURFACE EXPLORATIONS

Three (3) test borings (referred to as NB-1 through NB-3) were advanced at the site on November 1, 2022 by New England Boring Contractors, Inc. of East Taunton, Massachusetts. Test borings were advanced to depths ranging from 8.5 to 14.0 feet below existing grade using a CME-75 truck rig drilling equipment with 4¼-inch inside-diameter hollow-stem augers.

Photo 2: View of truck drill rig at boring location NB-1.

Soil samples were generally obtained nearly continuously from the ground surface to the termination depth, using a standard 1 3/8" inside-diameter split-barrel sampler. Standard Penetration Tests (SPTs) were performed in general accordance with industry standards utilizing an automatic hammer to advance the split-barrel sampler. A greater efficiency is typically achieved with the automatic hammer compared to the conventional

safety hammer operated with a cathead and rope. The effect of the automatic hammer's efficiency has been considered in the interpretation and analysis of the subsurface information for this report.

Test borings were observed and logged by Nobis personnel. Soil samples obtained from the test borings were classified in general accordance with the modified Burmister classification system and are presented on the test boring logs included in **Appendix B**. The United States Department of Agriculture (USDA) descriptions were also included on the boring logs. Exploration locations are illustrated on the Subsurface Exploration Plan included in **Figure 2**.

SUBSURFACE CONDITIONS

The generalized soil stratigraphy encountered in the borings consisted of a surficial layer of asphalt, overlying fill and native soils. A generalized description of the soils encountered are discussed below in order of increasing depth.

Asphalt / Bituminous Pavement – Asphalt was encountered at the ground surface in test borings NB-1 and NB-2. The pavement thickness encountered in the borings ranged from approximately 1 to 5 inches.

An approximately 3 inches thick gravel subbase course layer was encountered below the asphalt pavement in some of the borings. The subbase generally consisted of fine to coarse gravel, with varying amounts of sand and silt.

Fill – Fill was encountered in each test boring to depths ranging from approximately 1.3 to 3.5 feet below ground surface (bgs). Test boring NB-3 was performed adjacent to the existing structure and appeared to have a thicker layer of fill than the other test boring locations. The fill varied from medium dense to very dense and generally consisted of fine to coarse sand with varying amounts of gravel and silt. Cobbles were occasionally encountered within the fill or at the transition of fill to other stratums.

Sand and Silt – A stratum consisting primarily of sands with and (35-50%) to little (10-20%) silt and varying amounts of gravel was encountered below the fill stratum. The soil stratum varied in density from medium dense to dense and contained very faint to faint redoximorphic staining. The bottom depths of the stratum ranged between 5 to 10 feet bgs.

Inferred Cobbles and Boulders – A stratum containing cobbles and boulders was encountered in boring NB-1 from a depth of 6.5 to 8.5 feet bgs. Due to time constraints, test boring NB-1 was terminated after encountering spoon and auger refusal at 8.5 feet in the inferred cobbles and boulders.

River Deposits – Fine to coarse sand with varying amounts of silt and gravel was encountered underlying sand and silt stratums in borings NB-2 and NB-3. The stratum generally was loose to medium dense, with very few to over 50% organics. The organics ranged from roots and sticks to peat. Cobbles were occasionally encountered in this stratum. The bottom depths of the stratum ranged between 10 to 11 feet bgs.

Photo 3: View of sample S-6 from 12 to 14 feet bgs at boring location NB-2.

Glacial Till – A stratum consisting predominantly of fine to coarse sands and silts with varying amounts of gravel was encountered below the river deposits. The density of this soil stratum varied from medium dense to very dense. The top of the glacial till layer was encountered between 10 to 11 feet bgs.

Groundwater – At the time of drilling, groundwater was encountered at depths ranging from 5.3 to 11 feet bgs. The recorded depth to groundwater in NB-1 may be indicative of perched water due to the inferred cobbles and boulders.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the explorations were performed. Therefore, groundwater levels during construction or during the planned life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

INFILTRATION TESTING

To evaluate the permeability of the proposed infiltration areas, infiltration tests were performed in all three test borings at depths ranging from approximately 4.5 to 4.9 feet bgs. Hydraulic

conductivity testing was performed in the field in general accordance with ASTM D5126-90, using the borehole falling-head permeameter test method.

POTENTIAL ENVIRONMENTAL CONCERNS

During geotechnical drilling and sampling, a strong petroleum odor was noted to be present in the sample from 10 to 12 feet below ground surface in boring NB-3.

If a petroleum odor is encountered during construction, then the earthworks contractor will likely approach this as a change in condition, unless the condition is identified and explained in the bid documents. An environmental assessment was not part of our scope of services, and we recommend that the client evaluates if an environmental investigation is warranted for this project. Because monitoring wells exist in the vicinity of test boring NB-3, it is possible that these wells had previously been installed in support of an environmental assessment of remediation.

GEOTECHNICAL DESIGN RECOMMENDATIONS

Geotechnical recommendations regarding the estimated hydraulic conductivity and the pavement rehabilitation design for the project are outlined below. The recommendations contained in this report are based upon the results of field testing, engineering analyses, and our current understanding of the proposed development.

Hydraulic Conductivity

Nobis estimated the hydraulic conductivity based on empirical calculations using the Variable Head Method and Basic Time-Lag Method (Hvorslev Case B, 1957). Our calculations are based on the infiltration tests performed in the test borings at the time of drilling. Refer to **Table 1** below for estimated hydraulic conductivity values and the USDA soil classification at the approximate depth of the test performed:

Table 1 - Hydraulic Conductivity Test Results

Boring I.D.	Depth of Infiltration Test performed (feet)	Estimated Groundwater Table Depth (ft)	Variable Head Method: Hydraulic Conductivity (inch/hour)	Basic Time-Lag Method: Hydraulic Conductivity (inch/hour)	USDA Soil Classification at Depth of Test
NB-1	4.9	5.3*	0.72	0.69	Sandy Loam
NB-2	4.6	11.0	0.30	0.18	Sandy Loam
NB-3	4.5	10.5	5.04	5.83	Loamy Sand

* The estimated depth to groundwater at boring NB-1 may be artificially high as a result of potentially perched water and the water added during the infiltration test.

It should be noted that the individual permeability tests only measure the hydraulic conductivity in the immediate vicinity of the test performed and may not be representative of the average hydraulic conductivity of the soil stratum.

Per MassDOT Stormwater Handbook Volume 3, Table 2.3.3, an infiltration rate of 2.41 inches per hour and 1.02 inches/hour is listed for a USDA Textural Classification of Loamy Sand and Sandy Loam, respectively. We recommend an infiltration rate of 0.5 inches/hour for the loamy sand and sandy loam materials at the site.

Subgrade Preparation Procedures

Existing topsoil/subsoil and pavements should be removed from below the proposed pavement areas in their entirety. Existing fill may remain in place below proposed pavement areas provided the fill is stable upon proof-rolling.

Upon excavation to bottom of base course elevation, subgrades should be compacted with at least six passes of a vibratory drum roller with a minimum static drum weight of 10,000-pounds. It should be noted that the soil subgrades were sometimes silty and may be susceptible to disturbance when wet. Proper drainage of construction areas should be provided to protect the subgrades from the detrimental effects of weather conditions. Over-excavate any weak or soft spots, including any roots/wood or other deleterious items, identified during proof-compaction and replace with compacted Processed Gravel Base Course.

Fill Materials and Compaction

Processed Gravel Base Course: To be used for the gravel base course, and for replacement of loose/soft areas, shall consist of hard, inert, durable gravel and sand and shall meet the requirements defined by the Massachusetts Department of Transportation (MassDOT) Highway Division Standard Specifications, M1.03.1. It shall be free from ice and snow, roots, surface coatings, sod, loam, clay, rubbish, and other deleterious or organic matter, and shall conform to the following gradation requirements if imported from offsite:

Sieve Size	% Finer By Weight
3-inch	100
1½-inch	70-100
¼-inch	50-85
No. 4	30-60
No. 200	0-10

Crushed Stone: Recommended as drainage material. Crushed stone shall meet the requirements defined by the MassDOT Highway Division Standard Specifications for Highways and Bridges, Table M2.01.0-1, Material M2.01.4 (3/4-inch stone). Crushed stone, where used, should be separated from soil subgrades, excavation sidewalls, and soil backfill with a geotextile separation fabric such as Mirafi 140N, or equivalent.

The recommended minimum compaction for fill placement below pavement areas is 95 percent, based on percentage of maximum dry density as defined by ASTM D-1557.

Frost Protection

For frost protection, only non-frost susceptible soils having a fines content (i.e. passing a No. 200 sieve) of not more than 10% should be placed to a depth of 4 feet below the finished pavement grades. Protect subgrades from frost at all times during construction. Fill should not be placed over frozen soil.

Reuse of Existing Materials

The majority of base course material (Processed Gravel Base Course) below the proposed pavement may need to be imported to the site, due to the high silt/fines content 2 to 4 feet below existing grades. Existing site soil may be reused as Processed Gravel Base Course, provided they meet the gradation requirements and are free of debris, not consisting of cobbles and boulders, material consisting of no greater than 10% fines (passing No. 200 Sieve), free of organics and other deleterious materials, and can then be placed and compacted as required herein. Excavated material not meeting the requirements for Processed Gravel Base Course may be reused as Common Borrow below the gravel base course layer, provided the following conditions are met:

- lifts of reused soils should be culled of cobbles in excess of four (4) inches in diameter;
- the soil is kept free from debris and other deleterious materials, and should not contain more than 20% by weight passing the #200 sieve size;
- strict moisture control of backfill soils is performed. This may involve covering soil stockpiles and scarifying soils during wet conditions and adding moisture during dry conditions; and,
- soils are capable of being placed in accordance with the compaction criteria.

The recommended minimum compaction for Common Borrow is 95 percent within 3-feet below the gravel base course and 92% more than 3-feet below the gravel base course, based on percentage of maximum dry density as defined by ASTM D-1557.

It should be noted that environmental chemical analytical testing was not performed by Nobis at the site and disposal of excess soil at an off-site location could potentially be required, incurring premium soil disposal costs. Environmental testing should be performed if there are excess materials. We recommend that your environmental consultant develop a soil management plan or specification to be incorporated into the construction documents.

Thank you for the opportunity to be of service. Should you require additional information, please contact us.

Very truly yours,

NOBIS GROUP®

Kamil Kocia
Staff Engineer

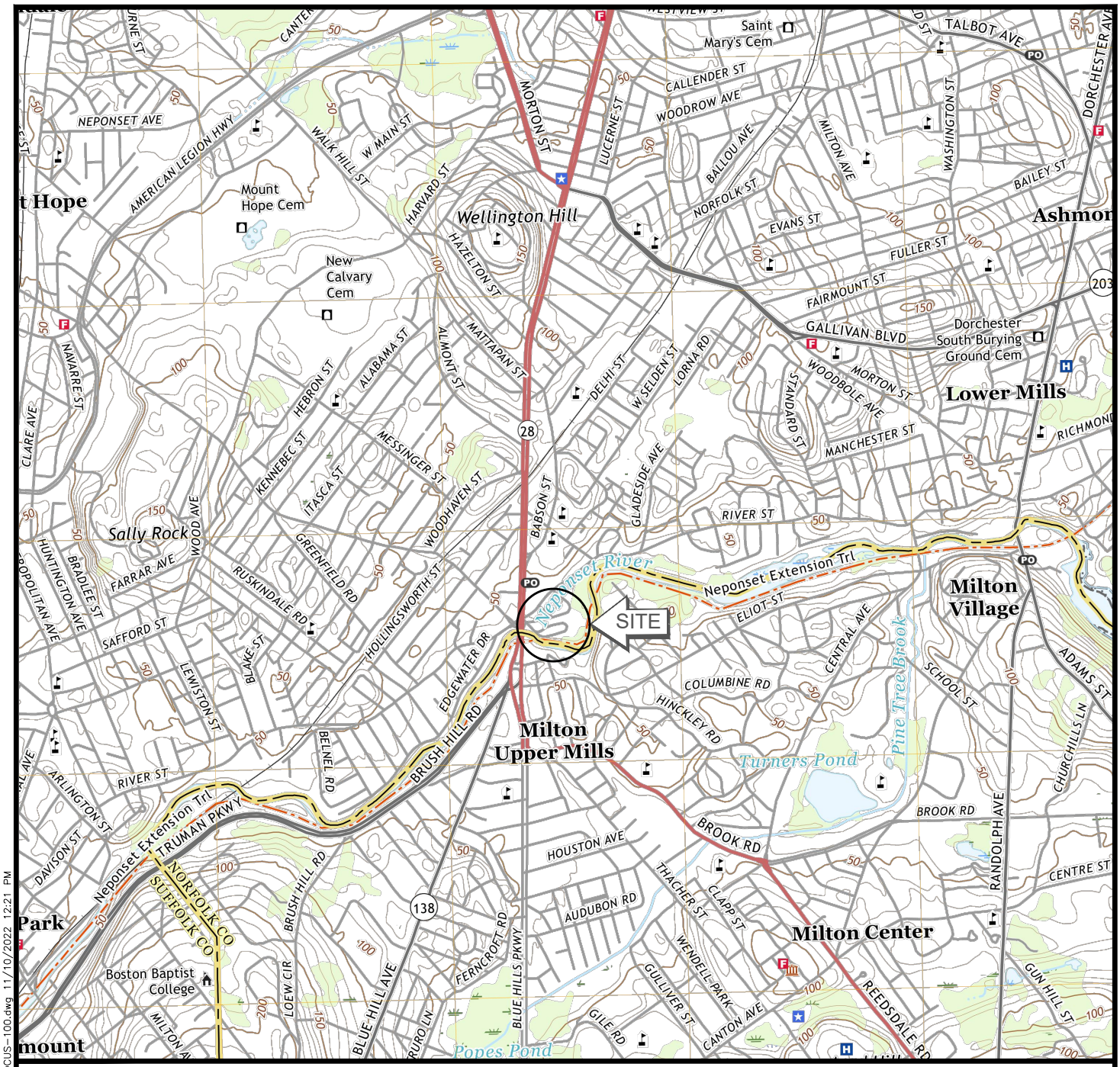
Kurt Jelinek, PE
Director of Transportation

Sarah A. Kurtzer, EIT
Project Engineer

Attachments:

Figure 1	Site Locus Plan
Figure 2	Subsurface Exploration Location Plan
Appendix A	Limitations
Appendix B	Test Boring Logs
Appendix C	Infiltration Test Calculations

FIGURES



NORTH

2021 USGS TOPOGRAPHIC MAP

BOSTON SOUTH QUADRANGLE
BOSTON, MASSACHUSETTS
NORTH AMERICAN VERTICAL DATUM OF 1988
CONTOUR INTERVAL 10 FEET

APPROXIMATE SCALE
1 INCH = 2,000 FEET

nobis
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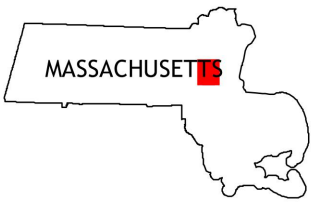

QUADRANGLE LOCATION

FIGURE 1

SITE LOCUS PLAN
MBTA MATTAPAN STATION
PARKING LOT
BOSTON, MASSACHUSETTS

DRAWN BY:	KAK	CHECKED BY:	SK
PROJECT NO.	100449.000	DATE:	NOVEMBER 10, 2022

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NOTES:

1. THE BASE PLAN WAS PREPARED BY VANASSE HANGEN BRUSTLIN, INC. (VHB) FROM AN AUTOCAD FILE CALLED "MATTAPAN LINE BASE MAP" DATED AUGUST 29, 2022. LOCATIONS AND SITE FEATURES DEPICTED ARE APPROXIMATE AND GIVEN FOR ILLUSTRATIVE PURPOSES.
2. INFILTRATION TESTS WERE PERFORMED AT EACH TEST BORING, ABOVE THE GROUNDWATER TABLE, BETWEEN APPROXIMATELY 4.5 TO 5 FEET BELOW EXISTING GRADES BY A NOBIS FIELD REPRESENTATIVE.
3. ELEVATIONS ARE BASE ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).

LEGEND

NB-1 TEST BORING LOCATION, PERFORMED BY NEW ENGLAND BORING CONTRACTORS OF EAST TAUNTON, MASSSACHUSETTS, AND BE OBSERVED BY NOBIS

NB-1

NB-2

NB-3

0 60' 120'

GRAPHIC SCALE

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FIGURE 2

SUBSURFACE EXPLORATION PLAN
MBTA MATTAPAN STATION
PARKING LOT
BOSTON, MASSACHUSETTS

DRAWN BY: KAK	CHECKED BY: KJ
PROJECT NO. 100449.000	DATE: NOVEMBER 10, 2022

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APPENDIX A – Limitations

GEOTECHNICAL LIMITATIONS

Explorations and Subsurface Conditions

1. The analyses and design recommendations submitted in this report are based in part upon the data obtained from subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

   In preparing this report, Nobis relied on certain information provided by the Client and other parties referenced therein which were made available to Nobis at the time of our evaluation. Nobis did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more erratic. For specific information, refer to the exploration logs.

3. Water level readings have been made in the explorations at times and under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors occurring since the time measurements were made. The water table encountered in the course of the work may differ from that indicated in the Report.

   Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

4. Nobis' geotechnical services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.

Additional Services

5. Nobis recommends that we be retained to provide services during future site observations, design, implementation activities, construction and/or property development/ redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our recommendations, design concepts and/or opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design recommendations; and iv) assess the consequences of changes in technologies and/or regulations.

Use of Report

6. Nobis prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in our proposal and/or report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to Nobis.

   This report is for design purposes only and is not sufficient to prepare an accurate construction bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to design considerations only.

7. Nobis' findings and conclusions are based on the work conducted as part of the scope of work set forth in our proposal and/or report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions considering the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the project design has been altered in any way, Nobis shall be so notified and afforded the opportunity to revise the report, as appropriate, to reflect the unanticipated changed conditions.

8. Nobis' services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

Compliance with Codes and Regulations

9. Nobis used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

Opinion of Cost

10. This report may contain or be based on comparative cost opinions for the purpose of evaluating alternative foundation schemes. These opinions may also involve approximate quantity evaluations. It should be noted that quantity estimates may not be accurate enough for construction bids. In addition, since we are not professional estimators of labor and materials cost, the evaluation of construction costs should be considered as approximate guidelines and could vary significantly from actual costs. Nobis does not guarantee the accuracy of our cost opinions as compared to contractor's bids for construction costs.

END OF LIMITATIONS

APPENDIX B – Test Borings

BOREHOLE LOG

Project: MBTA Mattapan Bus Facility
Location: Boston, Massachusetts
Nobis Project No.: 100449.000

Boring No.: **NB-1**
Boring Location: See Figure 2
Checked by: A. Fragoso
Date Start: November 1, 2022
Date Finish: November 1, 2022

Contractor: New England Boring Contractors
Driller: G. Twombly Jr.
Nobis Rep.: K. Kocia

Rig Type / Model: Truck / CME 75
Hammer Type: Automatic Hammer
Hammer Hoist: Automatic

Ground Surface Elev.: (+/-) 35.5
Datum: NAVD 88

	Drilling Method	Sampler
Type	Hollow Stem Auger	Split-Spoon
Size ID (in.)	4.25	1-3/8
Advancement	Augered	140-lb Hammer

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
▼ 11/01/22	09:50	5.3	8	8.2	10 min

Depth (ft.)	Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
							35.2 / 0.3 ASPHALT	Approximately 1-inch of asphalt encountered, overlying approximately 3-inches of base coarse, consisting primarily of fine to coarse gravel.	
1	S-1	17	0.5-2	23			FILL 34.3 / 1.3	S-1A (8"): Very dense, dark brown - gray, fine to coarse SAND, some fine Gravel, little Silt, few asphalt fragments/articles. Dry to moist. (FILL). (USDA Classification - GRAVELLY LOAMY SAND).	
2				32					
3	S-2	14	2-4	18				S-1B (9"): Medium dense, tan - gray, fine to coarse SAND and Silt, little fine to coarse Gravel. Moist. (USDA Classification - SANDY LOAM).	
4				15				S-2: Medium dense, brown - gray, fine to coarse SAND and Silt, trace fine to coarse Gravel. Moist. Very faint redoximorphic staining present. (USDA Classification - SANDY LOAM).	
5				10			SAND AND SILT		
6	S-3	12	5-6.7	8	▼			Infiltration test performed. Water introduced at approximately 4.9 feet below ground surface.	1
7				6				S-3: Medium dense, brown, fine to coarse SAND, some Silt, one (1) piece of cobble present. Wet. (USDA Classification - SANDY LOAM).	
8				5					
9	S-4	0	8-8.2	10			29.0 / 6.5		
10				50/2"			INFERRED COBBLES AND BOULDERS	High drilling resistance encountered between 6.5 and 8.5 feet below ground surface.	
11				100/2"			27.0 / 8.5	S-4: Very dense, No recovery. Based on spoils and drilling resistance, cobbles and boulders present.	2
12								Boring terminated at 8.5 feet on auger refusal.	
13									
14									
15									
16									
17									
18									
19									
20									

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:
1) Infiltration test performed at 4.9 feet bgs.
2) Boring backfilled with cuttings, one (1) bag of filter sand and topped off with asphalt cold patch upon completion.

Soil descriptions, and lithology, are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BOREHOLE LOG

nobis

Project: MBTA Mattapan Bus Facility
Location: Boston, Massachusetts
Nobis Project No.: 100449.000

Boring No.: **NB-2**
Boring Location: See Figure 2
Checked by: A. Fragoso
Date Start: November 1, 2022
Date Finish: November 1, 2022

Contractor: New England Boring Contractors
Driller: G. Twombly Jr.
Nobis Rep.: K. Kocia

Rig Type / Model: Truck / CME 75
Hammer Type: Automatic Hammer
Hammer Hoist: Automatic

Ground Surface Elev.: (+/-) 35
Datum: NAVD 88

	Drilling Method	Sampler
Type	Hollow Stem Auger	Split-Spoon
Size ID (in.)	4.25	1-3/8
Advancement	Augered	140-lb Hammer

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
▼ 11/01/22	11:35	11.0	12	14	10 min

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
							ASPHALT 34.6 / 0.4	Approximately 5-inches of asphalt encountered, overlying approximately 3-inches of base coarse, consisting primarily of fine to coarse gravel.	
1	S-1	18	0.5-2.5	75			FILL 33.5 / 1.5	S-1A (9"): Very dense, black - gray, fine to coarse SAND, little Silt, numerous asphalt fragments/articles. Dry to moist. (FILL). (USDA Classification - LOAMY SAND).	
				40					
2				38				S-1B (9"): Very dense, orangish-brown - gray, fine to coarse GRAVEL, some fine to coarse Sand, some Silt. Moist. Redoximorphic staining present. (USDA Classification - EXTREMELY GRAVELLY SANDY LOAM).	
				45			SAND AND SILT W/ GRAVEL		
3	S-2	13	2.5-4.5	25				S-2: Dense, orangish-brown - gray, fine to coarse SAND and Silt, some fine to coarse Gravel. Moist. Redoximorphic staining present. (USDA Classification - GRAVELLY SANDY LOAM).	
				16					
4				16					
				10					
5									1
	S-3	11	5-7	5				Infiltration test performed. Water introduced at approximately 4.6 feet below ground surface. S-3: Stiff, brown, SILT and fine to coarse Sand. Wet. Faint redoximorphic staining present. (USDA Classification - SANDY LOAM).	
6				6					
				5					
7				5					
	S-4	13	7-9	6			SAND AND SILT	S-4: Medium dense, orangish-brown - gray, fine to coarse SAND and Silt, little fine Gravel. Wet. (USDA Classification - SANDY LOAM).	
8				7					
				8					
9				8					
							25.0 / 10.0		
10									
	S-5	12	10-12	9			RIVER DEPOSITS W/ ORGANICS	S-5A (7"): Very stiff, reddish-brown, fine to coarse SAND, some Silt, several to numerous organics / wood fragments / particles. Wet. (USDA Classification - SANDY LOAM).	
11				10	▼		24.0 / 11.0		
				10				S-5B (5"): Medium dense, brownish-gray, fine to coarse SAND, some fine Gravel, little Silt. Wet. (USDA Classification - GRAVELLY LOAMY SAND).	
12				12					
	S-6	16	12-14	40			GLACIAL TILL	S-6: Hard, brownish-gray, SILT and fine to coarse Sand. Wet. (USDA Classification - SANDY LOAM).	
13				20					
				22					
14				30			21.0 / 14.0		
								Boring terminated at 14 feet.	2
15									
16									
17									
18									
19									
20									

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:
1) Infiltration test performed at 4.6 feet bgs.
2) Boring backfilled with cuttings, one (1) bag of filter sand and topped off with asphalt cold patch upon completion.

Soil descriptions, and lithology, are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BOREHOLE LOG

Project: MBTA Mattapan Bus Facility

Location: Boston, Massachusetts

Nobis Project No.: 100449.000

Boring No.: **NB-3**

Boring Location: See Figure 2

Checked by: A. Fragoso

Date Start: November 1, 2022

Date Finish: November 1, 2022

Contractor: New England Boring Contractors

Driller: G. Twombly Jr.

Nobis Rep.: K. Kocia

Rig Type / Model: Truck / CME 75

Hammer Type: Automatic Hammer

Hammer Hoist: Automatic

Ground Surface Elev.: (+/-) 33.5

Datum: NAVD 88

	Drilling Method	Sampler
Type	Hollow Stem Auger	Split-Spoon
Size ID (in.)	4.25	1-3/8
Advancement	Augered	140-lb Hammer

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
▼ 11/01/22	14:20	10.5	10	12	15 min

Depth (ft.)	Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
1	S-1	17	0-2	18				S-1: Dense, black - brown - white, fine to coarse SAND, some fine to coarse Gravel, trace Silt, several asphalt fragments/articles. Dry to moist. (FILL). (USDA Classification - GRAVELLY SAND).	
2				22					
3	S-2	13	2-4	16			FILL	S-2A (9"): Medium dense, black - gray, fine to coarse SAND, some fine to coarse Gravel, trace Silt, few asphalt fragments/articles. Moist. (USDA Classification - GRAVELLY SAND).	
4				15					
5				12			30.0 / 3.5		
6	S-3	9	5-7	7			SAND AND SILT	S-2B (4"): Medium dense, orangish-brown, fine to coarse SAND and fine Gravel, little Silt. Moist. Redoximorphic staining present. (USDA Classification - EXTREMELY GRAVELLY LOAMY SAND).	
7							28.5 / 5.0	Infiltration test performed. Water introduced at approximately 4.5 feet below ground surface.	1
8	S-4	11	7-9	3				S-3: Loose, dark brown - brown, fine to coarse SAND, little fine to coarse Gravel, little Silt, very few organics. Wet. Faint purple staining on gravel fragments present. (USDA Classification - LOAMY SAND).	
9				3					
10				4			RIVER DEPOSITS W/ TRACE ORGANICS	S-4: Medium stiff, dark gray - dark brown, SILT and fine to coarse Sand. few organics and roots. Wet. (USDA Classification - SANDY LOAM).	
11				3					
12				2					
13	S-5	14	10-12	10	▼			S-5: Hard, gray, SILT and fine to coarse Sand, little fine Gravel. Wet. Strong petroleum odor encountered within sample. (USDA Classification - SANDY LOAM).	
14				28					
15				25			GLACIAL TILL		
16				22			23.5 / 10.0		
17							21.5 / 12.0	Boring terminated at 12 feet.	2
18									
19									
20									

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Infiltration test performed at 4.5 feet bgs.
2) Boring backfilled with cuttings and two (2) bags of filter sand to ground surface.

Soil descriptions, and lithology, are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

APPENDIX C – Infiltration Test Calculations

Calculated by: KAK Date: 11/02/2022
Checked by: ACF Date: 11/04/2022

Infiltration - Permeability Calculations:

Objective: Calculate permeability/hydraulic conductivity and infiltration rate for Test Boring NB-1.

Approach: Use the Variable Head & Basic Time-Lag methods to calculate the hydraulic conductivity in inches/hour for the performed test boring at the proposed location of the stormwater detention system.

References: 1. Subsurface Location Plan, provided by Nobis Engineering.
2. Time Lag and Soil Permeability, Hsorlev (1951).

Given: 1. Groundwater was encountered during drilling within test boring NB-1 at approximately 5.3 feet below ground surface. However there is high likelihood that the ground water table measured was perched water within the boring.

Solution:

Test Location	NB-1
Test Number	1
Test Depth	4.9'
Date of Test	11/1/2022

USDA: Brown, SANDY LOAM (based on field observations).
Burmister: Brown, fine to coarse SAND, some Silt, Wet.

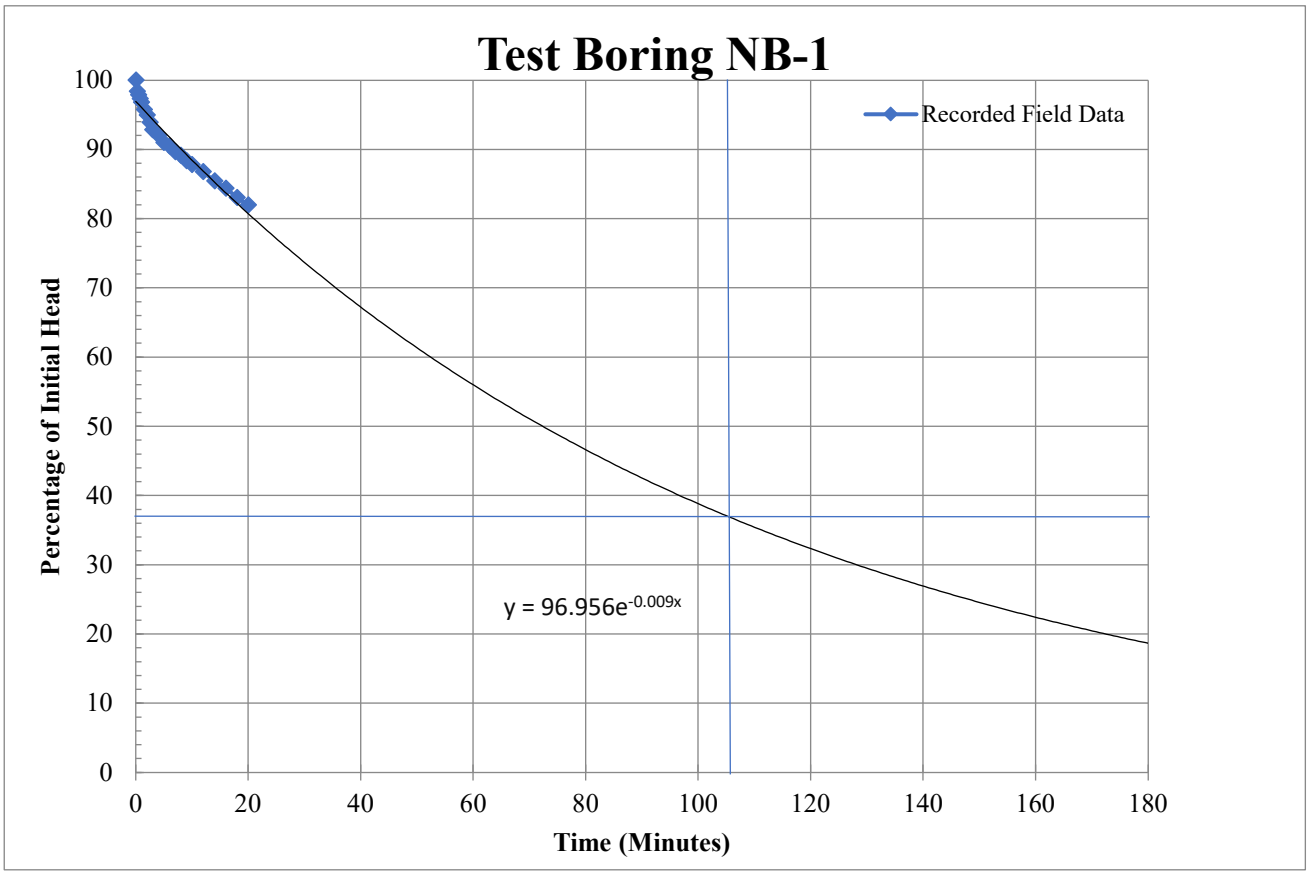
Time		Depth Reading		Head		Results	
Seconds	Minutes	inches	feet	Inches	Feet	Head + Initial Depth (feet)	Percent of Initial Head (%)
0	0.00	13.44	1.12	45.36	3.78	2.86	100.00
15	0.25	14.16	1.18	44.64	3.72	2.80	98.41
30	0.50	14.40	1.20	44.40	3.70	2.78	97.88
45	0.75	14.64	1.22	44.16	3.68	2.76	97.35
60	1.00	14.88	1.24	43.92	3.66	2.74	96.83
90	1.50	15.36	1.28	43.44	3.62	2.70	95.77
120	2.00	15.72	1.31	43.08	3.59	2.67	94.97
150	2.50	16.20	1.35	42.60	3.55	2.63	93.92
180	3.00	16.68	1.39	42.12	3.51	2.59	92.86
240	4.00	17.04	1.42	41.76	3.48	2.56	92.06
300	5.00	17.52	1.46	41.28	3.44	2.52	91.01
360	6.00	17.76	1.48	41.04	3.42	2.50	90.48
420	7.00	18.12	1.51	40.68	3.39	2.47	89.68
480	8.00	18.36	1.53	40.44	3.37	2.45	89.15
540	9.00	18.72	1.56	40.08	3.34	2.42	88.36
600	10.00	18.96	1.58	39.84	3.32	2.40	87.83
720	12.00	19.44	1.62	39.36	3.28	2.36	86.77
840	14.00	20.04	1.67	38.76	3.23	2.31	85.45
960	16.00	20.52	1.71	38.28	3.19	2.27	84.39
1080	18.00	21.12	1.76	37.68	3.14	2.22	83.07
1200	20.00	21.60	1.80	37.20	3.10	2.18	82.01

Calculated by: KAK Date: 11/02/2022
Checked by: ACF Date: 11/04/2022

Variable Head permeability, Flush Bottom in Uniform Soil (Hvorslev Case B)
K_m = mean coefficient of permeability
K_m = [(pi*D)/(11*(t2-t1))]*ln((H1)/(H2))

	inch/min	inch/hour	feet/day	cm/sec
K_m=	1.20E-02	7.22E-01	1.44E+00	5.10E-04

K_m = **0.72 inch/hour** (approximation using Variable Head Method)



Basic Time-Lag Method:

			inch/min	inch/hour	feet/day	cm/sec
T=	105.0	K_m=	1.16E-02	6.94E-01	1.39E+00	4.89E-04

Basic Time Lag Method - Flush Bottom in Uniform Soil (Hvorslev Case B)
Km = mean coefficient of permeability
Km = (pi*D)/(11*T)

@ y = 37 Solve for x = T
D = diameter of pipe = 4.25 inches

K_m = **0.69 inch/hour** (approximation using Time Lag Method)

Calculated by: KAK Date: 11/02/2022
Checked by: ACF Date: 11/04/2022

Infiltration - Permeability Calculations:

Objective: Calculate permeability/hydraulic conductivity and infiltration rate for Test Boring NB-2.

Approach: Use the Variable Head & Basic Time-Lag methods to calculate the hydraulic conductivity in inches/hour for the performed test boring at the proposed location of the stormwater detention system.

References: 1. Subsurface Location Plan, provided by Nobis Engineering.
2. Time Lag and Soil Permeability, Hsorlev (1951).

Given: 1. Groundwater was encountered during drilling within test boring NB-2 at approximately 11 feet below ground surface.

Solution:

Test Location	NB-2
Test Number	1
Test Depth	4.6'
Date of Test	11/1/2022

USDA: Brown, SANDY LOAM (based on field observations).
Burmister: Brown, SILT and fine to coarse SAND, Wet.

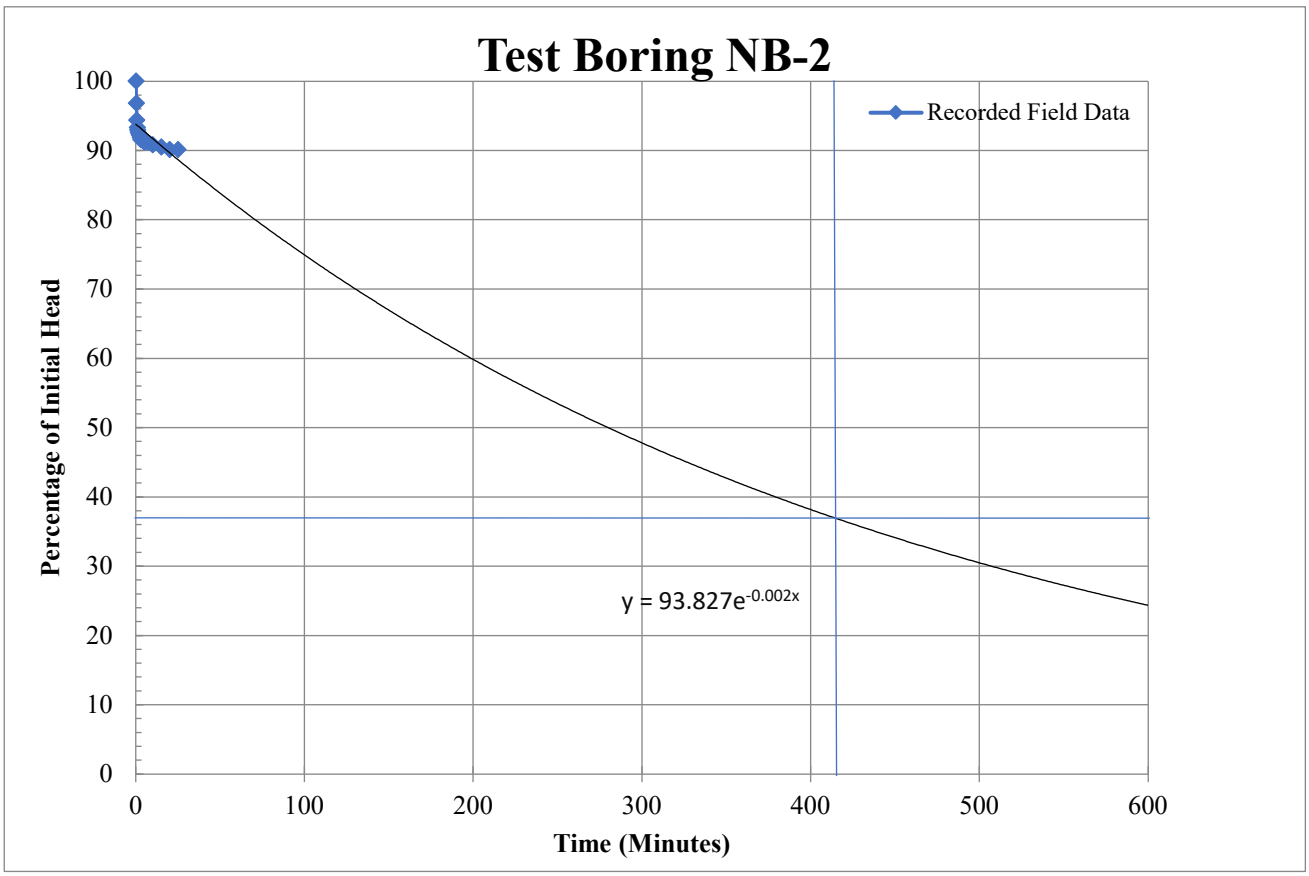
Time		Depth Reading		Head		Results	
Seconds	Minutes	inches	feet	Inches	Feet	Head + Initial Depth (feet)	Percent of Initial Head (%)
0	0.00	21.12	1.76	34.08	2.84	1.92	100.00
15	0.25	22.20	1.85	33.00	2.75	1.83	96.83
30	0.50	23.04	1.92	32.16	2.68	1.76	94.37
45	0.75	23.40	1.95	31.80	2.65	1.73	93.31
60	1.00	23.52	1.96	31.68	2.64	1.72	92.96
90	1.50	23.64	1.97	31.56	2.63	1.71	92.61
120	2.00	23.76	1.98	31.44	2.62	1.70	92.25
150	2.50	23.88	1.99	31.32	2.61	1.69	91.90
180	3.00	24.00	2.00	31.20	2.60	1.68	91.55
240	4.00	24.00	2.00	31.20	2.60	1.68	91.55
300	5.00	24.12	2.01	31.08	2.59	1.67	91.20
420	7.00	24.12	2.01	31.08	2.59	1.67	91.20
600	10.00	24.24	2.02	30.96	2.58	1.66	90.85
900	15.00	24.36	2.03	30.84	2.57	1.65	90.49
1200	20.00	24.48	2.04	30.72	2.56	1.64	90.14
1500	25.00	24.48	2.04	30.72	2.56	1.64	90.14

Calculated by: KAK Date: 11/02/2022
Checked by: ACF Date: 11/04/2022

Variable Head permeability, Flush Bottom in Uniform Soil (Hvorslev Case B)
K_m = mean coefficient of permeability
K_m = [(pi*D)/(11*(t2-t1))]*ln((H1)/(H2))

	inch/min	inch/hour	feet/day	cm/sec
K_m=	5.04E-03	3.02E-01	6.05E-01	2.13E-04

K_m = **0.30 inch/hour** (approximation using Variable Head Method)



Basic Time-Lag Method:

			inch/min	inch/hour	feet/day	cm/sec
T=	415.0	K_m=	2.92E-03	1.75E-01	3.51E-01	1.24E-04

Basic Time Lag Method - Flush Bottom in Uniform Soil (Hvorslev Case B)
Km = mean coefficient of permeability
Km = (pi*D)/(11*T)

@ y = 37 Solve for x = T
D = diameter of pipe = 4.25 inches

K_m = **0.18 inch/hour** (approximation using Time Lag Method)

Calculated by: KAK Date: 11/02/2022
Checked by: ACF Date: 11/04/2022

Infiltration - Permeability Calculations:

Objective: Calculate permeability/hydraulic conductivity and infiltration rate for Test Boring NB-3.

Approach: Use the Variable Head & Basic Time-Lag methods to calculate the hydraulic conductivity in inches/hour for the performed test boring at the proposed location of the stormwater detention system.

References: 1. Subsurface Location Plan, provided by Nobis Engineering.
2. Time Lag and Soil Permeability, Hsorlev (1951).

Given: 1. Groundwater was encountered during drilling within test boring NB-3 at approximately 10.5 feet below ground surface.

Solution:

Test Location	NB-3
Test Number	1
Test Depth	4.5'
Date of Test	11/1/2022

USDA: Dark Brown to Brown, LOAMY SAND (based on field observations).
Burmister: Dark Brown to Brown, fine to coarse SAND, little fine to coarse Gravel, little Silt, very few organics, Wet.

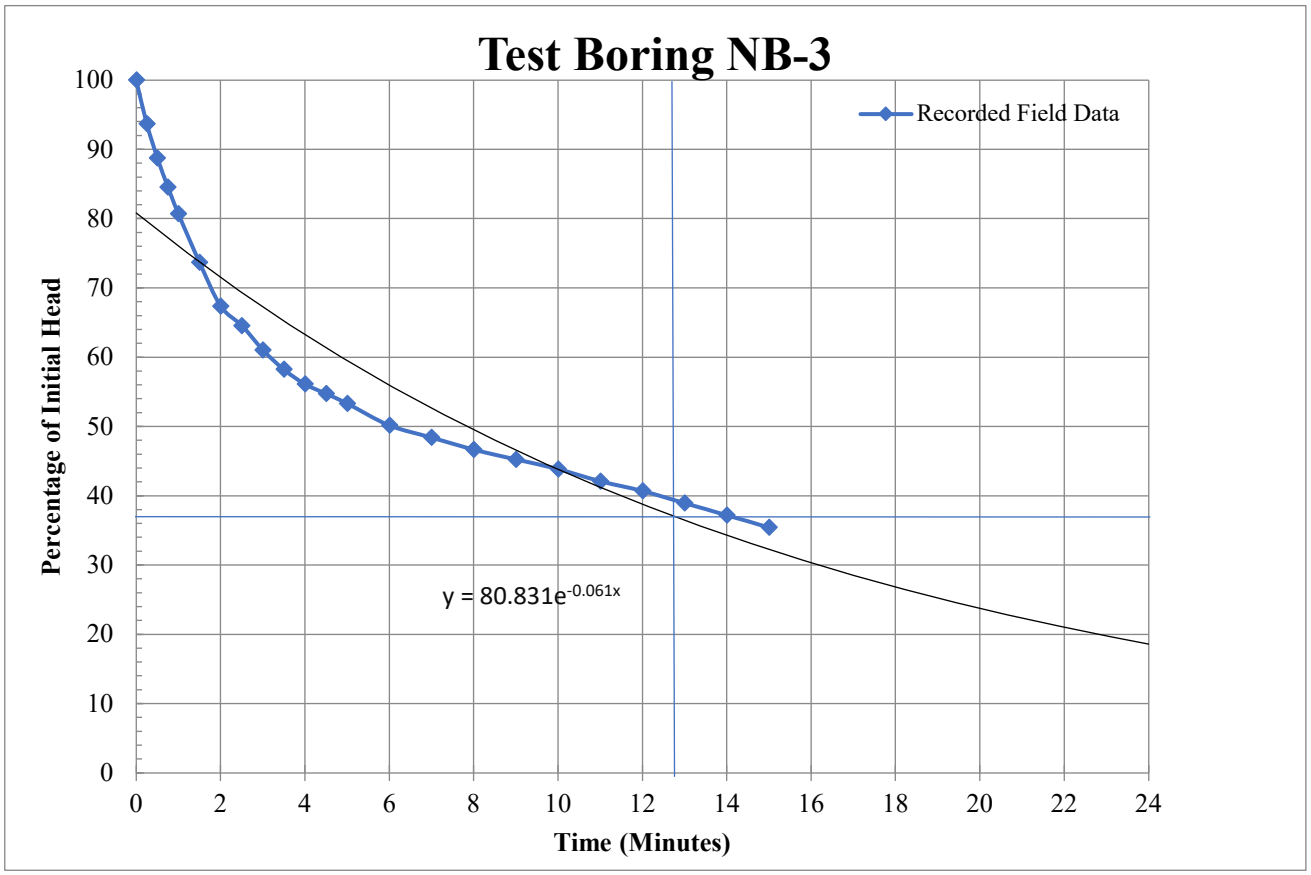
Time		Depth Reading		Head		Results	
Seconds	Minutes	inches	feet	Inches	Feet	Head + Initial Depth (feet)	Percent of Initial Head (%)
0	0.00	19.80	1.65	34.20	2.85	1.93	100.00
15	0.25	21.96	1.83	32.04	2.67	1.75	93.68
30	0.50	23.64	1.97	30.36	2.53	1.61	88.77
45	0.75	25.08	2.09	28.92	2.41	1.49	84.56
60	1.00	26.40	2.20	27.60	2.30	1.38	80.70
90	1.50	28.80	2.40	25.20	2.10	1.18	73.68
120	2.00	30.96	2.58	23.04	1.92	1.00	67.37
150	2.50	31.92	2.66	22.08	1.84	0.92	64.56
180	3.00	33.12	2.76	20.88	1.74	0.82	61.05
210	3.50	34.08	2.84	19.92	1.66	0.74	58.25
240	4.00	34.80	2.90	19.20	1.60	0.68	56.14
270	4.50	35.28	2.94	18.72	1.56	0.64	54.74
300	5.00	35.76	2.98	18.24	1.52	0.60	53.33
360	6.00	36.84	3.07	17.16	1.43	0.51	50.18
420	7.00	37.44	3.12	16.56	1.38	0.46	48.42
480	8.00	38.04	3.17	15.96	1.33	0.41	46.67
540	9.00	38.52	3.21	15.48	1.29	0.37	45.26
600	10.00	39.00	3.25	15.00	1.25	0.33	43.86
660	11.00	39.60	3.30	14.40	1.20	0.28	42.11
720	12.00	40.08	3.34	13.92	1.16	0.24	40.70
780	13.00	40.68	3.39	13.32	1.11	0.19	38.95
840	14.00	41.28	3.44	12.72	1.06	0.14	37.19
900	15.00	41.88	3.49	12.12	1.01	0.09	35.44

Calculated by: KAK Date: 11/02/2022
Checked by: ACF Date: 11/04/2022

Variable Head permeability, Flush Bottom in Uniform Soil (Hvorslev Case B)
K_m = mean coefficient of permeability
K_m = [(pi*D)/(11*(t2-t1))]*ln((H1)/(H2))

	inch/min	inch/hour	feet/day	cm/sec
K_m=	8.39E-02	5.04E+00	1.01E+01	3.55E-03

K_m = **5.04 inch/hour** (approximation using Variable Head Method)



Basic Time-Lag Method:

			inch/min	inch/hour	feet/day	cm/sec
T=	12.5	K_m=	9.71E-02	5.83E+00	1.17E+01	4.11E-03

Basic Time Lag Method - Flush Bottom in Uniform Soil (Hvorslev Case B)
Km = mean coefficient of permeability
Km = (pi*D)/(11*T)

@ y = 37 Solve for x = T
D = diameter of pipe = 4.25 inches

K_m = **5.83 inch/hour** (approximation using Time Lag Method)

0 150 300 600 Feet

MBTA Mattapan Station Drainage Improvements | Boston, MA

Legend

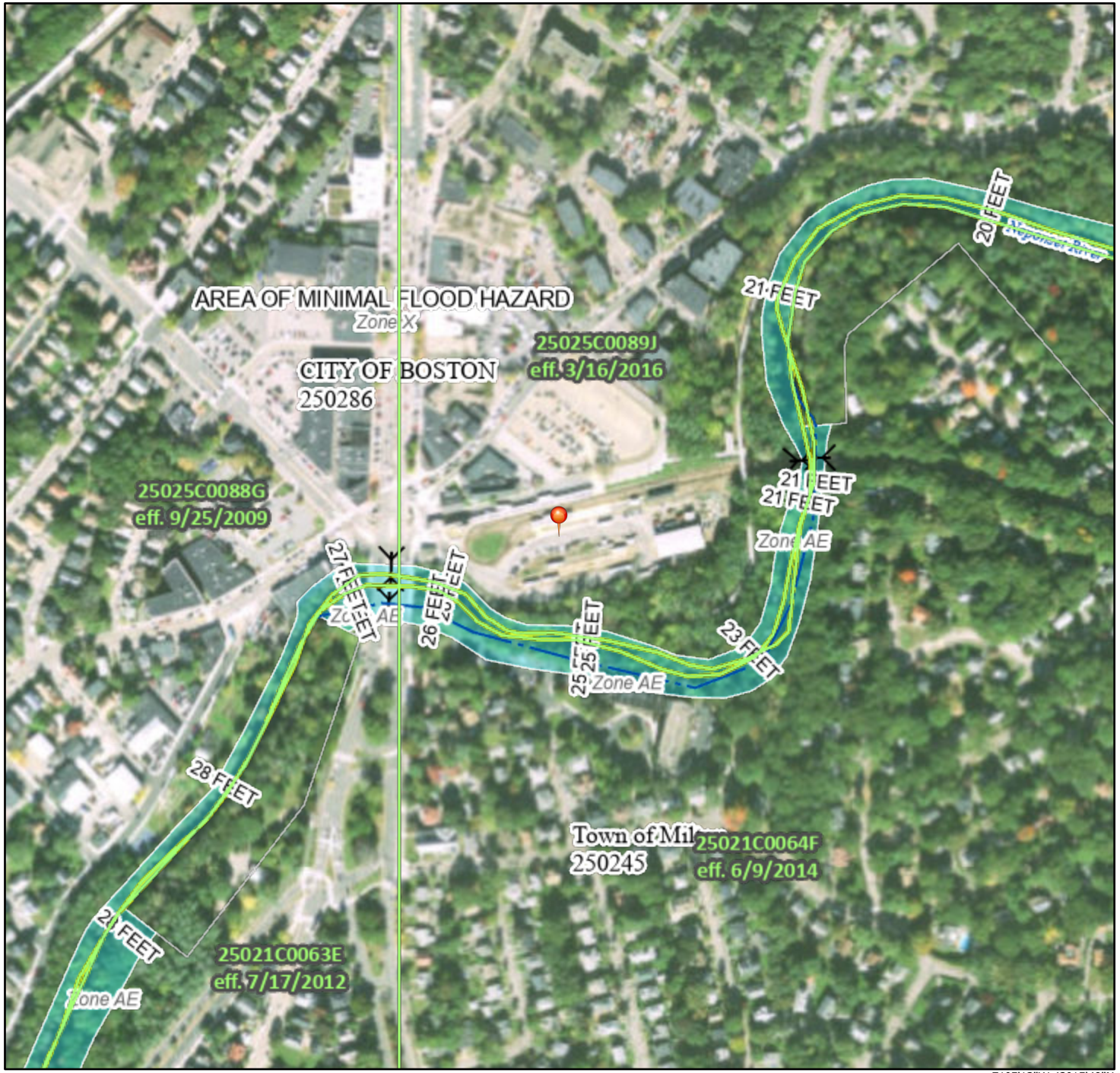
- Project Limits
- AE: 1% Annual Chance of Flooding, with BFE
- Area Not Included

Figure 4 - FEMA Map

Source Info: USGS, MassGIS, VHB

National Flood Hazard Layer FIRMette

71°5'51"W 42°16'16"N



71°5'13"W 42°15'49"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/17/2022 at 4:32 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix C: Supporting Calculations

- Groundwater recharge calculations
- Water quality calculations
- MassDEP TSS Removal Calculation Worksheets for SCM treatment trains

Recharge Calculations

Project	MBTA Mattapan Station Drainage Improvements	**Project #**	14841.18
Calculated by	TLB	**Date**	10/21/2022
Checked by	RPL	**Date**	10/21/2022

REQUIRED RECHARGE VOLUME

Hydrologic Soil Group (HSG)	Area (ft^2)	Inches of Runoff (in)	Volume (ft^3)
A	78,568	0.60	3,928
B		0.35	0
C		0.25	0
D		0.10	0
TOTAL	78,568		**3,928**

CAPTURE AREA ADJUSTMENT

Required Recharge Volume (ft^3)	3,928
Total Site Net Impervious Area (ft^2)	78,568
Total Site Impervious Area Draining to Recharge Facilities (ft^2)	66,148
Capture Area Adjustment Factor	1.19
Adjusted Required Recharge Volume (ft^3)	**4,666**

PROVIDED RECHARGE VOLUME

INFILTRATION TRENCH #01:

300'L x 3.5'H Stone Infiltration Trench with 1'H 2:1 Channel.

Volumes provided below the lowest outlet at elevation: 35.0

Provided Volume:

Elevation	Area (ft^2)	Cumulative Volume (ft^3)
30.5	1,800	0
35.0	3,624	**3,562**

Drawdown: $(V_{Infiltration}/A_{Bottom})$/Rawl's Rate

Rawls Recharge Rate:	**0.52**	(in/hr)
Drawdown Time:	**46**	(hours)

INFILTRATION TRENCH #02:

70'L x 3.5'H Stone Infiltration Trench with 1'H 2:1.

Volumes provided below the lowest outlet at elevation: 35.0

Recharge Calculations

Project	MBTA Mattapan Station Drainage Improvements	**Project #**	14841.18
Calculated by	TLB	**Date**	10/21/2022
Checked by	RPL	**Date**	10/21/2022

Provided Volume:

Elevation	Area (ft^2)	Cumulative Volume (ft^3)
30.5	420	0
35.0	864	**804**

Drawdown: $(V_{Infiltration}/A_{Bottom})$/Rawl's Rate

Rawls Recharge Rate:	**0.52**	(in/hr)
Drawdown Time:	**44**	(hours)

INFILTRATION BMP #03

34'L x 34'W x 3'H subsurface infiltration system with overflow to positive drainage

Volumes provided below the lowest outlet at elevation: 1.8

Provided Volume:

Elevation	Area (ft^2)	Cumulative Volume (ft^3)
0.0	1,501	0
		0
1.8	1,501	**1,357**

Drawdown: $(V_{Infiltration}/A_{Bottom})$/Rawl's Rate

Rawls Recharge Rate:	**2.41**	(in/hr)
Drawdown Time:	**5**	(hours)

RECHARGE VOLUME SUMMARY

Required Recharge Volume:	**4,666**	(ft^3)
Total Recharge Volume Provided:	**5,723**	(ft^3)

Structural BMP Calculations

Project	MBTA Mattapan Station Drainage Improvements	Project #	14841.18
Calculated by	TLD	Date	10/21/2022
Checked by	RPL	Date	10/21/2022

User Inputs										Water Quality Results													
										Phosphorus							Total Suspended Solids (TSS Reduction values can NOT be used for DEP Stormwater Standard 4 Compliance at this time.)						
BMP ID	BMP Type	BMP Soil Type	BMP Design Storage Volume (ft^3)	Impervious Catchment Area (ft^2)	Pervious Catchment Area (ft^2)	Catchment Primary Land Use	Catchment Primary HSG	Runoff Depth from Impervious Area (in)	EPA Water Quality Curve	Impervious P Loading Rate (lb/ac/yr)	Impervious P Load to BMP (lb/yr)	Pervious P Loading Rate (lb/ac/yr)	Pervious P Load to BMP (lb/yr)	Total P Load to BMP (lb/yr)	P Removal Credit (%)	P Load Reduction (lb/yr)	Impervious TSS Loading Rate (lb/ac/yr)	Impervious TSS Load to BMP (lb/yr)	Pervious TSS Loading Rate (lb/ac/yr)	Pervious TSS Load to BMP (lb/yr)	Total TSS Load to BMP (lb/yr)	TSS Removal Credit (%)	TSS Load Reduction (lb/yr)
Infiltration Trench #1	Infiltration Trench	Loam (0.52 in/hr)	3,562	42,380	-	Industrial	HSG D	1.0	Infiltration Trench	1.8	1.7	0.4	-	1.7	94%	1.6	377	367	91	-	367	100%	367
Infiltration Trench #2	Infiltration Trench	Loam (0.52 in/hr)	804	9,192	-	Industrial	HSG D	1.0	Infiltration Trench	1.8	0.4	0.4	-	0.4	94%	0.4	377	80	91	-	80	100%	80
Infiltration SCM #3	Subsurface Infiltration System	Loamy Sand (2.41 in/hr)	1,357	14,576	-	Industrial	HSG D	1.1	Infiltration Trench	1.8	0.6	0.4	-	0.6	98%	0.6	377	126	91	-	126	100%	126

TSS Removal Calculation Worksheet

VHB, Inc..
101 Walnut Street
Post Office Box 9151
Watertown, MA 02471
(617) 924-1770

Project Name:	**MBTA Mattapan**	Sheet:	**1 of 1**
Project Number:	**14841.18**	Date:	**21-Oct-2022**
Location:	**Mattapan, MA**	Computed by:	**TDL**
Discharge Point:	**DP-1**	Checked by:	**RPL**
Drainage Area(s):	**PR-SWALE, PR-BID-ALT-N, PR-BID-ALT-S**		

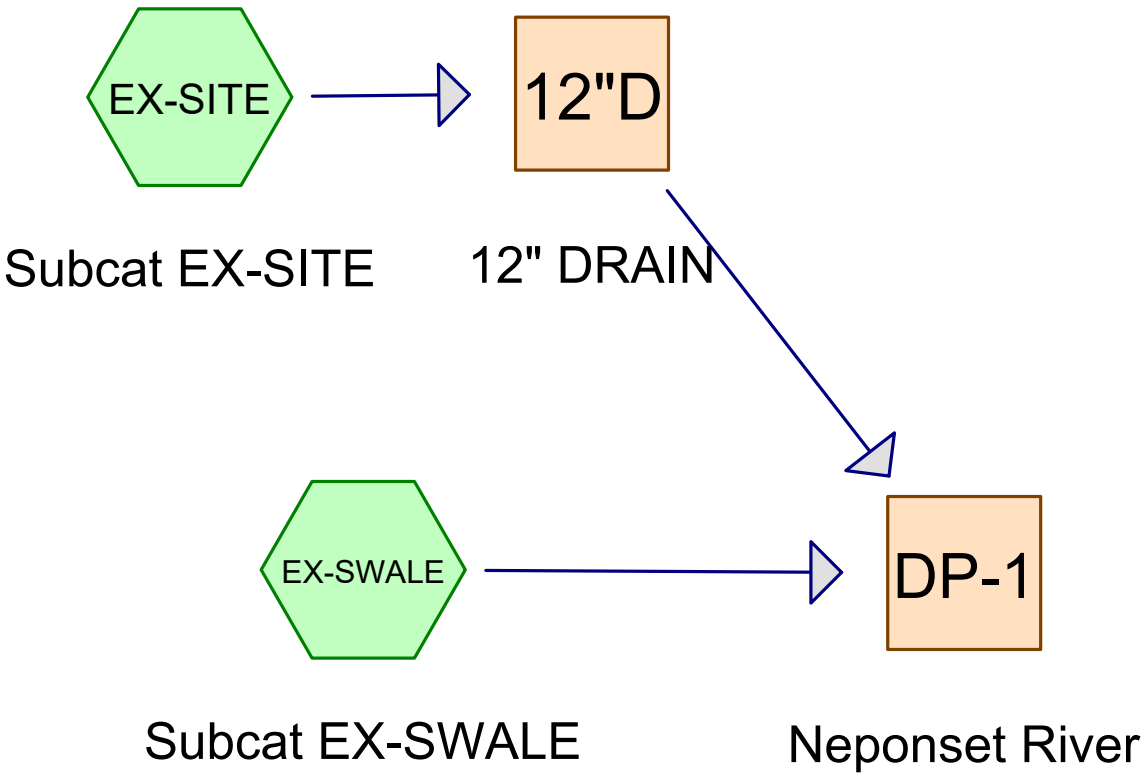
A	B	C	D	E
BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Infiltration Trench	**80%**	**1.00**	**0.80**	**0.20**
	0%	**0.20**	**0.00**	**0.20**
	0%	**0.20**	**0.00**	**0.20**
	0%	**0.20**	**0.00**	**0.20**
	0%	**0.20**	**0.00**	**0.20**

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1.
** Equals remaining load from previous BMP (E)

Treatment Train TSS Removal = **80%**

Appendix D: Hydraulic and Hydrologic Data

- Node diagrams
- Modeling inputs (precipitation, curve numbers, etc.)
- Modeling results (hydraulic capacity calculations for conduits, linear practices, basins, other structural components, etc.)



Subcat Reach Pond Link

Routing Diagram for EX
Prepared by VHB, Printed 10/28/2022

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-SITE: Subcat EX-SITE Runoff Area=4.505 ac 58.47% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=97 Runoff=15.43 cfs 49,632 cf

Subcatchment EX-SWALE: Subcat Runoff Area=0.973 ac 58.10% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=97 Runoff=3.33 cfs 10,719 cf

Reach 12"D: 12" DRAIN Inflow=15.43 cfs 49,632 cf
Outflow=15.43 cfs 49,632 cf

Reach DP-1: Neponset River Inflow=18.76 cfs 60,351 cf
Outflow=18.76 cfs 60,351 cf

Total Runoff Area = 238,602 sf Runoff Volume = 60,351 cf Average Runoff Depth = 3.04"
41.59% Pervious = 99,243 sf 58.41% Impervious = 139,360 sf

Summary for Subcatchment EX-SITE: Subcat EX-SITE

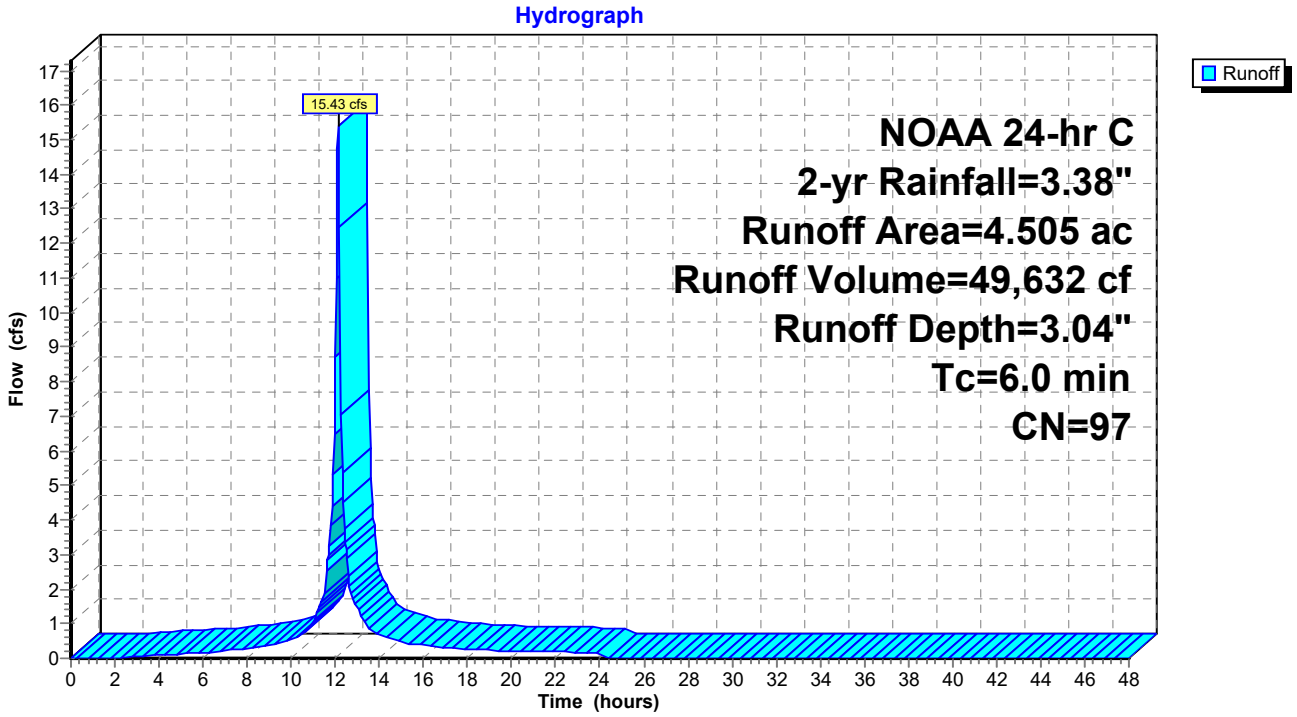
Runoff = 15.43 cfs @ 12.13 hrs, Volume= 49,632 cf, Depth= 3.04"
Routed to Reach 12"D : 12" DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.38"

Area (ac)	CN	Description
0.038	98	Paved roads w/curbs & sewers, HSG A
0.001	96	Gravel surface, HSG A
0.149	96	Gravel surface, HSG A
0.004	96	Gravel surface, HSG A
0.697	98	Paved roads w/curbs & sewers, HSG D
1.121	98	Paved roads w/curbs & sewers, HSG D
0.019	98	Paved roads w/curbs & sewers, HSG D
1.507	96	Gravel surface, HSG D
0.040	98	Roofs, HSG D
0.024	98	Roofs, HSG D
0.004	98	Roofs, HSG D
0.004	98	Roofs, HSG D
0.017	98	Roofs, HSG D
0.007	98	Roofs, HSG D
0.007	98	Roofs, HSG D
0.007	98	Roofs, HSG D
0.004	98	Roofs, HSG D
0.009	98	Roofs, HSG D
0.157	98	Roofs, HSG D
0.002	98	Roofs, HSG D
0.168	98	Roofs, HSG D
0.058	98	Paved roads w/curbs & sewers, HSG D
0.251	98	Roofs, HSG D
0.000	98	Paved roads w/curbs & sewers, HSG D
0.046	80	>75% Grass cover, Good, HSG D
0.164	96	Gravel surface, HSG D
4.505	97	Weighted Average
1.871		41.53% Pervious Area
2.634		58.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment EX-SITE: Subcat EX-SITE



Summary for Subcatchment EX-SWALE: Subcat EX-SWALE

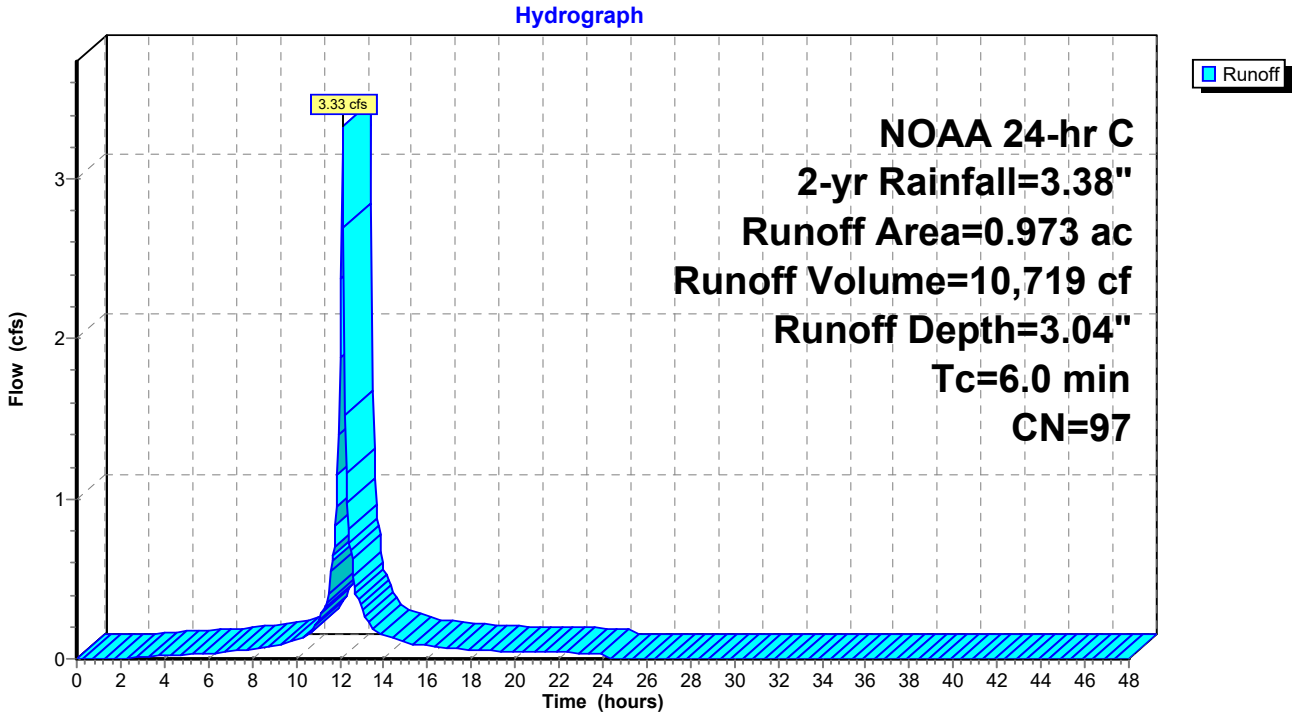
Runoff = 3.33 cfs @ 12.13 hrs, Volume= 10,719 cf, Depth= 3.04"
Routed to Reach DP-1 : Neponset River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.38"

Area (ac)	CN	Description
0.001	96	Gravel surface, HSG A
0.019	96	Gravel surface, HSG A
0.122	98	Paved roads w/curbs & sewers, HSG A
0.003	98	Roofs, HSG D
0.029	96	Gravel surface, HSG D
0.000	98	Paved roads w/curbs & sewers, HSG D
0.359	96	Gravel surface, HSG D
0.439	98	Paved roads w/curbs & sewers, HSG D
0.973	97	Weighted Average
0.408		41.90% Pervious Area
0.565		58.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment EX-SWALE: Subcat EX-SWALE

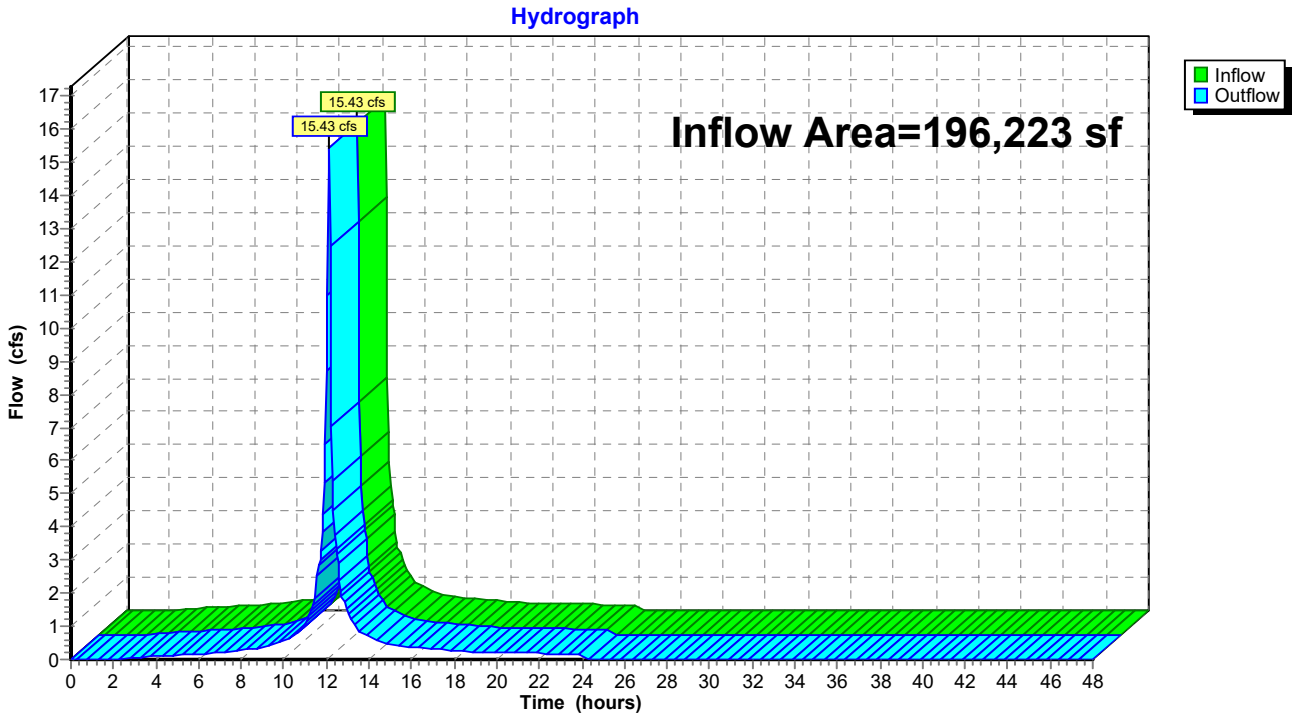


Summary for Reach 12"D: 12" DRAIN

Inflow Area = 196,223 sf, 58.47% Impervious, Inflow Depth = 3.04" for 2-yr event
Inflow = 15.43 cfs @ 12.13 hrs, Volume= 49,632 cf
Outflow = 15.43 cfs @ 12.13 hrs, Volume= 49,632 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach DP-1 : Neponset River

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 12"D: 12" DRAIN

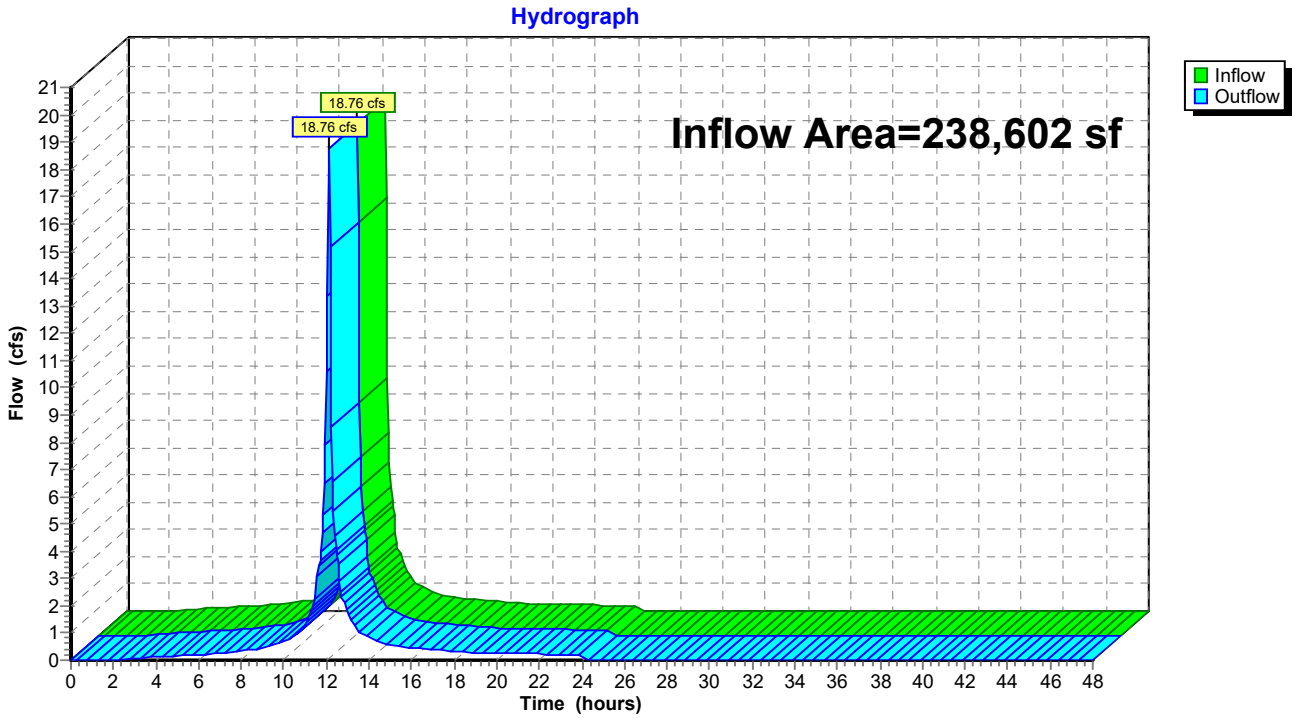


Summary for Reach DP-1: Neponset River

Inflow Area = 238,602 sf, 58.41% Impervious, Inflow Depth = 3.04" for 2-yr event
Inflow = 18.76 cfs @ 12.13 hrs, Volume= 60,351 cf
Outflow = 18.76 cfs @ 12.13 hrs, Volume= 60,351 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: Neponset River



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-SITE: Subcat EX-SITE Runoff Area=4.505 ac 58.47% Impervious Runoff Depth=4.95"
Tc=6.0 min CN=97 Runoff=24.52 cfs 80,878 cf

Subcatchment EX-SWALE: Subcat Runoff Area=0.973 ac 58.10% Impervious Runoff Depth=4.95"
Tc=6.0 min CN=97 Runoff=5.30 cfs 17,468 cf

Reach 12"D: 12" DRAIN Inflow=24.52 cfs 80,878 cf
Outflow=24.52 cfs 80,878 cf

Reach DP-1: Neponset River Inflow=29.81 cfs 98,346 cf
Outflow=29.81 cfs 98,346 cf

Total Runoff Area = 238,602 sf Runoff Volume = 98,346 cf Average Runoff Depth = 4.95"
41.59% Pervious = 99,243 sf 58.41% Impervious = 139,360 sf

Summary for Subcatchment EX-SITE: Subcat EX-SITE

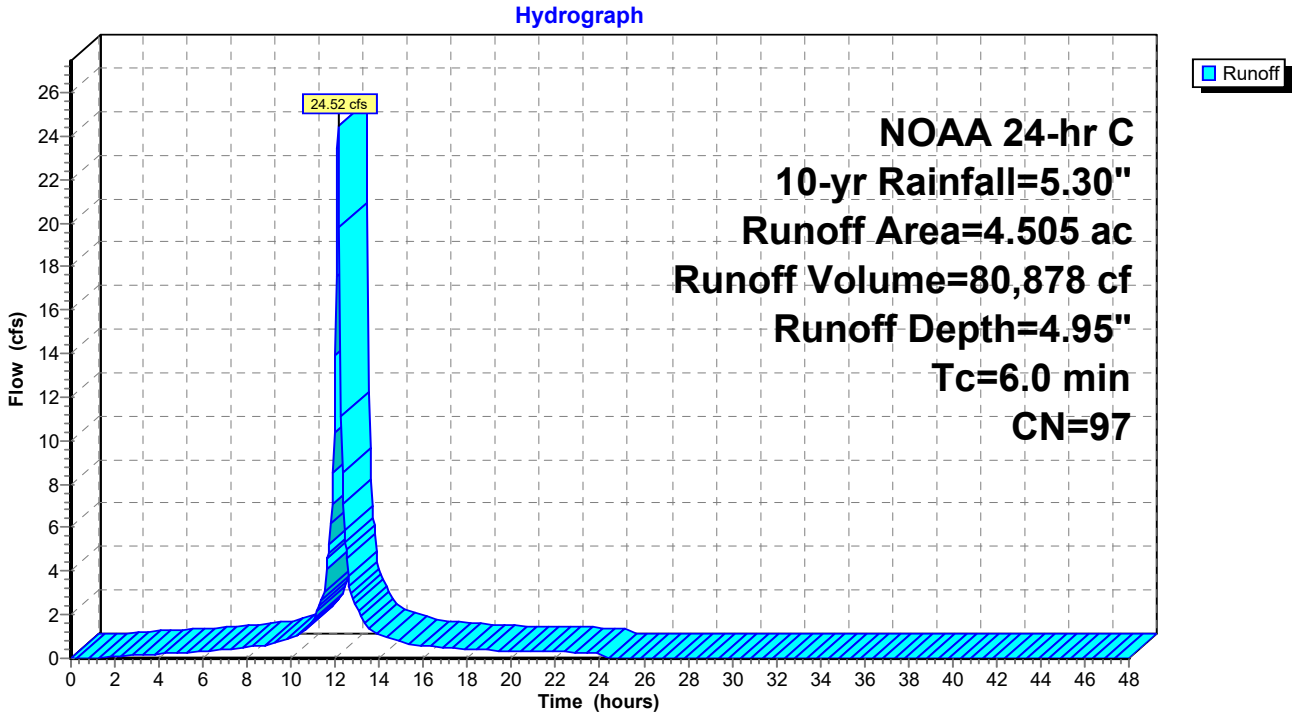
Runoff = 24.52 cfs @ 12.13 hrs, Volume= 80,878 cf, Depth= 4.95"
Routed to Reach 12"D : 12" DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=5.30"

Area (ac)	CN	Description
0.038	98	Paved roads w/curbs & sewers, HSG A
0.001	96	Gravel surface, HSG A
0.149	96	Gravel surface, HSG A
0.004	96	Gravel surface, HSG A
0.697	98	Paved roads w/curbs & sewers, HSG D
1.121	98	Paved roads w/curbs & sewers, HSG D
0.019	98	Paved roads w/curbs & sewers, HSG D
1.507	96	Gravel surface, HSG D
0.040	98	Roofs, HSG D
0.024	98	Roofs, HSG D
0.004	98	Roofs, HSG D
0.004	98	Roofs, HSG D
0.017	98	Roofs, HSG D
0.007	98	Roofs, HSG D
0.007	98	Roofs, HSG D
0.007	98	Roofs, HSG D
0.004	98	Roofs, HSG D
0.009	98	Roofs, HSG D
0.157	98	Roofs, HSG D
0.002	98	Roofs, HSG D
0.168	98	Roofs, HSG D
0.058	98	Paved roads w/curbs & sewers, HSG D
0.251	98	Roofs, HSG D
0.000	98	Paved roads w/curbs & sewers, HSG D
0.046	80	>75% Grass cover, Good, HSG D
0.164	96	Gravel surface, HSG D
4.505	97	Weighted Average
1.871		41.53% Pervious Area
2.634		58.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment EX-SITE: Subcat EX-SITE



Summary for Subcatchment EX-SWALE: Subcat EX-SWALE

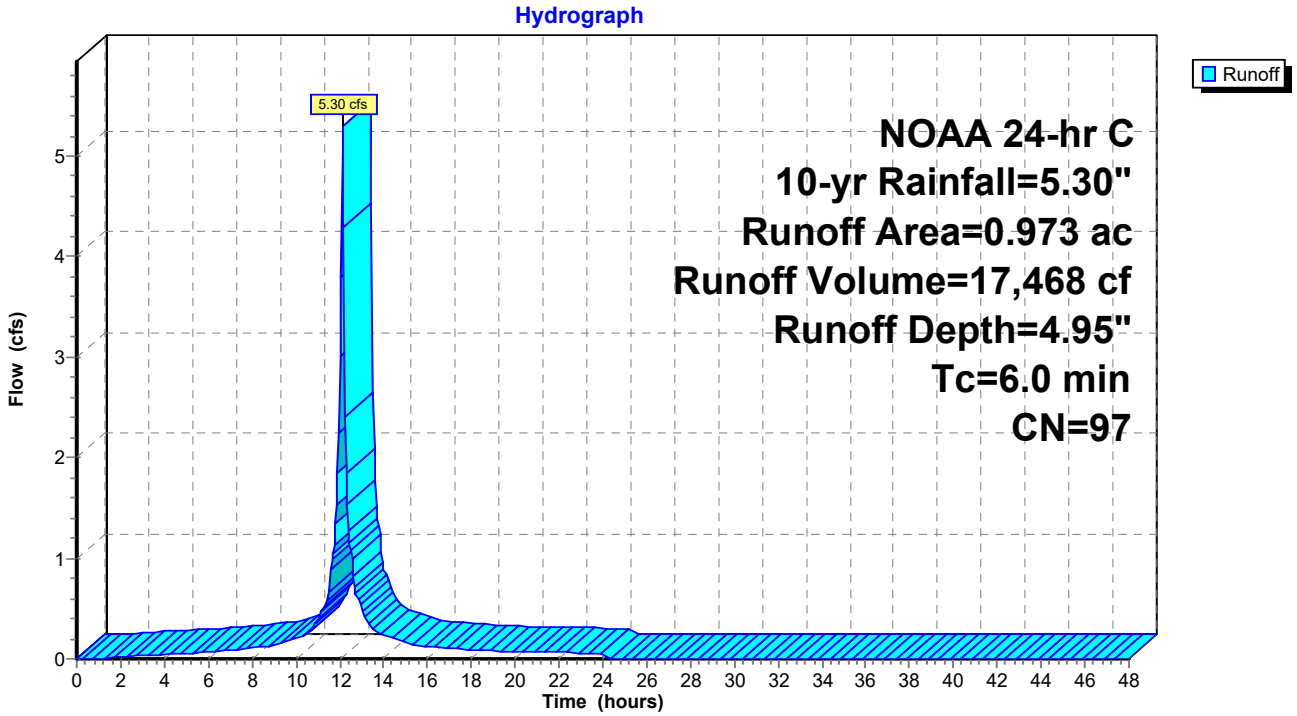
Runoff = 5.30 cfs @ 12.13 hrs, Volume= 17,468 cf, Depth= 4.95"
Routed to Reach DP-1 : Neponset River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=5.30"

Area (ac)	CN	Description
0.001	96	Gravel surface, HSG A
0.019	96	Gravel surface, HSG A
0.122	98	Paved roads w/curbs & sewers, HSG A
0.003	98	Roofs, HSG D
0.029	96	Gravel surface, HSG D
0.000	98	Paved roads w/curbs & sewers, HSG D
0.359	96	Gravel surface, HSG D
0.439	98	Paved roads w/curbs & sewers, HSG D
0.973	97	Weighted Average
0.408		41.90% Pervious Area
0.565		58.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment EX-SWALE: Subcat EX-SWALE

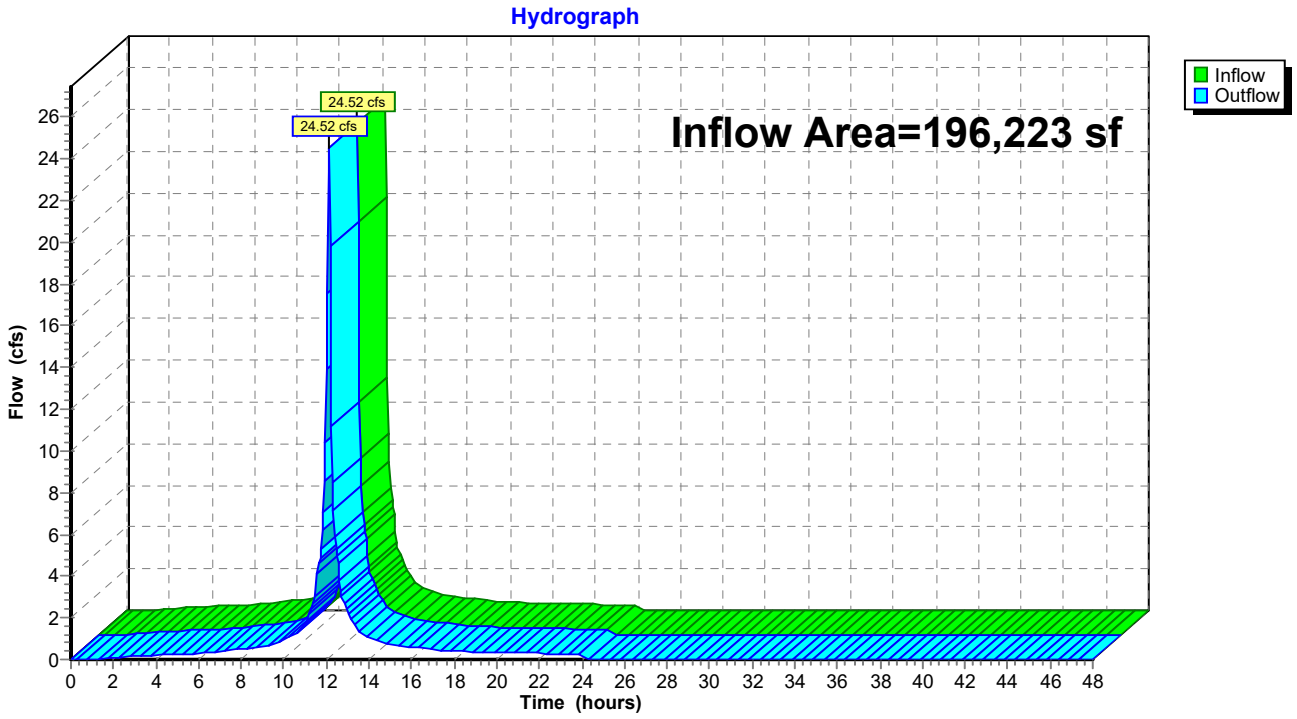


Summary for Reach 12"D: 12" DRAIN

Inflow Area = 196,223 sf, 58.47% Impervious, Inflow Depth = 4.95" for 10-yr event
Inflow = 24.52 cfs @ 12.13 hrs, Volume= 80,878 cf
Outflow = 24.52 cfs @ 12.13 hrs, Volume= 80,878 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach DP-1 : Neponset River

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 12"D: 12" DRAIN

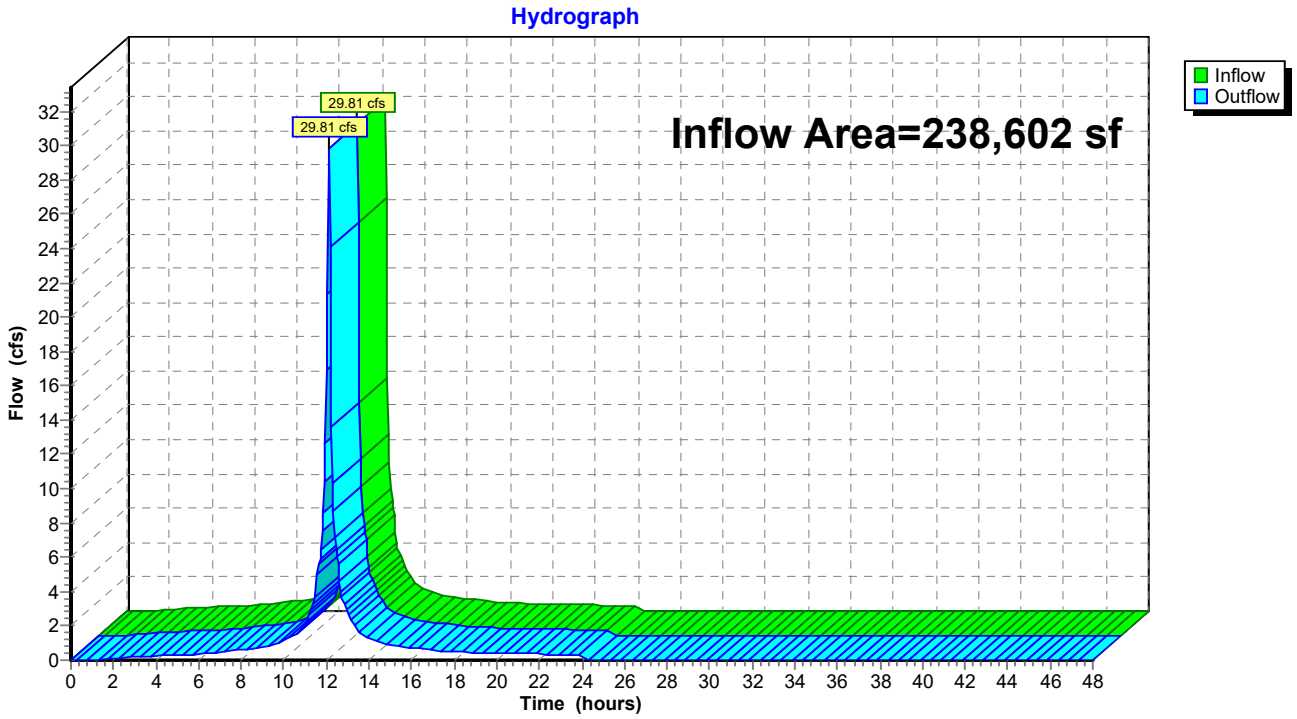


Summary for Reach DP-1: Neponset River

Inflow Area = 238,602 sf, 58.41% Impervious, Inflow Depth = 4.95" for 10-yr event
Inflow = 29.81 cfs @ 12.13 hrs, Volume= 98,346 cf
Outflow = 29.81 cfs @ 12.13 hrs, Volume= 98,346 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: Neponset River



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-SITE: Subcat EX-SITE Runoff Area=4.505 ac 58.47% Impervious Runoff Depth=7.97"
Tc=6.0 min CN=97 Runoff=38.77 cfs 130,325 cf

Subcatchment EX-SWALE: Subcat Runoff Area=0.973 ac 58.10% Impervious Runoff Depth=7.97"
Tc=6.0 min CN=97 Runoff=8.37 cfs 28,147 cf

Reach 12"D: 12" DRAIN Inflow=38.77 cfs 130,325 cf
Outflow=38.77 cfs 130,325 cf

Reach DP-1: Neponset River Inflow=47.15 cfs 158,472 cf
Outflow=47.15 cfs 158,472 cf

Total Runoff Area = 238,602 sf Runoff Volume = 158,472 cf Average Runoff Depth = 7.97"
41.59% Pervious = 99,243 sf 58.41% Impervious = 139,360 sf

Summary for Subcatchment EX-SITE: Subcat EX-SITE

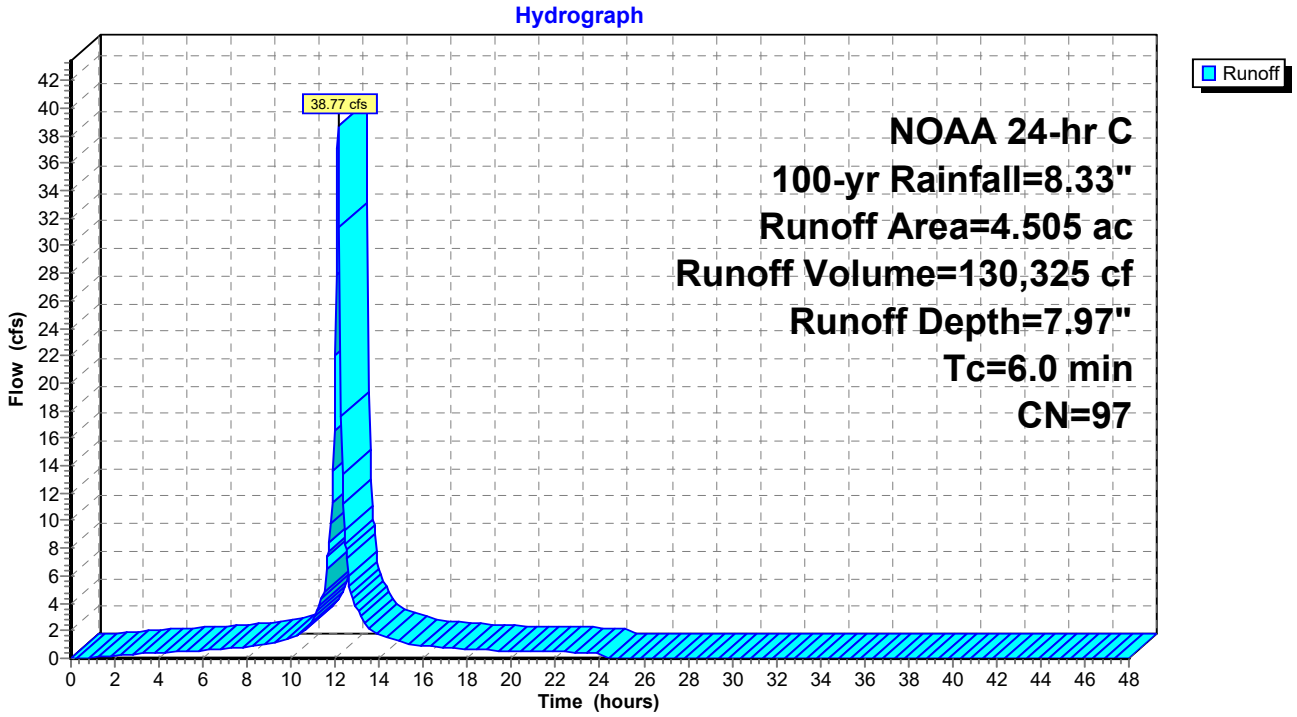
Runoff = 38.77 cfs @ 12.13 hrs, Volume= 130,325 cf, Depth= 7.97"
Routed to Reach 12"D : 12" DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.33"

Area (ac)	CN	Description
0.038	98	Paved roads w/curbs & sewers, HSG A
0.001	96	Gravel surface, HSG A
0.149	96	Gravel surface, HSG A
0.004	96	Gravel surface, HSG A
0.697	98	Paved roads w/curbs & sewers, HSG D
1.121	98	Paved roads w/curbs & sewers, HSG D
0.019	98	Paved roads w/curbs & sewers, HSG D
1.507	96	Gravel surface, HSG D
0.040	98	Roofs, HSG D
0.024	98	Roofs, HSG D
0.004	98	Roofs, HSG D
0.004	98	Roofs, HSG D
0.017	98	Roofs, HSG D
0.007	98	Roofs, HSG D
0.007	98	Roofs, HSG D
0.007	98	Roofs, HSG D
0.004	98	Roofs, HSG D
0.009	98	Roofs, HSG D
0.157	98	Roofs, HSG D
0.002	98	Roofs, HSG D
0.168	98	Roofs, HSG D
0.058	98	Paved roads w/curbs & sewers, HSG D
0.251	98	Roofs, HSG D
0.000	98	Paved roads w/curbs & sewers, HSG D
0.046	80	>75% Grass cover, Good, HSG D
0.164	96	Gravel surface, HSG D
4.505	97	Weighted Average
1.871		41.53% Pervious Area
2.634		58.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment EX-SITE: Subcat EX-SITE



Summary for Subcatchment EX-SWALE: Subcat EX-SWALE

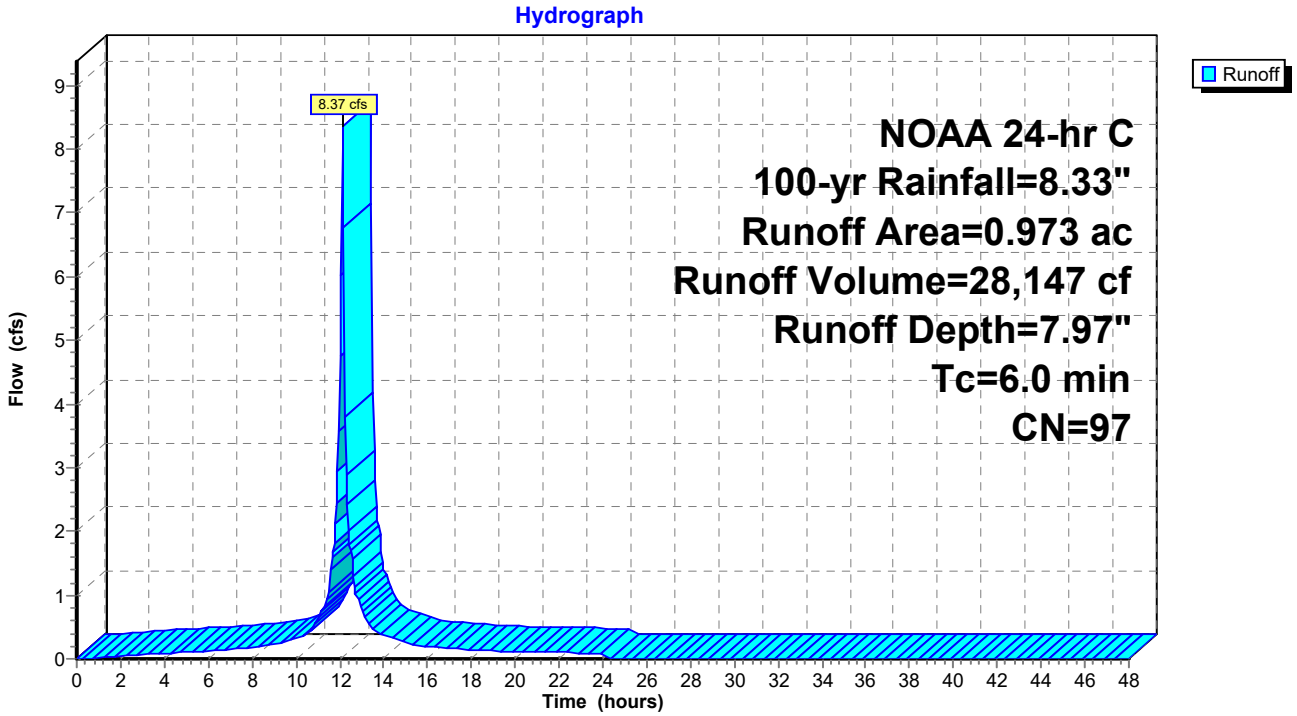
Runoff = 8.37 cfs @ 12.13 hrs, Volume= 28,147 cf, Depth= 7.97"
Routed to Reach DP-1 : Neponset River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.33"

Area (ac)	CN	Description
0.001	96	Gravel surface, HSG A
0.019	96	Gravel surface, HSG A
0.122	98	Paved roads w/curbs & sewers, HSG A
0.003	98	Roofs, HSG D
0.029	96	Gravel surface, HSG D
0.000	98	Paved roads w/curbs & sewers, HSG D
0.359	96	Gravel surface, HSG D
0.439	98	Paved roads w/curbs & sewers, HSG D
0.973	97	Weighted Average
0.408		41.90% Pervious Area
0.565		58.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment EX-SWALE: Subcat EX-SWALE

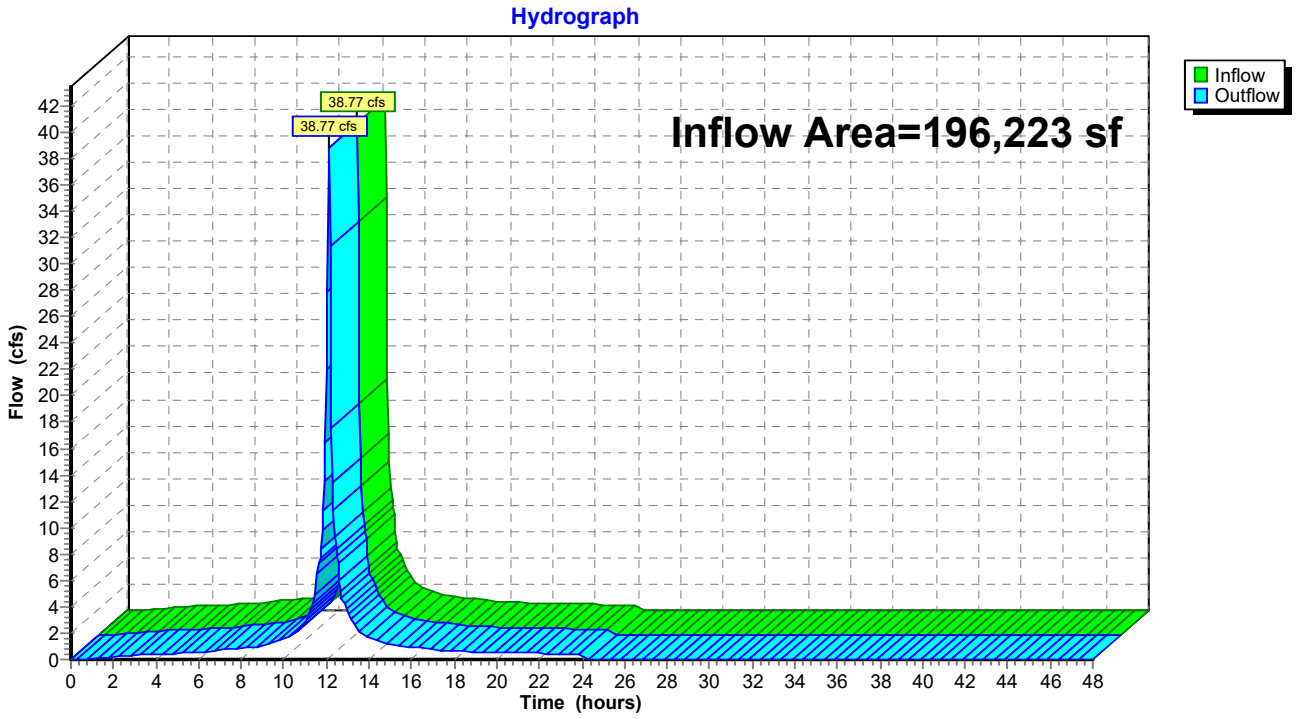


Summary for Reach 12"D: 12" DRAIN

Inflow Area = 196,223 sf, 58.47% Impervious, Inflow Depth = 7.97" for 100-yr event
Inflow = 38.77 cfs @ 12.13 hrs, Volume= 130,325 cf
Outflow = 38.77 cfs @ 12.13 hrs, Volume= 130,325 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach DP-1 : Neponset River

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 12"D: 12" DRAIN

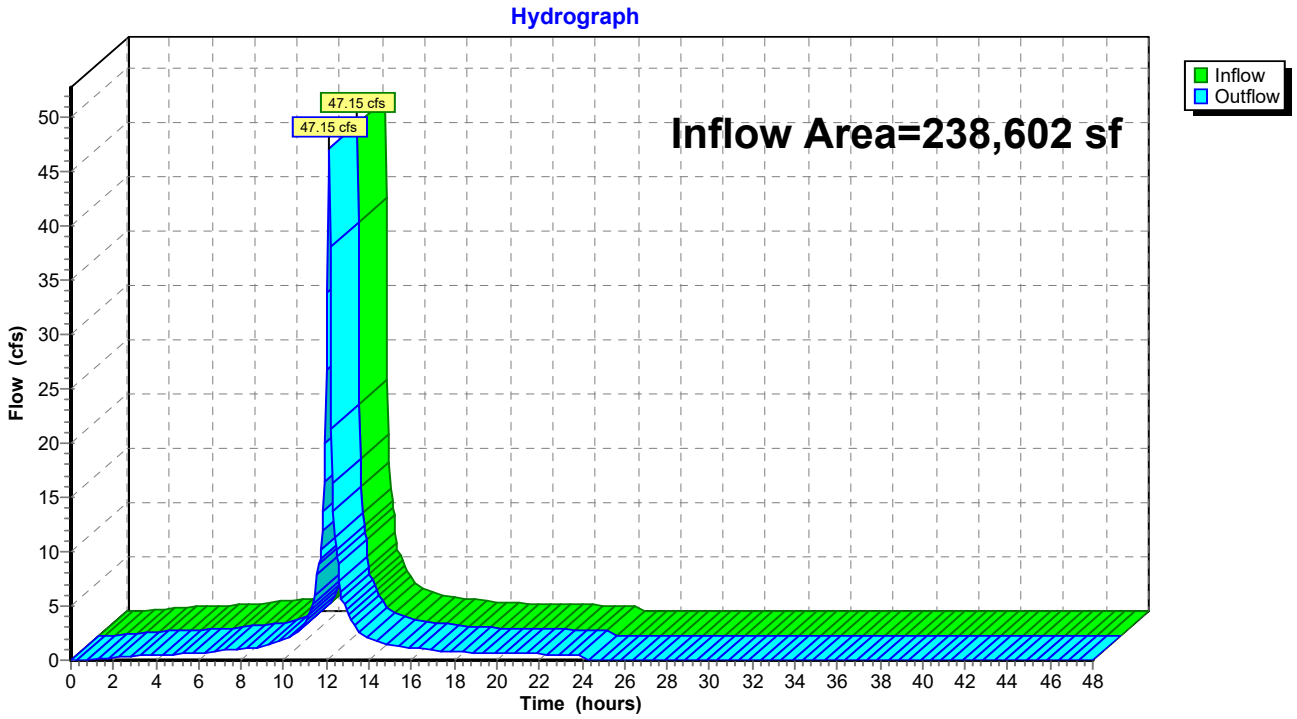


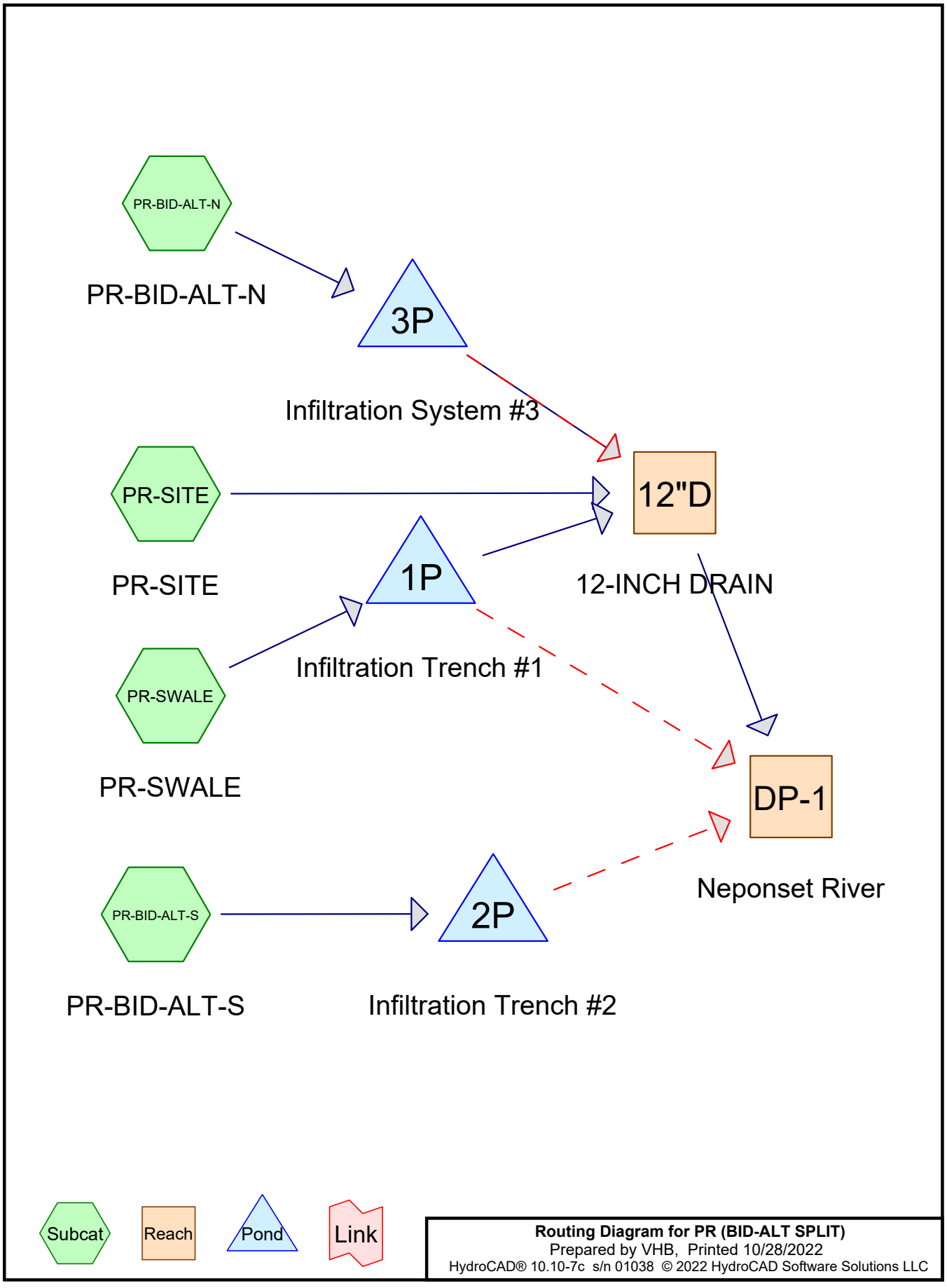
Summary for Reach DP-1: Neponset River

Inflow Area = 238,602 sf, 58.41% Impervious, Inflow Depth = 7.97" for 100-yr event
Inflow = 47.15 cfs @ 12.13 hrs, Volume= 158,472 cf
Outflow = 47.15 cfs @ 12.13 hrs, Volume= 158,472 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: Neponset River





Routing Diagram for PR (BID-ALT SPLIT)
Prepared by VHB, Printed 10/28/2022

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR-BID-ALT-N: Runoff Area=14,576 sf 99.91% Impervious Runoff Depth=3.15"
Tc=6.0 min CN=98 Runoff=1.16 cfs 3,822 cf

Subcatchment PR-BID-ALT-S: PR-BID-ALT-S Runoff Area=9,037 sf 99.72% Impervious Runoff Depth=3.15"
Tc=6.0 min CN=98 Runoff=0.72 cfs 2,370 cf

Subcatchment PR-SITE: PR-SITE Runoff Area=172,628 sf 65.06% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=97 Runoff=13.57 cfs 43,664 cf

Subcatchment PR-SWALE: PR-SWALE Runoff Area=42,380 sf 61.13% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=97 Runoff=3.33 cfs 10,719 cf

Reach 12"D: 12-INCH DRAIN Inflow=13.67 cfs 45,018 cf
Outflow=13.67 cfs 45,018 cf

Reach DP-1: Neponset River Inflow=16.87 cfs 49,726 cf
Outflow=16.87 cfs 49,726 cf

Pond 1P: Infiltration Trench #1 Peak Elev=34.97' Storage=3,508 cf Inflow=3.33 cfs 10,719 cf
Discarded=0.04 cfs 4,861 cf Primary=0.08 cfs 120 cf Secondary=3.20 cfs 4,708 cf Outflow=3.33 cfs 9,689 cf

Pond 2P: Infiltration Trench #2 Peak Elev=34.97' Storage=791 cf Inflow=0.72 cfs 2,370 cf
Discarded=0.01 cfs 1,154 cf Primary=0.71 cfs 1,020 cf Outflow=0.72 cfs 2,174 cf

Pond 3P: Infiltration System #3 Peak Elev=2.11' Storage=1,572 cf Inflow=1.16 cfs 3,822 cf
Discarded=0.02 cfs 2,588 cf Primary=0.53 cfs 1,233 cf Secondary=0.00 cfs 0 cf Outflow=0.55 cfs 3,822 cf

Total Runoff Area = 238,621 sf Runoff Volume = 60,576 cf Average Runoff Depth = 3.05"
32.20% Pervious = 76,834 sf 67.80% Impervious = 161,787 sf

Summary for Subcatchment PR-BID-ALT-N: PR-BID-ALT-N

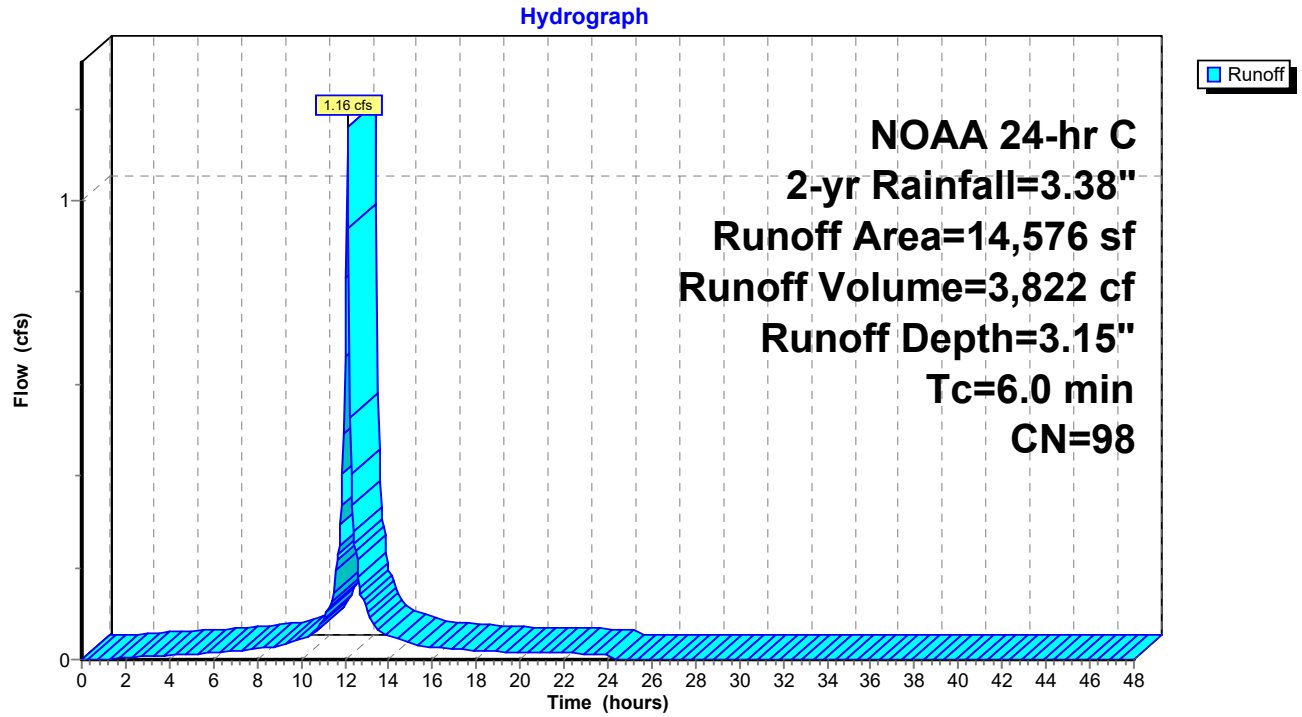
Runoff = 1.16 cfs @ 12.13 hrs, Volume= 3,822 cf, Depth= 3.15"
Routed to Pond 3P : Infiltration System #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.38"

Area (sf)	CN	Description
866	98	Paved roads w/curbs & sewers, HSG A
13,325	98	Paved roads w/curbs & sewers, HSG D
192	98	Roofs, HSG D
167	98	Roofs, HSG D
2	98	Roofs, HSG D
11	98	Roofs, HSG D
13	96	Gravel surface, HSG D
14,576	98	Weighted Average
13		0.09% Pervious Area
14,564		99.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment PR-BID-ALT-N: PR-BID-ALT-N



Summary for Subcatchment PR-BID-ALT-S: PR-BID-ALT-S

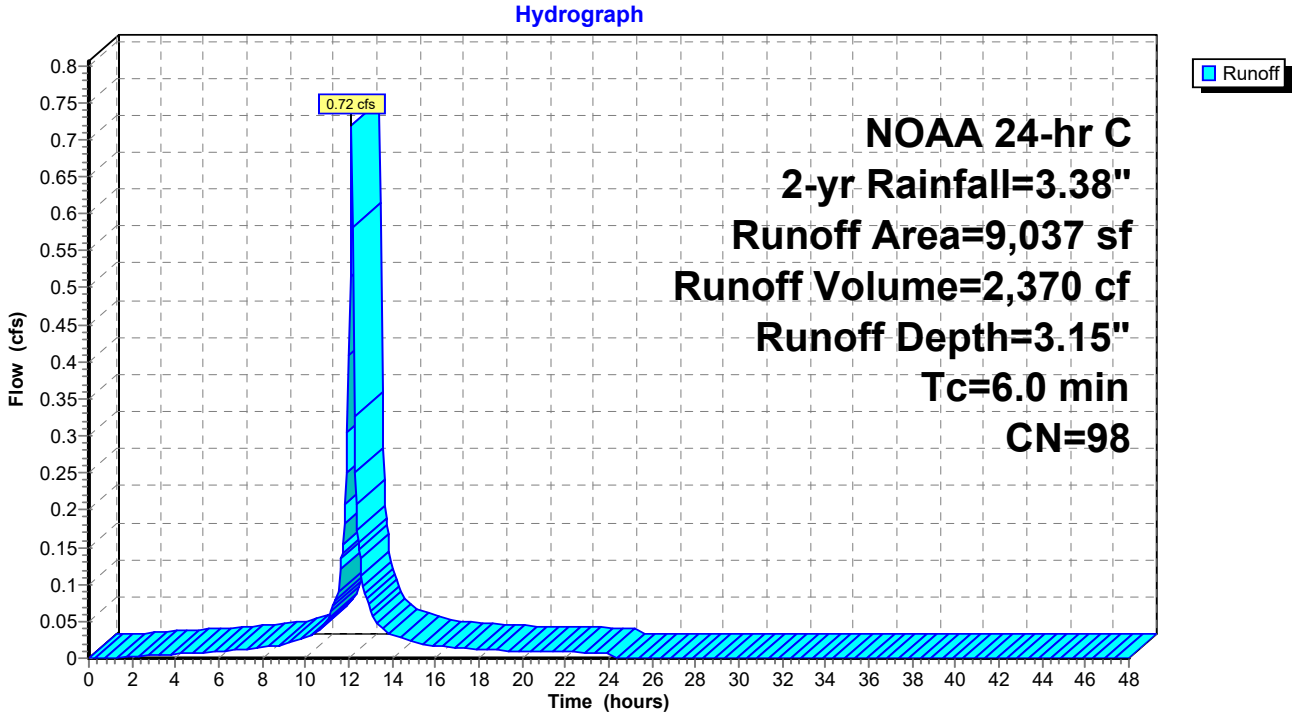
Runoff = 0.72 cfs @ 12.13 hrs, Volume= 2,370 cf, Depth= 3.15"
Routed to Pond 2P : Infiltration Trench #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.38"

Area (sf)	CN	Description
7	30	Woods, Good, HSG A
3,249	98	Paved roads w/curbs & sewers, HSG A
321	98	Roofs, HSG D
314	98	Roofs, HSG D
322	98	Roofs, HSG D
155	98	Roofs, HSG D
382	98	Roofs, HSG D
18	77	Woods, Good, HSG D
4,269	98	Paved roads w/curbs & sewers, HSG D
9,037	98	Weighted Average
25		0.28% Pervious Area
9,012		99.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment PR-BID-ALT-S: PR-BID-ALT-S



Summary for Subcatchment PR-SITE: PR-SITE

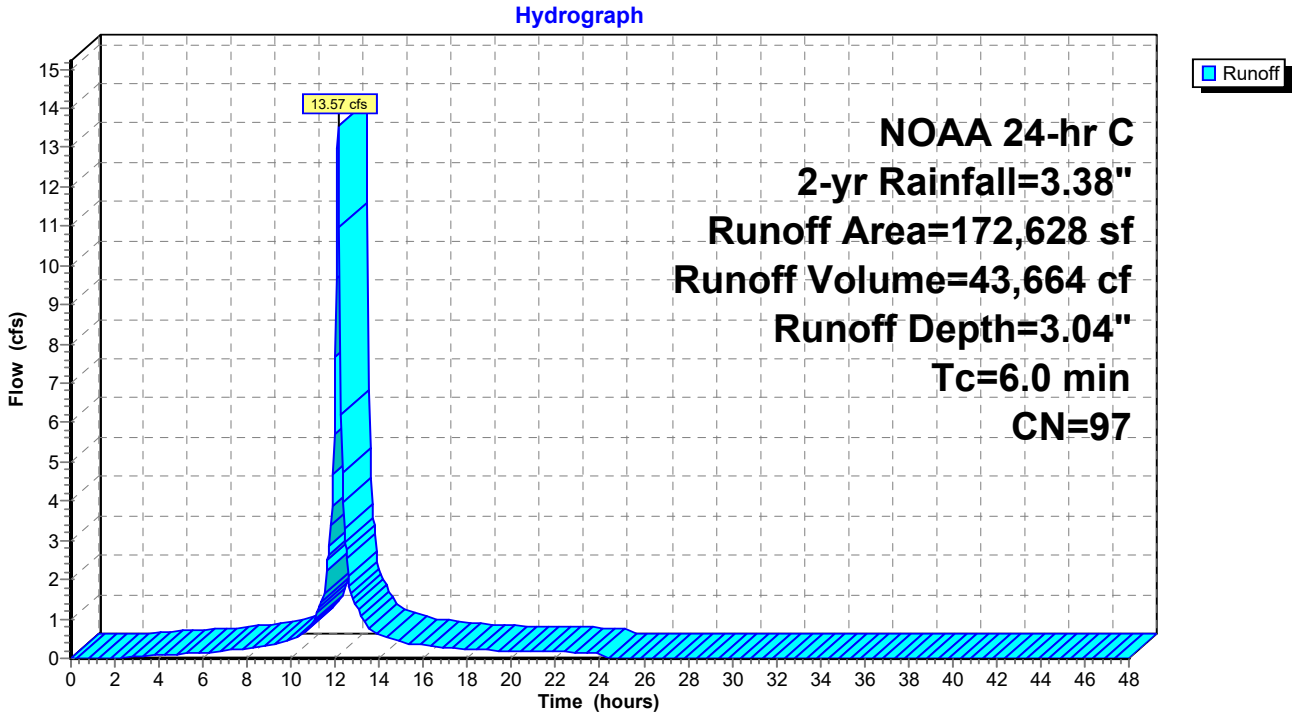
Runoff = 13.57 cfs @ 12.13 hrs, Volume= 43,664 cf, Depth= 3.04"
Routed to Reach 12"D : 12-INCH DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.38"

Area (sf)	CN	Description
1,652	98	Paved roads w/curbs & sewers, HSG A
25	96	Gravel surface, HSG A
195	96	Gravel surface, HSG A
2,384	96	Gravel surface, HSG A
0	98	Paved roads w/curbs & sewers, HSG D
79,362	98	Paved roads w/curbs & sewers, HSG D
0	98	Paved roads w/curbs & sewers, HSG D
2	98	Paved roads w/curbs & sewers, HSG D
52	98	Paved roads w/curbs & sewers, HSG D
1,748	98	Roofs, HSG D
1,043	98	Roofs, HSG D
743	98	Roofs, HSG D
6,838	98	Roofs, HSG D
98	98	Roofs, HSG D
7,299	98	Roofs, HSG D
2,547	98	Paved roads w/curbs & sewers, HSG D
10,920	98	Roofs, HSG D
48,589	96	Gravel surface, HSG D
0	98	Paved roads w/curbs & sewers, HSG D
1,984	80	>75% Grass cover, Good, HSG D
7,146	96	Gravel surface, HSG D
172,628	97	Weighted Average
60,323		34.94% Pervious Area
112,304		65.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment PR-SITE: PR-SITE



Summary for Subcatchment PR-SWALE: PR-SWALE

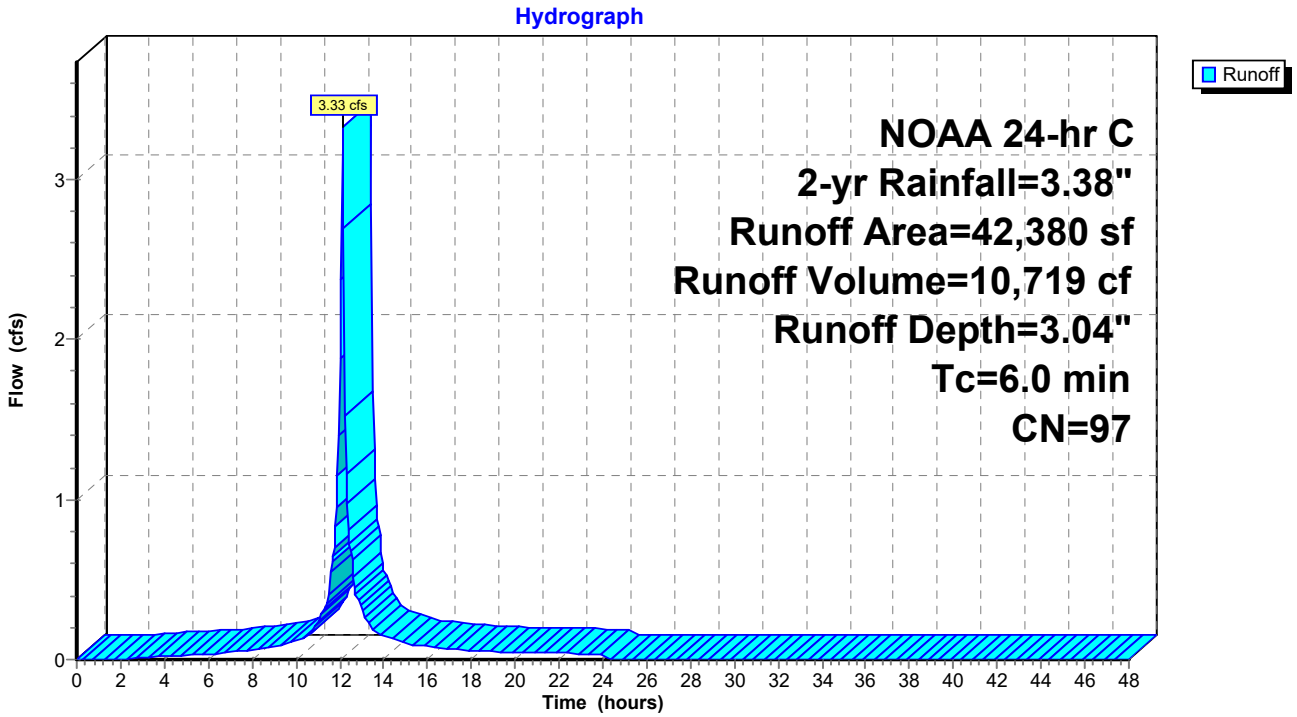
Runoff = 3.33 cfs @ 12.13 hrs, Volume= 10,719 cf, Depth= 3.04"
Routed to Pond 1P : Infiltration Trench #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.38"

Area (sf)	CN	Description
5,385	98	Paved roads w/curbs & sewers, HSG A
816	96	Gravel surface, HSG A
20,372	98	Paved roads w/curbs & sewers, HSG D
150	98	Roofs, HSG D
24	96	Gravel surface, HSG D
0	98	Paved roads w/curbs & sewers, HSG D
15,633	96	Gravel surface, HSG D
42,380	97	Weighted Average
16,473		38.87% Pervious Area
25,907		61.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment PR-SWALE: PR-SWALE

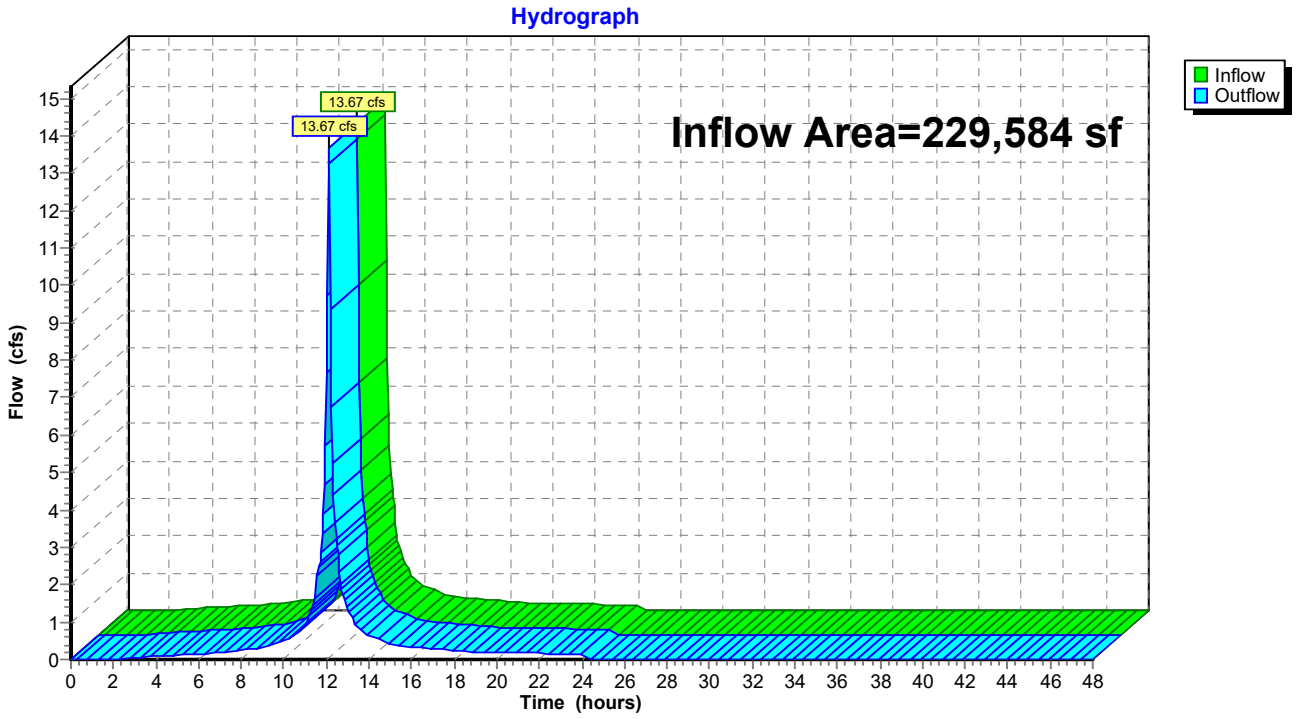


Summary for Reach 12"D: 12-INCH DRAIN

Inflow Area = 229,584 sf, 66.54% Impervious, Inflow Depth = 2.35" for 2-yr event
Inflow = 13.67 cfs @ 12.13 hrs, Volume= 45,018 cf
Outflow = 13.67 cfs @ 12.13 hrs, Volume= 45,018 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach DP-1 : Neponset River

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 12"D: 12-INCH DRAIN

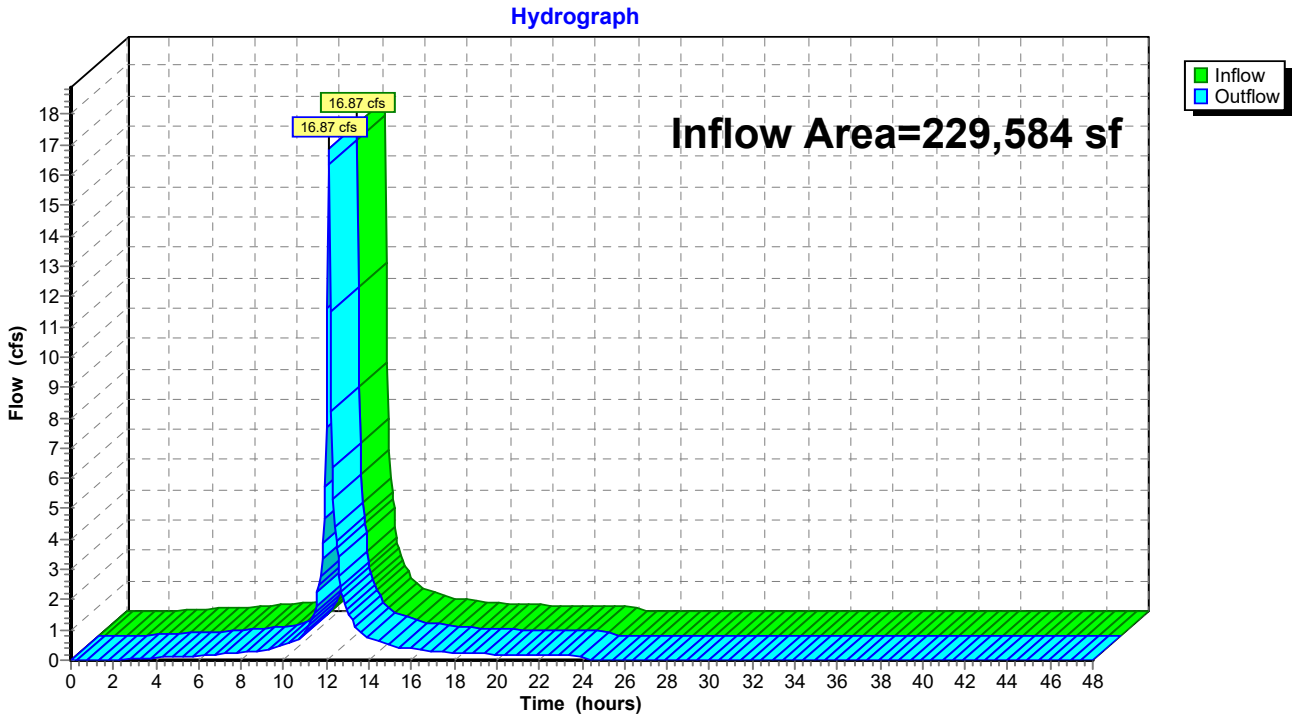


Summary for Reach DP-1: Neponset River

Inflow Area = 229,584 sf, 66.54% Impervious, Inflow Depth = 2.60" for 2-yr event
Inflow = 16.87 cfs @ 12.13 hrs, Volume= 49,726 cf
Outflow = 16.87 cfs @ 12.13 hrs, Volume= 49,726 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: Neponset River



Summary for Pond 1P: Infiltration Trench #1

Inflow Area = 42,380 sf, 61.13% Impervious, Inflow Depth = 3.04" for 2-yr event
Inflow = 3.33 cfs @ 12.13 hrs, Volume= 10,719 cf
Outflow = 3.33 cfs @ 12.13 hrs, Volume= 9,689 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.04 cfs @ 12.13 hrs, Volume= 4,861 cf
Primary = 0.08 cfs @ 12.13 hrs, Volume= 120 cf
Routed to Reach 12"D : 12-INCH DRAIN
Secondary = 3.20 cfs @ 12.13 hrs, Volume= 4,708 cf
Routed to Reach DP-1 : Neponset River

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 34.97' @ 12.13 hrs Surf.Area= 3,587 sf Storage= 3,508 cf

Plug-Flow detention time= 401.8 min calculated for 9,679 cf (90% of inflow)
Center-of-Mass det. time= 353.3 min (1,119.4 - 766.2)

Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	1,209 cf	**2.00'W x 300.00'L x 1.00'H Open Channel Z=2.0**
#2	30.50'	2,125 cf	**6.00'W x 300.00'L x 3.50'H Infiltration Trench** 6,300 cf Overall - 228 cf Embedded = 6,072 cf x 35.0% Voids
#3	31.00'	228 cf	**12.0" Round Pipe Storage** Inside #2 L= 290.0'
		3,562 cf	Total Available Storage

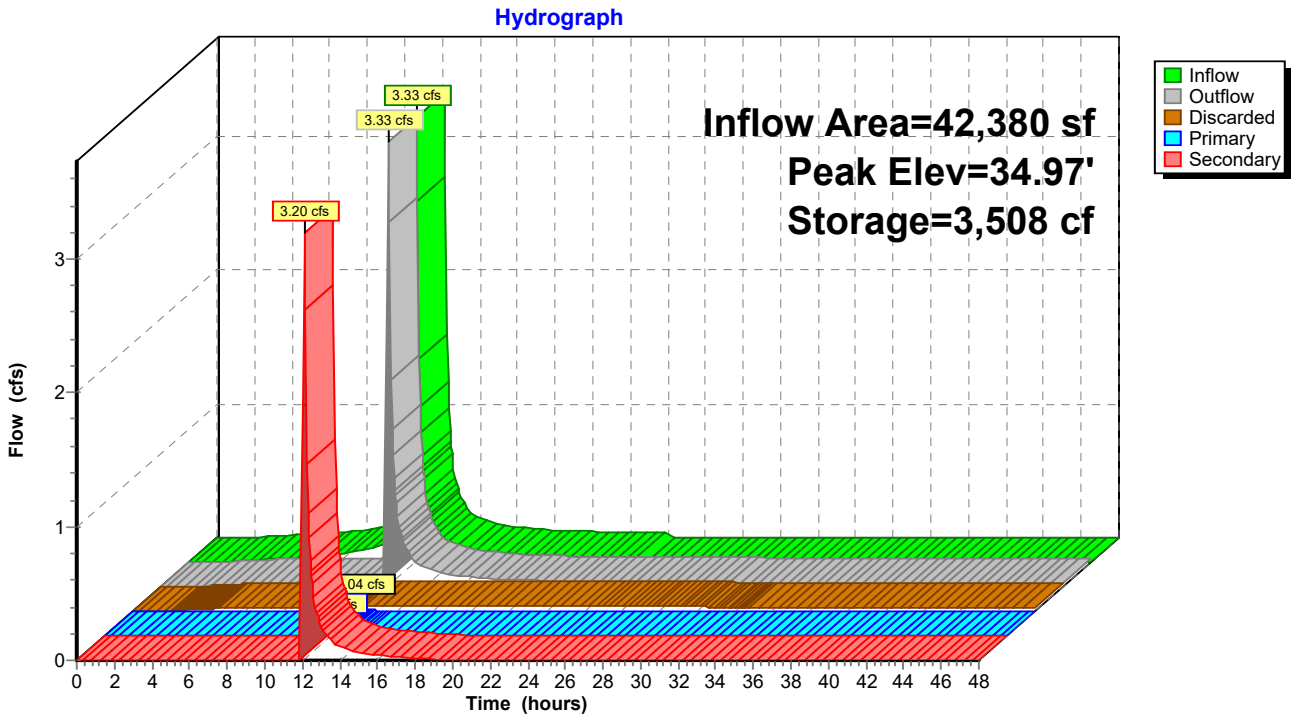
Device	Routing	Invert	Outlet Devices
#1	Primary	31.70'	**8.0" Round Outlet Pipe** L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 31.70' / 30.20' S= 0.0319 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf
#2	Device 1	34.95'	**24.0" Horiz. Over-top Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	34.95'	**300.0' long x 70.0' breadth Overland Flow Towards River** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#4	Discarded	30.50'	**0.520 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 12.13 hrs HW=34.97' (Free Discharge)
↑—**4=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.06 cfs @ 12.13 hrs HW=34.97' (Free Discharge)
↑—**1=Outlet Pipe** (Passes 0.06 cfs of 2.83 cfs potential flow)
↑—**2=Over-top Grate** (Weir Controls 0.06 cfs @ 0.46 fps)

Secondary OutFlow Max=2.18 cfs @ 12.13 hrs HW=34.97' (Free Discharge)
↑—**3=Overland Flow Towards River** (Weir Controls 2.18 cfs @ 0.37 fps)

Pond 1P: Infiltration Trench #1



Summary for Pond 2P: Infiltration Trench #2

Inflow Area = 9,037 sf, 99.72% Impervious, Inflow Depth = 3.15" for 2-yr event
Inflow = 0.72 cfs @ 12.13 hrs, Volume= 2,370 cf
Outflow = 0.72 cfs @ 12.13 hrs, Volume= 2,174 cf, Atten= 1%, Lag= 0.1 min
Discarded = 0.01 cfs @ 12.13 hrs, Volume= 1,154 cf
Primary = 0.71 cfs @ 12.13 hrs, Volume= 1,020 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 34.97' @ 12.13 hrs Surf.Area= 855 sf Storage= 791 cf

Plug-Flow detention time= 415.1 min calculated for 2,174 cf (92% of inflow)
Center-of-Mass det. time= 370.0 min (1,126.4 - 756.4)

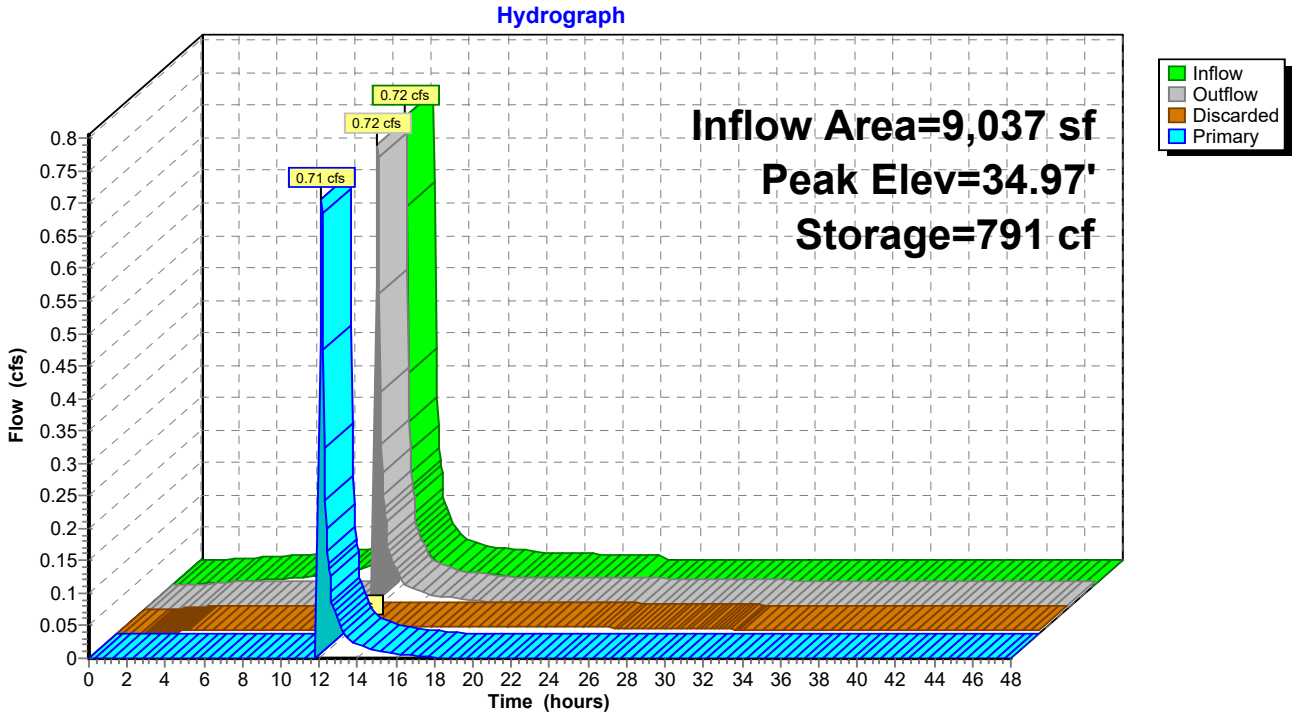
Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	289 cf	**2.00'W x 70.00'L x 1.00'H Open Channel Z=2.0**
#2	30.50'	515 cf	**6.00'W x 70.00'L x 3.50'H Infiltration Trench** 1,470 cf Overall x 35.0% Voids
		804 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	34.95'	**70.0' long x 10.0' breadth Overland Flow Towards River** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	30.50'	**0.520 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 12.13 hrs HW=34.97' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.48 cfs @ 12.13 hrs HW=34.97' (Free Discharge)
↑—**1=Overland Flow Towards River** (Weir Controls 0.48 cfs @ 0.35 fps)

Pond 2P: Infiltration Trench #2



Summary for Pond 3P: Infiltration System #3

Inflow Area = 14,576 sf, 99.91% Impervious, Inflow Depth = 3.15" for 2-yr event
Inflow = 1.16 cfs @ 12.13 hrs, Volume= 3,822 cf
Outflow = 0.55 cfs @ 12.26 hrs, Volume= 3,822 cf, Atten= 52%, Lag= 7.9 min
Discarded = 0.02 cfs @ 7.20 hrs, Volume= 2,588 cf
Primary = 0.53 cfs @ 12.26 hrs, Volume= 1,233 cf
Routed to Reach 12"D : 12-INCH DRAIN
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Reach 12"D : 12-INCH DRAIN

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 2.11' @ 12.26 hrs Surf.Area= 1,513 sf Storage= 1,572 cf

Plug-Flow detention time= 470.3 min calculated for 3,818 cf (100% of inflow)
Center-of-Mass det. time= 470.9 min (1,227.3 - 756.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	1,030 cf	**34.30'W x 43.75'L x 2.21'H Field A** 3,315 cf Overall - 739 cf Embedded = 2,576 cf x 40.0% Voids
#2A	0.50'	572 cf	**ADS N-12 12"** x 32 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 32 Chambers in 16 Rows 32.97' Header x 0.81 sf x 2 = 53.4 cf Inside
#3	0.00'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**
		1,640 cf	Total Available Storage

Storage Group A created with Chamber Wizard

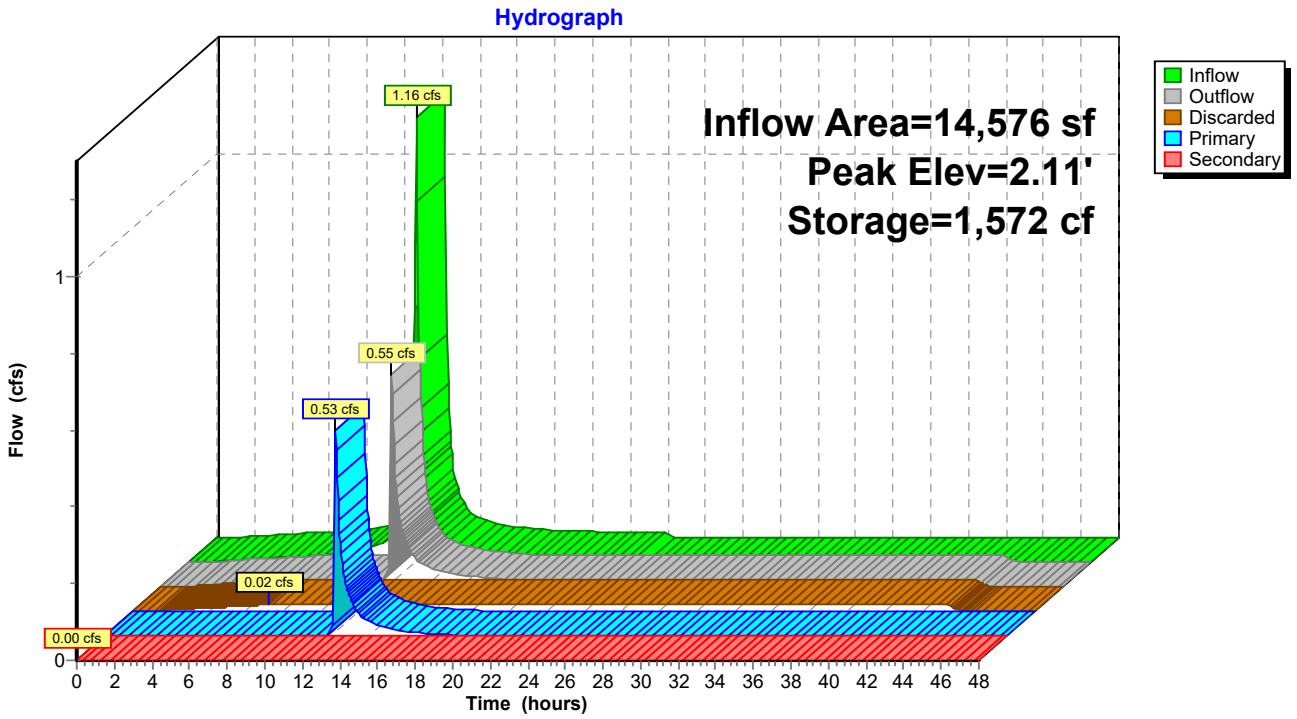
Device	Routing	Invert	Outlet Devices
#1	Primary	1.75'	**12.0" Round Outlet Pipe** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 1.75' / 1.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Discarded	0.00'	**0.520 in/hr Exfiltration over Surface area**
#3	Secondary	2.90'	**1.2" x 20.0" Horiz. Orifice/Grate X 10.00** C= 0.600 in 24.0" x 24.0" Grate (42% open area) Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 7.20 hrs HW=0.03' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.52 cfs @ 12.26 hrs HW=2.11' (Free Discharge)
└**1=Outlet Pipe** (Inlet Controls 0.52 cfs @ 2.05 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: Infiltration System #3



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR-BID-ALT-N: Runoff Area=14,576 sf 99.91% Impervious Runoff Depth=5.06"
Tc=6.0 min CN=98 Runoff=1.83 cfs 6,150 cf

Subcatchment PR-BID-ALT-S: PR-BID-ALT-S Runoff Area=9,037 sf 99.72% Impervious Runoff Depth=5.06"
Tc=6.0 min CN=98 Runoff=1.14 cfs 3,813 cf

Subcatchment PR-SITE: PR-SITE Runoff Area=172,628 sf 65.06% Impervious Runoff Depth=4.95"
Tc=6.0 min CN=97 Runoff=21.57 cfs 71,153 cf

Subcatchment PR-SWALE: PR-SWALE Runoff Area=42,380 sf 61.13% Impervious Runoff Depth=4.95"
Tc=6.0 min CN=97 Runoff=5.30 cfs 17,468 cf

Reach 12"D: 12-INCH DRAIN Inflow=23.51 cfs 74,782 cf
Outflow=23.51 cfs 74,782 cf

Reach DP-1: Neponset River Inflow=28.60 cfs 85,816 cf
Outflow=28.60 cfs 85,816 cf

Pond 1P: Infiltration Trench #1 Peak Elev=34.98' Storage=3,526 cf Inflow=5.30 cfs 17,468 cf
Discarded=0.04 cfs 5,049 cf Primary=0.13 cfs 282 cf Secondary=5.09 cfs 11,034 cf Outflow=5.27 cfs 16,365 cf

Pond 2P: Infiltration Trench #2 Peak Elev=34.98' Storage=795 cf Inflow=1.14 cfs 3,813 cf
Discarded=0.01 cfs 1,202 cf Primary=1.12 cfs 2,372 cf Outflow=1.13 cfs 3,574 cf

Pond 3P: Infiltration System #3 Peak Elev=2.49' Storage=1,633 cf Inflow=1.83 cfs 6,150 cf
Discarded=0.02 cfs 2,790 cf Primary=1.83 cfs 3,347 cf Secondary=0.00 cfs 0 cf Outflow=1.85 cfs 6,137 cf

Total Runoff Area = 238,621 sf Runoff Volume = 98,583 cf Average Runoff Depth = 4.96"
32.20% Pervious = 76,834 sf 67.80% Impervious = 161,787 sf

Summary for Subcatchment PR-BID-ALT-N: PR-BID-ALT-N

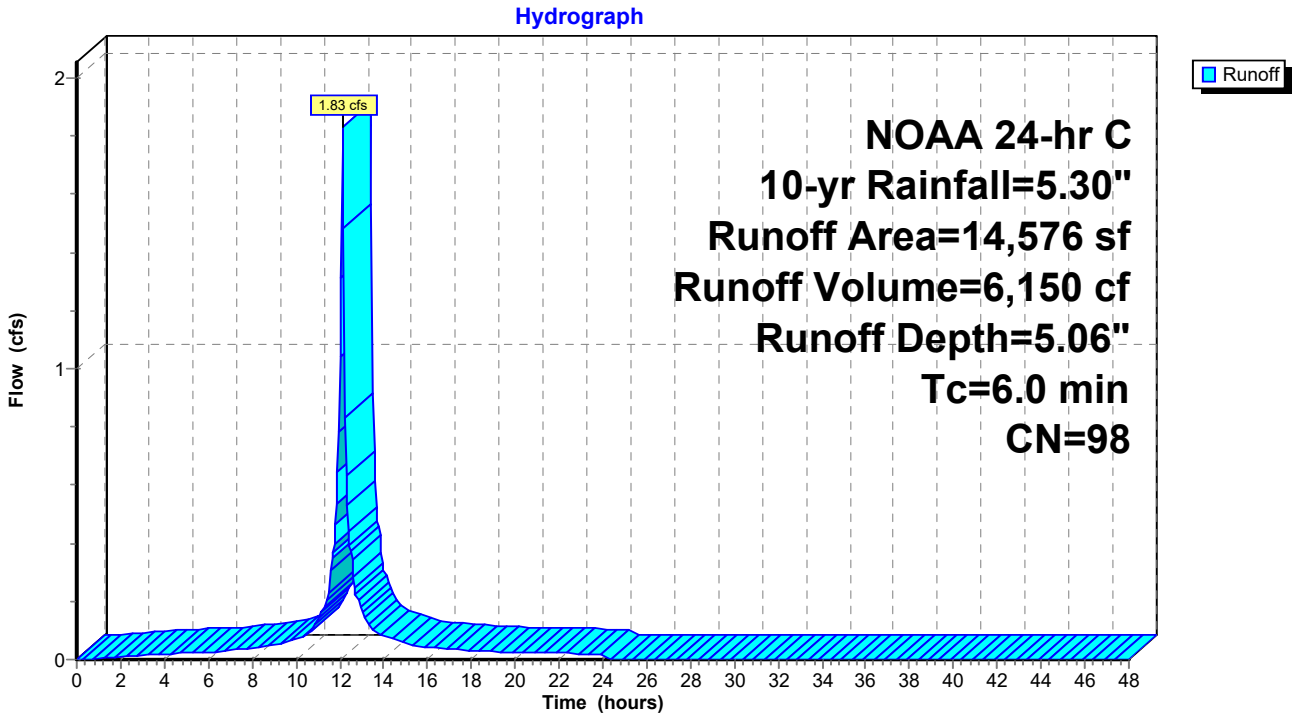
Runoff = 1.83 cfs @ 12.13 hrs, Volume= 6,150 cf, Depth= 5.06"
Routed to Pond 3P : Infiltration System #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=5.30"

Area (sf)	CN	Description
866	98	Paved roads w/curbs & sewers, HSG A
13,325	98	Paved roads w/curbs & sewers, HSG D
192	98	Roofs, HSG D
167	98	Roofs, HSG D
2	98	Roofs, HSG D
11	98	Roofs, HSG D
13	96	Gravel surface, HSG D
14,576	98	Weighted Average
13		0.09% Pervious Area
14,564		99.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment PR-BID-ALT-N: PR-BID-ALT-N



Summary for Subcatchment PR-BID-ALT-S: PR-BID-ALT-S

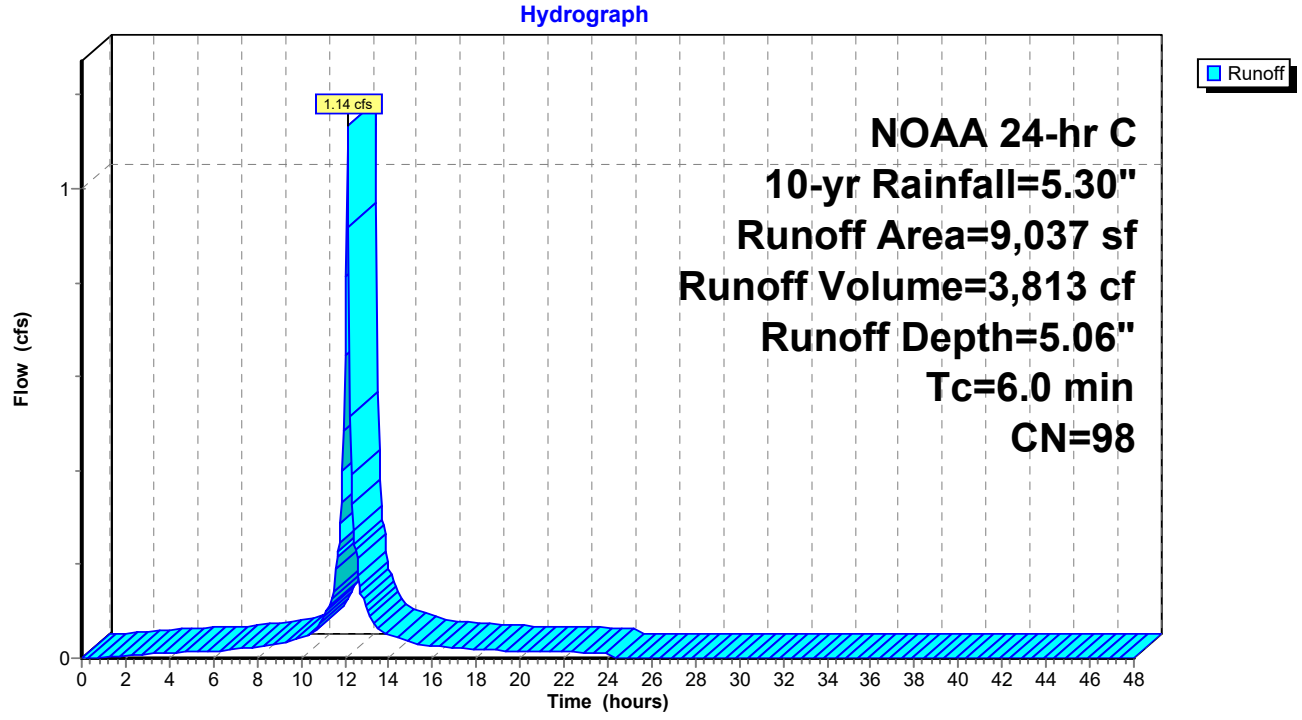
Runoff = 1.14 cfs @ 12.13 hrs, Volume= 3,813 cf, Depth= 5.06"
Routed to Pond 2P : Infiltration Trench #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=5.30"

Area (sf)	CN	Description
7	30	Woods, Good, HSG A
3,249	98	Paved roads w/curbs & sewers, HSG A
321	98	Roofs, HSG D
314	98	Roofs, HSG D
322	98	Roofs, HSG D
155	98	Roofs, HSG D
382	98	Roofs, HSG D
18	77	Woods, Good, HSG D
4,269	98	Paved roads w/curbs & sewers, HSG D
9,037	98	Weighted Average
25		0.28% Pervious Area
9,012		99.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment PR-BID-ALT-S: PR-BID-ALT-S



Summary for Subcatchment PR-SITE: PR-SITE

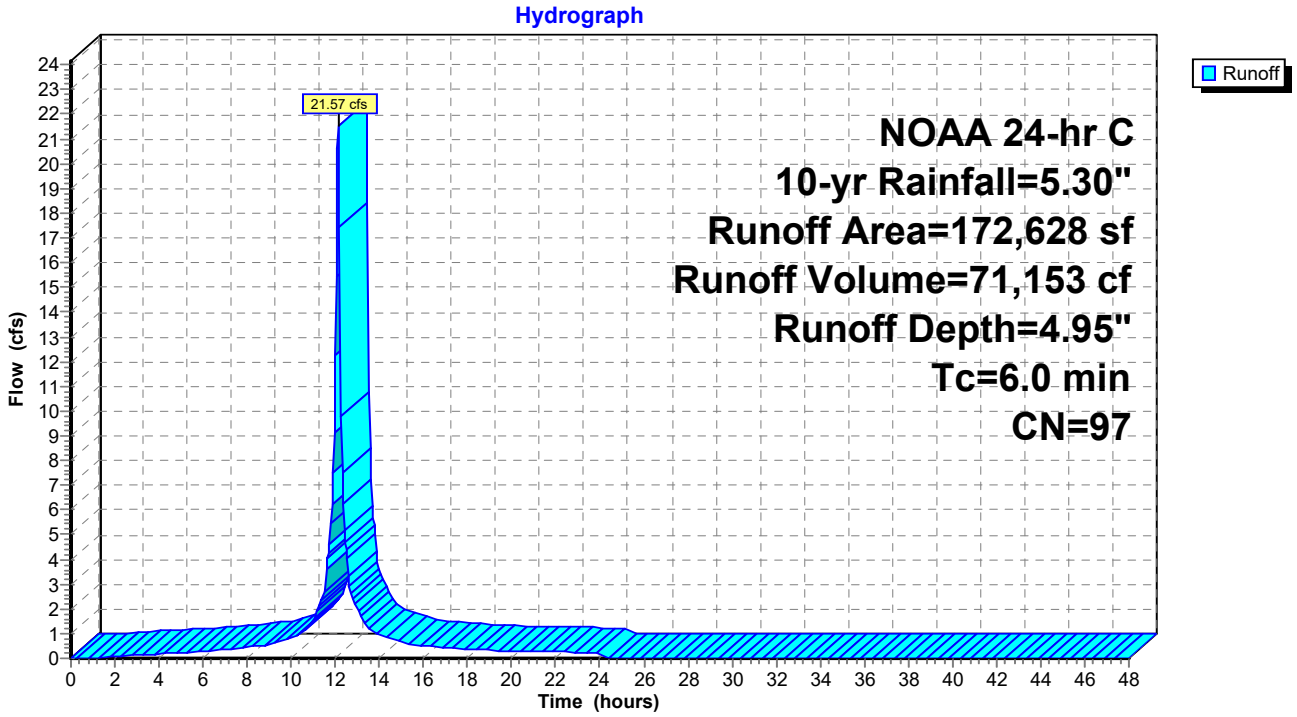
Runoff = 21.57 cfs @ 12.13 hrs, Volume= 71,153 cf, Depth= 4.95"
Routed to Reach 12"D : 12-INCH DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=5.30"

Area (sf)	CN	Description
1,652	98	Paved roads w/curbs & sewers, HSG A
25	96	Gravel surface, HSG A
195	96	Gravel surface, HSG A
2,384	96	Gravel surface, HSG A
0	98	Paved roads w/curbs & sewers, HSG D
79,362	98	Paved roads w/curbs & sewers, HSG D
0	98	Paved roads w/curbs & sewers, HSG D
2	98	Paved roads w/curbs & sewers, HSG D
52	98	Paved roads w/curbs & sewers, HSG D
1,748	98	Roofs, HSG D
1,043	98	Roofs, HSG D
743	98	Roofs, HSG D
6,838	98	Roofs, HSG D
98	98	Roofs, HSG D
7,299	98	Roofs, HSG D
2,547	98	Paved roads w/curbs & sewers, HSG D
10,920	98	Roofs, HSG D
48,589	96	Gravel surface, HSG D
0	98	Paved roads w/curbs & sewers, HSG D
1,984	80	>75% Grass cover, Good, HSG D
7,146	96	Gravel surface, HSG D
172,628	97	Weighted Average
60,323		34.94% Pervious Area
112,304		65.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment PR-SITE: PR-SITE



Summary for Subcatchment PR-SWALE: PR-SWALE

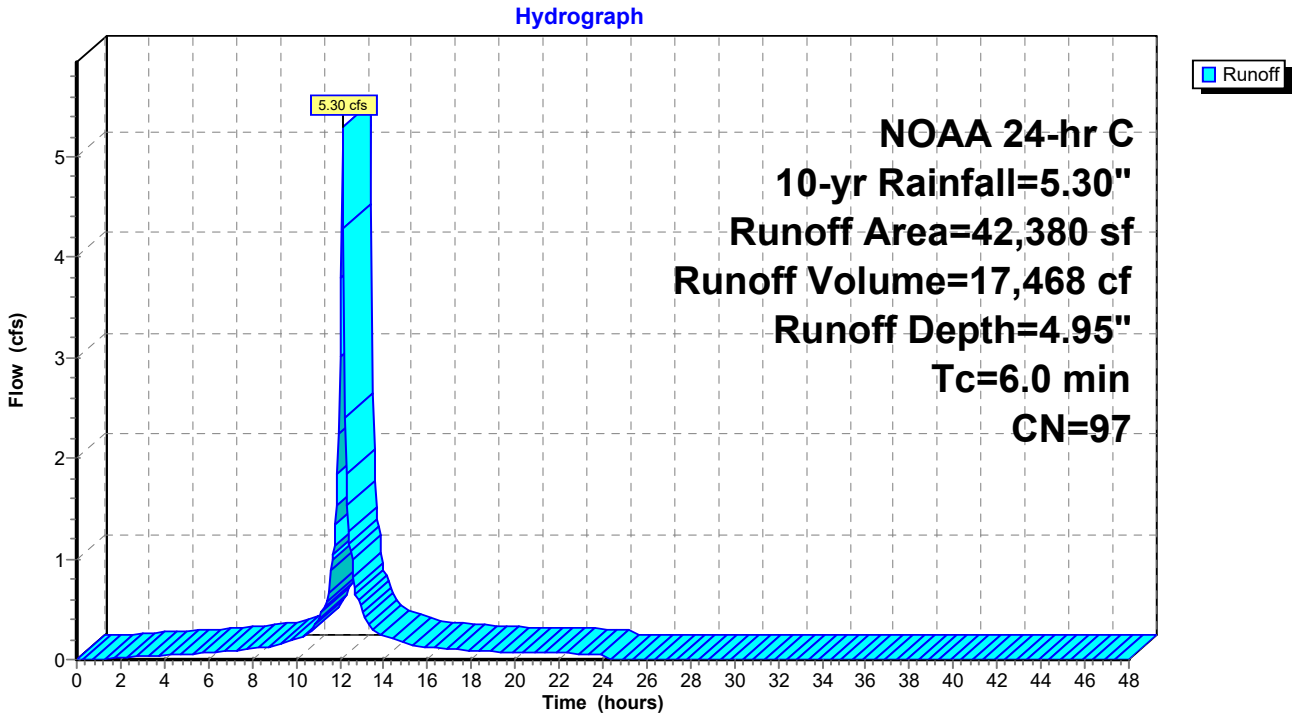
Runoff = 5.30 cfs @ 12.13 hrs, Volume= 17,468 cf, Depth= 4.95"
Routed to Pond 1P : Infiltration Trench #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=5.30"

Area (sf)	CN	Description
5,385	98	Paved roads w/curbs & sewers, HSG A
816	96	Gravel surface, HSG A
20,372	98	Paved roads w/curbs & sewers, HSG D
150	98	Roofs, HSG D
24	96	Gravel surface, HSG D
0	98	Paved roads w/curbs & sewers, HSG D
15,633	96	Gravel surface, HSG D
42,380	97	Weighted Average
16,473		38.87% Pervious Area
25,907		61.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment PR-SWALE: PR-SWALE

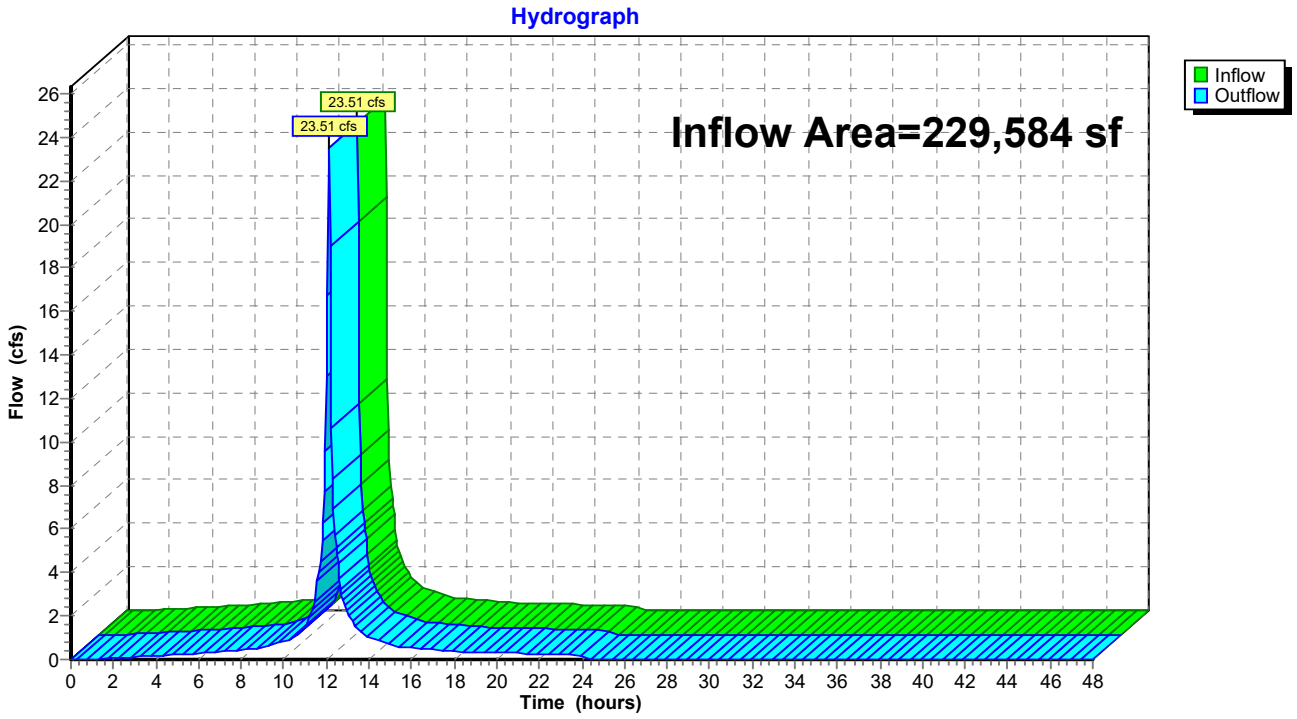


Summary for Reach 12"D: 12-INCH DRAIN

Inflow Area = 229,584 sf, 66.54% Impervious, Inflow Depth = 3.91" for 10-yr event
Inflow = 23.51 cfs @ 12.13 hrs, Volume= 74,782 cf
Outflow = 23.51 cfs @ 12.13 hrs, Volume= 74,782 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach DP-1 : Neponset River

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 12"D: 12-INCH DRAIN

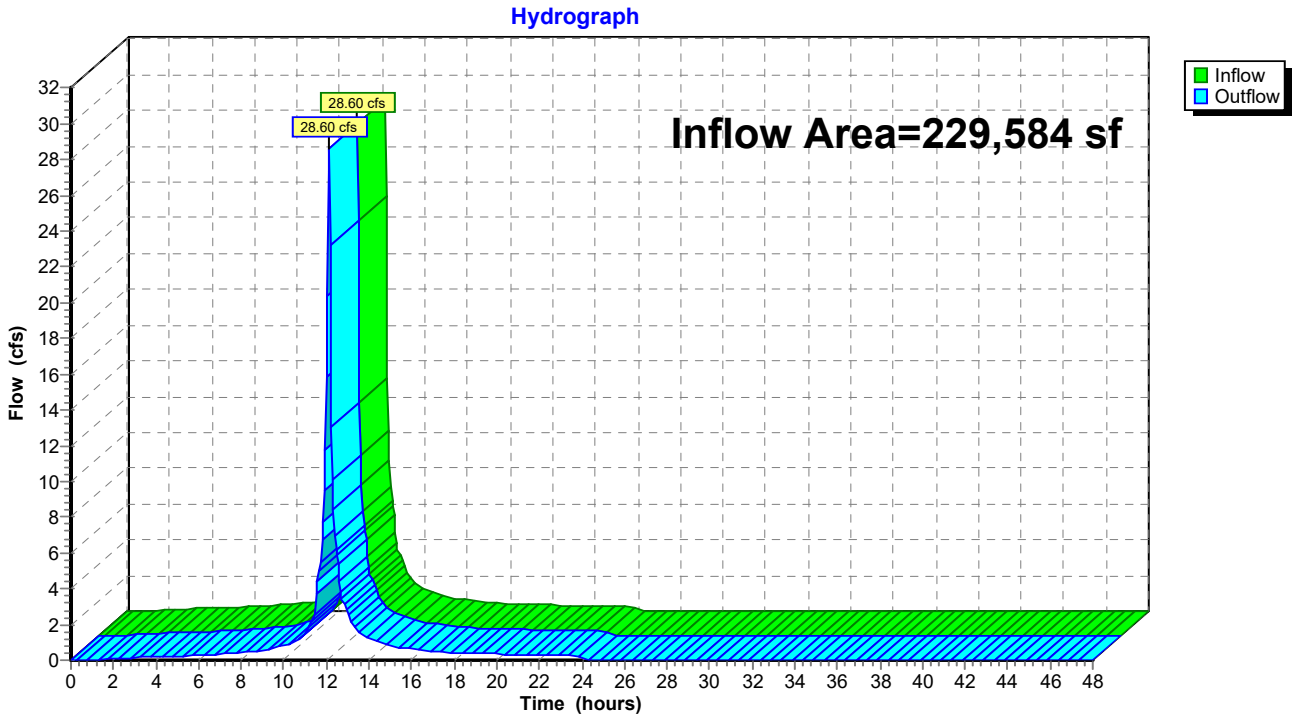


Summary for Reach DP-1: Neponset River

Inflow Area = 229,584 sf, 66.54% Impervious, Inflow Depth = 4.49" for 10-yr event
Inflow = 28.60 cfs @ 12.13 hrs, Volume= 85,816 cf
Outflow = 28.60 cfs @ 12.13 hrs, Volume= 85,816 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: Neponset River



Summary for Pond 1P: Infiltration Trench #1

Inflow Area = 42,380 sf, 61.13% Impervious, Inflow Depth = 4.95" for 10-yr event
Inflow = 5.30 cfs @ 12.13 hrs, Volume= 17,468 cf
Outflow = 5.27 cfs @ 12.13 hrs, Volume= 16,365 cf, Atten= 1%, Lag= 0.1 min
Discarded = 0.04 cfs @ 12.13 hrs, Volume= 5,049 cf
Primary = 0.13 cfs @ 12.13 hrs, Volume= 282 cf
Routed to Reach 12"D : 12-INCH DRAIN
Secondary = 5.09 cfs @ 12.13 hrs, Volume= 11,034 cf
Routed to Reach DP-1 : Neponset River

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 34.98' @ 12.13 hrs Surf.Area= 3,599 sf Storage= 3,526 cf

Plug-Flow detention time= 264.1 min calculated for 16,365 cf (94% of inflow)
Center-of-Mass det. time= 227.7 min (983.4 - 755.7)

Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	1,209 cf	**2.00'W x 300.00'L x 1.00'H Open Channel Z=2.0**
#2	30.50'	2,125 cf	**6.00'W x 300.00'L x 3.50'H Infiltration Trench** 6,300 cf Overall - 228 cf Embedded = 6,072 cf x 35.0% Voids
#3	31.00'	228 cf	**12.0" Round Pipe Storage** Inside #2 L= 290.0'
		3,562 cf	Total Available Storage

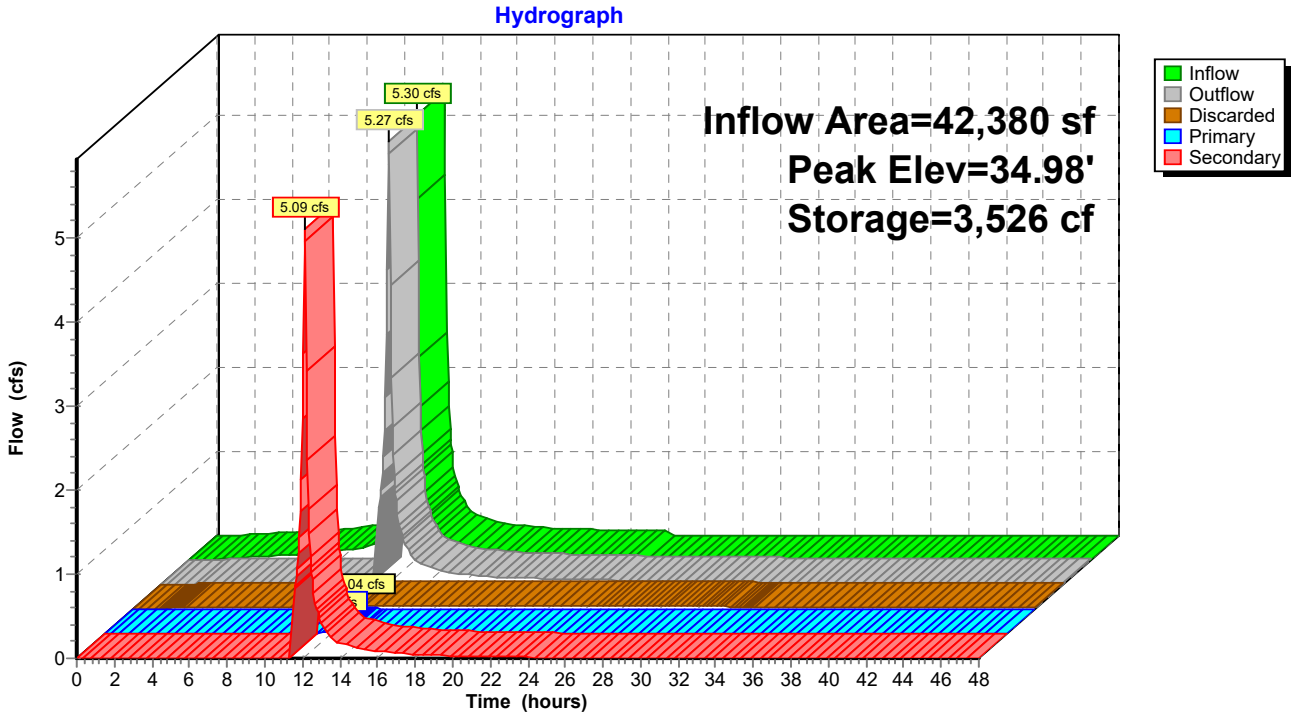
Device	Routing	Invert	Outlet Devices
#1	Primary	31.70'	**8.0" Round Outlet Pipe** L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 31.70' / 30.20' S= 0.0319 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf
#2	Device 1	34.95'	**24.0" Horiz. Over-top Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	34.95'	**300.0' long x 70.0' breadth Overland Flow Towards River** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#4	Discarded	30.50'	**0.520 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 12.13 hrs HW=34.98' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.10 cfs @ 12.13 hrs HW=34.98' (Free Discharge)
└**1=Outlet Pipe** (Passes 0.10 cfs of 2.83 cfs potential flow)
└**2=Over-top Grate** (Weir Controls 0.10 cfs @ 0.56 fps)

Secondary OutFlow Max=3.94 cfs @ 12.13 hrs HW=34.98' (Free Discharge)
└**3=Overland Flow Towards River** (Weir Controls 3.94 cfs @ 0.46 fps)

Pond 1P: Infiltration Trench #1



Summary for Pond 2P: Infiltration Trench #2

Inflow Area = 9,037 sf, 99.72% Impervious, Inflow Depth = 5.06" for 10-yr event
Inflow = 1.14 cfs @ 12.13 hrs, Volume= 3,813 cf
Outflow = 1.13 cfs @ 12.13 hrs, Volume= 3,574 cf, Atten= 1%, Lag= 0.1 min
Discarded = 0.01 cfs @ 12.13 hrs, Volume= 1,202 cf
Primary = 1.12 cfs @ 12.13 hrs, Volume= 2,372 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 34.98' @ 12.13 hrs Surf.Area= 858 sf Storage= 795 cf

Plug-Flow detention time= 280.5 min calculated for 3,570 cf (94% of inflow)
Center-of-Mass det. time= 245.5 min (993.4 - 747.9)

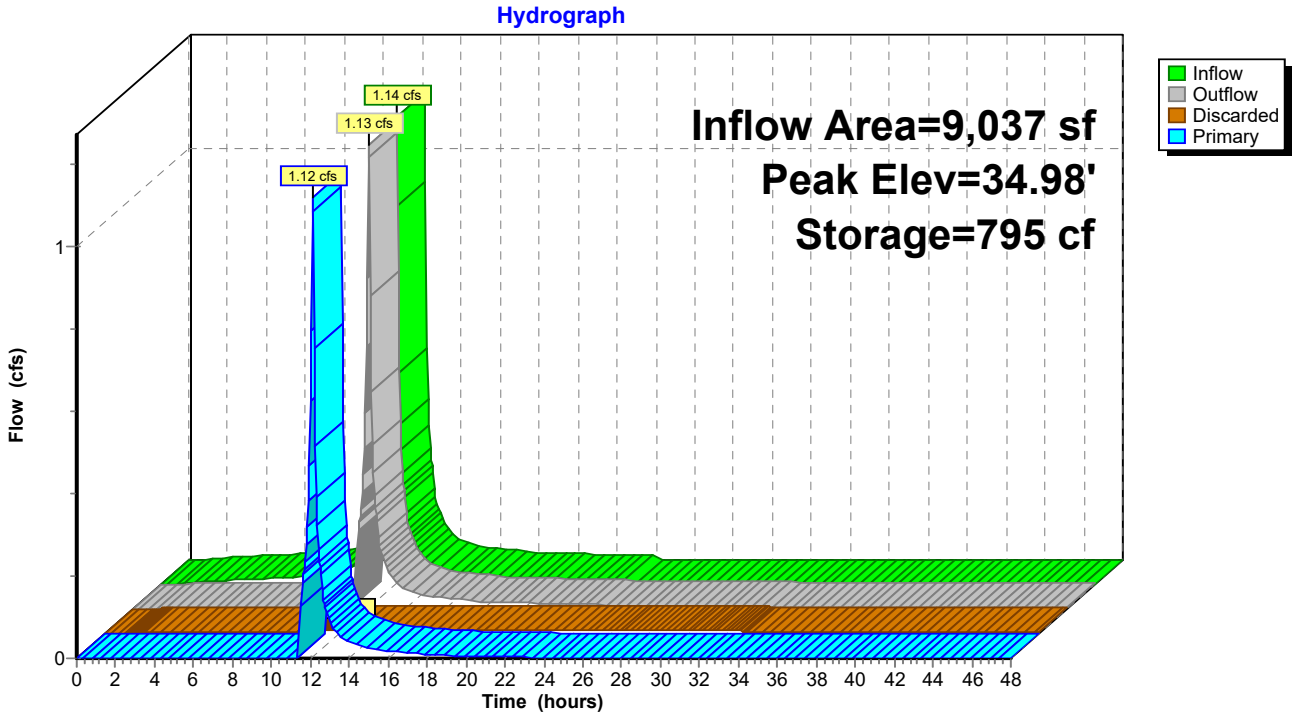
Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	289 cf	**2.00'W x 70.00'L x 1.00'H Open Channel Z=2.0**
#2	30.50'	515 cf	**6.00'W x 70.00'L x 3.50'H Infiltration Trench** 1,470 cf Overall x 35.0% Voids
		804 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	34.95'	**70.0' long x 10.0' breadth Overland Flow Towards River** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	30.50'	**0.520 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 12.13 hrs HW=34.98' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.87 cfs @ 12.13 hrs HW=34.98' (Free Discharge)
↑—**1=Overland Flow Towards River** (Weir Controls 0.87 cfs @ 0.43 fps)

Pond 2P: Infiltration Trench #2



Summary for Pond 3P: Infiltration System #3

Inflow Area = 14,576 sf, 99.91% Impervious, Inflow Depth = 5.06" for 10-yr event
Inflow = 1.83 cfs @ 12.13 hrs, Volume= 6,150 cf
Outflow = 1.85 cfs @ 12.12 hrs, Volume= 6,137 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.02 cfs @ 4.05 hrs, Volume= 2,790 cf
Primary = 1.83 cfs @ 12.12 hrs, Volume= 3,347 cf
Routed to Reach 12"D : 12-INCH DRAIN
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Reach 12"D : 12-INCH DRAIN

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 2.49' @ 12.12 hrs Surf.Area= 1,513 sf Storage= 1,633 cf

Plug-Flow detention time= 327.5 min calculated for 6,137 cf (100% of inflow)
Center-of-Mass det. time= 326.0 min (1,073.9 - 747.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	1,030 cf	**34.30'W x 43.75'L x 2.21'H Field A** 3,315 cf Overall - 739 cf Embedded = 2,576 cf x 40.0% Voids
#2A	0.50'	572 cf	**ADS N-12 12"** x 32 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 32 Chambers in 16 Rows 32.97' Header x 0.81 sf x 2 = 53.4 cf Inside
#3	0.00'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**
		1,640 cf	Total Available Storage

Storage Group A created with Chamber Wizard

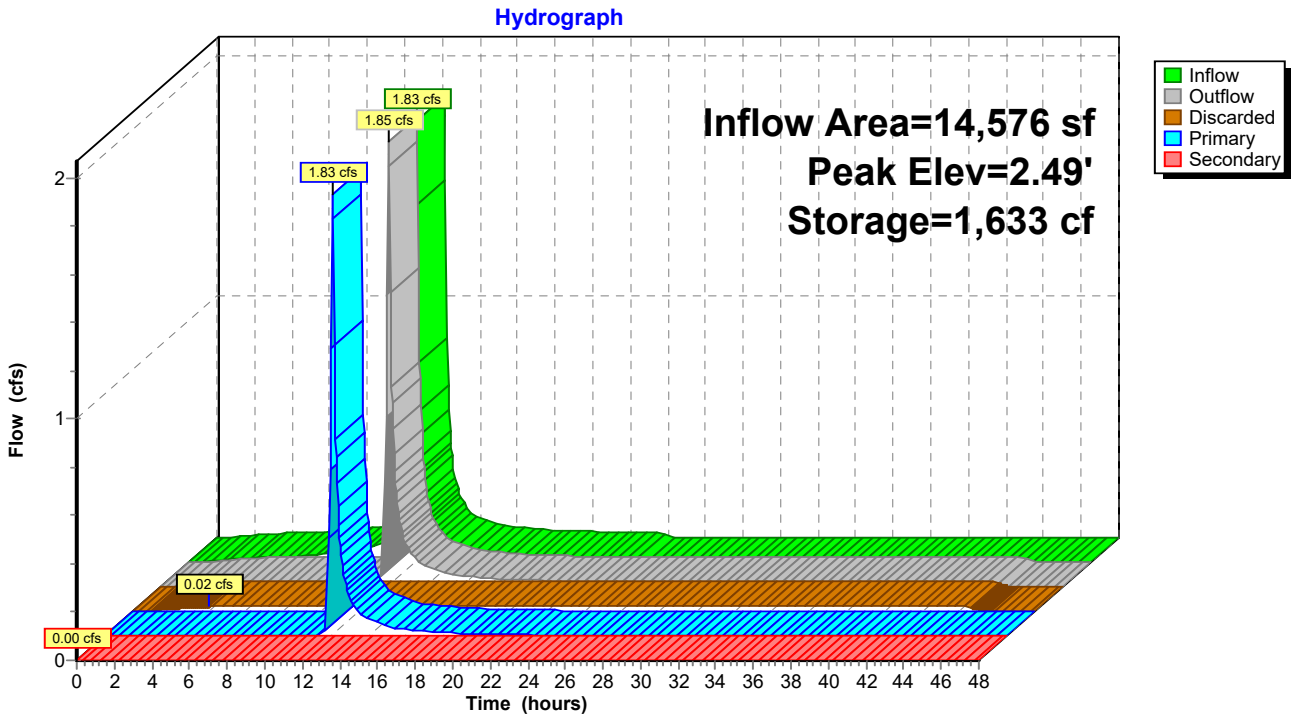
Device	Routing	Invert	Outlet Devices
#1	Primary	1.75'	**12.0" Round Outlet Pipe** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 1.75' / 1.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Discarded	0.00'	**0.520 in/hr Exfiltration over Surface area**
#3	Secondary	2.90'	**1.2" x 20.0" Horiz. Orifice/Grate X 10.00** C= 0.600 in 24.0" x 24.0" Grate (42% open area) Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 4.05 hrs HW=0.03' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.75 cfs @ 12.12 hrs HW=2.47' (Free Discharge)
↑**1=Outlet Pipe** (Inlet Controls 1.75 cfs @ 2.89 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
↑**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: Infiltration System #3



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR-BID-ALT-N: Runoff Area=14,576 sf 99.91% Impervious Runoff Depth=8.09"
Tc=6.0 min CN=98 Runoff=2.89 cfs 9,827 cf

Subcatchment PR-BID-ALT-S: PR-BID-ALT-S Runoff Area=9,037 sf 99.72% Impervious Runoff Depth=8.09"
Tc=6.0 min CN=98 Runoff=1.79 cfs 6,093 cf

Subcatchment PR-SITE: PR-SITE Runoff Area=172,628 sf 65.06% Impervious Runoff Depth=7.97"
Tc=6.0 min CN=97 Runoff=34.11 cfs 114,654 cf

Subcatchment PR-SWALE: PR-SWALE Runoff Area=42,380 sf 61.13% Impervious Runoff Depth=7.97"
Tc=6.0 min CN=97 Runoff=8.37 cfs 28,147 cf

Reach 12"D: 12-INCH DRAIN Inflow=37.18 cfs 122,160 cf
Outflow=37.18 cfs 122,160 cf

Reach DP-1: Neponset River Inflow=45.26 cfs 143,378 cf
Outflow=45.26 cfs 143,378 cf

Pond 1P: Infiltration Trench #1 Peak Elev=35.00' Storage=3,554 cf Inflow=8.37 cfs 28,147 cf
Discarded=0.04 cfs 5,255 cf Primary=0.21 cfs 542 cf Secondary=8.08 cfs 21,217 cf Outflow=8.33 cfs 27,015 cf

Pond 2P: Infiltration Trench #2 Peak Elev=35.00' Storage=802 cf Inflow=1.79 cfs 6,093 cf
Discarded=0.01 cfs 1,250 cf Primary=1.77 cfs 4,604 cf Outflow=1.78 cfs 5,854 cf

Pond 3P: Infiltration System #3 Peak Elev=2.82' Storage=1,638 cf Inflow=2.89 cfs 9,827 cf
Discarded=0.02 cfs 2,873 cf Primary=2.86 cfs 6,964 cf Secondary=0.00 cfs 0 cf Outflow=2.88 cfs 9,837 cf

Total Runoff Area = 238,621 sf Runoff Volume = 158,721 cf Average Runoff Depth = 7.98"
32.20% Pervious = 76,834 sf 67.80% Impervious = 161,787 sf

Summary for Subcatchment PR-BID-ALT-N: PR-BID-ALT-N

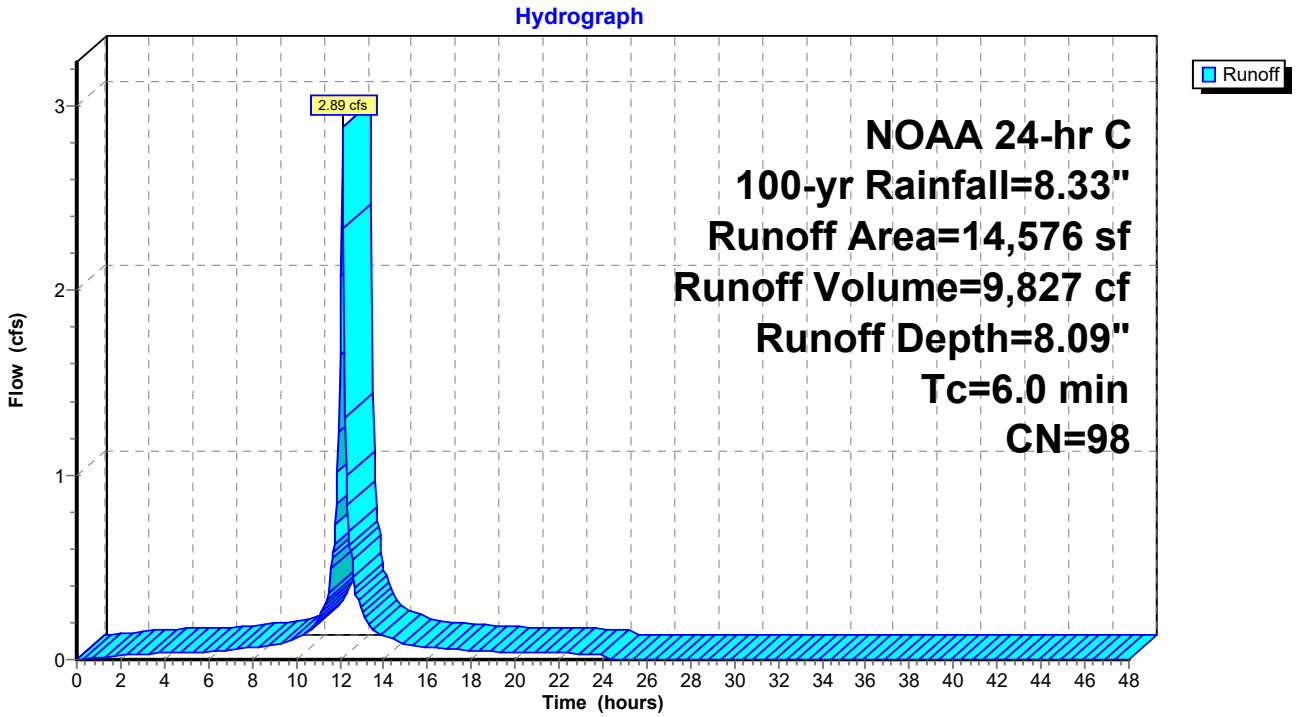
Runoff = 2.89 cfs @ 12.13 hrs, Volume= 9,827 cf, Depth= 8.09"
Routed to Pond 3P : Infiltration System #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.33"

Area (sf)	CN	Description
866	98	Paved roads w/curbs & sewers, HSG A
13,325	98	Paved roads w/curbs & sewers, HSG D
192	98	Roofs, HSG D
167	98	Roofs, HSG D
2	98	Roofs, HSG D
11	98	Roofs, HSG D
13	96	Gravel surface, HSG D
14,576	98	Weighted Average
13		0.09% Pervious Area
14,564		99.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment PR-BID-ALT-N: PR-BID-ALT-N



Summary for Subcatchment PR-BID-ALT-S: PR-BID-ALT-S

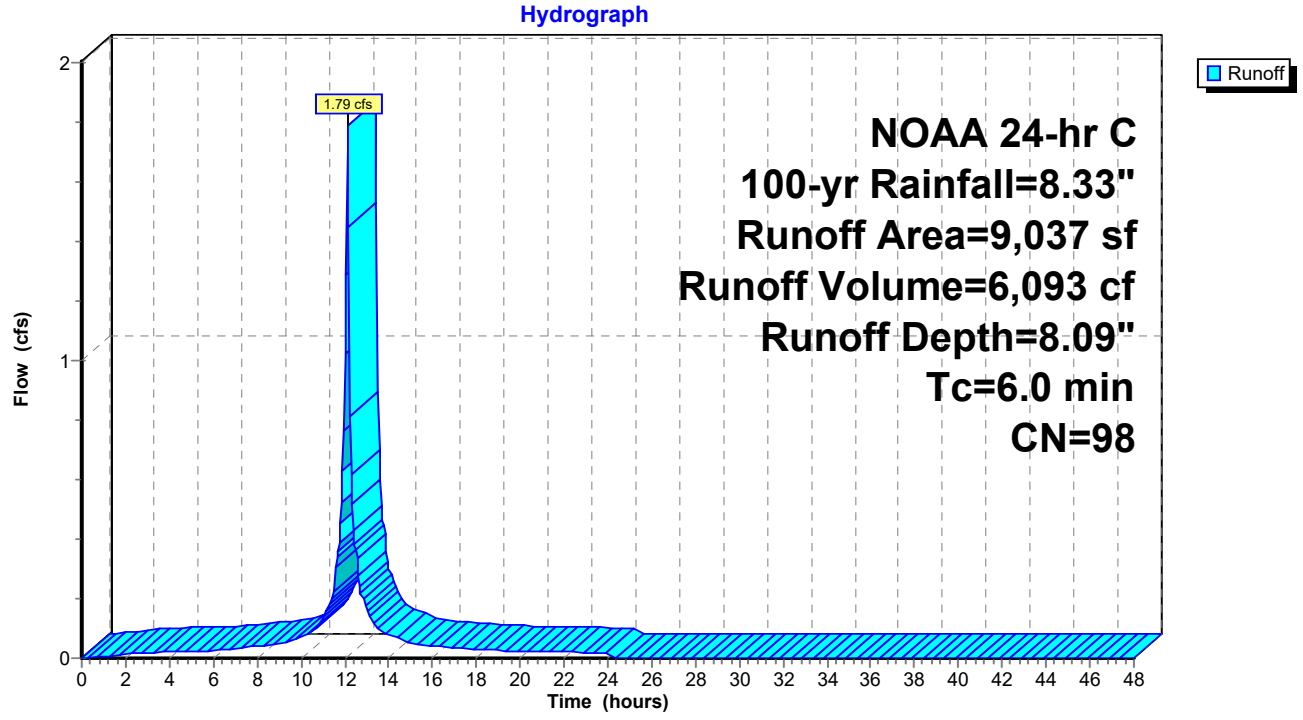
Runoff = 1.79 cfs @ 12.13 hrs, Volume= 6,093 cf, Depth= 8.09"
Routed to Pond 2P : Infiltration Trench #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.33"

Area (sf)	CN	Description
7	30	Woods, Good, HSG A
3,249	98	Paved roads w/curbs & sewers, HSG A
321	98	Roofs, HSG D
314	98	Roofs, HSG D
322	98	Roofs, HSG D
155	98	Roofs, HSG D
382	98	Roofs, HSG D
18	77	Woods, Good, HSG D
4,269	98	Paved roads w/curbs & sewers, HSG D
9,037	98	Weighted Average
25		0.28% Pervious Area
9,012		99.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment PR-BID-ALT-S: PR-BID-ALT-S



Summary for Subcatchment PR-SITE: PR-SITE

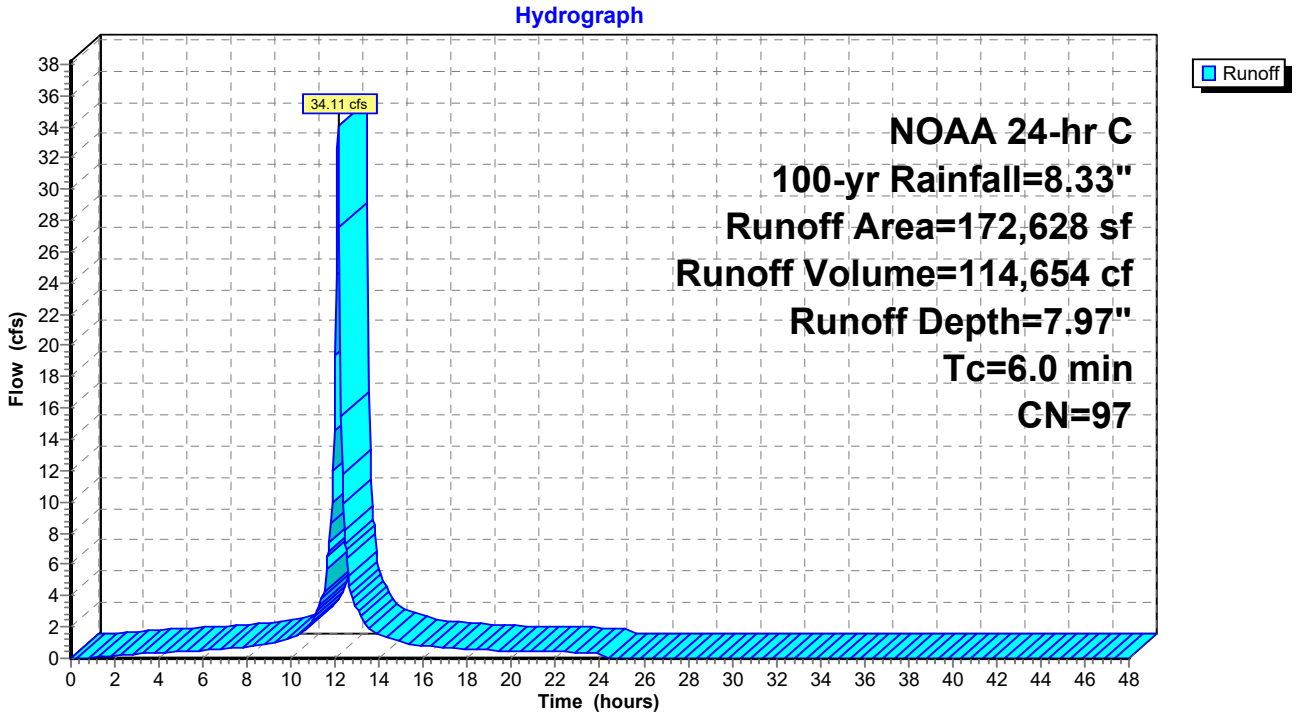
Runoff = 34.11 cfs @ 12.13 hrs, Volume= 114,654 cf, Depth= 7.97"
Routed to Reach 12"D : 12-INCH DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.33"

Area (sf)	CN	Description
1,652	98	Paved roads w/curbs & sewers, HSG A
25	96	Gravel surface, HSG A
195	96	Gravel surface, HSG A
2,384	96	Gravel surface, HSG A
0	98	Paved roads w/curbs & sewers, HSG D
79,362	98	Paved roads w/curbs & sewers, HSG D
0	98	Paved roads w/curbs & sewers, HSG D
2	98	Paved roads w/curbs & sewers, HSG D
52	98	Paved roads w/curbs & sewers, HSG D
1,748	98	Roofs, HSG D
1,043	98	Roofs, HSG D
743	98	Roofs, HSG D
6,838	98	Roofs, HSG D
98	98	Roofs, HSG D
7,299	98	Roofs, HSG D
2,547	98	Paved roads w/curbs & sewers, HSG D
10,920	98	Roofs, HSG D
48,589	96	Gravel surface, HSG D
0	98	Paved roads w/curbs & sewers, HSG D
1,984	80	>75% Grass cover, Good, HSG D
7,146	96	Gravel surface, HSG D
172,628	97	Weighted Average
60,323		34.94% Pervious Area
112,304		65.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment PR-SITE: PR-SITE



Summary for Subcatchment PR-SWALE: PR-SWALE

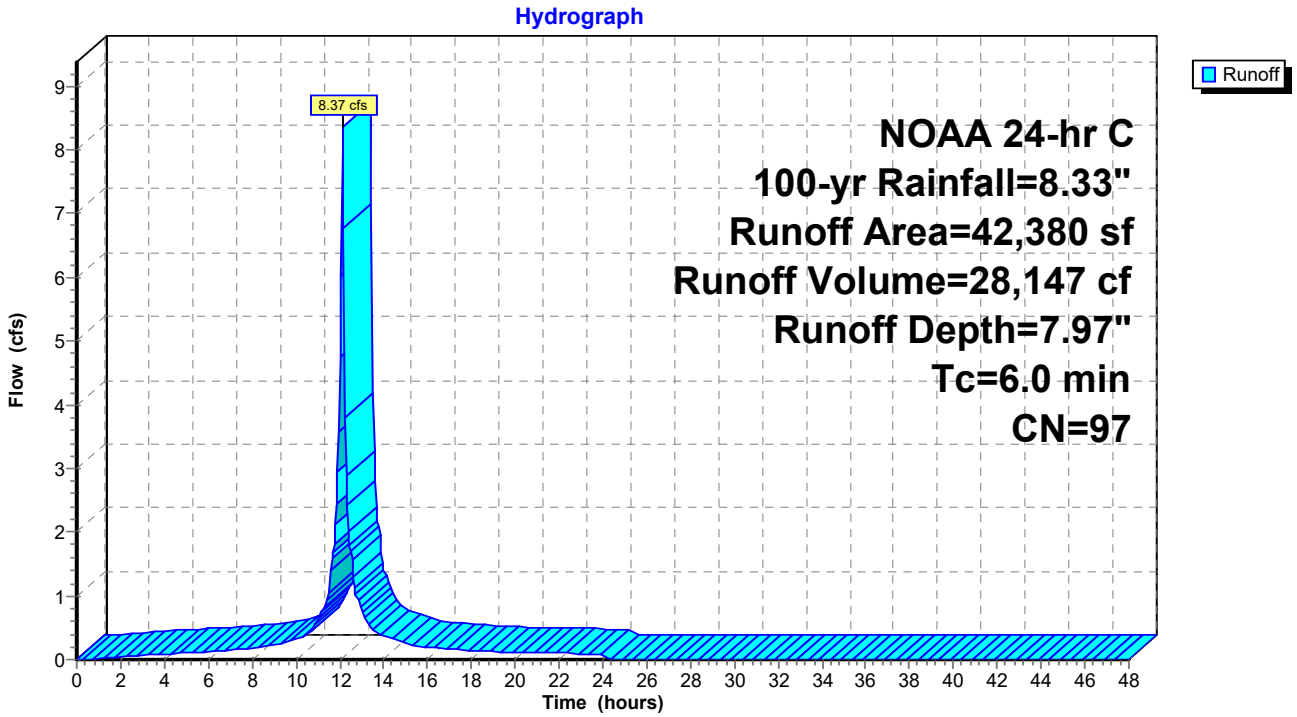
Runoff = 8.37 cfs @ 12.13 hrs, Volume= 28,147 cf, Depth= 7.97"
Routed to Pond 1P : Infiltration Trench #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.33"

Area (sf)	CN	Description
5,385	98	Paved roads w/curbs & sewers, HSG A
816	96	Gravel surface, HSG A
20,372	98	Paved roads w/curbs & sewers, HSG D
150	98	Roofs, HSG D
24	96	Gravel surface, HSG D
0	98	Paved roads w/curbs & sewers, HSG D
15,633	96	Gravel surface, HSG D
42,380	97	Weighted Average
16,473		38.87% Pervious Area
25,907		61.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min**

Subcatchment PR-SWALE: PR-SWALE

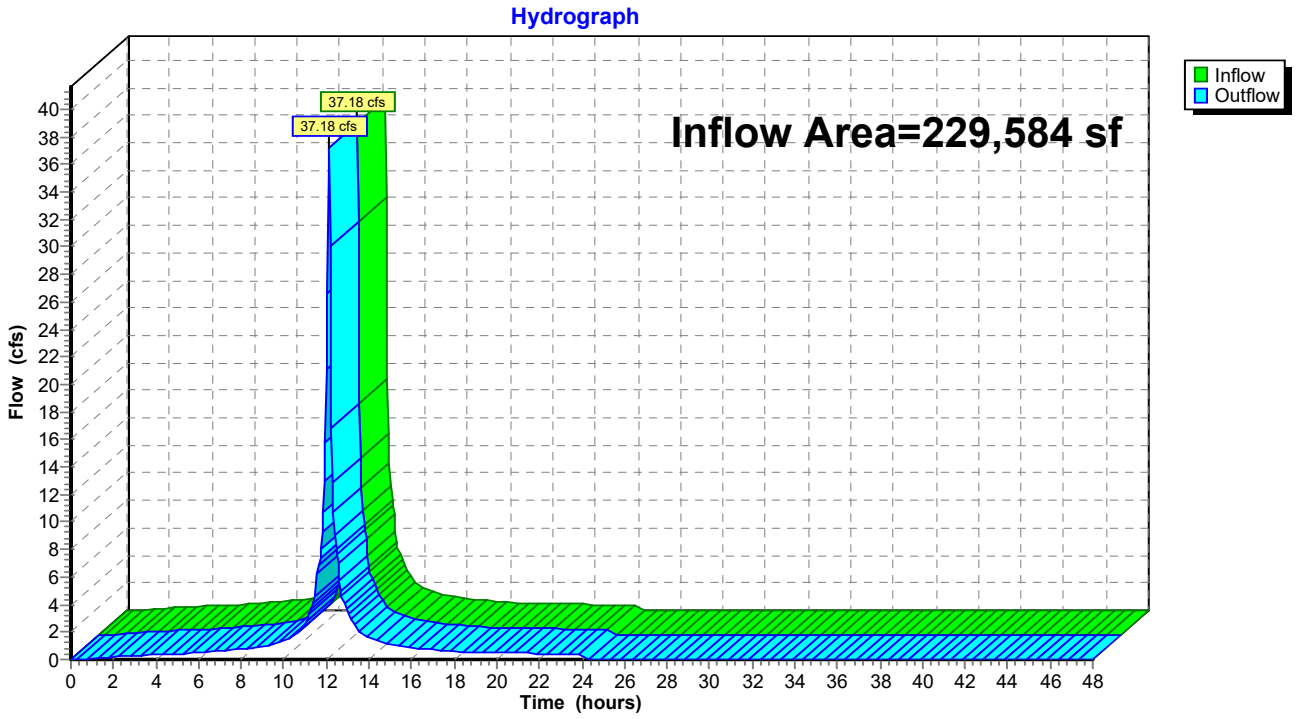


Summary for Reach 12"D: 12-INCH DRAIN

Inflow Area = 229,584 sf, 66.54% Impervious, Inflow Depth = 6.39" for 100-yr event
Inflow = 37.18 cfs @ 12.13 hrs, Volume= 122,160 cf
Outflow = 37.18 cfs @ 12.13 hrs, Volume= 122,160 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach DP-1 : Neponset River

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 12"D: 12-INCH DRAIN

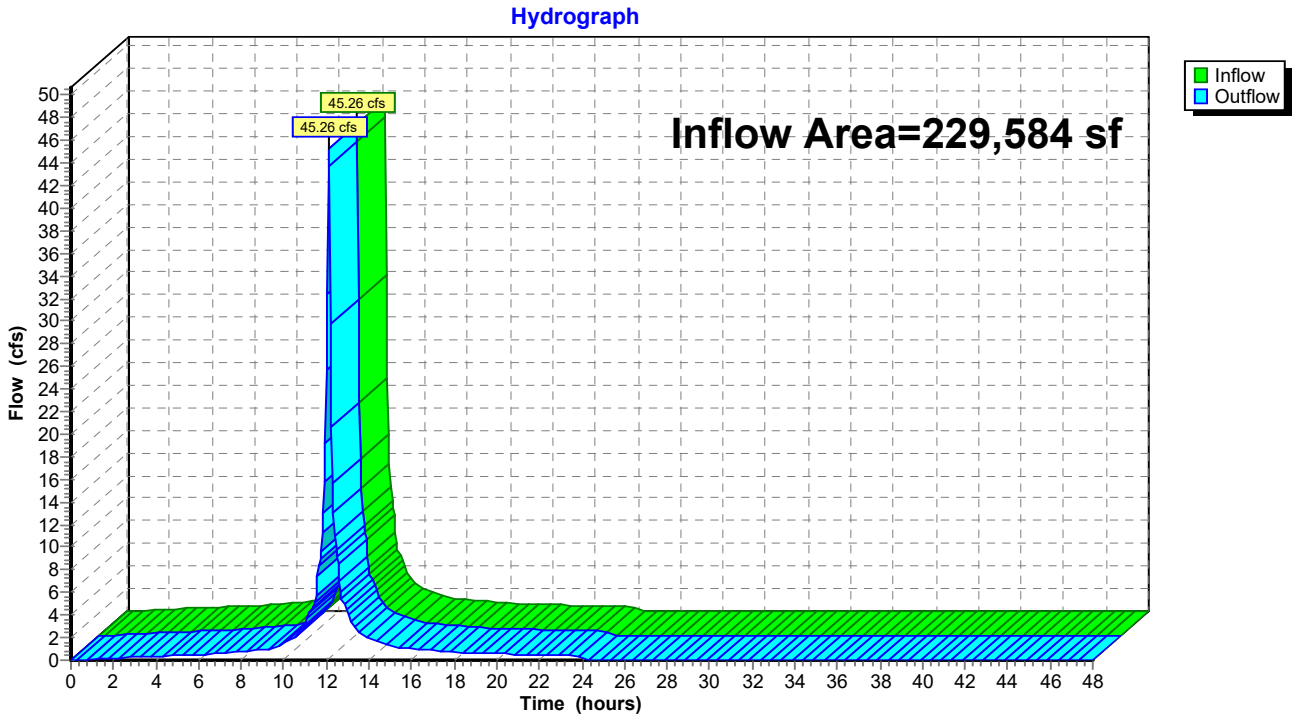


Summary for Reach DP-1: Neponset River

Inflow Area = 229,584 sf, 66.54% Impervious, Inflow Depth = 7.49" for 100-yr event
Inflow = 45.26 cfs @ 12.13 hrs, Volume= 143,378 cf
Outflow = 45.26 cfs @ 12.13 hrs, Volume= 143,378 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach DP-1: Neponset River



Summary for Pond 1P: Infiltration Trench #1

Inflow Area = 42,380 sf, 61.13% Impervious, Inflow Depth = 7.97" for 100-yr event
Inflow = 8.37 cfs @ 12.13 hrs, Volume= 28,147 cf
Outflow = 8.33 cfs @ 12.13 hrs, Volume= 27,015 cf, Atten= 1%, Lag= 0.1 min
Discarded = 0.04 cfs @ 12.13 hrs, Volume= 5,255 cf
Primary = 0.21 cfs @ 12.13 hrs, Volume= 542 cf
Routed to Reach 12"D : 12-INCH DRAIN
Secondary = 8.08 cfs @ 12.13 hrs, Volume= 21,217 cf
Routed to Reach DP-1 : Neponset River

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 35.00' @ 12.13 hrs Surf.Area= 3,618 sf Storage= 3,554 cf

Plug-Flow detention time= 179.1 min calculated for 27,015 cf (96% of inflow)
Center-of-Mass det. time= 154.0 min (901.3 - 747.3)

Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	1,209 cf	**2.00'W x 300.00'L x 1.00'H Open Channel Z=2.0**
#2	30.50'	2,125 cf	**6.00'W x 300.00'L x 3.50'H Infiltration Trench** 6,300 cf Overall - 228 cf Embedded = 6,072 cf x 35.0% Voids
#3	31.00'	228 cf	**12.0" Round Pipe Storage** Inside #2 L= 290.0'
		3,562 cf	Total Available Storage

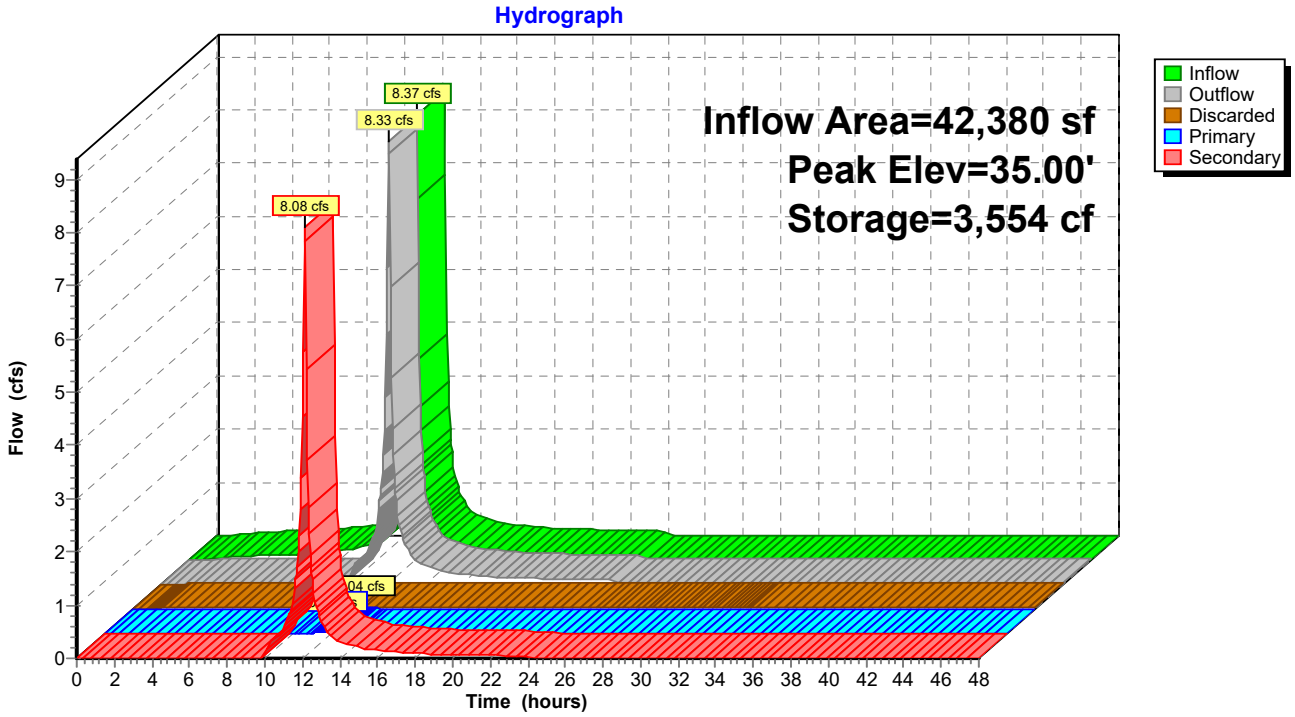
Device	Routing	Invert	Outlet Devices
#1	Primary	31.70'	**8.0" Round Outlet Pipe** L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 31.70' / 30.20' S= 0.0319 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf
#2	Device 1	34.95'	**24.0" Horiz. Over-top Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	34.95'	**300.0' long x 70.0' breadth Overland Flow Towards River** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#4	Discarded	30.50'	**0.520 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 12.13 hrs HW=34.99' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.19 cfs @ 12.13 hrs HW=34.99' (Free Discharge)
└**1=Outlet Pipe** (Passes 0.19 cfs of 2.83 cfs potential flow)
└**2=Over-top Grate** (Weir Controls 0.19 cfs @ 0.68 fps)

Secondary OutFlow Max=7.34 cfs @ 12.13 hrs HW=34.99' (Free Discharge)
└**3=Overland Flow Towards River** (Weir Controls 7.34 cfs @ 0.56 fps)

Pond 1P: Infiltration Trench #1



Summary for Pond 2P: Infiltration Trench #2

Inflow Area = 9,037 sf, 99.72% Impervious, Inflow Depth = 8.09" for 100-yr event
Inflow = 1.79 cfs @ 12.13 hrs, Volume= 6,093 cf
Outflow = 1.78 cfs @ 12.13 hrs, Volume= 5,854 cf, Atten= 1%, Lag= 0.1 min
Discarded = 0.01 cfs @ 12.13 hrs, Volume= 1,250 cf
Primary = 1.77 cfs @ 12.13 hrs, Volume= 4,604 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 35.00' @ 12.13 hrs Surf.Area= 863 sf Storage= 802 cf

Plug-Flow detention time= 191.5 min calculated for 5,854 cf (96% of inflow)
Center-of-Mass det. time= 166.9 min (908.2 - 741.3)

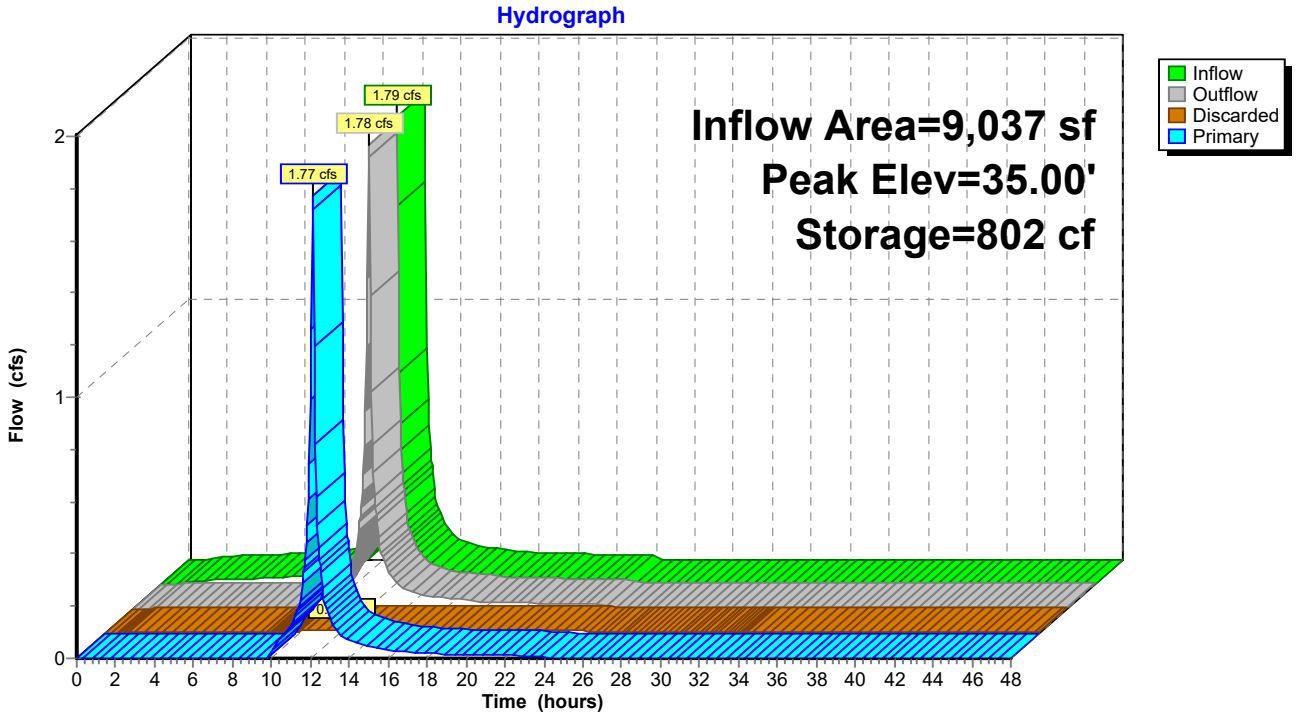
Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	289 cf	**2.00'W x 70.00'L x 1.00'H Open Channel Z=2.0**
#2	30.50'	515 cf	**6.00'W x 70.00'L x 3.50'H Infiltration Trench** 1,470 cf Overall x 35.0% Voids
		804 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	34.95'	**70.0' long x 10.0' breadth Overland Flow Towards River** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	30.50'	**0.520 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 12.13 hrs HW=34.99' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.61 cfs @ 12.13 hrs HW=34.99' (Free Discharge)
1=Overland Flow Towards River (Weir Controls 1.61 cfs @ 0.52 fps)

Pond 2P: Infiltration Trench #2



Summary for Pond 3P: Infiltration System #3

Inflow Area = 14,576 sf, 99.91% Impervious, Inflow Depth = 8.09" for 100-yr event
Inflow = 2.89 cfs @ 12.13 hrs, Volume= 9,827 cf
Outflow = 2.88 cfs @ 12.13 hrs, Volume= 9,837 cf, Atten= 0%, Lag= 0.1 min
Discarded = 0.02 cfs @ 1.95 hrs, Volume= 2,873 cf
Primary = 2.86 cfs @ 12.13 hrs, Volume= 6,964 cf
Routed to Reach 12"D : 12-INCH DRAIN
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Reach 12"D : 12-INCH DRAIN

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 2.82' @ 12.13 hrs Surf.Area= 1,513 sf Storage= 1,638 cf

Plug-Flow detention time= 222.0 min calculated for 9,817 cf (100% of inflow)
Center-of-Mass det. time= 224.9 min (966.2 - 741.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	1,030 cf	**34.30'W x 43.75'L x 2.21'H Field A** 3,315 cf Overall - 739 cf Embedded = 2,576 cf x 40.0% Voids
#2A	0.50'	572 cf	**ADS N-12 12"** x 32 Inside #1 Inside= 12.2"W x 12.2"H => 0.81 sf x 20.00'L = 16.2 cf Outside= 14.5"W x 14.5"H => 1.05 sf x 20.00'L = 20.9 cf 32 Chambers in 16 Rows 32.97' Header x 0.81 sf x 2 = 53.4 cf Inside
#3	0.00'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**
		1,640 cf	Total Available Storage

Storage Group A created with Chamber Wizard

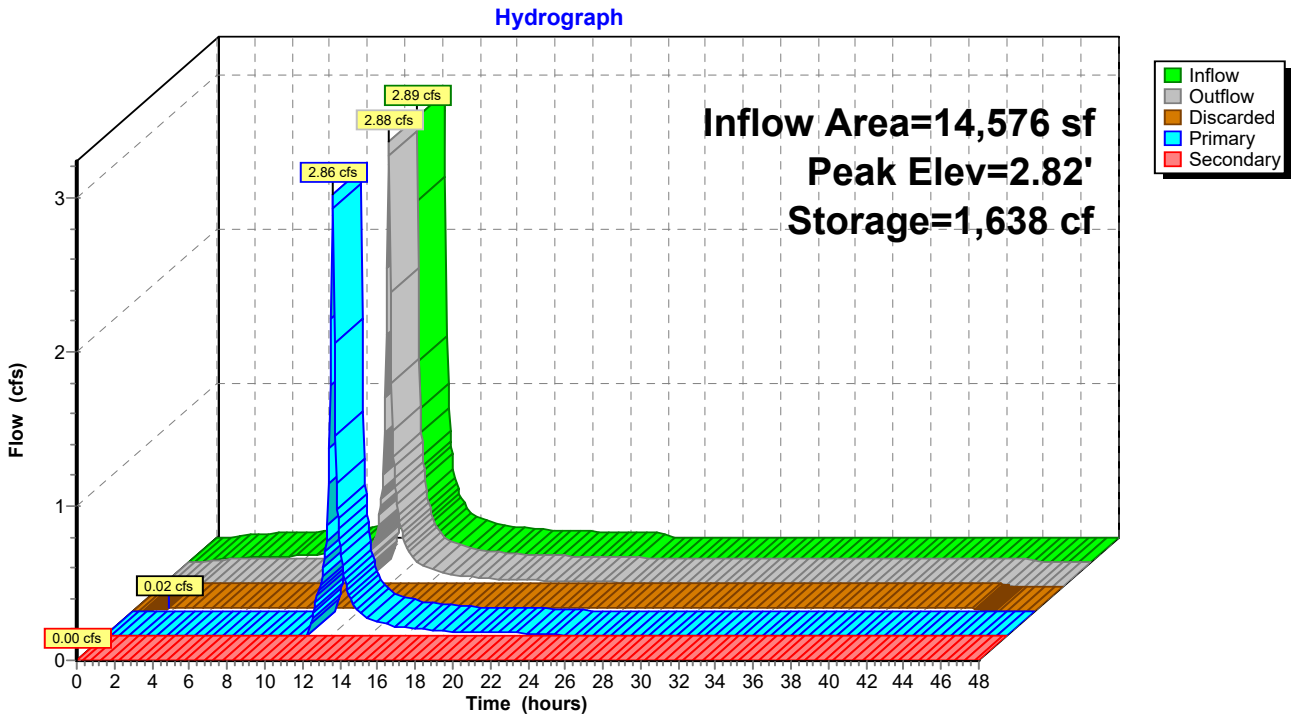
Device	Routing	Invert	Outlet Devices
#1	Primary	1.75'	**12.0" Round Outlet Pipe** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 1.75' / 1.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Discarded	0.00'	**0.520 in/hr Exfiltration over Surface area**
#3	Secondary	2.90'	**1.2" x 20.0" Horiz. Orifice/Grate X 10.00** C= 0.600 in 24.0" x 24.0" Grate (42% open area) Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 1.95 hrs HW=0.03' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=2.75 cfs @ 12.13 hrs HW=2.78' (Free Discharge)
↑**1=Outlet Pipe** (Inlet Controls 2.75 cfs @ 3.50 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
↑**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: Infiltration System #3



Appendix E: O&M Plan and LTPPP

- Stormwater Management System Operation and Maintenance (O&M) Plan
- Long-Term Pollution Prevention Plan (LTPPP)

Mattapan Station Drainage Improvements

Stormwater Management System Operation and Maintenance Plan and Long-Term Pollution Prevention Plan

Boston, MA

PREPARED FOR

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October 2022

Mattapan Station Drainage Improvements

Table of Contents

1

Stormwater Management System Operation and Maintenance (O&M) Plan

This Stormwater Management System Operation and Maintenance (O&M) Plan describes the approach for inspection and maintenance of drainage infrastructure and structural stormwater control measures (SCMs) to minimize contaminant loading for the Mattapan Station Drainage Improvement Project and the City of Boston. In general, inspection and maintenance activities will be conducted consistent with the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer System (MS4).

This document has been prepared per the requirements of Massachusetts Department of Environmental Protection (MassDEP) Regulations 310 CMR 10.05 (6)(k)(9) and satisfies the requirements of Massachusetts Stormwater Standard 9.

1.1 Responsible Party

The MBTA will be responsible for the operation and maintenance of all stormwater management systems within the project area. Questions or concerns regarding activities associated with this O&M Plan should be address to *[City/Town's Department of Public Works]* located at *[address]*, phone *(xxx) xxx-xxxx*.

1.2 Inspection and Maintenance Measures and Record-Keeping

See Figure 4 of the Stormwater Management Report for the proposed stormwater system within the project limits. The stormwater management system covered by this O&M Plan consists of the following measures:

- Infiltration Trench and System

MassDOT uses a performance-based inspection and maintenance program for SCMs and catch basins. For SCMs, MassDOT's overall approach is to inspect SCMs, and based on the results of the inspections, perform maintenance to preserve functionality. For catch basins, MassDOT's overall approach is to perform maintenance at an interval that maintains the functionality of the catch basin (e.g., sump is less than 50% full of sediment). Catch basin inspections, including documentation of sediment accumulation, and maintenance will generally occur simultaneously.

Mattapan Station Drainage Improvements

MassDOT's O&M program is data driven. Inspections and maintenance are recorded by personnel using hand-held tablets in the field to document sediment accumulation, maintenance action performed, and follow-up actions needed. Data are recorded in MassDOT's asset management system which is accessible in the field (mobile) or the office (desktop).

The table below summarizes data that is generally collected for each asset type. For all assets, the inspector and inspection date are recorded. Photo documentation of structure condition is taken and attached to the inspection record.

Inspection Form	Applicable Stormwater Assets	Information Collected
Inlets	› Catch basins › Outlet control structures	› Sediment accumulation › Trash/Debris accumulation › Signs of contamination › Frame and grate condition › Overall structure condition
SCMs	› Infiltration SCMs	› SCM accessibility › Presence of standing water › Level of erosion › Sediment accumulation › Trash/Debris accumulation › Vegetation condition › Overall SCM condition
Storm Discharge Points	› Outlets to SCMs	› Presence of flow › Signs of contaminated flow › Sediment accumulation › Level of erosion › Pipe condition › Scour protection condition › Overall structure condition

Mattapan Station Drainage Improvements

Maintenance actions will not occur at any set frequency, but rather will be based on condition and impact to functionality. Maintenance to be performed on the stormwater system includes:

Stormwater Feature	Potential Maintenance Actions	

Surface SCMs	• Remove and properly dispose of accumulated material (e.g., sediment, trash, leaf litter, debris)
	• Mow vegetated areas and remove and dispose of grass clippings
	• Regrade areas that show signs of unwanted ponding and channelization
	• Stabilize or reconstruct eroded areas and reseed
	• Replace stones/soil and/or replant vegetation
		• Remove woody growth
		• Treat invasive plants according to MassDOT Landscape Design Section
		• Infiltration and bioretention SCMs only:
		  ○ Address issues of standing water
		  ○ Drain and reconstruct SCM
		  ○ If rehabilitation is not possible, then retrofit to be a wet SCM while considering safety implications

Underground SCMs	• Remove and properly dispose of trash, sediment, debris, and root intrusions • Clean out sumps at an interval to maintain functionality (less than 50% full of sediment) • Jet and repair pipes	• Rehabilitate filtering and infiltration materials (e.g., geotextile fabric, crushed stone) • Stabilize and replace deteriorated structures • Perform evaluations (e.g., test pits) to evaluate subsurface conditions
Inlets and Outlets to SCMs	• Clear inlet and remove and properly dispose of sediment, trash, leaf litter, debris, and vegetation • Regrade areas that show signs of ponding and channelization • Repair or replace structural components • Repair damaged or eroded areas	• Provide or rehabilitate erosion control at the outlet • Regrade and replace the channel materials • Remove woody growth • Stabilize or reconstruct eroded areas • Treat invasive plants according to MassDOT Vegetation Management Plan

Based on the results of the inspection, repairs will be made in accordance with MassDOT standard practices. Maintenance will be prioritized given the urgency of the required maintenance and availability of staff, contracts, etc. Maintenance may require contracting if existing contracts are unavailable to perform the work. More intensive remedial activities may require permitting and/or an engineering solution.

1.3 Erosion and Sediment Control Measures during Maintenance Activities

For maintenance activities that could result in discharges of sediments or other contaminants into wetlands, waterways, or other resource areas regulated under 310 CMR 10.00, the responsible maintenance personnel will employ measures to prevent migration of these sediments/contaminants. Such temporary measures may include, but are not necessarily limited to, the use of siltation barriers, catch basin silt sacks/filter bags, pipe plugs, cofferdams deployed within the stormwater structure, turbidity curtains, or other practices designed to prevent such discharges.

See the following resources for more guidance on erosion and sediment (E&S) control design:

- The MassDOT Erosion and Sediment Control Field Guide includes detailed descriptions, photographs, and illustrations of E&S controls that the designer may incorporate into the plans.
- Chapter 8 of the MassDOT Project Development & Design Guide,[1] Section 8.5 - Erosion During Construction, includes a description of common construction period E&S control practices.
- The Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas[2] is an authoritative reference on erosion prevention measures.
- The Massachusetts Nonpoint Source Pollution Management Manual[3] provides an innovative user interface to present comprehensive detailed guidance on E&S controls for construction projects.

Where maintenance occurs in areas that are confined, with no risk of discharge to adjacent water bodies, no special measures may be needed. Examples include, but are not limited to: (1) cleaning of a forebay under dry conditions when the work can be completed and exposed surfaces stabilized prior to placing it back into service; and (2) catch basin cleaning where the activity is limited to removing material from a sump below the elevation of the outlet pipe.

1 See MassDOT PDDG at: https://www.mass.gov/lists/design-guides-and-manuals.

2 See Complete Erosion and Sedimentation Control Guidelines: A Guide for Planners, Designers, and Municipal Officials (May 2003) at: https://www.mass.gov/service-details/stormwater.

3 See Massachusetts Nonpoint Source Pollution Management Manual at: https://megamanual.geosyntec.com/npsmanual/default.aspx.

2

Long-Term Pollution Prevention Plan

This Long-Term Pollution Prevention Plan (LTPPP) describes the approach for pollution prevention and related maintenance activities for *[list name of Project and name of the municipality(s) the project is located within]*. In general, long-term pollution prevention and related maintenance activities will be conducted consistent with:

- The National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer System (MS4),
- MassDOT's anticipated NPDES Transportation Separate Storm Sewer System (TS4) Permit, and
- Measures outlined in MassDOT's Stormwater Management Plan (SWMP).

This LTPPP satisfies the requirements related to pollution prevention under Massachusetts Stormwater Standards 4, 5, 6, and 10.

2.1 Practices for Long-Term Pollution Prevention

For the facilities covered, long-term pollution prevention includes the following measures.

2.1.1 Litter Pick-up

MBTA will conduct litter pick-up from the stormwater management facilities in conjunction with routine road maintenance activities.

2.1.2 Inspection and Maintenance of Stormwater Assets

MBTA will conduct inspection and maintenance of drainage infrastructure and the stormwater control measures (SCMs) in accordance with the O&M Plan, as described in Section 1.

2.1.3 Snow and Ice Management

Snow and Ice Management will be conducted consistent with the practices outlined in the MassDOT Snow and Ice Control Program Environmental Status and Planning Report (ESPR), formerly known as the Snow and Ice Control Generic Environmental Impact Report (GEIR).

In accordance with the Snow and Ice Control ESPR, no sand is used on MassDOT/MBTA properties for snow and ice control. The exception to this rule is within reduced salt areas where high sodium levels have been found in drinking water sources.

2.1.4 Street Sweeping

Routine highway cleaning, with a brush-type street sweeper, will be conducted in accordance with standard MBTA practices. Sweeping will occur annually in the Spring.

2.1.5 Prohibition of Illicit Discharges

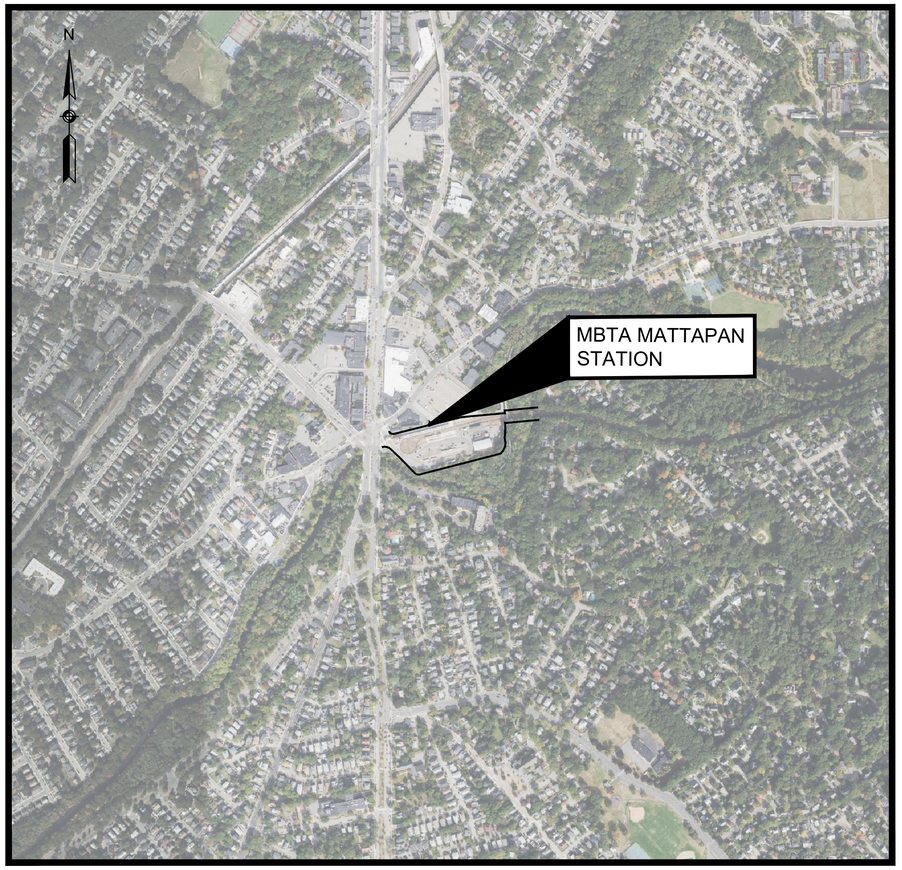
The MassDEP Stormwater Management Standard 10 prohibits illicit discharges to the stormwater management system. Illicit discharges are discharges that do not consist entirely of stormwater, except for certain specified non-stormwater discharges.

In accordance with the existing MS4 permit and anticipated TS4 permit requirements, examples of discharges from the following sources are not considered illicit discharges:

- Firefighting activities*
- Foundation drains
- Water line flushing
- Footing drains
- Landscape irrigation
- Individual residential car washing
- Uncontaminated groundwater
- Rising groundwater
- Diverted stream flows
- Flows from riparian habitats/wetlands
- Potable water sources
- Dechlorinated swimming pool water
- Street wash waters
- Wash water from residential buildings (no detergents)
- Condensation from air conditioning units
- Run-on from private driveways caused by precipitation
- Lawn watering
- Water from crawl space pumps

*Water from firefighting activities is allowed and need only be addressed where they are identified as significant sources of pollutants to waters of the United States.

Based on plan review and confirmation in the field, there are no known or proposed illicit connections associated with *the* Mattapan Station Drainage Improvement Project. *Should* an interconnection to the stormwater management system be identified, the MBTA PM will coordinate with MBTA Environmental to confirm if the connections are authorized. For unauthorized connections, the MBTA PM and/or MBTA Environmental Section will investigate the connections and if they are determined to be illicit, the connections will be managed through MBTA Illicit Discharge Detection and Elimination (IDDE) program and/or through other agencies.



PROJECT LOCATION PLAN

MASSACHUSETTS
BAY
TRANSPORTATION
AUTHORITY

Mattapan Station Parking Lot Drainage Improvements

MBTA Mattapan Station
Boston, MA

Preliminary Design Package

MBTA Contract No. Z94PS08

PRELIMINARY DESIGN

November 29th 2022

101 WALNUT STREET,
WATERTOWN, MA 02471
(617) 924-1770

\\vhb.com\gbl\pro\Wat-TE\14841.18 Mattapan Proj Drainage\cad\ve\planset\14841-18_CV.dwg

SHEET: 01 PLAN NO:

GENERAL

1. THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R).

2. IN THESE PLANS, THE TERM "NOT IN CONTRACT" (N.I.C.) SHALL BE UNDERSTOOD TO MEAN WORK DONE BY OTHERS CONTRACTED AND COMPLETED AHEAD OF THIS CONTRACT. INFORMATION SHOWN ON THESE PLANS IS BASED ON DESIGN INFORMATION. THE CONTRACTOR SHALL VERIFY AS-BUILTS AND/OR SITE CONDITION PRIOR TO CONSTRUCTION IN AREAS LABELED AS SUCH.

3. IN THESE PLANS, THE TERM "BY OTHERS" (BO) SHALL BE UNDERSTOOD TO MEAN WORK DONE BY OTHERS THAT IS COINCIDENT TO, OR TO BE DONE AFTER, WORK ISSUED UNDER THIS CONTRACT. CONTRACTOR SHALL COORDINATE WITH ADJACENT AND INTERSECTING CONTRACTS AS REQUIRED TO COMPLETE WORK ISSUED UNDER THIS CONTRACT IN CONFORMANCE WITH THE CONTRACT DOCUMENTS WITHOUT PRECLUDING THE COMPLETION OF SAID CONTRACTS.

4. WORK IMPACTING RAILROAD PROPERTY AND / OR RIGHT-OF-WAY SHALL BE COORDINATED WITH MBTA.

5. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY, INCLUDING BUT NOT LIMITED TO TEMPORARY ACCESS POINTS AND TEMPORARY EASEMENTS. ALL CONSTRUCTION ACTIVITY SHALL BE IN ACCORDANCE WITH MBTA AND OSHA STANDARDS, AND LOCAL REQUIREMENTS.

6. THE CONTRACTOR SHALL PROVIDE 72 HOURS NOTICE TO ALL PRIVATE PROPERTY OWNERS ABUTTING CONSTRUCTION AREAS PRIOR TO COMMENCEMENT OF WORK.

7. ALL WORK PERFORMED WITHIN THE PUBLIC RIGHT-OF-WAY (STREET OR ROADWAY ROW) SHALL CONFORM TO APPLICABLE MUNICIPAL AND / OR STATE HIGHWAY STANDARDS AS AMENDED.

8. ALL SIGNAGE AND PAVEMENT MARKINGS WITH SHALL CONFORM TO THE LATEST REVISIONS OF MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

9. ALL PROPOSED GRANITE BOUNDS AND ANY EXISTING MONUMENTATION DISTURBED DURING CONSTRUCTION SHALL BE RESET BY A PROFESSIONAL LAND SURVEYOR (PLS).

10. ALL EXISTING U.S.G.S. DISKS, HIGHWAY BOUNDS, RAILROAD MONUMENTS, PROPERTY BOUNDS, AND CITY BOUNDS SHALL BE PROTECTED AND RAISED TO FINISHED GRADE AS REQUIRED. ANY DAMAGE TO U.S.G.S. DISKS SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER AND THE U.S. GEOLOGICAL SURVEY AND SHALL BE REPAIRED AT NO COST TO THE AUTHORITY. ANY DAMAGE TO TOWN BOUNDS SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER AND MASSDOT AND SHALL BE REPAIRED AT NO COST TO THE AUTHORITY. THE CONTRACTOR SHALL INVENTORY ALL SUCH BOUNDS, DISKS, AND MONUMENTS PRIOR TO THE START OF ANY WORK.

11. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND STACKED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.

12. CONTRACTOR SHALL INSTALL APPROVED EROSION CONTROL MEASURES PRIOR TO EARTHWORK OPERATION AND MAINTAIN EROSION CONTROL MEASURES AND SEEDED EMBANKMENTS DURING CONSTRUCTION. EROSION CONTROL SHALL BE REMOVED ONLY UPON APPROVAL OF THE ENGINEER.

13. AREAS OUTSIDE THE LIMIT OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT NO EXPENSE TO THE OWNER AND NO ADDITIONAL COST TO THE PROJECT.

14. JOINTS BETWEEN NEW BITUMINOUS CONCRETE ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH HOT POURED RUBBERIZED ASPHALT SEALER AND BACKSANDED.

15. ALL AREAS DISTURBED DURING CONSTRUCTION EXCEPT PAVEMENT AND STRUCTURES SHALL RECEIVE LOAM AND SEEDING PER THE SPECIFICATIONS UNLESS OTHERWISE NOTED.

16. TREES AND SHRUBS OUTSIDE THE LIMITS OF GRADING SHALL NOT BE REMOVED, EXCEPT AS NOTED.

17. THE CONTRACTOR SHALL TAKE MEASURES NOT TO PRECLUDE WORK LABELED BO (BY OTHER) WHETHER OR NOT THAT OTHER WORK HAS BEEN COMPLETED PRIOR TO BEGINNING THIS CONTRACT.

18. EXCAVATION LIMITS SHOWN ARE APPROXIMATE. CONTRACTOR MAY EXCAVATE BEYOND LIMITS OF EXCAVATION SHOWN ON PLANS ONLY WITH APPROVAL OF THE ENGINEER. APPROVED EXCAVATION BEYOND APPROXIMATE LIMITS SHOWN WILL BE CONSIDERED A CONVENIENCE TO THE CONTRACTOR AND SHALL BE DONE AT NO ADDITIONAL COST TO THE PROJECT. WHERE EXCAVATION BEYOND APPROXIMATE LIMITS IS NOT ALLOWED DUE TO REQUIREMENTS TO AVOID ADVERSE IMPACTS TO ADJACENT INFRASTRUCTURE, WETLANDS, AND ABUTTERS, CONTRACTOR SHALL UTILIZE SUPPORT OF EXCAVATION OR OTHER APPROVED MEANS AND METHODS WHEN PERFORMING THE WORK AT NO ADDITIONAL COST TO THE CONTRACT.

19. VARIOUS LIMITS SHOWN ON THE PLANS INCLUDING BUT NOT LIMITED TO TREE CLEARING, GRADING, SAWCUTS, PAVING, AND OTHER WORK ARE APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR AND ENGINEER. ADJUSTMENTS TO THE ABOVE SHALL BE CONSIDERED FOR CONTRACTOR'S CONVENIENCE AND NO ADDITIONAL COST TO THE CONTRACT WILL BE CONSIDERED.

EXISTING CONDITIONS

1. HORIZONTAL DATUM IS REFERENCED TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM - NORTH AMERICAN DATUM OF 1988(2011).

2. VERTICAL DATUM IS REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). SOURCE CONTROL FOR THE TIE TO THE VERTICAL DATUM ARE SAME CORS STATIONS REFERRED TO IN NOTE 1.

3. SURVEY DATA SHOWN HAS BEEN PREPARED BY NITSCH ASSOCIATES, INC., 2 CENTER PLAZE, SUITE 430, BOSTON, MA 02108 (617) 338-0063 AND VANASSE HANGEN BRUSTLIN, INC., 101 WALNUT STREET, WATERTOWN, MA 02472.

4. THE SURFACE EVIDENCE OF THE UTILITIES SHOWN HAS BEEN LOCATED BY FIELD SURVEY, UNLESS NOTED OTHERWISE. THE LINEWORK REPRESENTING ALL UNDERGROUND STRUCTURES AND PIPES HAS BEEN SHOWN HEREON IN ITS APPROXIMATE LOCATION BASED ON AVAILABLE RECORD PLANS. THE SURVEYORS MAKE NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH THEY DO CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

5. THE CONTRACTOR SHALL CONFIRM EXISTING CONDITIONS AND REPORT ALL DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE ENGINEER.

UTILITIES

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATIONS OF ALL EXISTING UTILITIES, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES, WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL CONTACT "DIG SAFE" 72 HOURS PRIOR TO ANY EXCAVATION PERFORMED ON OR OFF SITE AT 1-888-344-7233 AND SHALL COORDINATE LOCATION OF NON "DIG SAFE" MEMBER UTILITIES WITHIN THE TIME FRAME SPECIFIED BY THE UTILITY OWNER.

2. THE CONTRACTOR SHALL MAKE ARRANGEMENTS AND SHALL BE RESPONSIBLE FOR PAYING ANY FEES FOR ANY POLE RELOCATION AND FOR THE ALTERATION OR ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE, FIRE ALARM, AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANY UNLESS NOTED OTHERWISE.

3. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION, SIZE, INVERTS, AND TYPES OF EXISTING PIPES AT ALL PROPOSED POINTS OF CONNECTION PRIOR TO ORDERING MATERIALS. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED IN WRITING TO THE ENGINEER FOR THE RESOLUTION OF THE CONFLICT.

4. ALL EXISTING UTILITIES SHALL BE MAINTAINED IN PLACE AND KEPT OPERATIONAL DURING CONSTRUCTION EXCEPT AS NOTED ON THE CONTRACT DRAWINGS. ANY NECESSARY DISRUPTION TO OR ABANDONMENT OF EXISTING UTILITIES SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER. MAINTENANCE OF EXISTING UTILITIES SHALL BE COMPLETED AT NO ADDITIONAL COST TO THE PROJECT.

5. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY ALL UTILITY COMPANIES AND CITIES / TOWNS THAT MAY BE AFFECTED BY ANY PORTION OF THIS CONSTRUCTION AND TO COORDINATE ALL WORK INVOLVING UTILITY COMPANIES OR CITY / TOWN FACILITIES, WHETHER THOSE FACILITIES ARE EXISTING OR PROPOSED. IT IS ALSO THE RESPONSIBILITY OF THE CONTRACTOR TO SUPPORT AND PROTECT EXISTING UTILITIES IN AND AROUND EXCAVATIONS. PROTECTION AND OR SUPPORT SHALL BE CONSIDERED INCIDENTAL WORK AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE ITEM BEING INSTALLED.

6. EXISTING UTILITIES CALLED FOR TO BE RELOCATED AS PART OF THE PROJECT SHALL BE VERIFIED WITH RESPECTIVE CONTROLLING AUTHORITY AS TO THEIR FINAL DISPOSITION.

7. ALL ABOVE GRADE STRUCTURES, POLES, TRANSFORMERS, ETC. TO BE RELOCATED SHALL BE SET IN A FINAL LOCATION TO BE APPROVED BY THE ENGINEER.

8. ALL UTILITY SURFACE CASTINGS (COVERS, GRATES, GATE BOXES, ETC.) TO REMAIN SHALL BE ADJUSTED TO THE NEW SURFACE GRADE AS REQUIRED, WHETHER OR NOT CALLED FOR ON THE PLANS.

9. THE CONTRACTOR SHALL ALTER THE MASONRY OF THE TOP SECTION OF ALL EXISTING DRAINAGE STRUCTURES AS NECESSARY FOR CHANGES IN GRADE, AND RESET ALL WATER AND DRAINAGE FRAMES, GRATES AND BOXES TO THE PROPOSED FINISH SURFACE GRADE. REQUIRED NEW MASONRY SHALL BE CLAY BRICK CONFORMING TO M4.05.2 OF THE MASSDOT HIGHWAY STANDARD SPECIFICATIONS.

10. CONTRACTOR SHALL PROTECT ALL UNDERGROUND DRAINAGE, SEWER, AND UTILITY FACILITIES FROM ALL DAMAGE DURING CONSTRUCTION. ANY DAMAGE TO THESE FACILITIES WILL BE RESTORED TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.

11. FIELD VERIFY EXISTING DRAINAGE MANHOLE AND CATCH BASIN INVERTS AND REPORT ANY DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE ENGINEER PRIOR TO START OF ANY DRAINAGE INSTALLATION.

12. ALL UTILITIES SHOWN ON PLANS SHALL BE RETAINED UNLESS OTHERWISE INDICATED.

13. UTILITY COMPANY SHALL BE RESPONSIBLE FOR PLACEMENT OF SAND BEDDING MATERIAL, CARRIER PIPE PROCUREMENT AND INSTALLATION, SERVICE CONNECTIONS AT THE MAIN AND METER, PROCUREMENT AND INSTALLATION OF THE METER, TESTING AND COMMISSIONING, AND ABANDONMENT OF THE EXISTING GAS LINE (IF APPLICABLE).

PRELIMINARY DESIGN

COMMONWEALTH OF MASSACHUSETTS
RACHEL P. LUNA
CIVIL
NO. 53331
REGISTERED PROFESSIONAL ENGINEER
11/29/2022

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

PARKING LOT DRAINAGE IMPROVEMENTS
MBTA MATTAPAN STATION, BOSTON, MA
MBTA CONTRACT No. Z94PS08

GENERAL NOTES

ISSUE	DATE	DESCRIPTION	BY	CHKD.	APP.

Vanasse Hangen Brustlin, Inc.
101 Walnut Street P.O. Box 9151
Watertown, Massachusetts 02471

PROJECT MANAGER Date

	DES. BY	DR. BY	CHK. BY	
HORIZ: N/A				PLAN NO.
VERT: N/A	TLD	TLD	RL	
DATE: NOV. 29, 2022				SHEET 02

ISSUE

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GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
CB	CB	CATCH BASIN
		CATCH BASIN CURB INLET
FP	FP	FLAG POLE
GP	GP	GAS PUMP
MB	MB	MAIL BOX
		POST SQUARE
		POST CIRCULAR
WELL	WELL	WELL
EHH	EHH	ELECTRIC HANDHOLE
		FENCE GATE POST
GG	GG	GAS GATE
		BORING HOLE (B), MONITORING WELL (MW), OR OBSERVATION WELL (OW)
		TEST PIT (TP)
		HYDRANT
		LIGHT POLE
CO.BD.		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		CLEANOUT/TRACK DRAINAGE MANHOLE/BALLAST INLET
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
MHB	MHB	MASSACHUSETTS HIGHWAY BOUND
MON		MONUMENT
SB		STONE BOUND
TB		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
TPL or GUY	TPL or GUY	TROLLEY POLE OR GUY POLE
HTP		TRANSMISSION POLE
UFB	UFB	UTILITY POLE W/ FIREBOX
UPDL	UPDL	UTILITY POLE WITH DOUBLE LIGHT
ULT	ULT	UTILITY POLE W / 1 LIGHT
UPL	UPL	UTILITY POLE
		BUSH
SIZE & TYPE		TREE
		STUMP
		SWAMP / MARSH
WG	WG	WATER GATE
PM	PM	PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
99		CONTOURS (ON-THE-GROUND SURVEY DATA)
100		
99		CONTOURS (PHOTOGRAMMETRIC DATA)
100		
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
G G		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
LP		UNDERGROUND LIQUID PROPANE MAIN
		BALANCED STONE WALL
		RETAINING WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
x	x	CHAIN LINK OR METAL FENCE
		WOOD FENCE
		EROSION CONTROL
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE (LIMIT OF GRADING)
		LIMIT OF COLD PLANE AND OVERLAY
		LIMIT OF EDGE OF PAVEMENT
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE (ROW)
		TOWN OR CITY BOUNDARY LINE
℄		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT
		FLOODPLAIN
		UNDERDRAIN
		DITCH
		FULL DEPTH HOT MIX ASPHALT

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		CENTERLINE OF STREAM
		PERMANENT EASEMENT
		LIMIT OF TREE CLEARING

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
RRSG	RRSG	RAILROAD SIGNAL
		SIGN AND POST
		SIGN AND POST (2 POSTS)
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		LOAD CENTER ASSEMBLY
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

SIGNAL AND COMMUNICATION SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
	MH	COMMUNICATION MANHOLE
	M	SIGNAL MANHOLE
	S	SIGNAL HANDHOLE
	E	ELECTRICAL MANHOLE/HANDHOLE
	PB	COMMUNICATION PULLBOX/HANDHOLE
	CO	SIGNAL AND COMMUNICATION CABLE
		SIGNAL AND COMMUNICATION CONDUIT
	E	SIGNAL POWER CABLE

RAILROAD TRACK / SIGNAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		POINT OF SWITCH - MANUAL WITH ELECTRIC LOCK
		POINT OF SWITCH - POWERED
	7	MILEPOST
RW	RW	RAILROAD REGULATORY SIGN
		RAILROAD TRACK CENTERLINE
		RAILROAD TRACK WITH BALLAST MAT
		SPLIT SWITCH DERAIL
		SLIDING BLOCK DERAIL
	1N	WAYSIDE SIGNAL
		GAS BOOSTER - LARGE
		GAS BOOSTER - SMALL

ENCVIRONMENTAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		25' RIVERFRONT AREA
		100' BUFFER ZONE
		25' RIVERFRONT AREA (ASSUMED)
		100' BUFFER ZONE (ASSUMED)

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
ONLY	ONLY	LEGEND "ONLY" - WHITE
	SL	STOP LINE
	CW	CROSSWALK
	SWEL	SOLID WHITE CENTER LINE
	SYCL	SOLID YELLOW CENTER LINE
	BWL	BROKEN WHITE LINE
	BYL	BROKEN YELLOW LINE
	DWL	DOTTED WHITE LINE
	DYL	DOTTED YELLOW LINE
	DWLEx	DOTTED WHITE LINE EXTENSION
	DYLEx	DOTTED YELLOW LINE EXTENSION
	DBWL	DOUBLE WHITE LINE
	DBYL	DOUBLE YELLOW LINE

PROPERTY ACQUISITION SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		TEMPORARY EASEMENT
		PERMANENT EASEMENT
		FEE TAKING AREA

PRELIMINARY DESIGN

COMMONWEALTH OF MASSACHUSETTS
RACHEL P. LUNA
CIVIL
NO. 53331
REGISTERED PROFESSIONAL ENGINEER
11/29/2022

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

PARKING LOT DRAINAGE IMPROVEMENTS
MBTA MATTAPAN STATION, BOSTON, MA
MBTA CONTRACT No. Z94PS08

LEGEND SHEET

ISSUE	DATE	DESCRIPTION	BY	CHKD.	APP.

Vanasse Hangen Brustlin, Inc.
101 Walnut Street P.O. Box 9151
Watertown, Massachusetts 02471

PROJECT MANAGER Date

	DES. BY	DR. BY	CHK. BY
HORIZ: N/A			
VERT: N/A	TLD	TLD	RL
DATE: NOV. 29, 2022			

PLAN NO.

SHEET 03

ISSUE

File: \\VHB.COM\GBL\PROJ\WAT-TE\14841.18 MATTAPAN PRKG DRAINAGE\CAD\EVIPLANSET\14841-18_NT&LG.DWG

RIVERBANK PLACE

N/F
COMMONWEALTH OF MASSACHUSETTS
PARCEL ID: 1800001000
DEED BOOK 47147 PAGE 236
74-1680 BLUE HILL AVE

N/F
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
PARCEL ID: 1800003000
DEED BOOK 00000 PAGE 000
BLUE HILL AVE

MDC SURFACE EASEMENT
BOOK 10032 PAGE 335

N/F
NICHOLAS FOTOPOU
PARCEL ID: 18000
DEED BOOK 19674 PAG
1672 BLUE HILL AV

N/F
COMMONWEALTH OF MASSACHUSETTS
PARCEL ID: 180
DEED BOOK 00000
BLUE HILL A

PRELIMINARY DESIGN

RACHEL P. LUNA
CIVIL
NO. 53331
REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS
11/29/2022

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

PARKING LOT DRAINAGE IMPROVEMENTS
MBTA MATTAPAN STATION, BOSTON, MA
MBTA CONTRACT No. Z94PS08

EXISTING CONDITIONS

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Vanasse Hangen Brustlin, Inc.
101 Walnut Street P.O. Box 9151
Watertown, Massachusetts 02471

PROJECT MANAGER Date

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VERT: 1" = 20'				ISSUE
DATE: Nov. 29, 2022				SHEET 04

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PLACE

"MATTAPAN, BLUE HILL AVE" SIGN

N/F
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
PARCEL ID: 1800003000
DEED BOOK 00000 PAGE 000
BLUE HILL AVE

N/F
COMMONWEALTH OF MASSACHUSETTS
PARCEL ID: 1800002000
DEED BOOK 00000 PAGE 000
BLUE HILL AVE

NEPONSET TRAIL BRIDGE

PRELIMINARY DESIGN

RACHEL P. LUNA
CIVIL
NO. 53331
REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS
11/29/2022

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

PARKING LOT DRAINAGE IMPROVEMENTS
MBTA MATTAPAN STATION, BOSTON, MA
MBTA CONTRACT No. Z94PS08

EXISTING CONDITIONS

ISSUE	DATE	DESCRIPTION	BY	CHKD.	APP.

0 10 20 40 FEET

Vanasse Hangen Brustlin, Inc.
101 Walnut Street P.O. Box 9151
Watertown, Massachusetts 02471

PROJECT MANAGER Date

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VERT: 1" = 20'			
DATE: Nov. 29, 2022			

PLAN NO.

SHEET 05

ISSUE

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RIVERBANK PLACE

RET EXISTING CURB
100' BUFFER
25' RA
RET EXISTING FENCE
SEDIMENT CONTROL BARRIER (TYP.)
PROP MILL & OVERLAY
RET EXISTING FENCE
LIMIT OF WORK (TYP.)
RET EXISTING O/H POSTS
RET EXISTING FENCE
RET EXISTING CURB
ADJUST
RET EXISTING CURB
PROP MILL & OVERLAY
PROP BIT. SAW CUT
WYE CONNECTION INV. ≈ 27.8
12" RCP
40.7' - 12" RCP
CONNECT TO EXISTING CB INV. = 28.8
PLUGGED 12" DRAIN PER CCTV INSPECTION
ADJUST
ADJUST
SLIP-LINE EXISTING PIPE BETWEEN DMH09 AND DMH10
LIMIT OF WORK (TYP.)
PROP BIT. SAW CUT
RET EXISTING FENCE
INDICATIVE LOCATION BASED ON CCTV SURVEY. CONTRACTOR TO UNBURY EXISTING DMH AND REPORT CONDITION
REMODEL
RET EXISTING FENCE
PROP BIT. SAW CUT
CONTRACTOR TO CONFIRM INVERT OF EXISTING 8" PIPE.
CONNECT TO EXISTING DMH INV. = 30.2
48.0' - 8" PVC
1.9%
1.2%
100' BUFFER
PROP CLEANOUT
REM EXISTING CONCRETE CURB
RET EXISTING FENCE
PROP INFILTRATION TRENCH
LIMIT OF WORK (TYP.)
119.8' - 12" SUBDRAIN
167.7' - 12" SUBDRAIN
AD-09A
R = 35.0
INV. IN = 31.0
INV. OUT = 31.7
SEDIMENT CONTROL BARRIER (TYP.)
PROP FULL DEPTH PAVEMENT
RET EXISTING FENCE
REM EXISTING CONCRETE CURB
PROP STONE TRENCH
35.08
35.00
34.86
34.90
35.00
36.34
36.00
35.70
35.40
35.20

PRELIMINARY DESIGN

RACHEL P. LUNA
CIVIL
NO. 53331
REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS
11/29/2022

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

PARKING LOT DRAINAGE IMPROVEMENTS
MBTA MATTAPAN STATION, BOSTON, MA
MBTA CONTRACT No. Z94PS08

CONSTRUCTION PLAN

ISSUE	DATE	DESCRIPTION	BY	CHKD.	APP.

0 10 20 40 FEET

vhb
Vanasse Hangen Brustlin, Inc.
101 Walnut Street P.O. Box 9151
Watertown, Massachusetts 02471

PROJECT MANAGER Date

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DATE: Nov 29, 2022			

PLAN NO.

SHEET 06

ISSUE

NOTE: SILT SACKS TO BE INSTALLED AT ALL STORM DRAINAGE INLETS.

"MATTAPAN, BLUE HILL AVE" SIGN

STOP SIGN

DMH14A
R = 34.1
INV. A = 29.3

ADD. ALTERNATE NO. 1

LIMIT OF WORK (TYP.)

CONTRACTOR TO LOCATE AND UNBURY DMH AND ADJUST TO SUIT PROPOSED GRADE

CONTRACTOR TO LOCATE AND UNBURY DMH AND ADJUST TO PROPOSED GRADE

PROP MILL & OVERLAY

PROP BIT. SAW CUT

RET EXISTING CURB

ADJUST

WYE CONNECTION
INV. ≈ 27.8

12" RCP

40.7' - 12" RCP

CONNECT TO EXISTING CB
INV. = 28.8

PLUGGED 12" DRAIN PER CCTV INSPECTION

SLIP-LINE EXISTING PIPE BETWEEN DMH09 AND DMH10

INDICATIVE LOCATION BASED ON CCTV SURVEY. CONTRACTOR TO UNBURY EXISTING DMH AND REPORT CONDITION

REMODEL

RET EXISTING FENCE

CONTRACTOR TO CONFIRM INVERT OF EXISTING 8" PIPE.

CONNECT TO EXISTING DMH
INV. = 30.2

48.0' - 8" PVC

119.8' - 12" SUBDRAIN

167.7' - 12" SUBDRAIN

AD-09A
R = 35.0
INV. IN = 31.0
INV. OUT = 31.7

SEDIMENT CONTROL BARRIER (TYP.)

PROP FULL DEPTH PAVEMENT

REM EXISTING CONCRETE CURB

PROP STONE TRENCH

PROP CLEANOUT

SEDIMENT CONTROL BARRIER (TYP.)

UNDERGROUND TREATMENT BMP

SEDIMENT CONTROL BARRIER (TYP.)

CB11
R = 33.3
INV. A = 29.3

PROP FULL DEPTH PAVEMENT

LIMIT OF WORK (TYP.)

RET EXISTING FENCE

PROP INFILTRATION TRENCH

ADD. ALTERNATE NO. 1

100' BUFFER (AS.)

25' RA (AS.)

100' BUFFER

25' RA

PRELIMINARY DESIGN

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CIVIL
NO. 53331
REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS
11/29/2022

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

PARKING LOT DRAINAGE IMPROVEMENTS
MBTA MATTAPAN STATION, BOSTON, MA
MBTA CONTRACT No. Z94PS08

CONSTRUCTION PLAN

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Vanasse Hangen Brustlin, Inc.
101 Walnut Street P.O. Box 9151
Watertown, Massachusetts 02471

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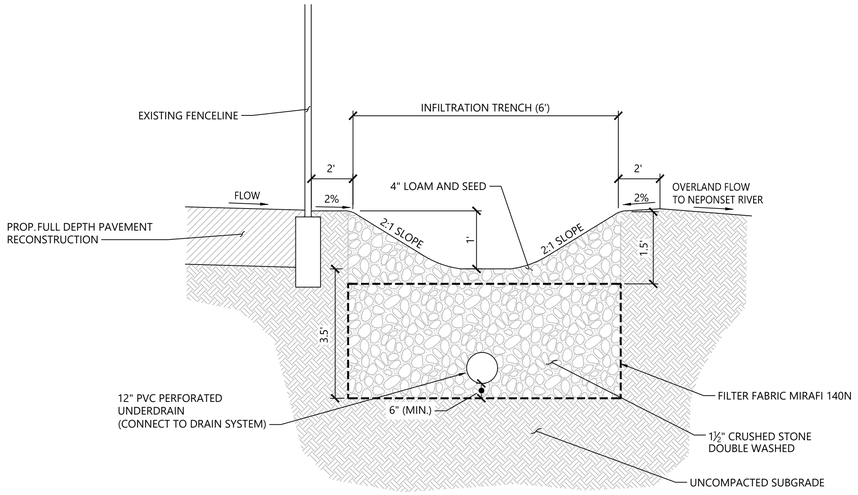
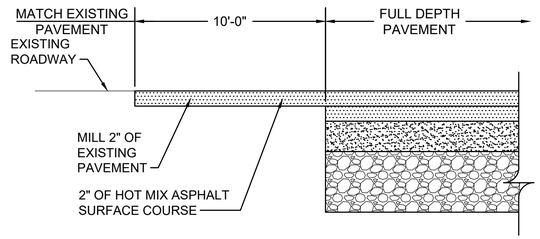


Infiltration Trench

3/20

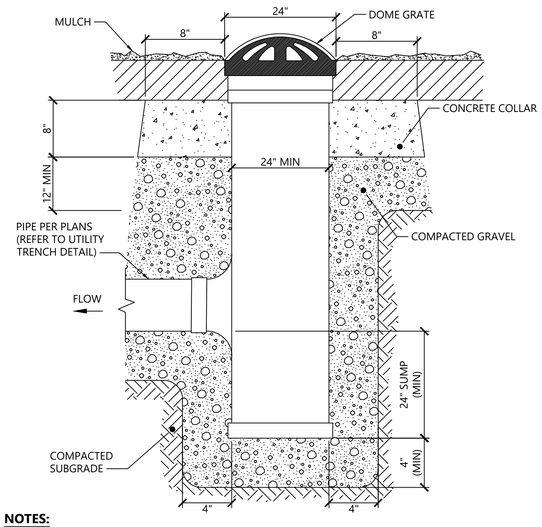
N.T.S. Source: VHB LD_198



LONGITUDINAL SECTION

FULL DEPTH PAVEMENT TRANSITION

SCALE: N.T.S.



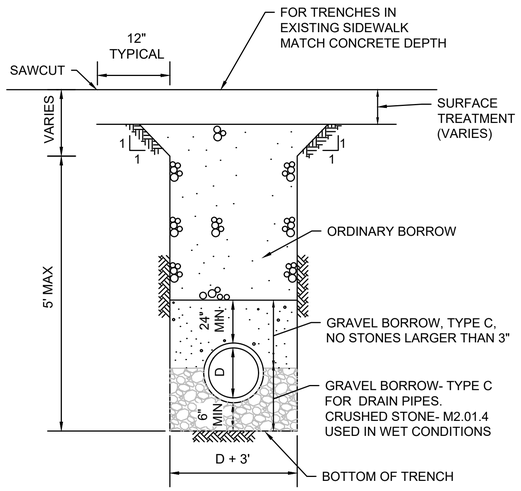
NOTES:

1. AREA DRAINS SHALL BE NYLOPLAST 24" DIAMETER DRAIN BASIN, OR APPROVED EQUAL.
2. GRATE SHALL BE NYLOPLAST 24" DOME GRATE (OR APPROVED EQUAL).

AD-09A - AREA DRAIN

12/19

N.T.S. Source: VHB LD_193



TRENCH DETAIL

SCALE: N.T.S. SOURCE: VHB DATE: AUGUST 25 2015

PRELIMINARY DESIGN

COMMONWEALTH OF MASSACHUSETTS
RACHEL P. LUNA
CIVIL
NO. 53331
REGISTERED PROFESSIONAL ENGINEER
11/29/2022

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

PARKING LOT DRAINAGE IMPROVEMENTS
MBTA MATTAPAN STATION, BOSTON, MA
MBTA CONTRACT No. Z94PS08

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PLAN NO.

SHEET 08

ISSUE

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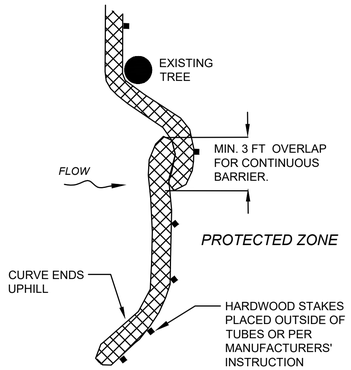


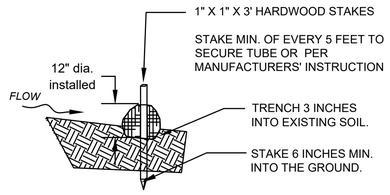
PLACE TUBE ALONG CONTOURS AND PERPENDICULAR TO FLOW.

PLACE AS CLOSE TO LIMIT OF SOIL DISTURBANCE AS POSSIBLE

ADJUST LOCATION AS REQUIRED FOR OPTIMUM EFFECTIVENESS. DO NOT INSTALL IN WATERWAYS.

PLACE STAKES AS NEEDED TO SECURE TUBES IN PLACE.

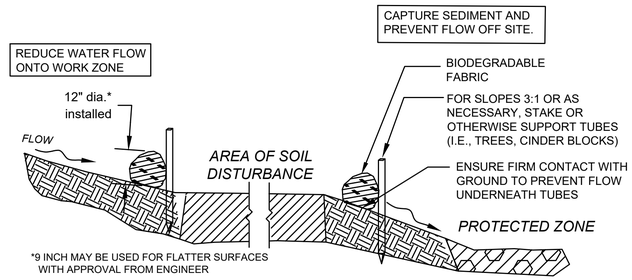
PLAN VIEW



SECTION

12 INCH STRAW WATTLE

NOT TO SCALE

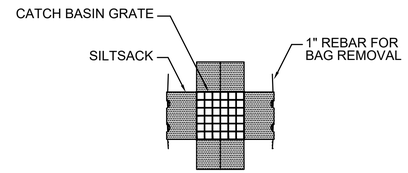


*9 INCH MAY BE USED FOR FLATTER SURFACES WITH APPROVAL FROM ENGINEER

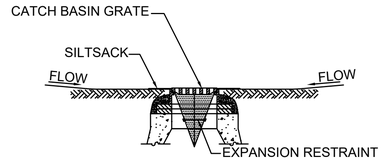
SECTION

EROSION CONTROL BARRIER

SCALE: N.T.S.



PLAN VIEW



SECTION VIEW

NOTES:

1. INSTALL SILTSACK IN ALL CATCH BASINS BEFORE COMMENCING WORK OR IN PAVED AREAS AFTER BINDER COURSE IS PLACED AND HAY BALES HAVE BEEN REMOVED.
2. GRATE TO BE PLACED OVER SILTSACK.
3. SILTSACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED. MAINTAIN UNTIL UPSTREAM AREAS HAVE BEEN PERMANENTLY STABILIZED

SILT SACK

SCALE: N.T.S. DATE: AUGUST 2008

PRELIMINARY DESIGN

COMMONWEALTH OF MASSACHUSETTS
RACHEL P. LUNA
CIVIL
NO. 53331
REGISTERED PROFESSIONAL ENGINEER
1/19/2022

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

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PLAN NO.

SHEET 09

ISSUE

Illicit Discharge Statement

Sanitary sewer and storm drainage structures remaining from previous development which are part of the redevelopment area will be removed or will be incorporated into updated sanitary sewer and separate stormwater sewer systems. The design plans submitted with this report have been designed so that the components included therein are in full compliance with current standards. No statement is made with regard to the drainage system in portions of the site not included in the redevelopment project area. The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharge.

12/1/2022

Rachel P. Luna, P.E. | Date | Massachusetts 53331